# ECTS – Information Brochure on the Bachelor / Master Degree Programme 05/2020

Department of Electrical Engineering and Information Technology

Bachelor Programme Electrical Engineering/ Information Technology

Bachelor Programme Automation Engineering/ Information Technology International

Master Programme Electrical Engineering/ Information Technology

Master Programme **Space Electronics** 

Master Programme Mechatronics



### CONTENTS

I.1	Basics about Studying	2
l.1.1 l.1.2	The academic year	2
I.2	Information on Bachelor and Master Degree programmes	5
I.2.1	What is ECTS?	5
1.2.2		5
I.2.3	Bachelor	5
I.2.4		5
I.2.5	Modules	5
I.2.6	ECTS credits	6
1.2.7	Diploma Supplement	6
I.2.8		6
I.3	The study programmes in the department of Electrical Engineering and Information Technolo	gy7
I.3.1	Contact	7
I.3.2	Module descriptions	8

### I.1 Basics about Studying

### I.1.1 The academic year

The academic year is divided into two equal semesters – the summer semester and the winter semester. Actual dates may vary according to events at the time. The dates given here serve as a guideline only. Information on the current semester length can be obtained from the Admission and Registrar's Office (Studentensekretariat) and the UAS Jena website.

Winter semester: Winter semester: Examination period: free period:	October to March February March
Summer semester: Summer semester: Examination period: free period:	April to September July to the begin of August August to the end of September
Holidays:	
Christmas holidays:	two weeks before the end of December (including Christmas Eve and New Year's Eve)
Easter:	Good Friday and Easter Monday
German Labour Day:	1 May
Ascension Day:	40 days after Easter/varied
Pentecost:	May (Whit Monday)
German Unity Day:	3 October
Reformation Day:	31 October

### Orientation for people interested in studying at the UAS Jena:

University Information Day:	April of every year
Trial study days:	April of every year
Girl's Day: Introductory days for first semester students: Orientation for secondary school classes:	March/April of every year at the beginning of the winter semester by appointment with the Advisors on Study Courses (see: Important contacts)

### I.1.2 Important addresses

Note: For current office hours, see the UAS Jena website (Internet: <u>www.eah-jena.de</u>), the current UAS Jena Study Guide or the information boards of the respective offices.

### **Department offices:**

Each Department (in German: Fachbereich) has a general administration office (in German: Sekretariat).

Business Administration:	Phone: +49 (0)3641 205-550, bw@eah-jena.de
Electrical and Information Engineering:	Phone: +49 (0)3641 205-700, et@eah-jena.de
Fundamental Sciences:	Phone: +49 (0)3641 205-500, gw@eah-jena.de
Mechanical Engineering:	Phone: +49 (0)3641 205-300, mb@eah-jena.de
Medical Engineering and Biotechnology:	Phone: +49 (0)3641 205-600, mt@eah-jena.de
SciTec (Precision-Optics-Materials-Environmer	t): Phone: +49 (0)3641 205-400 Phone: +49 (0)3641 205-350, SciTec@eah-jena.de

Social Work:		Phone: +49 (0)3641 205-800, sw@eah-jena.de
Industrial Engineering:		Phone: +49 (0)3641 205-900, wi@eah-jena.de
Student Advisory Service	(in German: Zentrale Stud Anja Jansen Bldg. 1, ground floor, roor Phone: +49 (0)3641 205 Fax: +49 (0)3641 205 E-Mail: studienberatung	n 13 (01.00.13) 5-122 5-121
Student Information Centre (your first drop-in centre for information)	(in German: Service Zentr Uwe Scharlock Bldg. 1, ground floor, roor Phone +49 (0)3641 205- Fax: +49 (0)3641 205 E-Mail: uwe.scharlock@	-230 5-231
Admission and Registrar's Office	(in German: Studentensel Beate Thieme, Andrea He Bldg. 1, ground floor, roor Phone: +49 (0)3641 205 Fax: +49 (0)3641 205 E-Mail: studentensekreta	endrich n 11 and 10 (01.00.10 and 01.00.11) 5-232 and -233 5-231
International Office:	(in German: Akademische Angelika Förster Bldg. 1, ground floor, roor Phone: +49 (0)3641 205 Fax: +49 (0)3641 205 E-Mail: auslandsamt@e	n 12 (01.00.12) 5-135 5-136
Servicepoint Master:	Elvira Babic Bldg. 1, ground floor, Rau Phone: +49 (03641) 205 Fax: +49 (03641) 205 E-Mail: master@eah-jer	5-148 5-231
Career Service:	Franziska Stang Bldg. 1 ground floor, room Phone:. +49 (03641) 205 E-Mail: career-service@	5-787
Thoska-Office:	Sabine Schubert Bldg. 1, ground floor, roor Phone: +49 (03641) 205 Fax: +49 (03641) 205 E-Mail: thoska@eah-jer	5-266 5-231
Examination offices of th	e departments:	

**Examination offices of the departments:** Each Department (in German: Fachbereich) has an examination office (in German: Prüfungsamt).

Business Administration and Mechanical Engineering:		ipfel +49 (0)3641 205-580 PA-I@eah-jena.de
Social Work:	Fax:	gmann +49 (0)3641 205-808 +49 (0) 3641 205-801 PA-II@eah-jena.de

Electrical Engineering/,	Gudrun Maetzig
Information Engineering,	Phone: +49 (0)3641 205-236
Medical Engineering and	Fax: +49 (0)3641 205-235
Biotechnology, SciTec:	E-Mail: PA-III@eah-jena.de
Industrial Engineering:	Kristina Sommerwerk Phone: +49 (0)3641 205-921 and -928 Fax: +49 (0) 3641 205-901 E-Mail: PA-IV@eah-jena.de

### Work placement offices of the departments:

Each Department (in German: Fachbereich) has a work placement office (in German: Praktikantenamt).

All engineering courses:	Dr. Sabine Karthe Phone: +49 (0)3641 205-485 Fax: +49 (0) 3641 205-451 E-Mail: sabine.karthe@eah-jena.de
Social Work:	Judith Kunze Phone: +49 (0)3641 205-805 Fax: +49 (0) 3641 205-807 E-Mail: Judith.Kunze@eah-jena.de
Business Administration:	Gabriele Bliedtner Phone: +49 (0)3641 205-566 Fax: +49 (0)3641 205-567 E-Mail: gabriele.bliedtner@eah-jena.de
Industrial Engineering:	Kristina Sommerwerk Phone: +49 (0)3641 205-921 Fax: +49 (0) 3641 205-901 E-Mail: PA-IV@eah-jena.de
Academic sports officer:	(in German: Hochschulsport) Michael Rothe Bldg. 3, 1st floor, room 11 (03.00.11) Phone: +49 (0)3641 205-254 Fax: +49 (0)3641 205-251 E-Mail: hochschulsport@eah-jena.de Web: http://hochschulsport.eah-jena.de/

Library (in German: Bibliothek):

lending service,	Bldg. 5, ground floor, room 47 (05.00.47)
enquiries, info:	Phone: +49 (0)3641 205-280 and -290
	E-Mail: bibliothek@eah-jena.de
	Internet: http://www.eah-jena.de/bib

Appointments for the Patent Information and Patent Enquiry Offices and the university archives should be made via telephone. A **free-of-charge** "**inventor guidance service**" provided by Jena patent lawyers is held on the third Tuesday of every month in the UAS Jena library. For appointments, please call: +49 (0)3641 205-273 or -275.

## I.2 Information on Bachelor and Master Degree programmes

### I.2.1 What is ECTS?

In Bologna in 1999, 29 European countries signed what is known as the "Bologna Declaration". The aim was the creation of an "European area of higher education" by 2010. To reach this goal, common academic quality standards have to be established throughout Europe. These standards primarily address

- the adoption of a two-tier system of easily readable and comparable degrees (Bachelor, Master),

- the establishment of a system of modules and credits (ECTS Credits),
- promoting the mobility of students (Diploma Supplement) as well as of teaching and research staff,
- quality assurance in study and teaching (evaluation and accreditation).

One prerequisite for the establishment of a European area of higher education is the European Credit Transfer and Accumulation System (ECTS). This European system for the crediting, transfer and accumulation of students' academic achievements is helpful, for example, when a student switches to another university or – with regard to lifelong learning – when someone starts an additional course of study at home or abroad.

The ECTS system is based on three principles:

- 1. Information (about the courses attended and outcomes achieved),
- 2. Learning Agreement (arranged between the institution concerned and the student), and
- 3. Assignment of ECTS credits (to display the student's workload).

### I.2.2 ECTS coordinators

For information about the ECTS, you may contact the Programme Coordinator (Associate Dean/ Studiendekan) or the Departmental Advisor (Studienfachberater) of your study course, or the head of the International Office.

### I.2.3 Bachelor

Bachelor degree programmes represent the basic academic course of study and culminate in a university degree that qualifies the graduate to enter a profession. A Bachelor programme lasts three to four years and is designed to enable the student to apply scientific methods in the given key study area and systematically create a basis for subsequent entry into professional life. It also equips students with non-subject-specific knowledge and capabilities. Graduating from a Bachelor degree course is a prerequisite for admission to a Master degree programme.

### I.2.4 Master

Master degree programmes are based on a previously completed course of study (e.g., Bachelor). They usually take one to two years and broaden and deepen the knowledge acquired in a Bachelor degree course. Master degree courses can be either "research-oriented" or "application-oriented", or a combination of both. Furthermore a distinction between "consecutive" (depending on a constitutive Bachelor degree course) and "non-consecutive" Master degree programmes is possible. In addition to this "qualifying" Master degree courses will also be offered at universities. They require additional professional experience (one to five years). Independent scientific work and research under supervision are the focus of a Master degree course. A Master degree is required in order to start a PhD-programme.

### I.2.5 Modules

Bachelor and Master degree programmes have a modular structure, they are unitised. The modular system refers to an organisational principle, according to which courses consist of clearly defined teaching and learning units, both in terms of content and time. Modules are the building blocks of a course or several courses of study.

A module is described in respect to quality (by way of a module description) and quantity (by way of ECTS credits). An examination is course-related and takes place at the end of the module. Students achieve specific qualifications (subject specific and non-subject specific knowledge) which combine to make up the overall qualification for a profession. In general a module takes place during the course of one semester, although in exceptional, well-grounded cases it may last for up to three semesters.

### A module may take place in any of the given forms:

In a **lecture** a lecturer teaches a specific subject. Basically it is of a theoretical nature, and a discussion with the students is rarely possible.

In **seminars** the knowledge gained in a lecture is deepened, they are usually held among small groups. Students are required to take part in a dialogue. New subject matter on particular topics can be dealt with in seminars.

In a **practice session** the theoretical knowledge imparted in the lecture is reinforced with the aid of practical assignments. Students are required to participate actively in these units.

**Laboratory practice sessions** are periods of subject-specific practical training in a lab, workshop or computer pool. Special working methods are practised under authentic working conditions.

There are various ways of concluding a module:

The most common method of completing a module is a **written examination**. The duration of the exam varies from 60 to 180 minutes. The examination questions usually relate to the content of the relevant module only and must be answered within the given amount of time.

In **oral examinations** students must answer questions on the subject matter of the given module. The duration of the exams varies but is generally shorter than a written examination.

In addition to these, there are various **alternative examinations** in the form of written tests (generally 60 minutes long), presentations, assignments, seminar/term papers or reports.

### I.2.6 ECTS credits

The competences acquired within a module (including subject-related knowledge as well as key general skills) are examined and rated in terms of both **grades (best: 1; lowest: 5)** and credit points (**ECTS credits**). ECTS credits are based on the workload, i.e. the time spent by an average student in successfully attending a module, including private study time. One ECTS credit stands for approximately 25-30 hours of work load.

Under the ECTS, 60 credits measure the work load of a full-time student in a complete academic year; accordingly, 30 credits are allocated for one semester, as a rule.

A student will get ECTS credits for any one module only after he or she has passed the examination for that module with a grade between 1 and 4 and thus proved to have achieved the required learning objectives. As grading systems vary greatly between European countries, problems of mutual recognition arise frequently. Therefore, an ECTS grading scale has been established in addition to national grades and ECTS credits. (For more information: "Ordnung zur Berechnung von ECTS-Graden an der Ernst-Abbe-Hochschule Jena")

### I.2.7 Diploma Supplement

Starting in 2005, all graduates from the UAS Jena receive a Diploma Supplement (DS) free of charge. This is a supplement to the Diploma degree certificate, in English and/or German, which provides a detailed description of the qualifications obtained during the degree programme and of the structure of the German higher education system. The DS is internationally harmonised and is aimed to facilitate the mutual recognition of qualifications across national borders.

### I.2.8 Evaluation and accreditation

Quality assurance is a mandatory constituent of the new study programmes offered by institutions of higher education. Measures include (1) internal evaluation of the teaching sessions by the students, and (2) regular appraisal of the new study programmes by external accreditation agencies and awarding of a quality seal by the accreditation council.

# I.3 The study programmes in the department of Electrical Engineering and Information Technology

## I.3.1 Contact

For any specific questions on the degree programmes at the department of Electrical Engineering and Information Technology please contact:

Academic adviser	DrIng. Oliver Reimer Phone: +49 (0)3641 205-703 E-Mail: Oliver.Reimer@eah-jena.de
Head of course AE/IEi	Prof. Dr. Alexander Richter Phone: +49 (0) 3641 205 747 E-Mail: Alexander.Richter@eah-jena.de
Head of course EE/IE Specialisation AE	Prof. Dr. Jörg Müller Phone: +49 (0)3641 205-702 E-Mail: Joerg.Mueller@eah-jena.de
Head of course EE/IE Specialisation CMT	Prof. Dr. Jürgen Kampe Phone: +49 (0)3641 205-788 E-Mail: Juergen.Kampe@eah-jena.de
Head of course EE/IE Specialisation CE	Prof. Prof. Oliver Jack Phone: +49 (0)3641 205-715 E-Mail: Oliver.Jack@eah-jena.de
Head of course SD	Prof. Dr. Frank Giesecke Phone: +49 (0)3641 205-764 E-Mail: Frank.Giesecke@eah-jena.de
Head of course SE	Prof. Dr. Burkart Voß Phone: +49 (0)3641 205-731 E-Mail: Burkart.Voß@eah-jena.de
Head of course ME	Prof. DrIng. Jörg Müller Tel.: (03641) 205-702 E-Mail: Joerg.Mueller@eah-jena.de

### 1.3.2 **Module descriptions**

In this chapter all offered modules (classified by module number) are described in detail. You can find the respective module number in the following overviews.

The first overview shows the modules of the Combined Field of Basics for all four Bachelor Courses, separately listed the modules from 4<sup>th</sup> to 7<sup>th</sup> semester for the Bachelor Programme EE/IT with it's specialisations: Automation Engineering (AE), Communication and Media Technology (CMT), Computer Engineering (CE) and the Bachelor Programme Automation Engineering/Information Technology International (AE/IEi). At the end you will find the overview of module descriptions for the Master Programmes System Design (SD) and Space Electronics (SE).

Module-No.	Module name	Module part	Semester	Programme
ET.1.101	Mathmatics 1		1	EE/IT, AE/IEi
ET.1.102	Mathmatics 2		1	EE/IT, AE/IEi
ET.1.103	Electrical Engineering 1		1	EE/IT, AE/IEi
ET.1.104.1	Computer Engineering	Basic of programming	1	EE/IT, AE/IEi
ET.1.104.2	(ET.1.104)	Algorithms and data structures	2	EE/IT, AE/IEi
ET.1.105.1	Physics		1	EE/IT, AE/IEi
ET.1.105.2	(ET.1.105)		2	EE/IT, AE/IEi
ET.1.106.1	Technical English		1	EE/IT, AE/IEi
ET.1.106.2	(ET.1.106)		2	EE/IT, AE/IEi
ET.1.202	Mathmatics 3		2	EE/IT, AE/IEi
ET.1.203	Electrical Engineering 2		2	EE/IT, AE/IEi
ET.1.201.1	Electronic Components		2	EE/IT, AE/IEi
ET.1.201.2	(ET.1.201)		3	EE/IT, AE/IEi
ET.1.301	Circuit Design		3	EE/IT
ET.1.302	Theory of Signals and Systems (ET.1.302)		3	EE/IT, AE/IEi
ET.1.303.1	Basic Measurement Techniques (ET.1.303)		3	EE/IT, AE/IEi
ET.1.304	Automatic Control		3	EE/IT, AE/IEi
ET.1.305	Digital Systems		3	EE/IT, AE/IEi
ET.1.306.1	Intercultural Communication 1 (ET.1.306)	Elective module Foreign Languages	3	AE/IEi

### <u>Combined Field of Basics for all specialisations (1<sup>st</sup> – 3<sup>rd</sup> semester, all bachelor programmes):</u>

Legend for the module code:  $\underline{\mathsf{ET}}.\underline{\mathsf{Y}}.\underline{\mathsf{XXX}}.\underline{\mathsf{Z}}$ 

ET Y = Department of EE/IT

= Module level (1= bachelor level, 2= master level)

XXX Z = basic module code

### Bachelorprogramme Automation Engineering /Information Engineering International (4th – 7th Semester):

Module-No.	Module name	Module part	Semester	Programme
ET.1.306.2	Intercultural Communication 1 (ET.1.306)	Introduction to Intercultural Communication	4	AE/IEi
ET.1.411	Digital Signal Processing		4	AE/IEi
ET.1.303.2	Basic Measurement Techniques (ET.1.303)		4	AE/IEi
ET.1.401	Microprocessor Technology		4	AE/IEi
ET.1.402.3	Analogue Circuit Design		4	AE/IEi
ET.1.403	Digital Design		4	AE/IEi
ET.1.404	Electrical Drives		4	AE/IEi
ET.1.510	Intercultural Communication 2		5	AE/IEi
ET.1.511	Modules abroad		5	AE/IEi
ET.1.501	Non-technical Elective Module	To be announced	6	AE/IEi
ET.1.606	Intercultural Communication 3		6	AE/IEi
ET.1.601	Digital Control Systems		6	AE/IEi
ET.1.406.1	Image Processing		6	AE/IEi
ET.1.410	Software Engineering		6	AE/IEi
ET.1.900	Elective Modules		6	AE/IEi
ET.1.605	Microcomputer Design		6	AE/IEi
ET.1.907	Automation Objects		6	AE/IEi
ET.1.908	Selected Sections on Analogue Circuitry		6	AE/IEi
ET.1.407.1	Introduction in Optoelectronics		6	AE/IEi
ET.1.509.2	Real Time Operating Systems		6	AE/IEi
ET.1.701	Industrial Placement		7	AE/IEi
ET.1.702	Bachelor Thesis		7	AE/IEi
ET.1.703	Colloquium		7	AE/IEi

Legend for the module code: <u>ET.Y.XXX.Z</u> ET = Department of EE/IT Y = Module level (1= bachelor level, 2= master level) XXX = basic module code Z = Module part (necessary for modules with 2

### Module-No. Module name Module part Semester Programme EE/IE – Sp.: AE ET.1.411 **Digital Signal Processing** 4 **Basic Measurement Techniques** ET.1.303.2 4 EE/IE - Sp.: AE (ET.1.303) EE/IE - Sp.: AE ET.1.401 Microprocessor Technology 4 ET.1.403 EE/IE - Sp.: AE **Digital Design** 4 ET.1.404 EE/IE - Sp.: AE 4 **Electrical Drives** ET.1.402.1 EE/IE - Sp.: AE 4 Analogue Circuit Design (ET.1.402) EE/IE - Sp.: AE ET.1.402.2 5 ET.1.405.1 EE/IE - Sp.: AE Control Systems Control Systems/ PLC 4 (ET.1.405) EE/IE - Sp.: AE ET.1.405.2 Motion Control 5 ET.1.502 Modelling/Simulation 5 EE/IE - Sp.: AE ET.1.503 EE/IE - Sp.: AE Automation Systems 5 EE/IE - Sp.: AE ET.1.504.1 5 Fieldbus **Process Communication** ET.1.504.2 (ET.1.504) EE/IE - Sp.: AE Local Area Networks 6 ET.1.501 EE/IE - Sp.: AE Non-Technical Elective Module 5/6 ET.1.501.1 **Business Administration** EE/IE - Sp.: AE 5 Management of ET.1.501.2 EE/IE - Sp.: AE 6 Projects EE/IE – Sp.: AE ET.1.501.3 Working Environment in Future 5/6 EE/IE - Sp.: AE ET.1.501.4 Planning Game Strat Up 5/6 EE/IE – Sp.: AE E-Business Innovation Startup 5/6 ET.1.501.5 Founding EE/IE – Sp.: AE GM, Businessplaning I und II 5/6 ET.1.501.6 EE/IE – Sp.: AE ET.1.501.7 Innovationmanagement 5/6 Image Processing/Image ET.1.406.1 EE/IE - Sp.: AE 6 Image Processing Analysis (ET.1.406) ET.1.407 EE/IE - Sp.: AE **Optoelectronics** 6 ET.1.601 EE/IE - Sp.: AE **Digital Control Systems** 6 ET.1.900 EE/IE - Sp.: AE **Elective Modules** 5/6 ET.1.901 Electromagnetic Compatibility EE/IE - Sp.: AE 5/6 ET.1.902 Power Electronics EE/IE - Sp.: AE 5/6 ET.1.903 Sensor Technology EE/IE - Sp.: AE 5/6 ET.1.904 Integrated Circuit Design EE/IE - Sp.: AE 5/6 Process Measurement ET.1.905 EE/IE - Sp.: AE 5/6 Technology ET.1.907 EE/IE - Sp.: AE Automation Objects 5/6 Selected Sections on Analogue EE/IE - Sp.: AE ET.1.908 5/6 Circuitry Industrial Placement EE/IE - Sp.: AE 7 ET.1.701 **Bachelor Thesis** EE/IE - Sp.: AE ET.1.702 7 EE/IE - Sp.: AE Colloquium ET.1.703 7

## Bachelorprogramme Electrical Engineering /Information Engineering (4th – 7th Semester) - Specialisation Automation Engineering -

### Legend for the module code: ET.Y.XXX.Z

ET = Department of EE/IT

XXX = basic module code

Y = Module level (1= bachelor level, 2= master level)

Module-No.	Module name	Module part	Semester	Programme
ET.1.411	Digital Signal Processing		4	EE/IE – Sp.: CMT
ET.1.303.2	Basic Measurement Techniques (ET.1.303)		4	EE/IE – Sp.: CMT
ET.1.401	Microprocessor Technology		4	EE/IE – Sp.: CMT
ET.1.407	Optoelectronics		4	EE/IE – Sp.: CMT
ET.1.408	Introduction in Communication Engineering		4	EE/IE – Sp.: CMT
ET.1.402.1	Analogue Circuit Design		4	EE/IE – Sp.: CMT
ET.1.402.2	(ET.1.402)		5	EE/IE – Sp.: CMT
ET.1.406.1	Image Processing/Image	Image Processing	4	EE/IE – Sp.: CMT
ET.1.406.2	Analysis (ET.1.406)	Image Analysis	5	EE/IE – Sp.: CMT
ET.1.507	Communication Networks		5	EE/IE – Sp.: CMT
ET.1.505	Computer Graphics		5	EE/IE – Sp.: CMT
ET.1.506.1	Radio Frequency Technique		5	EE/IE – Sp.: CMT
ET.1.506.2	(ET.1.506)		6	EE/IE – Sp.: CMT
ET.1.501	Non-Technical Elective Module		5/6	EE/IE – Sp.: CMT
ET.1.501.1	Business Admin.		5	EE/IE – Sp.: CMT
ET.1.501.2	Management of Projects		6	EE/IE – Sp.: CMT
ET.1.501.3	Working Environment in Future		5/6	EE/IE – Sp.: CMT
ET.1.501.4	Planning Game Strat Up		5/6	EE/IE – Sp.: CMT
ET.1.501.5	E-Business Innovation Startup Founding		5/6	EE/IE – Sp.: CMT
ET.1.501.6	GM, Businessplaning I und II		5/6	EE/IE – Sp.: CMT
ET.1.501.7	Innovationmanagement		5/6	EE/IE – Sp.: CMT
ET.1.602	Transmission Technique		6	EE/IE – Sp.: CMT
ET.1.603	Audio Engineering		6	EE/IE – Sp.: CMT
ET.1.604	Video Engineering		6	EE/IE – Sp.: CMT
ET.1.900	Elective Modules		5/6	EE/IE – Sp.: CMT
ET.1.901	Electromagnetic Compatibility		5/6	EE/IE – Sp.: CMT
ET.1.904	Integrated Circuit Design		5/6	EE/IE – Sp.: CMT
ET.1.906	Electronic Design		5/6	EE/IE – Sp.: CMT
ET.1.908	Selected Sections on Analogue Circuitry		5/6	EE/IE – Sp.: CMT
ET.1.909	Filter Design		5/6	EE/IE – Sp.: CMT
ET.1.910	Hardware Modelling		5/6	EE/IE – Sp.: CMT
ET.1.911	Web Design		5/6	EE/IE – Sp.: CMT
ET.1.403.1	Digital Design (Introduction)		5/6	EE/IE – Sp.: CMT
ET.1.912	Signal Processors		5/6	EE/IE – Sp.: CMT
ET.1.913	Multi-Med. Distributed Systems		5/6	EE/IE – Sp.: CMT
ET.1.701	Industrial Placement		7	EE/IE – Sp.: CMT
ET.1.702	Bachelor Thesis		7	EE/IE – Sp.: CMT
ET.1.703	Colloquium		7	EE/IE – Sp.: CMT

# Bachelorprogramme Electrical Engineering /Information Engineering (4th – 7th Semester) - Specialisation Communication and Media Technology-

 Legend for the module code: ET.Y.XXX.Z

 ET
 = Department of EE/IT

 Y
 = Module level (1= bachelor level, 2= master level)

 XXX
 = basic module code

 Z
 = Module part (necessary for modules with 2 semester duration, 1 = first part, 2 = second part)

Module-No.	Module name	Module part	Semester	Programme
ET.1.302.2	Theory of Signals and Systems (ET.1.302)		4	EE/IE – Sp.: CE
ET.1.303.2	Basic Measurement Techniques (ET.1.303)		4	EE/IE – Sp.: CE
ET.1.401	Microprocessor Technology		4	EE/IE – Sp.: CE
ET.1.403	Digital Design		4	EE/IE – Sp.: CE
ET.1.409	Datenbase		4	EE/IE – Sp.: CE
ET.1.410	Software-Engineering		4	EE/IE – Sp.: CE
ET.1.402.1	Analogue Circuit Design		4	EE/IE – Sp.: CE
ET.1.402.2	(ET.1.402)		5	EE/IE – Sp.: CE
ET.1.501	Non-Technical Elective Module		5/6	EE/IE – Sp.: CE
ET.1.501.1	Business Admin.		5	EE/IE – Sp.: CE
ET.1.501.2	Management of Projects		6	EE/IE – Sp.: CE
ET.1.501.3	Working Environment in Future		5/6	EE/IE – Sp.: CE
ET.1.501.4	Planning Game Strat Up		5/6	EE/IE – Sp.: CE
ET.1.501.5	E-Business Innovation Startup Founding		5/6	EE/IE – Sp.: CE
ET.1.501.6	GM, Businessplaning I und II		5/6	EE/IE – Sp.: CE
ET.1.501.7	Innovationmanagement		5/6	EE/IE – Sp.: CE
ET.1.508	Mobile Computing		5	EE/IE – Sp.: CE
ET.1.505	Computer Graphics		5	EE/IE – Sp.: CE
ET.1.504.1	Process Communication	Fieldbus	5	EE/IE – Sp.: CE
ET.1.504.2	(ET.1.504)	LAN	6	EE/IE – Sp.: CE
ET.1.509.1		Operating Systems	5	EE/IE – Sp.: CE
ET.1.509.2	Operating Systems     (ET.1.509)	Real-Time Operating Systems	6	EE/IE – Sp.: CE
ET.1.406.1	Image Processing		6	EE/IE – Sp.: CE
ET.1.605	Micro Computer Design		6	EE/IE – Sp.: CE
ET.1.900	Elective Modules		5/6	EE/IE – Sp.: CE
ET.1.901	Electromagnetic Compatibility		5/6	EE/IE – Sp.: CE
ET.1.904	Integrated Circuit Design		5/6	EE/IE – Sp.: CE
ET.1.906	Electronic Design		5/6	EE/IE – Sp.: CE
ET.1.908	Selected Sections on Analogue Circuitry		5/6	EE/IE – Sp.: CE
ET.1.909	Filter Design		5/6	EE/IE – Sp.: CE
ET.1.912	Signal Processors		5/6	EE/IE – Sp.: CE
ET.1.407.1	Optoelectronics (Introduction)		5/6	EE/IE – Sp.: CE
ET.1.601.1	Digital Control Systems (Introduction)		5/6	EE/IE – Sp.: CE
ET.1.701	Industrial Placement		7	EE/IE – Sp.: CE
ET.1.702	Bachelor Thesis		7	EE/IE – Sp.: CE
ET.1.703	Colloquium		7	EE/IE – Sp.: CE

### Bachelor programme Electrical Engineering /Information Engineering (4th – 7th Semester) - Specialisation Computer Engineering -

Legend for the module code: <u>ET.Y.XXX.Z</u> ET = Department of EE/IT Y = Module level (1= bachelor level, 2= master level) XXX = basic module code

XXX Z

### Master programme Electrical Engineering /Information Engineering

Module- No.	Module name	Modu	le part		Semester	Programme
ET.2.106	Numerical Mathematics / Optimization			1	Ma EE/IE	
ET.2.200	Design of Electronic Systems			2	Ma EE/IE	
ET.2.202	Electromagnetic Fields			2	Ma EE/IE	
ET.2.209	Technical elective modules*)				1/2	Ma EE/IE
ET.2.110	Nontechnical elective module**)				1	Ma EE/IE
ET.2.112		Indust	rial Prop	erty	1	Ma EE/IE
ET.2.113		Englis Purpos	h for S ses	Specific	1	Ma EE/IE
ET.2.114			ess istration r Engine		1	Ma EE/IE
ET.2.209	Technical elective modules:		nked Pro MT, CE			
ET.2.224	Intelligent Systems	x		x	2	Ma EE/IE
ET.2.211	Advanced Control Systems	х			2	Ma EE/IE
ET.2.120	Optimal Control	х			1	Ma EE/IE
ET.2.217	Technical Optics	х	x		1/2	Ma EE/IE
ET.2.215	Information Theory, Coding and Data Security		x		1/2	Ma EE/IE
ET.2.232	Augmented Reality/Virtual Reality		x	х	1/2	Ma EE/IE
ET.2.102	Softwareengineering		x	х	1/2	Ma EE/IE
ET.2.101	Theoretical Information Science			х	1/2	Ma EE/IE
ET.2.103	Digital Signal Processing	х	x	х	1	Ma EE/IE
ET.2.230	Processor Design			х	2	Ma EE/IE
ET.2.231	Signal Integrity		x		2	Ma EE/IE
ET.2.212	Embedded Systems	х	x	х	1/2	Ma EE/IE
ET.2.107	Servo Drive Systems and Components	х			1/2	Ma EE/IE
ET.2.220	Optoelectronics 2	х			2	Ma EE/IE
ET.2.218	Optical and optoelectronic sensors	х			2	Ma EE/IE
ET.2.221	Integration of mixed-signal circuits		х		2	Ma EE/IE
ET.2.219	Laser Technics	х	x		2	Ma EE/IE
ET.2.104	Reliability Theory	х	х	х	1	Ma EE/IE
ET.2.105	Analogue Design		х		1/2	Ma EE/IE
ET.2.300	Complex Lab Session				2/3	Ma ET/IT
ET.2.301	Master Thesis				3	Ma ET/IT
ET.2.302	Colloquium				3	Ma ET/IT

 Legend for the module code: ET.Y.XXX.Z

 ET
 = Department of EE/IT

 Y
 = Module level (1= bachelor level, 2= master level)

 XXX
 = basic module code

 Z
 = Module part (necessary for modules with 2 semester duration, 1 = first part, 2 = second part)

## Master programme Space Engineering

Module- No.	Module name	Module part	Semester	Programme
ET.2.103	Digital Signal Processing		1	SE
ET.2.104	Reliability Theory		1	SE
ET.2.120	Model Based Control Systems		1	SE
ET.2.121	Design of spaceborne electronics		1	SE
ET.2.122	Space Travel Systems		1	SE
ET.2.110	Nontechnical elective modules		1 / 2	SE
ET.2.112	Industrial Property		1	SE
ET.2.113	English for Specific Purposes		1	SE
ET.2.114	Business Administration for Master Engineers		1	SE
ET.2.200	Numerical Mathematics/Optimization		1	SE
ET.2.201	Satellite communication		2	SE
ET.2.202	Design of Electronic Systems		2	SE
ET.2.209	Technical elective modules		1 / 2	SE
ET.2.212	Embedded Systems		2	SE
ET.2.214	Actuators		2	SE
ET.2.218	Optoelectronics 2		2	SE
ET.2.220	Optical and optoelectronic sensors		2	SE
ET.2.224	Intelligent Systems		2	SE
ET.2.230	Processor Design		2	SE
ET.2.231	Signal Integrity		2	SE
ET.2.300	Complex Lab Session		2/3	SE
ET.2.301	Master Thesis		3	SE
ET.2.302	Colloquium		3	SE

Legend for the module code: <u>ET.Y.XXX.Z</u> ET = Department of EE/IT Y = Module level (1= bachelor level, 2= master level) XXX = basic module code Z = Module part (necessary for modules with 2

Module- No.	Module name	Module part	Semester	Programme
ME.2.102	Mechatronics		1.	ME
ME.2.105	Pattern Recognition		1.	ME
ET.2.120	Optimal Control and Regulate		1.	ME
ET.2.211	Complex Controls		2.	ME
ET.2.200	Numerical Mathematics / Optimization		2.	ME
		Actuators		ME
ME.2.203	00	Simulation of Electromechanical Systems	2.	
ME.2.109	Mechatronics Project		2./3.	ME
ME.2.107	Nontechnical elective module		1.	ME
ME.2.108	Technical elective modules		1./2.	ME
ET.2.112		Industrial Property	1.	ME
ET.2.113	Nontechnical elective module	English for Specific Purposes	1.	ME
ET.2.114		Business Administration for Master Engineers	1.	ME
ME.2.108	Technical elective modules			ME
ME.2.206	Experimental modal analysis		variabel	ME
ET.2.104	Reliability Theory		variabel	ME
ET.2.220	Optical and Optoelectronical Sensors		variabel	ME
ET.2.221	Integrated mixed signal circuits		variabel	ME
ET.2.224	Intelligent systems		variabel	ME
ET.2.231	signal integrity		variabel	ME
ET.2.232	Augmented Reality/Virtual Reality		variabel	ME
ET.2.212	Embedded Systems		variabel	ME
ET.2.202	Design of Electronic Systems		variabel	ME
ME.2.301	Masterarbeit		3.	ME
ME.2.302	Kolloquium		3.	ME

 Legend for the module code: ET.Y.XXX.Z

 ET
 = Department of EE/IT

 Y
 = Module level (1= bachelor level, 2= master level)

 XXX
 = basic module code

 Z
 = Module part (necessary for modules with 2 semester duration, 1 = first part, 2 = second part)

Module number	ET.1.101
Module name	Mathematics 1
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba), ATITi (Ba)
Module coordinator	Prof. Dr. Elizabeth Ribe
Compulsory/ optional/ electiv	Compulsory
Learning objectives	After successful completion of this module, students are capable of - solving equations and inequations (with fractions, powers, roots, absolute values, logarithms, summations and products) using elementary algebra rules.
	- specifying the solution set of equations and inequations as intervals or sets.
	<ul> <li>performing basic operations on vectors.</li> <li>determine characteristics of vectors (magnitude, linear independence, parallelism, etc.).</li> </ul>
	<ul> <li>calculate vector products (dot product, cross product, scalar triple product).</li> <li>using vector products in order to determine characteristics of vectors (angle between vectors, parallelism, linear independence, etc.).</li> <li>setting up various forms of equations for planes and lines.</li> <li>examining the positions of points, lines, and planes to one another.</li> </ul>
	<ul> <li>performing basic operations on matrices.</li> <li>determining various characteristics of matrices (dimensions, type, rank, determinant, invertibility, etc.).</li> <li>determining all solutions of a linear system of equations using Gaussian</li> </ul>
	<ul> <li>determining all solutions of a linear system of equations using Gaussian</li> <li>elimination.</li> <li>determining all of a matrix's eigenvalues and eigenvectors.</li> <li>switching between the rectangular, polar, and exponential forms of</li> </ul>
	complex numbers. - identifying various characteristics of complex numbers (magnitude,
	argument, imaginary part, real part, complex conjugate). - performing calculations on complex numbers involving addition,
	<ul><li>multiplication, division, powers, and roots.</li><li>representing complex numbers in the Cartesian complex plane and Polar complex plane.</li></ul>
Module content	<ul> <li>Elemental Algebra</li> <li>Vectors in the 2- and 3 dimensions</li> <li>Linear equations</li> </ul>
	- Matrices - Determinants and eigenvalue problem
Course type	2L - 2E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	Exercises with solutions, worksheets
Recommended	- Papula: Mathematik für Ingenieure Bd. 1-3
literature Method(s) of instruction/	- Papula , Mathematische Formelsammlung Lecture / Exercise
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/ Winter	winter term
Term	1st term
Recommended	Entrance qualification for Universities of Applied Sciences
requirements	
Assessment	exam 90 min
Assessment modalities ECTS credits	PL – exam during audit period(graded) 6
Workload	180h of total work load, thereof
	60 h presence time
	120 h self study
	45 h lectures
	45 Exercises
	30 h exam preperation
Usability of this module	Mathematics 3 Numerical Mathematics / Optimization
Time	According time table
Duration of module	1 term

Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.102
Module name	Mathematics 2
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba), ATITi (Ba)
Module coordinator	Prof. Dr. Henning Kempka
Compulsory/ optional/	Compulsory
electiv	Compusory
Learning objectives	Confidence in dealing with methods of differential calculus and integration in one variable to solve practical problems. After succesfull participation at the module Mathematik 2 the students are able to apply the methods which are taught in the areas which are content of the module. Further, they posess the Abbility to successfully apply the mathematical procedures on physical and engineering problems.
Module content	<ul> <li>Sequences and limits</li> <li>Series and Potential series</li> <li>Elementary Functions</li> <li>Terms; general properties of functions of one variable</li> <li>Exponential-, Logarithm- and trigonometric functions</li> <li>Polynomials and rational functions</li> <li>Onedimensional differential calculus</li> <li>Continuity of functions</li> <li>Derivative and its properties, derivation rules</li> <li>Applications of differential calculus (Taylor's formula, limits on the Bernoulli de l'Hospital, Newton's method)</li> <li>Integral Calculus</li> <li>Definite and indefinite integral, fundamental theorem of differential and integral calculus</li> <li>Integration rules; applications of the definite integral</li> <li>Improper integral and the Gamma function</li> </ul>
Course type	4L - 2E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	Exercises with solutions, worksheets
Recommended	- Papula, Mathematik für Ingenieure und Naturwissenschaftler, Bd.1-3
literature	- Papula , Mathematische Formelsammlung - Bartsch , Mathematische Formeln
Method(s) of	Lecture, supplemented by exercises
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	1st term
Recommended	Entrance qualification for Universities of Applied Sciences
requirements	
Assessment	exam 120 min
Assessment modalities ECTS credits	PL – exam during audit period(graded) 6
Workload	180h of total work load, thereof
	90h of contact hours and 90h of self-study, consisting of: 70 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 20 h exam preparation
Usability of this module	Following modules: Mathematics 3
	Numerical Mathematics / Optimization
	Stochastics
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.103
Module name	Electrical Engineering 1
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba), ATITi (Ba)
Module coordinator	Prof. DrIng. Thomas Reuter
Compulsory/ optional/ electiv	Compulsory
Learning objectives	The student should learn the fundamentals of Electrical Engineering especially direct current technique, as well as basic properties and
	characteristics of electrical and magnetic fields in different media.
Module content	- Base items of Electrical Engineering, basic circuit, branched and no
	branched electrical circuit, active and passive two terminal network
	<ul> <li>Voltage and power source, energy and power balance</li> </ul>
	<ul> <li>calculation procedure of direct current networks</li> </ul>
	- characterisation and calculation of electrical and magnetic fields, transients
	by switching operations
Course type	3L - 2E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	exercises, e-learning
Recommended	Führer u.a.: Grundlagen ET 1 + 2
literature	Weißgerber: Elektrotechnik für Ingenieure Bd. 1 – 3
	Vömel, Zastrow: Aufgabensammlung ET 1+2
Method(s) of	Lecture: work on the blackboard, tutorial exercises
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	1st term
Compulsory	none
requirements	
Recommended	Entrance qualification for Universities of Applied Sciences
requirements	
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	6
Workload	180h of total work load, thereof
	75h of contact hours and
	105h of self-study, consisting of:
	90 h lecture (preparation and rework)
	0 h practical training (preparation and evaluation)
	15 h exam preparation
Usability of this module	Requirement for Electrical Engineering 2
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German
Language	German

Induction         Entries           Sub module         Computer Science Basics           Department         Electrical Engineering and Information Technology           Degree program         ET/IT (Ba), ATITI (Ba)           Module continator         Prof. DrIng. Oliver Jack           Computery/ optional/ electiv         Computery optional/ electiv           Learning objectives         At the end of the module students are able: - to understand algorithms and basic data structures - to identify recursive algorithms           - to identify recursive algorithms         - to understand structured programming paradigm - to apply refinement or developing procedural programs in the programming language C           Module content         Information. message, data, problem - algorithm - program, imperative programming constructs, structurered programming, program semantics: control-flow diagram, basic data structures: strings and arrays, abstract data types, functionsand procedures: call-by-value and call-by-reference, recursion           Course type         2L - 2E - 05 - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture stides, examples of solutions           Recommended         Joachim Goll und Cornelia Heinisch. Java als erste Programmiersprache: literature           Verdag, Berlin, 7. Autlage, 2013.         Guido Krüger, Handbuch der Java Programmierung. O'Reilly Verlag, Köin, 8. Auflage, 2014.           Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurg Pro	Module number	ET.1.104.1
Sub module         Computer Science Basics           Department         Electrical Engineering and Information Technology           Degree program         ET/IT (Ba), ATTI (Ba)           Module coordinator         Prof. DrIng. Oliver Jack           Computsory optional/ electiv         Computsory           Learning objectives         At the end of the module students are able: - to understand algorithms and basic data structures - to remember the imperative programming paradigm - to identify recursive algorithms           - to understand structured programming porgrams in the programming language C         Importance           Module content         Information, message, data, problem - algorithm - program, imperative programming constructs, structurered programming, program semantics: control-flow diagram, basic data structures: strings and arrays, abstract data types, functionsand procedures: call-by-reference, recursion           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture sites, examples of solutions           Recommended         Joachim Goll und Comelia Heinisch. Java als erste Programmiersprache: literature           Ein professionelle Einsteg in Java 7 Galieo Press, Bonn, 4. Auflage, 2014.           Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jam Wiesenberger, Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014.           Instruction/ media being used         Level category		
Department         Electrical Engineering and Information Technology           Degree program         ET/IT (Ba), ATITi (Ba)           Module coordinator         Prof. DrIng, Oliver Jack           Compulsory/ optional/ electiv         Compulsory           Learning objectives         At the end of the module students are able: - to understand algorithms and basic data structures - to understand algorithms and basic data structures - to understand structured programming paradigm - to apply relinement for developing procedural programs in the programming language C           Module content         Information, message, data, problem - algorithm - program, imperative programming constructs, structurered programming, program semantics: control-flow diagram, basic data structures: strings and arrays, abstract data types, functionsand procedures: call-by-value and call-by-reference, recursion           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture sildes, examples of solutions         Recommended           Idachim Goli und Corneila Helmisch. Java als erste Programmiersprache: Ein professioneller Einstieg in die Objektorientierung mit Java.Springer Verlag, Berlin, 7. Auflage, 2014.           Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2014.         Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2014.           Level category         1         (Bachelor=1, Master=2)           Summer/ Winter         winter term           Level,		
Degree program         ET/IT (Ba), ATITi (Ba)           Module coordinator         Prof. DrIng. Oliver Jack           Compulsory         Compulsory           electiv         At the end of the module students are able: - to understand algorithms and basic data structures - to inderstand structures programming paradigm - to identify recursive algorithms           - to understand structured programming - to understand structured programming - to apply refinement for developing procedural programs in the programming constructs, structurered programming, program semantics: control-flow diagram, basic data structures: strings and arrays, abstract data types, functionsand procedures: call-by-value and call-by-reference, recursion           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture slides, examples of solutions           Recommended         Joachim Gol und Cornelia Heinisch. Java als erste Programmirersprache: literature           Uido Krüger-Alandbuch der Java Programmierung. O'Reilly Verlag, Köln, 8. Auflage, 2014.           Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014.           Method(s) of instruction/ media being used         Iccture, exercise course at the PC-Lab           Summer/ Winter         Winter term           Assessment         Item paper           Assessment         1 (Bachelor=1, Master=2)           Summer/ Winter </td <td></td> <td></td>		
Module coordinator         Prof. DrIng. Oliver Jack           Compulsory/ optional/ leativ         Compulsory         At the end of the module students are able: - to understand algorithms and basic data structures - to understand syntax and semantics of imperative programs - to understand structure forgramming           Module content         Information. message, data, problem - algorithm - program, imperative programming language C           Module content         Information. message, data, problem - algorithm - program, imperative programming constructs, structurered programming, program semantics: control-flow diagram, basic data structures: strings and arrays, abstract data types, functionsand procedures: call-by-value and call-by-reference, recursion           Recommended         Joachim Goll und Cornelia Heinisch. Java als erste Programmiersprache: Ein professioneller Einstig in die Objektorientierung mit Java. Springer Verlag, Berlin, 7. Auflage, 2013.           Guide Krüger-Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8. Auflage, 2014.           Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1. Carl Hanser Verlag, München, 7. Auflage, 2014.           Method(s) of Instruction/ media being used         I (Bachelor=1, Master=2)           Level/ category         1 (Bachelor=1, Master=2)           Summer/ Winter         Vinter term           Assessment modalities         9 (for the total modul)           Workload         135 hof total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture, preparatit		
Compulsory/ optional/ electiv         Compulsory           Learning objectives         At the end of the module students are able: - to understand algorithms and basic data structures - to remember the imperative programming paradigm - to identify recursive algorithms           - to understand syntax and semantics of imperative programs - to understand structured programming - to apply refinement for developing procedural program, imperative programming constructs, structurered programming, program semantics: control-flow diagram, basic data structures: strings and arrays, abstract data types, functions and procedures: call-by-value and call-by-reference, recursion           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture sides, examples of solutions         Economeinded           literature         Joachim Goll und Comelia Heinisch. Java als erste Programmiersprache: Ein professioneller Einstieg in die Objektorientierung mit Java.Springer Verlag, Berlin, 7. Auflage, 2013. Guido Krüger.Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8. Auflage, 2014. Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, Minchen, 7. Auflage, 2014.           Method(s) of Instruction/ media being used         Lever (caegory         1. (Bachelor=1, Master=2)           Summer/ Winter         Su- ungraded course work during the lecture period         Further Information           The students have to do a software programming task.         ECTS credits         9 (for the total modu)           Worklo		
electiv         Interview           Learning objectives         At the end of the module students are able: - to understand algorithms and basic data structures - to identify recursive algorithms           - to identify recursive algorithms           - to understand syntax and semantics of imperative programs - to understand structure forgramming - to apply refinement for developing procedural programs in the programming constructs, structurered programming, program semantics: control-flow diagram, basic data structures: strings and arrays, abstract data types, functionsand procedures: call-by-value and call-by-reference, recursion           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture sildes, examples of solutions           Recommended         Joachim GOI und Cornelia Heinisch. Java als erste Programmiersprache: Ein professioneller Einstieg in die Objektorientierung mit Java. Springer Verlag, Berlin, 7. Auflage, 2013. Guido Krüger, Handbuch der Java Programmierung. O Reilly Verlag, Köln, 8. Auflage, 2014. Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014. Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.           Method(s) of Instructon/ media being used         Iecture, exercise course at the PC-Lab           Level/ category         1. (Bachelor=1, Master=2)           Summer/ Winter         Summer/ Winter           Term         1. term           Compulsory         none <tr< td=""><td></td><td><u> </u></td></tr<>		<u> </u>
Learning objectives       At the end of the module students are able: - to understand algorithms and basic data structures - to identify recursive algorithms - to identify recursive algorithms - to understand syntax and semantics of imperative programs - to understand syntax and semantics of imperative programs - to apply refinement for developing procedural programs in the programming constructs, structureed programming, program semantics: control-flow diagram, basic data structures. strings and arrays, abstract data types, functionsand procedures: call-by-value and call-by-reference, recursion.         Course type       2L - 2E - 0S - 0P       (Lecture, Exercises, Seminar, practical course)         Learning Material       Lecture sides, examples of solutions         Recommended       Joachim Goll und Cornelia Heinisch. Java als erste Programminesprache: Ein professioneller Einstieg in die Objektorientierung mit Java. Springer Verlag, Berlin, 7. Auflage, 2013. Guido Krüger Handbuch der Java Programmiersung. O'Reilly Verlag, Köln, 8. Auflage, 2014. Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmiern in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014. Bernhard Steppan. Einstig in Java 7.Galileo Press, Bonn, 4. Auflage, 2011. I ecture, exercise course at the PC-Lab instruction/ media being used Level (rategory 1 (Bachelor=1, Master=2) Summer/ Winter winter term Term T. Imm Compulsory none requirements Assessment modalities S.L - ungraded course work during the lecture period Further Information The students have to do a software programming task.		Comparenty
<ul> <li>- to understand algorithms and basic data structures         <ul> <li>- to remember the imperative programming paradigm</li> <li>- to identify recursive algorithms</li> <li>- to understand structured programming</li> <li>- to understand structured programming</li> <li>- to apply refinement for developing procedural programs in the programming constructs, structurered programming, program semantics: control-flow diagram, basic data structures: strings and arrays, abstract data types, functionsand procedures: call-by-value and call-by-reference, recursion</li> </ul> </li> <li>Course type 2L - 2E - 0S - 0P (Lecture, Exercises, Seminar, practical course)</li> <li>Learning Material Lecture slides, examples of solutions</li> <li>Recommended</li> <li>Joachim Goll und Cornelia Heinisch. Java als erste Programmiersprache: Ein professioneller Einstieg in die Objektorientierung mit Java.Springer Verlag, Berlin, 7. Auflage, 2013.</li> <li>Guido Krüger.Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8. Auflage, 2014.</li> <li>Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014.</li> <li>Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.</li> <li>Method(s) of instruction/</li> <li>media being used</li> <li>Level/ category</li> <li>1. (Bachelor=1, Master=2)</li> <li>Summer/ Winter</li> <li>Winter term</li> <li>The machemistica SL - ungraded course work during the lecture period</li> <li>Further Information</li> <li>The students have to do a software programming task.</li> <li>ECTS credits</li> <li>9 (for the total modul)</li> <li>Workload</li> <li>135h of total modul)</li> <li>Workload</li> <li>136h of total workload, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and evaluation)</li></ul>		At the end of the module students are able:
<ul> <li>- to remember the imperative programming paradigm         <ul> <li>- to identify recursive algorithms</li> <li>- to understand syntax and semantics of imperative proograms</li> <li>- to understand syntax and semantics of imperative programs</li> <li>- to apply refinement for developing procedural programs in the programming language C</li> </ul> </li> <li>Module content         <ul> <li>Information, message, data, problem - algorithm - program, imperative programming, orostructs, structurered programming, program semantics: control-flow diagram, basic data structures: strings and arays, abstract data types, functionsand procedures: call-by-value and call-by-reference, recursion</li> <li>Course type</li> <li>21 - 22 - 0S - 0P</li> <li>Lecture slides, examples of solutions</li> </ul> </li> <li>Recommended</li> <li>Joachim Goll und Cornelia Heinisch. Java als erste Programmiersprache: En professioneller Einstieg in die Objektorientierung mit Java.Springer</li> <li>Verlag, Berlin, 7, Auflage, 2013.</li> <li>Guido Krüger.Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8, Auflage, 2014.</li> <li>Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger.</li> <li>Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7, Auflage, 2014.</li> <li>Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.</li> </ul> <li>Method(s) of lecture, exercise course at the PC-Lab instruction/         <ul> <li>media being used</li> <li>Level category</li> <li>(Bachelor=1, Master=2)</li> <li>Summer/ Winter</li> <li>winter term</li> <li>Assessment</li> <li>term paper</li> </ul> </li> <li>Assessment</li> <li>term paper</li> <li>Assessment</li> <li>term pap</li>		- to understand algorithms and basic data structures
- to understand syntax and semantics of imperative programs           - to understand structured programming           - to apply refinement for developing procedural program, imperative programming language C           Module content         Information, message, data, problem - algorithm – program, imperative programming constructs, structures: strings and arrays, abstract data types, functionsand procedures: call-by-value and call-by-reference, recursion           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture sildes, examples of solutions           Recommended         Joachim Goll und Cornelia Heinisch. Java als erste Programmiersprache:           Ein professioneller Einstieg in die Objektorientierung mit Java.Springer Verlag, Berlin, 7. Auflage, 2013.         Guido Krüger.Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8. Auflage, 2014.           Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger.         Grundkurs Programmiere in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.           Method(s) of         lecture, exercise course at the PC-Lab           instruction/         metre term           Term         1. term           Compulsory         none           requirements         9 (for the total modul)           Workload         135 nof total work kod, thereof           60h of contact hours and         75h of self-study, consisting of:		
- to understand structured programming           - to apply refinement for developing procedural programs in the programming language C           Module content         Information, message, data, problem - algorithm – program, imperative programming constructs, structurered programming, program semantics: control-flow diagram, basic data structures: strings and arrays, abstract data types, functionsand procedures: call-by-value and call-by-reference, recursion           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture slides, examples of solutions           Recommended         Joachim Goll und Cornelia Heinisch. Java als erste Programmiersprache: Ein professioneller Einstieg in die Objektorientierung mit Java.Springer Verlag, Berlin, 7. Auflage, 2013.           Guido Krüger.Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8. Auflage, 2014.         Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1. Carl Hanser Verlag, München, 7. Auflage, 2014.           Method(s) of instruction/ media being used         lecture, exercise course at the PC-Lab           Level/ category         1           Method(s) of instruction/ media being used         lecture rem           Level/ category         1           Usachim Gold         lecture, exercise course work during the lecture period           Tirtme         1. term           Compulsory         none           Requirements		- to identify recursive algorithms
- to apply refinement for developing procedural programs in the programming language C           Module content         Information, message, data, problem - algorithm - program, imperative programming constructs, structurered programming, program semantics: control-flow diagram, basic data structures: strings and arrays, abstract data types, functionsand procedures: call-by-value and call-by-reference, recursion           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture slides, examples of solutions           Recommended         Joachim Goll und Cornelia Heinisch. Java als erste Programmiersprache: Ein professioneller Einstieg in die Objektorientierung mit Java. Springer Verlag, Berlin, 7. Auflage, 2013.           Guido Krüger.Handbuch der Java Programmierung. O'Reilly Verlag, Köin, 8. Auflage, 2014.         Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014.           Method(s) of instruction/ media being used         lecture, exercise course at the PC-Lab           Level/ category         1           Method(s) of instruction/ media being used         lecture term           Assessment         term paper           Assessment         set of samet have to do a software programming task.           ECTS credits         9 (for the total modul)           Workload         135h of total work koad, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation		
programming language C           Module content         Information, message, data, problem - algorithm – program, imperative programming constructs, structurered programming, program semantics: control-flow diagram, basic data structures: strings and arrays, abstract data types, functionsand procedures: call-by-value and call-by-reference, recursion           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture sitedies, examples of solutions           Recommended         Joachim Goll und Cornella Heinisch. Java als erste Programmiersprache: Ein professioneller Einstieg in die Objektorientierung mit Java.Springer Verlag, Berlin, 7. Auflage, 2013.           Guido Krüger. Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8. Auflage, 2014.           Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014.           Method(s) of         lecture, exercise course at the PC-Lab           instruction/ media being used         lecture rem           Level (category         1 (Bachelor=1, Master=2)           Summer/Winter         winter term           Term         1. term           Compulsory         none           requirements         9 (for the total modul)           Workload         135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and evantion) 15 h exam preparation		
Module content         Information, message, data, problem - algorithm - program, imperative programming constructs, structurered programming, program semantics: control-flow diagram, basic data structures: strings and arrays, abstract data types, functionsand procedures: call-by-value and call-by-reference, recursion           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture slides, examples of solutions           Recommended         Joachim Goll und Cornelia Heinisch. Java als erste Programmiersprache: Ein professioneller Einstieg in die Objektorientierung mit Java.Springer Verlag, Berlin, 7. Auflage, 2013.           Guido Krüger, Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8. Auflage, 2014.         Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014.           Method(s) of instruction/ media being used         Iecture, exercise course at the PC-Lab           Level/ category         1         (Bachelor=1, Master=2)           Summer/ Winter         winter term           Term         1. term           Compulsory         none           requirements         SL - ungraded course work during the lecture period           Further Information         The students have to do a software programming task.           ECTS credits         9 (for the total modul)           Workload         135h of total work load, thereof 60h of co		
programming constructs, structurered programming, program semantics: control-flow diagram, basic data structures: strings and arrays, abstract data types, functionsand procedures: call-by-value and call-by-reference, recursionCourse type2L - 2E - 0S - 0P(Lecture, Exercises, Seminar, practical course)Learning MaterialLecture slides, examples of solutionsRecommendedJoachim Goll und Cornelia Heinisch. Java als erste Programmiersprache: Ein professioneller Einstieg in die Objektorientierung mit Java.Springer Verlag, Berlin, 7. Auflage, 2013. Guido Krüger. Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8. Auflage, 2014. Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014. Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.Method(s) of instruction/ media being usedlecture, exercise course at the PC-LabSummer/ Winterwinter termTerm1. (Bachelor=1, Master=2)Summer/ Winterwinter termAssessmentterm paperAssessmentsetter paperAssessmentg (for the total modul)Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH Jena<		
control-flow diagram, basic data structures: strings and -base and -by-reference, recursion           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture slides, examples of solutions           Recommended         Joachim Goll und Cornelia Heinisch. Java als erste Programmiersprache:           literature         Ein professioneller Einstieg in die Objektorientierung mit Java.Springer           Verlag, Berlin, 7. Auflage, 2013.         Guido Krüger.Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8.           Auflage, 2014.         Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger.           Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7.         Auflage, 2014.           Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.         Iecture, exercise course at the PC-Lab           media being used         Iecture, exercise course at the PC-Lab           Level/ category         1. (Bachelor=1, Master=2)           Summer/ Winter         winter term           Assessment         term paper           Assessment modalities         SL - ungraded course work during the lecture period           Further Information         The students have to do a software programming task.           ECTS credits         9 (for the total modul)           Workload         135h of total work load, thereof <td>Module content</td> <td></td>	Module content	
types, functionsand procedures: call-by-value and call-by-reference, recursion           Course type         2L - 2E - 0S - 0P (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture slides, examples of solutions           Recommended         Joachim Goll und Cornelia Heinisch. Java als erste Programmiersprache: Ein professioneller Einstieg in die Objektorientierung mit Java.Springer Verlag, Berlin, 7. Auflage, 2013. Guido Krüger, Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8. Auflage, 2014. Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014. Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.           Method(s) of instruction/ media being used         lecture, exercise course at the PC-Lab           Summer// Winter         winter term           Term         1. (Bachelor=1, Master=2)           Summer// Winter         mone           requirements         Assessment           Assessment         term paper           Assessment         St ungraded course work during the lecture period           Further Information         The students have to do a software programming task.           ECTS credits         9 (for the total modul)           Workload         135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparation		
recursion           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture sildes, examples of solutions           Recommended         Joachim Goll und Cornelia Heinisch. Java als erste Programmiersprache: Ein professioneller Einstieg in die Objektorientierung mit Java.Springer Verlag, Berlin, 7. Auflage, 2013.           Guido Krüger, Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8. Auflage, 2014.         Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014.           Method(s) of instruction/ media being used         lecture, exercise course at the PC-Lab           Level/ category         1         (Bachelor=1, Master=2)           Summer/Winter         winter term           Term         1. term           Compulsory         none           requirements         SL - ungraded course work during the lecture period           Further Information         The students have to do a software programming task.           ECTS credits         9 (for the total modul)           Workload         135h of total work load, thereof           60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparation           Usability of this module         Submodule Algorithms and data structures, Mo		
Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture slides, examples of solutions           Recommended         Joachim Goll und Cornelia Heinisch. Java als erste Programmiersprache: Ein professioneller Einstieg in die Objektorientierung mit Java.Springer Verlag, Berlin, 7. Auflage, 2013.           Guido Krüger, Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8. Auflage, 2014.         Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014.           Method(s) of instruction/ media being used         Iecture, exercise course at the PC-Lab           Summer/ Winter         winter term           Term         1. term           Compulsory         none           requirements         Sessment           Assessment         term paper           Assessment         term paper           Assessment         term paper           Assessment         g (for the total modul)           Workload         135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparation           Usability of this module         Submodule Algorithms and data structures, Mobile Computing / Software- Engineering Systems           Time         According time table <td></td> <td></td>		
Learning Material         Lecture slides, examples of solutions           Recommended         Joachim Goll und Cornelia Heinisch. Java als erste Programmiersprache: Ein professioneller Einstieg in die Objektorientierung mit Java.Springer Verlag, Berlin, 7. Auflage, 2013. Guido Krüger.Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8. Auflage, 2014. Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014. Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.           Method(s) of instruction/ media being used         lecture, exercise course at the PC-Lab           Summer/ Winter         winter term           Term         1. term           Compulsory         none           requirements         SL - ungraded course work during the lecture period           Further Information         The students have to do a software programming task.           ECTS credits         9 (for the total modul)           Workload         135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparation           Usability of this module         Submodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems,Operating Systems, Software Engineering, Real Time Operating Systems           Time         According time table           Duration of module         1 term <t< td=""><td>Course time</td><td></td></t<>	Course time	
Recommended literatureJoachim Goll und Cornelia Heinisch. Java als erste Programmiersprache: Ein professioneller Einstieg in die Objektorientierung mit Java. Springer Verlag, Berlin, 7. Auflage, 2013. Guido Krüger.Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8. Auflage, 2014. Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014. Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.Method(s) of instruction/ media being usedlecture, exercise course at the PC-LabLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm1. termAssessmentterm paperAssessmentterm paperAssessmentgifor the total modul)Workload9 (for the total modul)Workload13Sh of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
literatureEin professioneller Einstieg in die Objektorientierung mit Java.Springer Verlag, Berlin, 7. Auflage, 2013. Guido Krüger, Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8. Auflage, 2014. Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014. Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.Method(s) of instruction/ media being usedlecture, exercise course at the PC-LabLevel/ category1(Bachelor=1, Master=2)Summer/ Winterwinter termTerm1. termCompulsory requirementsnoneAssessmentterm paperAssessment modalitiesSL - ungraded course work during the lecture periodFurther InformationThe students have to do a software programming task.ECTS credits9 (for the total modul)Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Verlag, Berlin, 7. Auflage, 2013. Guido Krüger.Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8. Auflage, 2014. Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014. Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.Method(s) of instruction/ media being used Level/ category1(Bachelor=1, Master=2)Summer/Winterwinter termTerm1. term noneCompulsory requirementsnoneAssessmentterm paperAssessment ECTS credits9 (for the total modul)Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture of self-study, on and evaluation) 15 h exam preparation Subability of this moduleUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Guido Krüger.Handbuch der Java Programmierung. O'Reilly Verlag, Köln, 8. Auflage, 2014. Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014. Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.Method(s) of instruction/ media being usedlecture, exercise course at the PC-LabLevel/ category1(Bachelor=1, Master=2)Summer/ Winterwinter termTerm1. termCompulsory requirementsnoneAssessmentterm paperAssessment ECTS credits9 (for the total modul)Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	interature	
Auflage, 2014. Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014. Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.Method(s) of instruction/ media being usedlecture, exercise course at the PC-LabLevel/ category1(Bachelor=1, Master=2)Summer/ Winterwinter termTerm1. termCompulsory requirementsnoneAssessmentterm paperAssessment modalitiesSL - ungraded course work during the lecture periodFurther Information The students have to do a software programming task.ECTS credits9 (for the total modul)Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Dietmar Ratz, Jens Scheffler, Detlef Seese, und Jan Wiesenberger. Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auflage, 2014. Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.Method(s) of instruction/ media being usedlecture, exercise course at the PC-LabLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm1. termCompulsory requirementsnoneAssessmentterm paperAssessment modalitiesSL - ungraded course work during the lecture periodFurther InformationThe students have to do a software programming task.ECTS credits9 (for the total modul)Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Grundkurs Programmieren in Java, Band 1.Carl Hanser Verlag, München, 7. Auffage, 2014. Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.Method(s) of instruction/ media being usedlecture, exercise course at the PC-LabLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm1. termCompulsory requirementsnoneAssessment modalitiesSL - ungraded course work during the lecture periodFurther InformationThe students have to do a software programming task.ECTS credits9 (for the total modul)Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Auflage, 2014. Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.Method(s) of instruction/ media being usedlecture, exercise course at the PC-LabLevel/category1 (Bachelor=1, Master=2)Summer/Winterwinter termTerm1. termCompulsory requirementsnoneAssessmentterm paperAssessment modalitiesSL - ungraded course work during the lecture periodFurther InformationThe students have to do a software programming task.ECTS credits9 (for the total modul)Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.Method(s) of instruction/ media being usedlecture, exercise course at the PC-LabLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm1. termCompulsory requirementsnoneAssessmentterm paperAssessment modalitiesSL - ungraded course work during the lecture periodFUrther InformationThe students have to do a software programming task.ECTS credits9 (for the total modul)Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
instruction/ media being usedI(Bachelor=1, Master=2)Level/ category1(Bachelor=1, Master=2)Summer/ Winterwinter termTerm1. termCompulsory requirementsnoneAssessmentterm paperAssessment modalitiesSL - ungraded course work during the lecture periodFurther InformationThe students have to do a software programming task.ECTS credits9 (for the total modul)Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		Bernhard Steppan. Einstieg in Java 7.Galileo Press, Bonn, 4. Auflage, 2011.
media being usedLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm1. termCompulsory requirementsnoneAssessmentterm paperAssessment modalitiesSL - ungraded course work during the lecture periodFurther InformationThe students have to do a software programming task.ECTS credits9 (for the total modul)Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		lecture, exercise course at the PC-Lab
Level/ category1(Bachelor=1, Master=2)Summer/ Winterwinter termTerm1. termCompulsorynonerequirementsnoneAssessmentterm paperAssessment modalitiesSL - ungraded course work during the lecture periodFurther InformationThe students have to do a software programming task.ECTS credits9 (for the total modul)Workload135h of total work load, thereof60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Summer/Winterwinter termTerm1. termCompulsory requirementsnoneAssessmentterm paperAssessment modalitiesSL - ungraded course work during the lecture periodFurther InformationThe students have to do a software programming task.ECTS credits9 (for the total modul)Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Term1. termCompulsory requirementsnoneAssessmentterm paperAssessment modalitiesSL - ungraded course work during the lecture periodFurther InformationThe students have to do a software programming task.ECTS credits9 (for the total modul)Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Compulsory requirementsnoneAssessmentterm paperAssessment modalitiesSL - ungraded course work during the lecture periodFurther InformationThe students have to do a software programming task.ECTS credits9 (for the total modul)Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
requirementsAssessmentterm paperAssessment modalitiesSL - ungraded course work during the lecture periodFurther InformationThe students have to do a software programming task.ECTS credits9 (for the total modul)Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		1. term
Assessmentterm paperAssessment modalitiesSL - ungraded course work during the lecture periodFurther InformationThe students have to do a software programming task.ECTS credits9 (for the total modul)Workload135h of total work load, thereof60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		none
Assessment modalitiesSL - ungraded course work during the lecture periodFurther InformationThe students have to do a software programming task.ECTS credits9 (for the total modul)Workload135h of total work load, thereof60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Further InformationThe students have to do a software programming task.ECTS credits9 (for the total modul)Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems,Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
ECTS credits9 (for the total modul)Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Workload135h of total work load, thereof 60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems,Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
60h of contact hours and 75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems,Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
75h of self-study, consisting of: 60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	VVOIKIOAU	
60 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
0 h practical training (preparation and evaluation)         15 h exam preparation         Usability of this module         Submodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems,Operating Systems, Software Engineering, Real Time Operating Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
15 h exam preparation         Usability of this module         Submodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems,Operating Systems, Software Engineering, Real Time Operating Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
Usability of this moduleSubmodule Algorithms and data structures, Mobile Computing / Software- Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Engineering forMobile Systems, Operating Systems, Software Engineering, Real Time Operating Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually	Usability of this module	
Real Time Operating Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
TimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Place/ room     EAH Jena       Frequency of offer     Annually	Time	
Frequency of offer Annually		v v
	Place/ room	EAH Jena
Language German	Frequency of offer	Annually
	Language	German

Module number         ET.1.104.2           Module name         Computer Science           Sub module         Algorithms and data structures           Department         Electrical Engineering and Information Technology           Degree program         ET/IT (Ba), ATITi (Ba)           Module coordinator         Prof. DrIng. Oliver Jack           Compulsory/ optional/ electiv         Compulsory           Learning objectives         At the end of the module students are able: - to apply algorithms and data structures for basic problems - to understand specific algorithms and data structures for searching, sorting and graph problems - to analyse algorithms with respect to efficiency and correctness - to test programs systematically - to understand object-oriented programming - to apply object-oriented program develoment methods in C++           Module content         Basic algorithms and data structures, Interdependency between algorithms and data structure, proof of correctness, efficiency considerations, programming paradigms           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture slides, examples of solutions           Recommended         Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und Clifford Stein: Algorithmen - Eine Einführung, Oldenbourg 2010 Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993 Sedgewick, R.: Algorithms in C++, Addison Wesley 1990 Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002           Method(
Sub module         Algorithms and data structures           Department         Electrical Engineering and Information Technology           Degree program         ET/IT (Ba), ATITi (Ba)           Module coordinator         Prof. DrIng. Oliver Jack           Compulsory/ optional/ electiv         Compulsory           Learning objectives         At the end of the module students are able: - to apply algorithms and data structures for basic problems - to understand specific algorithms and data structures for searching, sorting and graph problems - to analyse algorithms with respect to efficiency and correctness - to test programs systematically - to understand object-oriented programming - to apply object-oriented program develoment methods in C++           Module content         Basic algorithms and data structures, Interdependency between algorithms and data structure, proof of correctness, efficiency considerations, programming paradigms           Course type         2L - 2E - 0S - 0P         (Lecture Exercises, Seminar, practical course)         Learning Material           Lecture slides, examples of solutions         Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und Clifford Stein: Algorithmen - Eine Einführung, Oldenbourg 2010 Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993 Sedgewick, R.: Algorithms in C, Addison Wesley 1990 Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002           Method(s) of instruction/ media being used         lecture, exercises
Department         Electrical Engineering and Information Technology           Degree program         ET/IT (Ba), ATITi (Ba)           Module coordinator         Prof. DrIng, Oliver Jack           Compulsory/ optional/ electiv         Compulsory           Learning objectives         At the end of the module students are able: - to apply algorithms and data structures for basic problems - to understand specific algorithms and data structures for searching, sorting and graph problems - to analyse algorithms with respect to efficiency and correctness - to test programs systematically - to analyse algorithms and data structures, Interdependency between algorithms and data structure, proof of correctness, efficiency considerations, programming paradigms           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture slides, examples of solutions           Recommended literature         Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und Clifford Stein: Algorithmen - Eine Einführung, Oldenbourg 2010 Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993 Sedgewick, R.: Algorithms in C, Addison Wesley 1990 Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002           Method(s) of instruction/ media being used         lecture, exercises
Degree program         ET/IT         (Ba), ATITi (Ba)           Module coordinator         Prof. DrIng. Oliver Jack           Compulsory/ optional/ electiv         Compulsory           Learning objectives         At the end of the module students are able: - to apply algorithms and data structures for basic problems - to understand specific algorithms and data structures for searching, sorting and graph problems - to analyse algorithms with respect to efficiency and correctness - to test program systematically - to understand object-oriented programming - to apply object-oriented program develoment methods in C++           Module content         Basic algorithms and data structures, Interdependency between algorithms and data structure, proof of correctness, efficiency considerations, programming paradigms           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture slides, examples of solutions           Recommended literature         Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und Clifford Stein: Algorithmen - Eine Einführung, Oldenbourg 2010 Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993 Sedgewick, R.: Algorithmen in C++, Addison Wesley 1990 Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002           Method(s) of instruction/ media being used         lecture, exercises
Module coordinator         Prof. DrIng. Oliver Jack           Compulsory/ optional/ electiv         Compulsory           Learning objectives         At the end of the module students are able: - to apply algorithms and data structures for basic problems - to understand specific algorithms and data structures for searching, sorting and graph problems - to analyse algorithms with respect to efficiency and correctness - to east programs systematically - to understand object-oriented program develoment methods in C++           Module content         Basic algorithms and data structures, Interdependency between algorithms and data structure, proof of correctness, efficiency considerations, programming paradigms           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture slides, examples of solutions           Recommended literature         Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und Clifford Stein: Algorithmen - Eine Einführung, Oldenbourg 2010 Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993 Sedgewick, R.: Algorithmen in C++, Addison Wesley 1990 Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002           Method(s) of instruction/ media being used         lecture, exercises
Compulsory/ optional/ electiv       Compulsory         Learning objectives       At the end of the module students are able: - to apply algorithms and data structures for basic problems - to understand specific algorithms and data structures for searching, sorting and graph problems - to analyse algorithms with respect to efficiency and correctness - to test programs systematically - to understand object-oriented program develoment methods in C++         Module content       Basic algorithms and data structures, Interdependency between algorithms and data structure, proof of correctness, efficiency considerations, programming paradigms         Course type       2L - 2E - 0S - 0P       (Lecture, Exercises, Seminar, practical course)         Learning Material       Lecture slides, examples of solutions         Recommended literature       Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und Clifford Stein: Algorithmen - Eine Einführung, Oldenbourg 2010 Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993 Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002         Method(s) of instruction/ media being used       lecture, exercises
electiv       At the end of the module students are able:         Learning objectives       At the end of the module students are able:         - to apply algorithms and data structures for basic problems         - to understand specific algorithms and data structures for searching, sorting and graph problems         - to analyse algorithms with respect to efficiency and correctness         - to test programs systematically         - to understand object-oriented program develoment methods in C++         Module content       Basic algorithms and data structures, Interdependency between algorithms and data structure, proof of correctness, efficiency considerations, programming paradigms         Course type       2L - 2E - 0S - 0P       (Lecture, Exercises, Seminar, practical course)         Learning Material       Lecture slides, examples of solutions         Recommended       Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und Clifford Stein: Algorithmen - Eine Einführung, Oldenbourg 2010         Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993       Sedgewick, R.: Algorithms in C, Addison Wesley 1990         Sedgewick, R.: Algorithms in C++, Addison Wesley 2002       Iecture, exercises
Learning objectivesAt the end of the module students are able: - to apply algorithms and data structures for basic problems - to understand specific algorithms and data structures for searching, sorting and graph problems - to analyse algorithms with respect to efficiency and correctness - to test programs systematically - to understand object-oriented programming - to apply object-oriented program develoment methods in C++Module contentBasic algorithms and data structures, Interdependency between algorithms and data structure, proof of correctness, efficiency considerations, programming paradigmsCourse type2L - 2E - 0S - 0P(Lecture, Exercises, Seminar, practical course)Learning MaterialLecture slides, examples of solutionsRecommended literatureThomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und Clifford Stein: Algorithms in C, Addison Wesley 1990 Sedgewick, R.: Algorithms in C, Addison Wesley 1990 Sedgewick, R.: Algorithms in C, Addison Wesley 1990 Sedgewick, R.: Algorithms in C++, Addison Wesley 2002
<ul> <li>to apply algorithms and data structures for basic problems         <ul> <li>to understand specific algorithms and data structures for searching, sorting and graph problems                 <ul></ul></li></ul></li></ul>
<ul> <li>- to understand specific algorithms and data structures for searching, sorting and graph problems         <ul> <li>- to analyse algorithms with respect to efficiency and correctness</li> <li>- to est programs systematically</li> <li>- to understand object-oriented programming</li> <li>- to apply object-oriented program develoment methods in C++</li> </ul> </li> <li>Module content</li> <li>Basic algorithms and data structures, Interdependency between algorithms and data structure, proof of correctness, efficiency considerations, programming paradigms</li> <li>Course type</li> <li>2L - 2E - 0S - 0P (Lecture, Exercises, Seminar, practical course)</li> <li>Learning Material</li> <li>Lecture slides, examples of solutions</li> <li>Recommended</li> <li>literature</li> <li>Addison-Wesley 1993</li> <li>Sedgewick, R.: Algorithms in C, Addison Wesley 1990</li> <li>Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002</li> <li>Method(s) of         <ul> <li>instruction/</li></ul></li></ul>
and graph problems - to analyse algorithms with respect to efficiency and correctness - to test programs systematically - to understand object-oriented programming - to apply object-oriented program develoment methods in C++Module contentBasic algorithms and data structures, Interdependency between algorithms and data structure, proof of correctness, efficiency considerations, programming paradigmsCourse type2L - 2E - 0S - 0P Learning MaterialLecture slides, examples of solutionsRecommended literatureThomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und Clifford Stein: Algorithmen - Eine Einführung, Oldenbourg 2010 Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993 Sedgewick, R.: Algorithmen in C++, Addison Wesley 1990 Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002Method(s) of instruction/ media being usedlecture, exercises
- to analyse algorithms with respect to efficiency and correctness - to test programs systematically - to understand object-oriented programming - to apply object-oriented program develoment methods in C++Module contentBasic algorithms and data structures,Interdependency between algorithms and data structure, proof of correctness, efficiency considerations, programming paradigmsCourse type2L - 2E - 0S - 0P Learning MaterialLecture slides, examples of solutionsRecommended literatureThomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und Clifford Stein: Algorithmen - Eine Einführung, Oldenbourg 2010 Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993 Sedgewick, R.: Algorithmen in C++, Addison Wesley 1990 Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002Method(s) of instruction/ media being usedlecture, exercises
<ul> <li>to test programs systematically         <ul> <li>to understand object-oriented programming</li> <li>to apply object-oriented program develoment methods in C++</li> </ul> </li> <li>Module content         <ul> <li>Basic algorithms and data structures, Interdependency between algorithms and data structure, proof of correctness, efficiency considerations, programming paradigms</li> </ul> </li> <li>Course type</li> <li>2L - 2E - 0S - 0P (Lecture, Exercises, Seminar, practical course)</li> <li>Learning Material</li> <li>Lecture slides, examples of solutions</li> <li>Recommended</li> <li>Recommended</li> <li>Iterature</li> <li>Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993</li> <li>Sedgewick, R.: Algorithms in C, Addison Wesley 1990</li> <li>Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002</li> <li>Method(s) of instruction/ media being used</li> </ul>
- to understand object-oriented programming - to apply object-oriented program develoment methods in C++Module contentBasic algorithms and data structures, Interdependency between algorithms and data structure, proof of correctness, efficiency considerations, programming paradigmsCourse type2L - 2E - 0S - 0P(Lecture, Exercises, Seminar, practical course)Learning MaterialLecture slides, examples of solutionsRecommended literatureThomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und Clifford Stein: Algorithmen - Eine Einführung, Oldenbourg 2010 Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993 Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002Method(s) of instruction/ media being usedlecture, exercises
- to apply object-oriented program develoment methods in C++Module contentBasic algorithms and data structures, Interdependency between algorithms and data structure, proof of correctness, efficiency considerations, programming paradigmsCourse type2L - 2E - 0S - 0P(Lecture, Exercises, Seminar, practical course)Learning MaterialLecture slides, examples of solutionsRecommended literatureThomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und CliffordStein: Algorithmen - Eine Einführung, Oldenbourg 2010 Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993 Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002Method(s) of instruction/ media being usedlecture, exercises
Module contentBasic algorithms and data structures, Interdependency between algorithms and data structure, proof of correctness, efficiency considerations, programming paradigmsCourse type2L - 2E - 0S - 0P(Lecture, Exercises, Seminar, practical course)Learning MaterialLecture slides, examples of solutionsRecommended literatureThomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und Clifford Stein: Algorithmen - Eine Einführung, Oldenbourg 2010 Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993 Sedgewick, R.: Algorithms in C, Addison Wesley 1990 Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002Method(s) of instruction/ media being usedlecture, exercises
and data structure, proof of correctness, efficiency considerations, programming paradigmsCourse type2L - 2E - 0S - 0P (Lecture, Exercises, Seminar, practical course)Learning MaterialLecture slides, examples of solutionsRecommended literatureThomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und Clifford Stein: Algorithmen - Eine Einführung, Oldenbourg 2010 Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993 Sedgewick, R.: Algorithms in C, Addison Wesley 1990 Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002Method(s) of instruction/ media being usedlecture, exercises
programming paradigmsCourse type2L - 2E - 0S - 0P (Lecture, Exercises, Seminar, practical course)Learning MaterialLecture slides, examples of solutionsRecommendedThomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und CliffordliteratureStein: Algorithmen - Eine Einführung, Oldenbourg 2010Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993Sedgewick, R.: Algorithms in C, Addison Wesley 1990Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002Method(s) of instruction/ media being used
Course type2L - 2E - 0S - 0P(Lecture, Exercises, Seminar, practical course)Learning MaterialLecture slides, examples of solutionsRecommendedThomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und CliffordliteratureStein: Algorithmen - Eine Einführung, Oldenbourg 2010Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993Sedgewick, R.: Algorithms in C, Addison Wesley 1990Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002Method(s) of instruction/ media being used
Learning MaterialLecture slides, examples of solutionsRecommendedThomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und CliffordliteratureStein: Algorithmen - Eine Einführung, Oldenbourg 2010Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993 Sedgewick, R.: Algorithms in C, Addison Wesley 1990 Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002Method(s) of instruction/ media being usedlecture, exercises
Recommended       Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, und Clifford         literature       Stein: Algorithmen - Eine Einführung, Oldenbourg 2010         Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms,         Addison-Wesley 1993         Sedgewick, R.: Algorithms in C, Addison Wesley 1990         Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002         Method(s) of         instruction/         media being used
literature       Stein: Algorithmen - Eine Einführung, Oldenbourg 2010         Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms, Addison-Wesley 1993 Sedgewick, R.: Algorithms in C, Addison Wesley 1990 Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002         Method(s) of instruction/ media being used       lecture, exercises
Aho, A.V., Hopcroft, J.E., Ullman, J.D.: Data Structures and Algorithms,         Addison-Wesley 1993         Sedgewick, R.: Algorithms in C, Addison Wesley 1990         Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002         Method(s) of         instruction/         media being used
Addison-Wesley 1993         Sedgewick, R.: Algorithms in C, Addison Wesley 1990         Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002         Method(s) of       lecture, exercises         instruction/         media being used
Sedgewick, R.: Algorithms in C, Addison Wesley 1990         Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002         Method(s) of instruction/ media being used
Sedgewick, R.: Algorithmen in C++, Addison Wesley 2002           Method(s) of instruction/ media being used         Iecture, exercises
Method(s) of     lecture, exercises       instruction/     media being used
instruction/ media being used
media being used
Summer/Winter summer term
Term 2. term
Compulsory none
requirements
Recommended Modul ET.1.104.1 - Grundlagen der Programmierung
requirements
Assessment term paper
Assessment modalities APL – assessment during the semester period (graded)
Further Information The students have to conduct a software programming project
ECTS credits 9 (for the total modul)
Workload 135h of total work load, thereof
60h of contact hours and
75h of self-study, consisting of:
60 h lecture (preparation and rework)
0 h practical training (preparation and evaluation)
15 h exam preparation
Usability of this module Mobile Computing / Software-Engineering forMobile Systems,Operating
Systems, Real-Time-Operating Systems, Software Engineering
Time According time table
Duration of module 1 term
Place/ room EAH Jena
Frequency of offer Annually
Language German

Modulo number	ET 1 105 1
Module number	ET.1.105.1
Module name	Physics
Sub module	Physics 1
Department	Electrical Engineering and Information Technology
Degree program	ATITi (Ba), ET/IT (Ba)
Module coordinator	Prof. Dr. Stefan Sienz
Compulsory/ optional/ electiv	Compulsory
Learning objectives	Consolidated and extended basic physical knowledge, modelling of physical problems and application to simple examples in mechanics, electrostatics and magnetostatics (abstraction, setting up and solving of equations, distinction of essential from negligible influences, interpretation of the results)
Module content	Kinematics, dynamics of point mass, rigid body dynamics, oscillation, fluid mechanics, electrostatics, magnetostatics
Course type	2L - 2E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	Worksheets, exercises, e-learning
Recommended literature	D. C. Giancoli, Physik: Lehr- und Übungsbuch, Pearson Studium; 3. Auflage 2009
	D. Halliday, R. Resnick, J Walker, Physik, Bachelor Edition Wiley-VCH, Weinheim 2007
	Paul A Tipler, Gene Mosca Physik für Wissenschaftler und Ingenieure, Elsevier, 2. Aufl. 2004, ISBN 3-8274-1164-5
	F. Kuypers, Physik für Ingenieure, Bd.1: Mechanik und Thermodynamik, VCH-Verlag Weinheim 2002
	M. Alonso, E. Finn, Physics, Addison Wesley; Revised edition (June 10, 1992)
Method(s) of	Lecture with exercises
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/ Winter	winter term
Term	1st term
Recommended	Entrance qualification for Universities of Applied Sciences
requirements	
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
Further Information	Successful participation and cooperation in excercises and if any e-learning
ECTS credits	9 (for the entire module)
Workload	135h of total work load, thereof
	60h of contact hours and
	75h of self-study, consisting of:
	35 h lecture (preparation and rework)
	25 h practical training (preparation and evaluation)
	15 h exam preparation
Usability of this module	Measurement technology
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.105.2
Module name	Physics
Sub module	Physics 2
Department	Electrical Engineering and Information Technology
Degree program	ATITi (Ba), ET/IT (Ba)
Module coordinator	Prof. Dr. Stefan Sienz
Compulsory/ optional/ electiv	Compulsory
Learning objectives	Extended basic physical knowledge, application to simple examples (recognition of analogies, distinction of essential from not essential influences, interpretation of the results), application of the knowledge in practical laboratory courses (consolidation of the knowledge, practice with measuring instruments, first experience in evaluation and valuation of measuring results)
Module content	Thermodynamics, waves, geometrical optics, wave optics, selected topics of quantum physics, among others the wave-particle dualism
Course type	2L - 1E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	Worksheets, exercises, E-learning
Recommended	D. C. Giancoli, Physik: Lehr- und Übungsbuch, Pearson Studium; 3. Auflage
literature	2009 D. Halliday, R. Resnick, J Walker, Physik, Bachelor Edition Wiley-VCH, Weinheim 2007
	Paul A Tipler, Gene Mosca Physik für Wissenschaftler und Ingenieure, Elsevier, 2. Aufl. 2004, ISBN 3-8274-1164-5
	F. Kuypers, Physik für Ingenieure, Bd.1: Mechanik und Thermodynamik,
	VCH-Verlag Weinheim 2002
	M. Alonso, E. Finn, Physics, Addison Wesley; Revised edition (June 10, 1992)
Method(s) of	Lecture with exercises
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	2nd term
Compulsory	none
requirements	
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
Further Information	Successful participation and cooperation in excercises and if any e-learning
ECTS credits	9 (for the entire module)
Workload	135h of total work load, thereof
	60h of contact hours and
	75h of self-study, consisting of:
	35 h lecture (preparation and rework)
	10 h excercise courses
	15 h practical training (preparation and evaluation)
	15 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.106
Module name	Technical English
Department	Electrical Engineering and Information Technology
Degree program	ATITi (Ba), ET/IT (Ba)
Module coordinator	Frau Wiedemann
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	Students are enabled to deal with a wide variety of study and work-related situations in English (Level B2 of the Common European Framework). At the
	same time, students consolidate and extend their existing language skills as
Module content	well as general vocabulary and grammar. - studying at the UAS Jena
	- basic mathematics and describing graphs
	- IT, technical devices and measuring instruments
	- lab sessions
	- materials, energy, electricity
	- projects and presentations
Course type	0L - 2E - 0S - 0P (ET.1.106.1)
	0L - 3E - 0S - 0P (ET.1.106.2) (Lecture, Exercises, Seminar, practical
	course)
Learning Material	script and handouts
Recommended	- Comfort, Hick, Savage "Basic Technical English" Oxford University Press,
literature	1990
	- Wagner" Science and Engineering" Cornelsen & Oxford, 2000
	- AGlendinning , McEwan" Oxford English for Electronics", Oxford University
	Press,1993
	- Bauer "English for technical purposes" Cornelsen & Oxford, 2000
	- Englisch für technische Berufe – Computer und IT-Berufe, Klett-Verlag
	2002
	- Encyclopaedia Britannica, CD-ROM editino, 1997
	- Murphy "English Grammar in Use" CUP/ Klett-Verlag
	- Wagner, Zörner "Technical Grammar and Vocabulary", Cornelsen&
	Oxford, 1998
	- Vince, Michael, Macmillan English Grammar in Context
	-Zeitschrift: "Inch" (Technical English Inch by Inch)
	-Cambridge English for Engineering. CPU 2012
	-Cambridge English for Scientists. CPU 2012
Method(s) of	Multimedia, Video, Audio materials
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winterterm and summer term
Term	1st and 2nd term
Recommended	Above level B1 of Common European Framework of Reference for
requirements	Languages
Assessment	course attendance certificate, written test
Assessment modalities	SL - ungraded course work during the lecture period MODULE ACHIEVEMENT after 1st Semester
Further Information	
ECTS credits	written examination (90 minutes) in 2nd Semester
Workload	6 (for the entire module) 180 h of total work load, therefrom
VVUIKIUAU	75 of presence at university and
	105 h of self-study, consisting of:
	- 80 h seminar (preparation and rework)
	- 25 h preparation for examination
Usability of this module	Creditable for other Modules of Technical English within the Bachelor
	studies at the University of Applied Sciences Jena, equivalent to level B2
	CEF or Unicert II technical language
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	English
Language	

Module number	ET.1.201
Module name	Prof. Dr. Martin Hoffmann
Department	Electrical Engineering and Information Technology
Degree program Module coordinator	ET/IT (Ba), ATITi (Ba) Prof. Dr. Martin Hoffmann
Compulsory/ optional/	
electiv	Compulsory
Learning objectives	- Basic knowledge about function, construction and application of electronic
Learning objectives	components
	- Practical experience in measurement of parameters of electronic
	components
	- Standard applications in electronic cirquits
	- Definition of Parameters for electronic devices in applications and selection
	of devices by data sheets
Module content	Passive components R,L,C, semiconductor diodes, bipolar transistors,
	unipolar transistors, thyristors, optoelectronic devices
Course type	2. Term 3L – 0E – 0S – 1P (ET.1.201.1)
	3. Term $1L - 0E - 0S - 1P$ (ET.1.201.2) (Lecture, Exercises, Seminar,
	practical course)
Learning Material	Literature, lab instruction sheets, handouts
Recommended	Passive elektronische Bauelemente - Aufbau, Funktion, Eigenschaften,
literature	Dimensionierung und Anwendung, Leonhard Stiny, Verlag Springer Vieweg
	Aktive elektronische Bauelemente - Aufbau, Struktur, Wirkungsweise,
	Eigenschaften und praktischer Einsatz diskreter und integrierter Halbleiter-
	Bauteile, Leonhard Stiny, Verlag Springer Vieweg
	Werkstoffe und Bauelemente der Elektrotechnik, Hanno Schaumburg,
	Verlag Teubner
Method(s) of	Lecture, practical course, self-study
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	Summer term- / winter term
Term	2. and 3. term
Compulsory	none
requirements	
Recommended	Electrical Engineering 1, Analysis 1, Physik
requirements	
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	9
Workload	270h (SWS) of total work load, thereof
	90h of contact hours and
	180h of self-study, consisting of:
	80 h lecture (preparation and rework)
	70 h practical training (preparation and evaluation)
	30 h exam preparation
Usability of this module	Analog and Digital Circuit Organisation, Basic Measurement Techniques,
	Audio Engineering, Electronic Design
Time	According time table
Duration of module	2 terms
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module name         Mathematics 3           Department         Electrical Engineering and Information Technology           Degree program         E1/1T (Ba), ATTTI (Ba)           Module coordinator         Prof. Dr. Henning Kempka           Compulsory/ optional/ electiv         Confidence in dealing with methods of differential calculus and integratic several variables, in ordinary differential equations as well as in Laplace and Fourier transform to solve practical problems. After succesfull participation at the module Mathematik 3 the students ar able to apply the methods which are taught in the areas which are conte the module. Further, they posess the Abbility to sucessfully apply the mathematical procedures on physical and engineering problems. Furthermore, the students know the fundamental concepts of stochastics           Module content         Multidimensional differential calculus - Furthermore, the students know the fundamental concepts of stochastics - Partial derivative and extremal values Multidimensional integral calculus - partial derivative and extremal values Multidimensional integral calculus - applications - Integrals in cartesian and polar coordinates - Applications - Integrals in cartesian, zylinder- and spherical coordinates - Applications - Integrals concept sequations of 2nd (and higher) order with constant coefficients           - Systems of linear Differential Equations of 2nd (and higher) order with constant coefficients         - Systems of linear Differential Equations of 1st order with constant coefficients           - Sochastics         - Correlation - Normal distribution - Regression - Normal distribution - Regression - Normal distribution - Regression - Normal distribution - Regression - Normal distribution	Module number	ET.1.202
Department         Electrical Engineering and Information Technology           Degree program         ET/IT (Ba), ATITi (Ba)           Module coordinator         Prof. Dr. Henning Kempka           Compulsory/ optional/ electiv         Confidence in dealing with methods of differential calculus and integratic several variables, in ordinary differential equations as well as in Laplace and Fourier transform to solve practical problems. After succesfull participation at the module Mathematik 3 the students are able to apply the methods which are taught in the areas which are composed the module. Further, they posess the Abbility to succesfully apply the mathematical procedures on physical and engineering problems. Furthermore, the students know the fundamental concepts of stochastics           Module content         Multidimensional differential calculus - partial derivative and extremal values Multidimensional integral calculus - 2D-integrals in cartesian and polar coordinates - 3D-integrals in cartesian and polar coordinates - 1nice integrals, line parametrization Integral transform Ordinary Differential Equations of 2nd (and higher) order with constant coefficients           - Interal Differential Equations of 1st order with constant coefficients         - Basic concepts, equations of 1st order with constant coefficients           - Systems of linear Differential Equations of 1st order with constant coefficients         - Basic concept of descritive Statistics           - Correlation         - Regression         - Regression           - Normal distribution A		
Degree program         ET/T         (Ba)           Module coordinator         Prof. Dr. Henning Kempka           Compulsory/ optional/         Compulsory           electiv         Confidence in dealing with methods of differential calculus and integratio several variables, in ordinary differential equations as well as in Laplace and Fourier transform to solve practical problems. After successfull participation at the module Mathematik 3 the students ar able to apply the methods which are taught in the areas which are content the module. Purther, they posess the Abbility to successfully apply the mathematical procedures on physical and engineering problems. Furthermore, the students know the fundamental concepts of stochastics           Module content         Multidimensional differential calculus           - partial derivative and extremal values         Multidimensional integral calculus           - applications         - partial derivative and extremal values           Multidimensional integrals in cartesian, any londer - and spherical coordinates         - Applications           - line integrals, incartesian, zylinder- and spherical coordinates         - Applications           - line integrals, concepts, equations 1st order         - Introduction, basic concepts, equations 1st order           - line integrals         - Basic concept of descritive Statistics           - Correlation         - Regression           - Normal distribution         - Regression           - Regression         - Normal distribution		
Module coordinator         Prof. Dr. Henning Kempka           Compulsory/ optional/ electiv         Compulsory           Learning objectives         Confidence in dealing with methods of differential calculus and integratio several variables, in ordinary differential equations as well as in Laplace and Fourier transform to solve practical problems. After succesfull participation at the module Mathematik 3 the students ar able to apply the methods which are taught in the areas which are conte the module. Further, they posess the Abbility to succesfully apply the mathematical procedures on physical and engineering problems. Furthermore, the students know the fundamental concepts of stochastics           Module content         Multidimensional differential calculus           - Functions of several variables         - partial derivative and extremal values Multidimensional integral calculus           - 2D-integrals in cartesian, zylinder- and spherical coordinates         - 3D-integrals in cartesian, zylinder- and spherical coordinates           - Applications         - line integrals, line parametrization Integral transform         - Linear Differential Equations           - Interdiction, basic concepts, equations 1st order         - Linear Differential Equations of 1st order with constant coefficients           - Systems of linear Differential Equations of 1st order with constant Coefficients         - Correlation           - Regression         - Correlation           - Regression         - Regression           - Normal distribution         A glimpse on Statistical inference      <	•	
Compulsory/ optional/ electiv         Compulsory           Learning objectives         Confidence in dealing with methods of differential calculus and integratio several variables, in ordinary differential equations as well as in Laplace and Fourier transform to solve practical problems. After succesfull participation at the module Mathematik 3 the students ar able to apply the methods which are taught in the areas which are content the module. Further, they poess the Abbility to successfully apply the mathematical procedures on physical and engineering problems. Furthermore, the students know the fundamental concepts of stochastics Multidimensional differential calculus - partial derivative and extremal values Multidimensional integral calculus - partial derivative and extremal values Multidimensional integral calculus - Dahitegrals in cartesian and polar coordinates - 3D-integrals in cartesian, and polar coordinates - Applications - Integrals, line parametrization Integral transform - Laplace transform - Laplace transform - Introduction, basic concepts, equations 1st order - Introduction, basic concepts, equations of 1st order with constant coefficients - Systems of linear Differential Equations of 1st order with constant coefficients - Correlation - Regression - Normal distribution A glimpse on Statistical Inference Course type 4L - 2E - 05 - 09 - (Lecture, Exercises, Seminar, practical course) Learning Material Recommended literature           Recommended Intervention         Exercises with solutions, worksheets           Recommended Intervention         Exercises with solutions, worksheets           Recommended Interature         Exercises with solutions, worksheets           Recommended Interature         Exercises with solutions, worksheets           Recommended Interature <td></td> <td></td>		
Learning objectives         Confidence in dealing with methods of differential calculus and integrational several variables, in ordinary differential equations as well as in Laplace and Fourier transform to solve practical problems. After succesfull participation at the module Mathematik 3 the students and able to apply the methods which are taught in the areas which are contered the module. Further, they posess the Abbility to succesfully apply the mathematical procedures on physical and engineering problems. Furthermore, the students know the fundamental concepts of stochastics           Module content         Multidimensional differential calculus           - Purctions of several variables         - partial derivative and extremal values           Multidimensional integral calculus         - 2D-integrals in cartesian, zylinder- and spherical coordinates           - Applications         - line integrals, in cartesian, zylinder- and spherical coordinates           - Applications         - line integrals, incartesian, zylinder- and spherical coordinates           - Applications         - line integrals, incartesian, zylinder- and spherical coordinates           - Applications         - line integrals, incortesing oblems           - Introduction, basic concepts, equations of 1st order         - Laplace transform           - Correlation         - Systems of linear Differential Equations of 1st order with constant coefficients           - Systems of linear Differential Equations         - Normal distribution           - Regression         - Normal distribution           - Regress		
- Functions of several variables         - partial derivative and extremal values         Multidimensional integral calculus         - 2D-integrals in cartesian and polar coordinates         - 3D-integrals in cartesian, zylinder- and spherical coordinates         - Applications         - line integrals, line parametrization         Integral transforms         - Fourier transform         - Laplace transform         - Laplace transform         - Linear Differential Equations         - Introduction, basic concepts, equations 1st order         - Linear Differential Equations of 2nd (and higher) order with constant coefficients         - Systems of linear Differential Equations of 1st order with constant Coefficients         Stochastics         - Regression         - Normal distribution         - A glimpse on Statistical inference         Course type       4L - 2E - 0S - 0P (Lecture, Exercises, Seminar, practical course)         Learning Material       Exercises with solutions, worksheets         Recommended       Papula, Mathematische Formeln         Hartung, Elpeit, Klösener: Statistik, Lehr- und Handbuch der angewandte Statistik, DeGruyter (2012)         Method(s) of instruction/       Lecture, supplemented by exercises         Summer/Winter       supmer term         Summer/Winter       suppl		After succesfull participation at the module Mathematik 3 the students are able to apply the methods which are taught in the areas which are content of the module. Further, they posess the Abbility to successfully apply the
Course type4L - 2E - 0S - 0P(Lecture, Exercises, Seminar, practical course)Learning MaterialExercises with solutions, worksheetsRecommendedPapula, Mathematik für Ingenieure und Naturwissenschaftler, Bd. 1-3literatureBd. 1-3Preuß/Wenisch, Lehr- und Übungsbuch Mathematik, Bd. 1-2 Papula, Mathematische Formelsammlung Bartsch, Mathematische Formeln Hartung, Elpelt, Klösener: Statistik, Lehr- und Handbuch der angewandte Statistik, DeGruyter (2012)Method(s) of instruction/ media being usedLecture, supplemented by exercisesLevel/ category1(Bachelor=1, Master=2)Summer/ Winter2nd term	Module content	Multidimensional differential calculus - Functions of several variables - partial derivative and extremal values Multidimensional integral calculus - 2D-integrals in cartesian and polar coordinates - 3D-integrals in cartesian, zylinder- and spherical coordinates - Applications - Inie integrals, line parametrization Integral transforms - Fourier transform - Laplace transform Ordinary Differential Equations - Introduction, basic concepts, equations 1st order - Linear Differential Equations of 2nd (and higher) order with constant coefficients - Systems of linear Differential Equations of 1st order with constant Coefficients - Basic concept of descritive Statistics - Correlation - Regression - Normal distribution
Learning MaterialExercises with solutions, worksheetsRecommendedPapula, Mathematik für Ingenieure und Naturwissenschaftler, Bd. 1-3literatureBd. 1-3Preuß/Wenisch, Lehr- und Übungsbuch Mathematik, Bd. 1-2 Papula, Mathematische Formelsammlung Bartsch, Mathematische Formeln Hartung, Elpelt, Klösener: Statistik, Lehr- und Handbuch der angewandte Statistik, DeGruyter (2012)Method(s) of instruction/ media being usedLecture, supplemented by exercisesLevel/ category1(Bachelor=1, Master=2)Summer/Wintersummer termTerm2nd term	Course type	
Recommended literature       Papula, Mathematik für Ingenieure und Naturwissenschaftler, Bd. 1-3         Preuß/Wenisch, Lehr- und Übungsbuch Mathematik, Bd. 1-2         Papula, Mathematische Formelsammlung         Bartsch, Mathematische Formeln         Hartung, Elpelt, Klösener: Statistik, Lehr- und Handbuch der angewandte Statistik, DeGruyter (2012)         Method(s) of instruction/ media being used         Level/ category       1 (Bachelor=1, Master=2)         Summer/Winter       summer term         Term       2nd term		
instruction/ media being used Level/ category 1 (Bachelor=1, Master=2) Summer/ Winter summer term Term 2nd term	Recommended literature	Papula, Mathematik für Ingenieure und Naturwissenschaftler, Bd. 1-3 Preuß/Wenisch, Lehr- und Übungsbuch Mathematik, Bd. 1-2 Papula, Mathematische Formelsammlung Bartsch, Mathematische Formeln Hartung, Elpelt, Klösener: Statistik, Lehr- und Handbuch der angewandten Statistik, DeGruyter (2012)
Summer/Winter         summer term           Term         2nd term	instruction/ media being used	Lecture, supplemented by exercises
Term 2nd term		
Recommended   Mathematics 1 and Mathematics 2		
requirements	requirements	
Assessment exam 120 min		
Assessment modalities PL – exam during audit period(graded)		PL – exam during audit period(graded)
ECTS credits       6         Workload       180h of total work load, thereof         90h of contact hours and       90h of self-study, consisting of:         70 h lecture (preparation and rework)       0 h practical training (preparation and evaluation)		<ul> <li>180h of total work load, thereof</li> <li>90h of contact hours and</li> <li>90h of self-study, consisting of:</li> <li>70 h lecture (preparation and rework)</li> <li>0 h practical training (preparation and evaluation)</li> </ul>
20 h exam preparation           Usability of this module         Numerical Mathematics / Optimization	Usability of this module	

Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.203
Module name	Electrical Engineering 2
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba), ATITi (Ba)
Specialization/ Profil	EAT, TI, KMT
Module coordinator	Prof. DrIng. Matthias Förster
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	The basics of alternating current technology are to be taught. After successful participation, students are able to calculate different characteristics (effective value etc.) of alternating and mixed signals (signal shapes). Students can display sine sizes using pointers and perform calculations at the complex level. You are aware the relationships of power and can be applied. Students get to know to draw local curves and understand the three-phase system
Module content	The topics of the lecture are:
	description of sinusoidal and non-sinusoidal alternating variables - network calculation for alternating currents– symbolic method – phasor diagrams – transfer locus'– energy – power – three-phase systems
Course type	2L - 2E - 0S - 2P (Lecture, Exercises, Seminar, practical course)
Learning Material	exercises, lab instruction sheets
Recommended	Führer u.a.: Grundlagen ET 1 + 2
literature	Weißgerber: Elektrotechnik für Ingenieure Bd. 1 - 3 Vömel, Zastrow: Aufgabensammlung ET 1+2 Hagmann: Grundlagen der Elektrotechnik, Aufgabensammlung zu den Grundlagen der Elektrotechnik
Method(s) of	Lecture: work on blackboard, tutorial exercises, experiments in the
instruction/	laboratory after instructions and written preparations
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	2. term
Compulsory	none
requirements	
Recommended	Elektrotechnik 1
requirements	
Assessment	exam 90 min, laboratory internship certificate
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	6
Workload	180 h of total work load, thereof
	- 90 h of contact hours
	- 90 h of self-study, consisting of:
	preparation and rework
	lecture 20 h
	exercise 20 h
	practical training 30 h (preparation and evaluation)
	exam preparation 20 h
Usability of this module	Basis for all further ET-Moduls
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.301
Module name	Circuit Design
Department	Electrical Engineering and Information Technology
Degree program	ATITi (Ba), ET/IT (Ba)
Module coordinator	Prof. Dr. Detlef Redlich
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	acquiring fundamental knowledge of design, function and application of electronic components and units including hands-on experience
Module content	- Design and properties, parameters and thresholds, typical application of
	components, diodes, bipolar and unipolar transistors, field effect transistors, thyristors, optoelectronic
	- Simulation of electronic circuits of digital and analogue technology
Course type	1L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course)
Learning Material	List will be announced during the lecture.
Recommended	B. Beetz: Elektroniksimulation mit PSpice. Vieweg-Verlag 2010
literature	
Method(s) of	lecture, practical course
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	3. term
Compulsory	none
requirements	
Recommended	Modules: Electronic Components, Electrical Engineering 1
requirements	
Assessment	course attendance certificate
Assessment modalities	SL - ungraded course work during the lecture period
ECTS credits	3
Workload	90h of total work load, thereof
	45h of contact hours and
	45h of self-study, consisting of:
	15 h lecture (preparation and rework)
	20 h practical training (preparation and evaluation)
	10 h exam preparation
Usability of this module	Design of electronic systems
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.302
Module name	Theory of Signals and Systems
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba), ATITi (Ba)
Specialization/ Profil	EAT, TI, KMT
Module coordinator	Prof. DrIng. Frank Giesecke
Compulsory/ optional/ electiv	Compulsory
Learning objectives	Learning of methods for analysis of signals and systems for use in
	specification and test of modern communication systems and the
	development of solutions in automation.
Module content	Standard signals – classification of signals - characterization of signals by
	means of statistics – properties of systems - characterization of systems –
	convolution – Fourier transform – Laplace transform – sampling theorem –
	correlation
Course type	4L – 2E – 0S – 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	lecture scripts, textbooks, tasks and solutions
Recommended	Frey, T.; Bossert, M.: Signal- und Systemtheorie
literature	Kreß, D.; Irmer, R.: Angewandte Systemtheorie
	Meyer, M.: Grundlagen der Informationstechnik
Method(s) of	lectures, exercises
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	3. term
Compulsory	none
requirements	
Recommended	Mathematics, Basics of Electrical Engineering, Basics of Computer Science
requirements	
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	6
Workload	180 h of total work load, thereof
	- 90 h of contact hours
	- 90 h of self-study, consisting of:
	preparation and rework
	lecture 30 h
	exercise 30h
I lookiliku of this model.	exam preparation 30 h
Usability of this module	Usable for modules mainly related to processing of signals, for instance
	control engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processors.
	Furthermore this module is used for the course of studies in mechatronics
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module name         Basic Measurement Techniques           Department         Electrical Engineering and Information Technology           Dagree program         ATTTi (Ba), ET/IT (Ba)           Module coordinator         Prof. Dr., Alexander Richter           Compulsory/optional/ Electriv         Compulsory           Compulsory/optional/ Electriv         Compulsory           Compulsory/optional/ electriv         Compulsory           Compulsory/optional/ electriv         Compulsory           Cherixe uncertainties in measurement - characterize and parameters of measurement devices - know electromechanical measurement devices - know electromechanical unantities (I, U, R, Z, f, t) - measure elocitical quantities (I, U, R, Z, f, t) - measure elocitical quantities (I, U, R, Z, f, t) - measure elocitical quantities (I, U, R, Z, f, t) - measure elocitical quantities (I, U, R, Z, f, t) - measure intime Domain and in Frequency Domain (FFT Analyser, Spectrum Analyser, Network Analysis) - define signals and noise. Signal-to-Noise-Ratio, Noise figure - solve simple tasks in sensoric of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration) - trundamentals of measurement devices - electromechanical quantities (I, U, R, Z, f, t) - measurement of electrical quantities (I, U, R, Z, f, t) - measurement of electrical quantities (I, U, R, Z, f, t) - measurement of olectrical quantities (I, U, R, Z, f, t) - measurement of olectrical quantities (I, U, R, Z, f, t) - mea	Module number	ET.1.303
Department         Electrical Engineering and Information Technology           Degree program         ATTFI (Ba), ETTI (Ba)           Module coordinator.         Prof. Dr. Alexander Richter           Compulsory/ optional/ electiv         Compulsory           After successful participation, the student is able to - define fundamentals of measurement (general definitions, standards, International System of Units)           - derive uncertainties in measurement devices           - know electromechanical measurement devices           - introduce Digital Measurement           - measure electrical quantities (I, U, R, Z, f, I)           - measure elicitical quantities in measurement devices           - measure circuit parameters           - measure circuit parameters           - solve simple tasks in sensoric of non-electrical quantities by electrical measure discuit parameters           - define signals and noise, Signal-to-Noise-Ratio, Noise figure           - solve simple tasks in sensoric of non-electrical quantities by electrical measurement of ancertainties in measurement           - expression of uncertainties in measurement devices           - introduction to Digital Measurement           - expression of uncertainties in measurement devices           - introduction to Digital Measurement devices           - introduction to Digital Measurement devices           - introduction to Digital Measurement devices		
Degree program         ATTI (Ba), ET/IT (Ba)           Module coordinato         Prof. Or., Alexander Richter           Compulsory/ optional/ electiv         Compulsory           Learning objectives         After successful participation, the student is able to - define fundamentals of measurement (general definitions, standards, International System of Units)           - derive uncertainties in measurement devices         - know electromechanical measurement devices           - know electromechanical quantities (I, U, R, Z, f, t)         - measure electrical quantities (I, U, R, Z, f, t)           - measure electrical quantities (I, U, R, Z, f, t)         - measure electrical quantities (I, U, R, Z, f, t)           - measure electrical quantities (I, U, R, Z, f, t)         - measure electrical quantities (I, U, R, Z, f, t)           - define signals and noise, Signal-to-Noise Fatto, Noise figure         - solve similpe tasks in sensoric of non-electrical quantities by electrical means (displacement), position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)           Module content         - fundamentals of measurement devices           - expression of uncertainties in measurement devices           - electromechanical measurement devices           - intraduction to Digital Measurement           - characteristics and parameters of measurement devices           - electromechanical quantities (I, U, R, Z, f, t)           - measurement of incel quantities (I, U, R, Z, f, t)		
Module coordinator         Prof. Dr. Alexander Richter           Compulsory optional/ electiv         Compulsory           Learning objectives         After successful participation, the student is able to - define fundamentals of measurement (general definitions, standards, International System of Units) - define fundamentals of measurement devices - know electromechanical measurement devices - know electromechanical measurement devices - know electromechanical measurement devices - know electromechanical measurement devices - measure electrical quantities (I, U, R, Z, f, 1) - measure electrical quantities (I, U, R, Z, f, 1) - measure electrical quantities (I, U, R, Z, f, 1) - measure electrical quantities (I, U, R, Z, f, 1) - measure electrical quantities (I, U, R, Z, f, 1) - measure electrical quantities (I, U, R, Z, f, 1) - measure electrical quantities (I, U, R, Z, f, 1) - measurement devices - electromechanical measurement (general definitions, standards, International System of Units) - expression of uncertainties in measurement devices - introduction to Digital Measurement (I) - econsurement of electrical quantities (I, U, R, Z, f, 1) - measurement of electrical quantities (I, U, R, Z, f, 1) - measurement of electrical quantities (I, U, R, Z, f, 1) - measurement of electrical quantities (I, U, R, Z, f, 1) - measurement of electrical quantities (I, U, R, Z, f, 1) - measurement of electrical quantities (I, U, R, Z, f, 1) - measurement of electrical quantities (I, U, R, Z, f, 1) - measurement of electrical quantities (I, U, R, Z, f, 1) - measurement		
electiv         After successful participation, the student is able to - define fundamentals of measurement (general definitions, standards, International System of Units) - derive uncertainties in measurement devices - know electronechanical measurement devices - introduce Digital Measurement - characterize and parameters of measurement devices - introduce Digital Measurement - measure electrical quantities (I, U, R, Z, f, t) - measure electrical quantities (I, U, R, Z, f, t) - measure circuit parameters - measure circuit parameters - measure circuit parameters - measure circuit parameters - measure in Time Domain and in Frequency Domain (FFT Analyser, Spectrum Analyser, Network Analysis) - define signals and noise, Signal-to-Noise-Ratio, Noise figure - solve simlpe tasks in sensoric of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)           Module content         - fundamentals of measurement (general definitions, standards, International System of Units) - expression of uncertainties in measurement - characteristics and parameters of measurement - measurement of electrical quantities (I, U) - oscilloscopes - introduction to Digital Measurement - measurement of electrical quantities (I, U, R, Z, f, t) - measurement of electrical quantities (I, U, R, Z, f, t) - measurement of circuit parameters - measurement of non-electrical quantities by electrical level, correlated signals) - measurement of non-electrical quantities by electrical level, correlated signals) - measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)           Course type         3th Term: 2L = 1E = OS = 1P (ET 1.303.2) (Lecture, Exercises, Seminar, practical course)         Lecture, theoretic	Module coordinator	
Learning objectives         After successful participation, the student is able to - define fundamentals of measurement (general definitions, standards, International System of Units) - derive uncertainties in measurement devices - know electromechanical measurement devices - introduce Digital Measurement - handle oscilloscopes - measure electrical quantities (I, U, R, Z, f, t) - measure intercical quantities (I, U, R, Z, f, t) - measure intercical quantities (I, U, R, Z, f, t) - measure intercical quantities (I, U, R, Z, f, t) - measure intercical quantities (I, U, R, Z, f, t) - measure intercical quantities (I, U, R, Z, f, t) - measure intercical quantities (I, U, R, Z, f, t) - measure intercical quantities to electrical quantities by electrical means (in Enternial and qgas humidity, vibration) - fundamentals of measurement (general definitions, standards, International System of Units) - expression of uncertainties in measurement devices - introduction to Digital Measurement - characteristics and parameters of measurement devices - introduction to Digital Measurement - measurement of circuit parameters - me	Compulsory/ optional/	
- define fundamentals of measurement (general definitions, standards, International System of Units)           - derive uncertainties in measurement           - characterize and parameters of measurement devices           - know electromechanical measurement devices           - introduce Digital Measurement           - measure electrical quantities (I, U, R, Z, I, t)           - measure electrical quantities (I, U, R, Z, I, t)           - measure circuit parameters           - emeasure circuit parameters           - ove simple tasks in sensoric of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)           Module content         - fundamentals of measurement (general definitions, standards, international System of Units)           - expression of uncertainties in measurement         - expression of uncertainties in measurement           - expression of uncertainties in measurement evices         - introduction to Digital Measurement           - measurement of electrical quantities (I, U, R, Z, f, t)         - measurement of clicuit parameters           - measurement of clicuit parameters         - measurement of clicuit parameters           - introduction to Digital Measurement (davanced level, correlated signals)         - measurement of clicuit parameters           - introduction to Digital Measurement (davanced	electiv	
International System of Units)         - derive uncertainties in measurement         - characterize and parameters of measurement devices         - know electromechanical measurement devices         - introduce Digital Measurement         - measure electrical quantities (I, U, R, Z, f, t)         - measure introduce Digital Measurement         - measure introduce Digital Measurement         - measure introduce Digital Measurement         - define signals and noise. Signal-to-Noise-Ratio, Noise figure         - solve simlpe tasks in sensoric of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)         Module content       - fundamentals of measurement (general definitions, standards, International System of Units)         - expression of uncertainties in measurement devices       - electromechanical measurement devices         - introduction to Digital Measurement       - measurement of electrical quantities (I, U, R, Z, f, t)         - measurement of electrical quantities (I, U, R, Z, f, t)       - measurement of electrical quantities (I, U, R, Z, f, t)         - measurement of orn-electrical quantities by electrical measure, (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)         Course type       3th Term: 2L - 1E - 0S - 1P (ET.1.303.2)         - measurement of non-electrical quantities by electrical means (displac	Learning objectives	
- derive uncertainties in measurement         - characterize and parameters of measurement devices         - know electromechanical measurement devices         - introduce Digital Measurement         - handle oscilloscopes         - measure circuit parameters         - measure circuit parameters         - measure circuit parameters         - measure circuit parameters         - solve simple tasks in sensoric of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)         Module content       - fundamentals of measurement (general definitions, standards, International System of Units)         - expression of uncertainties in measurement       - characterize and anameters of measurement         - characterize and of electrical quantities (I, U, R, Z, f, t)       - measurement of electrical quantities (I, U, R, Z, f, t)         - measurement of electrical quantities (I, U, R, Z, f, t)       - measurement of circuit parameters         - expression of uncertainties in measurement (advanced level, correlated signals)       - signals and noise, Signal-Io-Noise-Ratio, Noise figure         - expression of uncertainties in measurement (advanced level, correlated signals)       - signals and noise, Signal-Io-Noise-Ratio, Noise figure         - expression of uncertainties in measurement (advanced level, correlated signals)       - measurement of electrical quantities (I, U, R, Z, f, t)		
- characterize and parameters of measurement devices         - know electromical measurement devices         - introduce Digital Measurement         - handle oscilloscopes         - measure circuit parameters         - measure in Time Domain and in Frequency Domain (FFT Analyser, Spectrum Analyser, Network Analysis)         - define signals and noise, Signal-to-Noise-Ratio, Noise figure         - solve simiple tasks in sensoric of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)         Module content       - fundamentals of measurement (general definitions, standards, International System of Units)         - expression of uncertainties in measurement devices       - electromechanical measurement devices         - electromechanical measurement devices       - introduction to Digital Measurement         - measurement of electrical quantities (I, U)       - oscilloscopes         - measurement of electrical quantities (I, U)       - oscilloscopes         - measurement of onon-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)         Course type       3th Term: L - 1E - 0S - 1P (ET.1.303.2)         Course type       3th Term: L - 1E - 0S - 1P (ET.1.303.2)         Course type       3th Term: L - 1E - 0S - 1P (ET.1.303.2)         Method(s) of Lecture, theo		•
<ul> <li>know electromechanical measurement devices</li> <li>introduce Digital Measurement</li> <li>handle oscilloscopes</li> <li>measure electrical quantities (I, U, R, Z, f, t)</li> <li>measure in Time Domain and in Frequency Domain (FFT Analyser, Spectrum Analyser, Network Analysis)</li> <li>define signals and noise, Signal-to-Noise-Ratio, Noise figure</li> <li>solve simple tasks in sensoric of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)</li> <li>fundamentals of measurement (general definitions, standards, International System of Units)</li> <li>expression of uncertainties in measurement</li> <li>electromechanical measurement devices</li> <li>electromechanical measurement (general definitions, standards, International System of Directrical quantities (I, U)</li> <li>oscilloscopes</li> <li>measurement of circuit parameters</li> <li>measurement of circuit parameters</li> <li>signals and noise, Signal-to-Noise-Ratio, Noise figure</li> <li>expression of uncertainties in measurement (advanced level, correlated signals)</li> <li>signals and noise, Signal-to-Noise-Ratio, Noise figure</li> <li>expression of uncertainties in measurement (advanced level, correlated signals)</li> <li>measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)</li> <li>therm: 2L - 1E - 0S - 1P (ET.1.303.2) (Lecture, Exercises, Seminar, practical course)</li> <li>Learning Material</li> <li>Script, worksheets, L</li></ul>		
- introduce Digital Measurement         - handle oscilloscopes         - measure electrical quantities (I, U, R, Z, f, t)         - measure in Time Domain and in Frequency Domain (FFT Analyser, Spectrum Analyser, Network Analysis)         - define signals and noise. Signal-to-Noise-Ratio, Noise figure         - solve similpe tasks in sensoric of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)         Module content       - fundamentals of measurement general definitions, standards, linternational System of Units)         - expression of uncertainties in measurement devices       - electromechanical measurement devices         - electromechanical measurement devices       - electromechanical measurement devices         - introduction to Digital Measurement       - measurement of electrical quantities (I, U)         - oscilloscopes       - measurement of electrical quantities (I, U)         - measurement of of cloud parameters       - measurement of electrical quantities (I, UR, Z, f, t)         - measurement of of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)         Course type       3th Term: 2L - 1E - 0S - 1P (ET.1.303.2)         Course type       3th Term: 2L - 1E - 0S - 1P (ET.1.303.2)         Course type       Tränkler, R, "Taschenbuch der Messtechnik", Alanser, 2007 </td <td></td> <td></td>		
<ul> <li>handle oscilloscopes</li> <li>measure electrical quantities (I, U, R, Z, f, t)</li> <li>measure circuit parameters</li> <li>measure circuit parameters</li> <li>measure in Time Domain and in Frequency Domain (FFT Analyser, Spectrum Analyser, Network Analysis)</li> <li>define signals and noise, Signal-to-Noise-Ratio, Noise figure</li> <li>solve simple tasks in sensoric of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)</li> <li>fundamentals of measurement (general definitions, standards, International System of Units)</li> <li>expression of uncertainties in measurement</li> <li>expression of uncertainties (I, U)</li> <li>oscilloscopes</li> <li>introduction to Digital Measurement</li> <li>ensaurement of electrical quantities (I, U)</li> <li>oscilloscopes</li> <li>measurement of circuit parameters</li> <li>measurement of circuit parameters</li> <li>measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)</li> <li>measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)</li> <li>measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)</li> <li>measurement of sol – 1P (ET.1.303.1)</li> <li>4th Term: 2L – 1E – 0S – 1P (ET.1.303.2) (Lecture, Exercises, Seminar, practical course)</li> <li>Learning Material</li> <li>Script, worksheets, lab instruction sheets</li> <li>Recommended</li> <li>Trakker, R., "Taschenbuck der Messtechnik", Teubner, 2001</li> <li>Partier, R., Messtechnik", Vieweg, 2001</li> <li>Adunka, F., Messunsi</li></ul>		
- measure electrical quantities (I, U, R, Z, f, t)           - measure in Time Domain and in Frequency Domain (FFT Analyser, Spectrum Analyser, Network Analysis)           - define signals and noise, Signal-to-Noise-Ratio, Noise figure           - solve simipe tasks in sensoric of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)           Module content         - fundamentals of measurement (general definitions, standards, International System of Units)           - expression of uncertainties in measurement devices         - electromechanical measurement (general definitions, standards, Introduction to Digital Measurement           - measurement of electrical quantities (I, U)         - osciloscopes           - measurement of electrical quantities (I, U)         - osciloscopes           - measurement of electrical quantities in measurement (edvanced level, correlated signals)         - signals and noise, Signal-to-Noise-Ratio, Noise figure           - expression of uncertainties in measurement (advanced level, correlated signals)         - measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)           Course type         3th Term: 2L - 1E - OS - 1P (ET.1.303.1) 4th Term: 2L - 1E - OS - 1P (ET.1.303.2) (Lecture, Exercises, Seminar, practical course)           Learning Material         Script, worksheets, lab instruction sheets           Recommended         Tränk		
<ul> <li>measure in Time Domain and in Frequency Domain (FFT Analyser, Spectrum Analyser, Network Analysis)         <ul> <li>define signals and noise, Signal-to-Noise-Ratio, Noise figure</li> <li>solve simple tasks in sensoric of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)</li> </ul> </li> <li>fundamentals of measurement (general definitions, standards, International System of Units)         <ul> <li>expression of uncertainties in measurement devices</li> <li>electromechanical measurement devices</li> <li>electromechanical measurement devices</li> <li>introduction to Digital Measurement</li> <li>measurement of electrical quantities (1, U)</li> <li>oscilloscopes</li> <li>measurement of electrical quantities (1, U, R, Z, f, t)</li> <li>measurement of electrical quantities by electrical means (displacement) on origital-to-Noise-Ratio, Noise figure</li> <li>expression of uncertainties in measurement (advanced level, correlated signals)</li> <li>measurement of noise, Signal-to-Noise-Ratio, Noise figure</li> <li>expression of uncertainties in measurement (advanced level, correlated signals)</li> <li>measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)</li> </ul> </li> <li>Course type         <ul> <li>3th Term: 2L – 1E – 0S – 1P (ET.1.303.1)</li> <li>4th Term: 2L – 1E – 0S – 1P (ET.1.303.2)</li> <li>(Lecture, Exercises, Seminar, practical course)</li> <li>brifter, F, "Elektronische Messtechnik", Teubner, 2001 Partier, R, "Messtechnik", Vieweg, 2001 Adurka, F, " Messtechnik", Vieweg, 2001 Partier, R, "Messtechnik", Vieweg, 2</li></ul></li></ul>		
- measure in Time Domain and in Frequency Domain (FFT Analyser, Spectrum Analyser, Network Analysis)           - define signals and noise, Signal-to-Noise-Ratio, Noise figure           - solve simipe tasks in sensoric of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)           Module content         - fundamentals of measurement (general definitions, standards, International System of Units)           - expression of uncertainties in measurement devices         - electromechanical measurement devices           - introduction to Digital Measurement         - characteristics and parameters of measurement devices           - introduction to Digital Measurement         - measurement of electrical quantities (I, U)           - oscilloscopes         - measurement of electrical quantities (I, U)           - solidoscopes         - measurement of circuit parameters           - measurement of circuit parameters         - measurement of sectrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)           Course type         3th Term: 2L – 1E – 0S – 1P (ET.1.303.2)         (Lecture, Exercises, Seminar, practical course)           - practical course)         Script, worksheets, lab instruction sheets         - Script, worksheets, lab instruction sheets           Recommended         Tränkler, R, "Taschenbuch der Messtechnik", Hanser, 2007         Midmkn, T. "Einf		
<ul> <li>- define signals and noise. Signal-to-Noise-Ratio, Noise figure         <ul> <li>solve simipe tasks in sensoric of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)</li> </ul> </li> <li>Module content         <ul> <li>- fundamentals of measurement (general definitions, standards, International System of Units)</li></ul></li></ul>		
<ul> <li>- solve simlipe tasks in sensoric of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)</li> <li>Module content</li> <li>- fundamentals of measurement (general definitions, standards, International System of Units)         <ul> <li>- expression of uncertainties in measurement</li> <li>- characteristics and parameters of measurement devices</li> <li>- electromechanical measurement devices</li> <li>- electromechanical measurement devices</li> <li>- introduction to Digital Measurement</li> <li>- measurement of electrical quantities (I, U), R, Z, f, t)</li> <li>- measurement of electrical quantities (I, U, R, Z, f, t)</li> <li>- measurement of circuit parameters</li> <li>- measurement of non-electrical quantities by electrical means</li> <li>- signals and noise, Signal-to-Noise-Ratio, Noise figure</li> <li>- expression of uncertainties in measurement (advanced level, correlated signals)</li> <li>- measurement of non-electrical quantities by electrical means</li> <li>(displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)</li> </ul> </li> <li>Course type         <ul> <li>3th Term: 2L – 1E – 0S – 1P (ET.1.303.1)</li> <li>4th Term: 2L – 1E – 0S – 1P (ET.1.303.2)</li> <li>(Lecture, Exercises, Seminar, practical course)</li> </ul> </li> <li>Learning Material Script, worksheets, lab instruction sheets</li> <li>Recommended</li> <li>Tränkler, R., "Taschenbuch der Messtechnik", Oldenbourg, 1996</li> <li>Schrüfer, R., "Messtechnik", Vieweg, 2001</li> <li>Partier, R., Messtechnik", Vieweg, 2001</li> <li>Partier, R., Messtechnik", Vieweg, 2001</li></ul>		
means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)           Module content         Fundamentals of measurement (general definitions, standards, International System of Units)           - expression of uncertainties in measurement devices         - electromechanical measurement devices           - electromechanical measurement devices         - electromechanical measurement devices           - introduction to Digital Measurement         - measurement of electrical quantities (I, U)           - oscilloscopes         - measurement of electrical quantities (I, U, R, Z, f, t)           - measurement of clectrical quantities (I, U, R, Z, f, t)         - measurement of clectrical quantities (I, U, R, Z, f, t)           - measurement of on-clectrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)           Course type         3th Term: 2L – 1E – 0S – 1P (ET.1.303.1)           - there, Tei, worksheets, lab instruction sheets           Recommended         Tränkler, R, Taschenbuch der Messtechnik", Oldenbourg, 1996           Schrüfer, E, "Elektronische Messtechnik", Hanser, 2007           Mühl, T.: "Einführung in die elektrische Messtechnik", Teubner, 2001           Partier, R, "Messtechnik", Vieweg, 2001           Adunka, F, "Messunsicherheiten, Vulkan, 1998           DIN V ENV 13005. "Leifraden Angabe der Unsicherheit beim Messen", 1999		
temperature, material and gas humidity, vibration)           Module content         - fundamentals of measurement (general definitions, standards, International System of Units)           - expression of uncertainties in measurement         - characteristics and parameters of measurement devices           - electromechanical measurement devices         - introduction to Digital Measurement           - measurement of electrical quantities (I, U)         - oscilloscopes           - measurement of electrical quantities (I, U, R, Z, f, t)         - measurement of electrical quantities (I, U, R, Z, f, t)           - measurement of non-electrical quantities by electrical means         - signals and noise, Signal-to-Noise-Ratio, Noise figure           - expression of uncertainties in measurement (advanced level, correlated signals)         - measurement of non-electrical quantities by electrical means           (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)           Course type         3th Term: 2L – 1E – 0S – 1P (ET.1.303.1)           4th Term: 2L – 1E – 0S – 1P (ET.1.303.2)         (Lecture, Exercises, Seminar, practical course)           Learning Material         Script, worksheets, lab instruction sheets           Recommended         Tränkler, R, "Taschenbuch der Messtechnik", Oldenbourg, 1996           Iterature         Schrüfer, E, "Elektronische Messtechnik", Oldenbourg, 1996           DIN V ENV 13005: "Leiftaden Angabe der Unsicherheit beim Messen", 1		
Module content       - fundamentals of measurement (general definitions, standards, International System of Units)         - expression of uncertainties in measurement       - characteristics and parameters of measurement devices         - electromechanical measurement devices       - introduction to Digital Measurement         - measurement of electrical quantities (I, U)       - oscilloscopes         - measurement of circuit parameters       - measurement of circuit parameters         - measurement of incertainties in measurement (advanced level, correlated signals)       - signals and noise, Signal-to-Noise-Ratio, Noise figure         - expression of uncertainties in measurement (advanced level, correlated signals)       - measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)         Course type       3th Term: 2L – 1E – 0S – 1P (ET.1.303.1)         4th Term: 2L – 1E – 0S – 1P (ET.1.303.2)       (Lecture, Exercises, Seminar, practical course)         Learning Material       Script, worksheets, lab instruction sheets         Recommended       Tränkler, R., "Taschenbuch der Messtechnik", Oldenbourg, 1996         Schrüfer, E., "Elektronische Messtechnik", Hanser, 2007       Mühl, T.: "Einführung in die elektrische Messtechnik", Teubner, 2001         Partier, R., Messucchnik", Vieweg, 2001       Adunka, F., Messucchnik", Vieweg, 2001         Method(s) of       Lecture, theoretical exercises, practical		
International System of Units)           - expression of uncertainties in measurement           - characteristics and parameters of measurement devices           - electromechanical measurement devices           - introduction to Digital Measurement           - measurement of electrical quantities (I, U)           - oscilloscopes           - measurement of electrical quantities (I, U, R, Z, f, t)           - measurement of circuit parameters           - measurement in Time Domain and in Frequency Domain (FFT Analyser, Spectrum Analyser, Network Analysis)           - signals and noise, Signal-to-Noise-Ratio, Noise figure           - expression of uncertainties in measurement (advanced level, correlated signals)           - measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)           Course type         3th Term: 2L - 1E - OS - 1P (ET.1.303.2)           (Lecture, Exercises, Seminar, practical course)         Learning Material           Script, worksheets, lab instruction sheets         Tränkler, R, "Taschenbuch der Messtechnik", Oldenbourg, 1996           Schrüfer, E., "Elektronische Messtechnik", Houbner, 2001         Partier, R, "Messuscherheiten, Vulkan, 1998           DIN V ENV 13005: _Leifraden Angabe der Unsicherheit beim Messen", 1999         Method(s) of instruction/ material exercises, practical course           Interterm and summer term	Madula content	
<ul> <li>expression of uncertainties in measurement</li> <li>characteristics and parameters of measurement devices</li> <li>electromechanical measurement devices</li> <li>introduction to Digital Measurement</li> <li>measurement of electrical quantities (I, U)</li> <li>oscilloscopes</li> <li>measurement of circuit parameters</li> <li>signals and noise, Signal-to-Noise-Ratio, Noise figure</li> <li>expression of uncertainties in measurement (advanced level, correlated signals)</li> <li>signals and noise, Signal-to-Noise-Ratio, Noise figure</li> <li>expression of uncertainties in measurement (advanced level, correlated signals)</li> <li>measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)</li> </ul> Course type 3th Term: 2L – 1E – OS – 1P (ET.1.303.2) (Lecture, Exercises, Seminar, practical course) Learning Material Script, worksheets, lab instruction sheets Recommended Tränkler, R, "Taschenbuch der Messtechnik", Oldenbourg, 1996 Schrüfer, E, "Elektronische Messtechnik", Heubner, 2001 Partier, R, "Messucchnik", Vieweg, 2001 Adunka, F., Messucchnik", Viewe	Module content	
<ul> <li>characteristics and parameters of measurement devices         <ul> <li>electromechanical measurement devices</li> <li>introduction to Digital Measurement</li> <li>measurement of electrical quantities (I, U)</li> <li>oscilloscopes</li> <li>measurement of electrical quantities (I, U, R, Z, f, t)</li> <li>measurement of electrical quantities (I, U, R, Z, f, t)</li> <li>measurement of circuit parameters</li> <li>measurement of circuit parameters</li> <li>measurement of circuit parameters</li> <li>signals and noise, Signal-to-Noise-Ratio, Noise figure</li> <li>expression of uncertainties in measurement (advanced level, correlated signals)</li> <li>signals and noise, Signal-to-Noise-Ratio, Noise figure</li> <li>expression of uncertainties in measurement (advanced level, correlated signals)</li> <li>measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)</li> </ul> </li> <li>Course type         <ul> <li>3th Term: 2L – 1E – 0S – 1P (ET.1.303.1)</li> <li>4th Term: 2L – 1E – 0S – 1P (ET.1.303.2)</li> <li>(Lecture, Exercises, Seminar, practical course)</li> </ul> </li> <li>Learning Material Script, worksheets, lab instruction sheets</li> <li>Recommended Tränkler, R, "Taschenbuch der Messtechnik", Oldenbourg, 1996</li> <li>Schrüfer, E., "Elektronische Messtechnik", Teubner, 2001</li> <li>Partier, R, "Messtechnik", Vieweg, 2001</li> <li>Adunka, F., Messunsicherheiten, Vulkan, 1998</li> <li>DIN V ENV 13005: "Leifraden Angabe der Unsicherheit beim Messen", 1999</li> </ul> <li>Method(s) of         <ul> <li>Lecture, theoretical exercises, practical course</li> <li< td=""><td></td><td></td></li<></ul></li>		
- electromechanical measurement devices         - introduction to Digital Measurement         - measurement of electrical quantities (I, U)         - oscilloscopes         - measurement of circuit parameters         - measurement of circuit parameters         - measurement of non-electrical quantities by electrical means         - signals and noise, Signal-to-Noise-Ratio, Noise figure         - expression of uncertainties in measurement (advanced level, correlated signals)         - measurement of non-electrical quantities by electrical means         (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)         Course type       3th Term: 2L - 1E - 0S - 1P (ET.1.303.1)         4th Term: 2L - 1E - 0S - 1P (ET.1.303.2)       (Lecture, Exercises, Seminar, practical course)         Learning Material       Scipt, worksheets, lab instruction sheets         Recommended       Tränkler, R, "Taschenbuch der Messtechnik", Oldenbourg, 1996         Schrüfer, E, "Elektronische Messtechnik", Teubner, 2001         Patrier, R, "Messtechnik", Vieweg, 2001         Adunka, F, "Messtechnik", Vieweg, 2001		
<ul> <li>introduction to Digital Measurement</li> <li>measurement of electrical quantities (I, U)</li> <li>oscilloscopes</li> <li>measurement of circuit parameters</li> <li>measurement in Time Domain and in Frequency Domain (FFT Analyser, Spectrum Analyser, Network Analysis)</li> <li>signals and noise, Signal-to-Noise-Ratio, Noise figure</li> <li>expression of uncertainties in measurement (advanced level, correlated signals)</li> <li>measurement in Time Domain diges humidity, vibration)</li> </ul>		
- measurement of electrical quantities (I, U)         - oscilloscopes         - measurement of electrical quantities (I, U, R, Z, f, t)         - measurement of circuit parameters         - measurement in Time Domain and in Frequency Domain (FFT Analyser, Spectrum Analyser, Network Analysis)         - signals and noise, Signal-to-Noise-Ratio, Noise figure         - expression of uncertainties in measurement (advanced level, correlated signals)         - measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)         Course type       3th Term: 2L - 1E - OS - 1P (ET.1.303.2)         (Lecture, Exercises, Seminar, practical course)       Learning Material         Recommended       Tränkler, R, "Taschenbuch der Messtechnik", Oldenbourg, 1996         Schrüfer, E, "Elektronische Messtechnik", Hanser, 2007         Mühl, T.: "Einführung in die elektrische Messtechnik", Teubner, 2001         Adunka, F, " Messunsicherheiten, Vulkan, 1998         DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999         Method(S) of       Lecture, theoretical exercises, practical course         instruction/       Lecture, theoretical exercises, practical course         Summer/ Winter       winter term and summer term         Term       3th and 4th term         Compulsory       none		
- measurement of electrical quantities (I, U, R, Z, f, t)         - measurement in Time Domain and in Frequency Domain (FFT Analyser, Spectrum Analyser, Network Analysis)         - signals and noise, Signal-to-Noise-Ratio, Noise figure         - expression of uncertainties in measurement (advanced level, correlated signals)         - measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)         Course type       3th Term: 2L - 1E - 0S - 1P (ET.1.303.1)         4th Term: 2L - 1E - 0S - 1P (ET.1.303.2)       (Lecture, Exercises, Seminar, practical course)         Learning Material       Script, worksheets, lab instruction sheets         Recommended       Tränkler, R, "Taschenbuch der Messtechnik", Oldenbourg, 1996         Schrüfer, E, "Elektronische Messtechnik", Oldenbourg, 1996         Schrüfer, E, "Bestechnik", Vieweg, 2001         Adunka, F, "Messuschenkeiten, Vulkan, 1998         DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999         Method(s) of         Level/ category       1         1       (Bachelor=1, Master=2)         Summer/ Winter       winter term and summer term         Term       3th and 4th term         Compulsory       none         Recommended       Mathematics, Physics, Electrical Engineering         requirements <td></td> <td>- measurement of electrical quantities (I, U)</td>		- measurement of electrical quantities (I, U)
<ul> <li>measurement of circuit parameters         <ul> <li>measurement in Time Domain and in Frequency Domain (FFT Analyser, Spectrum Analyser, Network Analysis)             <ul></ul></li></ul></li></ul>		
<ul> <li>measurement in Time Domain and in Frequency Domain (FFT Analyser, Spectrum Analyser, Network Analysis)         <ul> <li>signals and noise, Signal-to-Noise-Ratio, Noise figure</li> <li>expression of uncertainties in measurement (advanced level, correlated signals)</li> <li>measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)</li> </ul> </li> <li>Course type 3th Term: 2L – 1E – 0S – 1P (ET.1.303.1)         <ul> <li>4th Term: 2L – 1E – 0S – 1P (ET.1.303.2)</li> <li>(Lecture, Exercises, Seminar, practical course)</li> </ul> </li> <li>Learning Material Script, worksheets, lab instruction sheets</li> <li>Recommended Tränkler, R, "Taschenbuch der Messtechnik", Oldenbourg, 1996 Schrüfer, E, "Elektronische Messtechnik", Hanser, 2007 Mühl, T.: "Einführung in die elektrische Messtechnik", Teubner, 2001 Partier, R, "Messunsicherheiten, Vulkan, 1998 DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999 Method(s) of Lecture, theoretical exercises, practical course</li> </ul> <li>Method(s) of Lecture, theoretical exercises, practical course</li> <li>Mumer/ Winter winter term and summer term Term 3th and 4th term none none nequirements</li> <li>Recommended Mathematics, Physics, Electrical Engineering</li> <li>Assessment modalities PL – exam during audit period(graded)</li> <li>Further Information The module examination consists of a written test at the end of the 4th</li>		
Spectrum Analyser, Network Analysis)       - signals and noise, Signal-to-Noise-Ratio, Noise figure         - expression of uncertainties in measurement (advanced level, correlated signals)       - measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)         Course type       3th Term: 2L – 1E – 0S – 1P (ET.1.303.1)         4th Term: 2L – 1E – 0S – 1P (ET.1.303.2)       (Lecture, Exercises, Seminar, practical course)         Learning Material       Script, worksheets, lab instruction sheets         Recommended       Tränkler, R., "Taschenbuch der Messtechnik", Oldenbourg, 1996         Schrüfer, E, "Elektronische Messtechnik", Hanser, 2007         Mühl, T.:., "Einführung in die elektrische Messtechnik", Teubner, 2001         Partier, R, "Messuchnik", Vieweg, 2001         Adunka, F., "Messunsicherheiten, Vulkan, 1998         DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999         Method(s) of instruction/         media being used         Level/ category       1         Bachelor=1, Master=2)         Summer/ Winter       winter term and summer term         Term       3th and 4th term         Compulsory       none         requirements       exam 120 min, Laboratory internship certificate         Assessment       exam 120 min, Laboratory internshi		
- signals and noise, Signal-to-Noise-Ratio, Noise figure         - expression of uncertainties in measurement (advanced level, correlated signals)         - measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)         Course type       3th Term: 2L – 1E – 0S – 1P (ET.1.303.1)         4th Term: 2L – 1E – 0S – 1P (ET.1.303.2)       (Lecture, Exercises, Seminar, practical course)         Learning Material       Script, worksheets, lab instruction sheets         Recommended       Tränkler, R., "Taschenbuch der Messtechnik", Oldenbourg, 1996         Schrüfer, E., "Elektronische Messtechnik", Hanser, 2007       Mühl, T.: "Einführung in die elektrische Messtechnik", Teubner, 2001         Partier, R., "Messunsicherheiten, Vulkan, 1998       DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999         Method(s) of       Lecture, theoretical exercises, practical course         instruction/       winter term and summer term         Term       3th and 4th term         Compulsory       none         requirements       Mathematics, Physics, Electrical Engineering         Recommended       Mathematics, Physics, Electrical Engineering         requirements       exam 120 min, Laboratory internship certificate         Assessment       exam 120 min, Laboratory internship certificate         Assessme		
- expression of uncertainties in measurement (advanced level, correlated signals)         - measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)         Course type       3th Term: 2L - 1E - 0S - 1P (ET.1.303.1)         4th Term: 2L - 1E - 0S - 1P (ET.1.303.2)       (Lecture, Exercises, Seminar, practical course)         Learning Material       Script, worksheets, lab instruction sheets         Recommended       Tränkler, R, "Taschenbuch der Messtechnik", Oldenbourg, 1996         Iterature       Schrüfer, E, "Elektronische Messtechnik", Hanser, 2007         Mühl, T.: "Einführung in die elektrische Messtechnik", Teubner, 2001         Partier, R, "Messunsicherheiten, Vulkan, 1998         DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999         Lecture, theoretical exercises, practical course         instruction/         media being used         Level/ category       1         Lecture, theoretical exercises, practical course         Summer/ Winter       winter term and summer term         Terquirements       none         Recommended       Mathematics, Physics, Electrical Engineering         requirements       exam 120 min, Laboratory internship certificate         Assessment       exam 120 min, Laboratory internship certificate		
signals)       - measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)         Course type       3th Term: 2L – 1E – 0S – 1P (ET.1.303.1)         4th Term: 2L – 1E – 0S – 1P (ET.1.303.2)       (Lecture, Exercises, Seminar, practical course)         Learning Material       Script, worksheets, lab instruction sheets         Recommended       Tränkler, R, "Taschenbuch der Messtechnik", Oldenbourg, 1996         Schrüfer, E, "Elektronische Messtechnik", Hanser, 2007         Mühl, T.: "Einführung in die elektrische Messtechnik", Teubner, 2001         Partier, R, "Messtechnik", Vieweg, 2001         Adunka, F, " Messunsicherheiten, Vulkan, 1998         DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999         Leevel/ category       1         Level/ category       1         Summer/ Winter       winter term and summer term         Term       3th and 4th term         Compulsory       none         requirements       Mathematics, Physics, Electrical Engineering         Assessment       exam 120 min, Laboratory internship certificate         Assessment modalities       PL – exam during audit period(graded)         Further Information       The module examination consists of a written test at the end of the 4th		
- measurement of non-electrical quantities by electrical means (displacement, position, angle, thickness of layers, force, pressure, temperature, material and gas humidity, vibration)         Course type       3th Term: 2L – 1E – 0S – 1P (ET.1.303.1) 4th Term: 2L – 1E – 0S – 1P (ET.1.303.2) (Lecture, Exercises, Seminar, practical course)         Learning Material       Script, worksheets, lab instruction sheets         Recommended       Tränkler, R, "Taschenbuch der Messtechnik", Oldenbourg, 1996         Iterature       Schrüfer, E, "Elektronische Messtechnik", Hanser, 2007         Mühl, T.: "Einführung in die elektrische Messtechnik", Teubner, 2001 Partier, R, "Messunsicherheiten, Vulkan, 1998 DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999         Method(s) of instruction/ media being used       Lecture, theoretical exercises, practical course         Level/ category       1       (Bachelor=1, Master=2)         Summer/ Winter       winter term and summer term         Term       3th and 4th term         Compulsory requirements       Mathematics, Physics, Electrical Engineering         Recommended       Mathematics, Physics, Electrical Engineering         Ressesment       exam 120 min, Laboratory internship certificate         Assessment modalities       PL – exam during audit period(graded)         Further Information       The module examination consists of a written test at the end of the 4th <td></td> <td></td>		
temperature, material and gas humidity, vibration)           Course type         3th Term: 2L - 1E - 0S - 1P (ET.1.303.1)           4th Term: 2L - 1E - 0S - 1P (ET.1.303.2)         (Lecture, Exercises, Seminar, practical course)           Learning Material         Script, worksheets, lab instruction sheets           Recommended         Tränkler, R, "Taschenbuch der Messtechnik", Oldenbourg, 1996           Schrüfer, E, "Elektronische Messtechnik", Hanser, 2007         Mühl, T.: "Einführung in die elektrische Messtechnik", Teubner, 2001           Partier, R, "Messunsicherheiten, Vulkan, 1998         DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999           Method(s) of instruction/         Lecture, theoretical exercises, practical course           Instruction/         winter term and summer term           Term         3th and 4th term           Compulsory         none           requirements         Mathematics, Physics, Electrical Engineering           Recommended         Mathematics, Physics, Electrical Engineering           requirements         exam 120 min, Laboratory internship certificate           Assessment modalities         PL – exam during audit period(graded)           Further Information         The module examination consists of a written test at the end of the 4th		
Course type       3th Term: 2L - 1E - 0S - 1P (ET.1.303.1) 4th Term: 2L - 1E - 0S - 1P (ET.1.303.2) (Lecture, Exercises, Seminar, practical course)         Learning Material       Script, worksheets, lab instruction sheets         Recommended       Tränkler, R, "Taschenbuch der Messtechnik", Oldenbourg, 1996 Schrüfer, E, "Elektronische Messtechnik", Hanser, 2007 Mühl, T.: "Einführung in die elektrische Messtechnik", Teubner, 2001 Partier, R, "Messtechnik", Vieweg, 2001 Adunka, F, "Messunsicherheiten, Vulkan, 1998 DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999         Method(s) of instruction/ media being used       Lecture, theoretical exercises, practical course         Level/ category       1       (Bachelor=1, Master=2)         Summer/ Winter       winter term and summer term         Term       3th and 4th term         Compulsory requirements       Mathematics, Physics, Electrical Engineering         Recommended requirements       Mathematics, Physics, Electrical Engineering         Assessment       exam 120 min, Laboratory internship certificate         Assessment modalities       PL – exam during audit period(graded)         Further Information       The module examination consists of a written test at the end of the 4th		
4th Term: 2L – 1E – 0S – 1P (ET.1.303.2)       (Lecture, Exercises, Seminar, practical course)         Learning Material       Script, worksheets, lab instruction sheets         Recommended       Tränkler, R, "Taschenbuch der Messtechnik", Oldenbourg, 1996         Schrüfer, E, "Elektronische Messtechnik", Hanser, 2007       Mühl, T.: "Einführung in die elektrische Messtechnik", Teubner, 2001         Partier, R, "Messunsicherheiten, Vulkan, 1998       DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999         Method(s) of instruction/       Lecture, theoretical exercises, practical course         Summer/ Winter       winter term and summer term         Term       3th and 4th term         Compulsory       none         requirements       Mathematics, Physics, Electrical Engineering         Assessment       exam 120 min, Laboratory internship certificate         Assessment modalities       PL – exam during audit period(graded)         Further Information       The module examination consists of a written test at the end of the 4th		
practical course)Learning MaterialScript, worksheets, lab instruction sheetsRecommendedTränkler, R, "Taschenbuch der Messtechnik", Oldenbourg, 1996literatureSchrüfer, E, "Elektronische Messtechnik", Hanser, 2007Mühl, T.: "Einführung in die elektrische Messtechnik", Teubner, 2001Partier, R, "Messtechnik", Vieweg, 2001Adunka, F, "Messunsicherheiten, Vulkan, 1998DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999Method(s) ofLecture, theoretical exercises, practical courseinstruction/media being usedLevel/ category1(Bachelor=1, Master=2)Summer/ Winterwinter term and summer termTerm3th and 4th termCompulsoryrequirementsRecommendedMathematics, Physics, Electrical EngineeringrequirementsAssessmentexam 120 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)Further InformationThe module examination consists of a written test at the end of the 4th	Course type	
Learning MaterialScript, worksheets, lab instruction sheetsRecommendedTränkler, R, "Taschenbuch der Messtechnik", Oldenbourg, 1996literatureSchrüfer, E, "Elektronische Messtechnik", Hanser, 2007Mühl, T.: "Einführung in die elektrische Messtechnik", Teubner, 2001Partier, R, "Messtechnik", Vieweg, 2001Adunka, F, "Messunsicherheiten, Vulkan, 1998DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999Method(s) ofInstruction/media being usedLevel/ category1(Bachelor=1, Master=2)Summer/ Winterwinter term and summer termTerm3th and 4th termCompulsorynonerequirementsRecommendedMathematics, Physics, Electrical EngineeringrequirementsAssessmentexam 120 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)Further InformationThe module examination consists of a written test at the end of the 4th		
Recommended literatureTränkler, R, "Taschenbuch der Messtechnik", Oldenbourg, 1996 Schrüfer, E, "Elektronische Messtechnik", Hanser, 2007 Mühl, T.: "Einführung in die elektrische Messtechnik", Teubner, 2001 Partier, R, "Messtechnik", Vieweg, 2001 Adunka, F, " Messunsicherheiten, Vulkan, 1998 DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999Method(s) of instruction/ media being usedLecture, theoretical exercises, practical courseLevel/ category1(Bachelor=1, Master=2)Summer/ Winterwinter term and summer termTerm3th and 4th termCompulsory requirementsnoneRecommended requirementsMathematics, Physics, Electrical EngineeringAssessmentexam 120 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)Further InformationThe module examination consists of a written test at the end of the 4th	Learning Motorial	
literatureSchrüfer, E, "Elektronische Messtechnik", Hanser, 2007 Mühl, T.: "Einführung in die elektrische Messtechnik", Teubner, 2001 Partier, R, "Messtechnik", Vieweg, 2001 Adunka, F, "Messunsicherheiten, Vulkan, 1998 DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999Method(s) of instruction/ media being usedLecture, theoretical exercises, practical courseLevel/ category1(Bachelor=1, Master=2)Summer/ Winterwinter term and summer termTerm3th and 4th termCompulsory requirementsnoneRecommended requirementsMathematics, Physics, Electrical EngineeringAssessmentexam 120 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)Further InformationThe module examination consists of a written test at the end of the 4th		
Mühl, T.: "Einführung in die elektrische Messtechnik", Teubner, 2001 Partier, R, "Messtechnik", Vieweg, 2001 Adunka, F, " Messunsicherheiten, Vulkan, 1998 DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999Method(s) of instruction/ media being usedLecture, theoretical exercises, practical courseLevel/ category1(Bachelor=1, Master=2)Summer/ Winterwinter term and summer termTerm3th and 4th termCompulsory requirementsnoneRecommended requirementsMathematics, Physics, Electrical EngineeringAssessment Assessment modalitiesexam 120 min, Laboratory internship certificateFurther InformationThe module examination consists of a written test at the end of the 4th		
Partier, R, "Messtechnik", Vieweg, 2001 Adunka, F, " Messunsicherheiten, Vulkan, 1998 DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999Method(s) of instruction/ media being usedLecture, theoretical exercises, practical courseLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter term and summer termTerm3th and 4th termCompulsory requirementsnoneRecommended requirementsMathematics, Physics, Electrical EngineeringAssessmentexam 120 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)Further InformationThe module examination consists of a written test at the end of the 4th	literature	
Adunka, F, "Messunsicherheiten, Vulkan, 1998 DIN V ENV 13005: "Leitfaden Angabe der Unsicherheit beim Messen", 1999Method(s) of instruction/ media being usedLecture, theoretical exercises, practical courseLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter term and summer termTerm3th and 4th termCompulsory requirementsnoneRecommended requirementsMathematics, Physics, Electrical EngineeringAssessmentexam 120 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)Further InformationThe module examination consists of a written test at the end of the 4th		
Method(s) of instruction/ media being usedLecture, theoretical exercises, practical courseLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter term and summer termTerm3th and 4th termCompulsory requirementsnoneRecommended requirementsMathematics, Physics, Electrical EngineeringAssessmentexam 120 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)Further InformationThe module examination consists of a written test at the end of the 4th		
instruction/       media being used         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       winter term and summer term         Term       3th and 4th term         Compulsory       none         requirements       methematics, Physics, Electrical Engineering         Recommended       Mathematics, Physics, Electrical Engineering         Assessment       exam 120 min, Laboratory internship certificate         Assessment modalities       PL – exam during audit period(graded)         Further Information       The module examination consists of a written test at the end of the 4th		
media being usedLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter term and summer termTerm3th and 4th termCompulsorynonerequirementsMathematics, Physics, Electrical EngineeringRecommended requirementsMathematics, Physics, Electrical EngineeringAssessmentexam 120 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)Further InformationThe module examination consists of a written test at the end of the 4th	Method(s) of	Lecture, theoretical exercises, practical course
Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       winter term and summer term         Term       3th and 4th term         Compulsory       none         requirements       Mathematics, Physics, Electrical Engineering         Recommended       Mathematics, Physics, Electrical Engineering         requirements       exam 120 min, Laboratory internship certificate         Assessment modalities       PL – exam during audit period(graded)         Further Information       The module examination consists of a written test at the end of the 4th	instruction/	
Summer/Winter       winter term and summer term         Term       3th and 4th term         Compulsory       none         requirements       none         Recommended       Mathematics, Physics, Electrical Engineering         requirements       and 120 min, Laboratory internship certificate         Assessment       exam 120 min, Laboratory internship certificate         Assessment modalities       PL – exam during audit period(graded)         Further Information       The module examination consists of a written test at the end of the 4th		
Term       3th and 4th term         Compulsory       none         requirements       none         Recommended       Mathematics, Physics, Electrical Engineering         requirements       none         Assessment       exam 120 min, Laboratory internship certificate         Assessment modalities       PL – exam during audit period(graded)         Further Information       The module examination consists of a written test at the end of the 4th		
Compulsory requirements       none         Recommended requirements       Mathematics, Physics, Electrical Engineering         Assessment       exam 120 min, Laboratory internship certificate         Assessment modalities       PL – exam during audit period(graded)         Further Information       The module examination consists of a written test at the end of the 4th		
requirements       Mathematics, Physics, Electrical Engineering         Recommended       Mathematics, Physics, Electrical Engineering         requirements       exam 120 min, Laboratory internship certificate         Assessment       exam 120 min, Laboratory internship certificate         Assessment modalities       PL – exam during audit period(graded)         Further Information       The module examination consists of a written test at the end of the 4th		
Recommended       Mathematics, Physics, Electrical Engineering         requirements       Assessment         Assessment       exam 120 min, Laboratory internship certificate         Assessment modalities       PL – exam during audit period(graded)         Further Information       The module examination consists of a written test at the end of the 4th		
requirements       exam 120 min, Laboratory internship certificate         Assessment modalities       PL – exam during audit period(graded)         Further Information       The module examination consists of a written test at the end of the 4th		Mathematics Physics Electrical Engineering
Assessmentexam 120 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)Further InformationThe module examination consists of a written test at the end of the 4th		
Assessment modalitiesPL – exam during audit period(graded)Further InformationThe module examination consists of a written test at the end of the 4th	Assessment	exam 120 min, Laboratory internship certificate
Further Information The module examination consists of a written test at the end of the 4th	Assessment modalities	
semester. In the test, students create solutuions for selected metrological	Further Information	
		semester. In the test, students create solutuions for selected metrological

	questions, and calculate various technically relevant variables and para meters based on given practical examples.
ECTS credits	9
Workload	270 h
Time	According time table
Duration of module	2 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.304
Module name	Automatic Control
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba), ATITI (Ba)
Module coordinator	Prof. DrIng. habil. Klaus-Peter Döge
Compulsory/ optional/ electiv	Compulsory
Learning objectives	Students will be enabled to analyze and evaluate simple control loop
	structures.
Module content	- Description of the system by means of differential equations and transfer
	function
	- PID controller and derivatives
	- linear transfer elements
	- investigation of stability, vibration capability and control error of control
	systems
Course type	2L - 1E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	Lecture script, collection of tasks, lab instruction sheets
Recommended	Reuter, M.; Zacher, S.: Regelungstechnik für Ingenieure, F.Vieweg-Verlag,
literature	10. Auflage, Braunschweig/Wiesbaden, 2002
	Wendt, L.: Taschenbuch der Regelungstechnik, Verlag Harri Deutsch, 3.
	Auflage, Thun/ Frankfurt 2000
Method(s) of	lab instruction sheets and collection of tasks on the Internet; CAE- Software
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	3. term
Compulsory	-linear differential equations
requirements	- calculate with complex numbers
	-matrix calculus
	-Laplace transform
Descent to t	-partial fraction decomposition
Recommended	none
requirements	
Assessment	written university exam 90 min
Assessment modalities	PL – during period of exams (graded)
ECTS credits	6
Workload	180h of total work load, thereof
	60h of contact hours and
	120h of self-study, consisting of:
	70 h lecture (preparation and rework)
	25 h practical training (preparation and evaluation) 25 h exam preparation
Usability of this module	- Modelling/ Simulation
	- Digital Control Systems
	- optimal control theory
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
	German
Language	German

Module number	ET.1.305
Module name	Digital Systems
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba), ATITi (Ba)
Module coordinator	Prof. DrIng. habil. Jürgen Kampe
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	At the end of the module students are able to understand the main digital
	signal codings. The students remember mathematical and formal forms of description as well as gate-level implementations of Boolean functions, they are able to apply the laws of Boolean algebra and Boolean algebra Rules as well as gate level minimization techniques, and they are able to design, build (assemble) and analyse basic as well as specific combinatorical circuits of computer science, measurement and automation technology. The students remember different forms of behavioral description and main models for finite state machines, and they are able to verify formal properties. The students remember several approaches of FSM state encoding, and they are able to design synchonouse and asynchronous automata, to assemble them of basic elements, and to analyse there behaviour.
	The students remember sources of dynamic errors in logic gate and in sequential circuits, and the students are able to apply principles to avoid them.
Module content	<ul> <li>Binary signals, signal coding, number systems, Boolean algebra;</li> <li>truth table, basic functions / fundamental systems;</li> <li>Boolean equations, logic minimization by equation transformation, Karnaugh-diagram, Quine-McCluskey, and K-diagram based factorization; logic synthesis and analysis;</li> <li>kombinatorical main functions for data processing purposes;</li> <li>sequential basic circuits and flip flops;</li> <li>register, counter, finite state machines (FSM), there properties, modeling by state diagrams, models for Mealy and Moore automata and the conversation into one another, synthesis and verification of synchronous and asynchronous FSM;</li> <li>dynamic behaviour of gate logic and automata;</li> <li>practical exercise on the design of gate logic and automata, including</li> </ul>
	keyboard controller, variable frequency signal generator, and pulse width modulator.
Course type	2L - 0E - 1S - 2P (Lecture, Exercises, Seminar, practical course)
Learning Material	Lecture notes, exercises, lab instruction sheets
Recommended literature	<ul> <li>K. Fricke: Digitaltechnik. Vieweg 2001</li> <li>K. Urbanski, R.Woitowitz: Digitaltechnik; Ein Lehr- und Übungs-buch. Springer 2000</li> <li>A.E.A. Almaini: Kombinatorische und sequentielle Schalt¬systeme. VCH 1989</li> <li>G. Scarbata: Synthese und Analyse Digitaler Schaltungen</li> <li>HD. Wuttke, K. Henke: Schaltsysteme: Eine Automaten-theoretische Einführung. Pearson Studium 2003</li> </ul>
Method(s) of instruction/ media being used	Lecture notes, exercises, lab instruction sheets
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	3. term
Compulsory	none
requirements	
Assessment	exam 120 min, Laboratory internship certificate
Assessment modalities	PL – exam during audit period(graded)
Further Information	The exam take place at the end of the 3rd semester. Regardless of the exam, the laboratory internship must be completed successfully.
ECTS credits	6
Workload	<ul><li>180h of total work load, thereof</li><li>75h of contact hours and</li><li>105h of self-study, consisting of:</li><li>45 h lecture (preparation and rework)</li></ul>

	25 h practical training (preparation and evaluation)
	25 h exam preparation
Usability of this module	Digital Design, Information Technology, Microprocessor Technology,
-	Embedded Systems
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.306.1
Module name	Intercultural Communication 1
Sub module	Elective Module Foreign language
Department	Electrical Engineering and Information Technology
Degree program	ATITi (Ba)
Module coordinator	Prof. Dr. Álexander Richter
Compulsory/ optional/ electiv	optional
Learning objectives	See module description.
Module content	The elective module (3 ECTS credits) offers a selection of different courses. - English for Specific Purposes (ET.2.213)
	- French
	- Russian
	- Spanish
	- Chinese
	For more detailed information consult the module descriptions.
Course type	(Lecture, Exercises, Seminar, practical course)
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	3th term
Compulsory	none
requirements	
Assessment	see module description of optional module
Assessment modalities	see module description of optional module
ECTS credits	3
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.306.2
Module name	Intercultural Communication 1
Sub module	Introduction in intercultural Communication
Department	Business Administration
Degree program	ATITi (Ba)
Module coordinator	Prof. Dr. Heiko Haase (FB BW)
Compulsory/ optional/ electiv	Compulsory
Learning objectives	The students are familiar with specific behaviorsin terms of businesscommunication and etiquettein majorcultural regions of theworld.
	As a result, they have the necessary intercultural skills order to successfully conduct business in different economic regions.
Module content	- Communicationconceptand models
	- oncept of cultureandcultural models
	- Interpersonal Communication
	- Cross-culturalstudiesofHofstede
	- Cross-culturalstudiesofHall
	- Cross-culturalstudiesofTrompenaars
	- Process ofcultural adaptation
Course type	2L - 0E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	Lecture notes, exercises andworksheets, recommended textbooks
Recommended	Schugk, Michael: Interkulturelle Kommunikation - Kulturbedingte
literature	Unterschiede in Verkauf und Werbung, Verlag Vahlen 2004.
	Heringer, Hans Jürgen: Interkulturelle Kommunikation: Grundlagen und
	Konzepte, UTB Verlag, 4. Auflage, 2014
	Bolten, Jürgen: Einführung in die Interkulturelle Wirtschaftskommunikation,
	UTB Verlag 2007.
Method(s) of	Interactive lecture with theoretical model developments and case studies in
instruction/	international business practice
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	4th term
Compulsory	none
requirements	
Assessment	term paper, case Study, presentation
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Workload	90h of total work load, thereof
	30h of contact hours and
	60h of self-study, consisting of:
	40 h lecture (preparation and rework)
	20 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.306.3
Module name	English for Specific Purposes
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ma), RFE (Ma), Me (Ma)
Module coordinator	Dr. Dagmar Berndt
Compulsory/ optional/ electiv	optional
Course type	(Lecture, Exercises, Seminar, practical course)
Level/ category	1 (Bachelor=1, Master=2)
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Workload	90 h
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	English

Module name         French           Department         Electrical Engineering and Information Technology           Degree program         ATITI (Ba)           Module coordinator         Frau Wiedemann           Compulsory/ optional/ electiv         optional           Learning objectives         Students will be enabled to apply the French language in everyday and in occupational situations. They use the language receptively when reading and listening and productively when speaking and writing. The desired level is A1-A2 of the Common European framework, i.e. -understanding simple written or spoken texts with their relevant content and some details when reading or listening; -speaking or writing in personal everyday situations such as family, leisure, university issues, or welcoming guests, orientation in an unknown city, telephoning.           Module content         Based on the target of language learning focus is on reading, writing, listening and speaking in the example situations as listed: - Everyday situations - Leisure - Student life - Simple descriptions To improve listening comprehension audio and video material is frequently applied providing an insight into French-speakingcountries and making students avare of intercultural issues. Students acquire basic vocabulary and knowledge of elementary grammar in order to communicate effectively.           Course type         OL - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course)           Learning Material         course material, course books, dictionaries           Recommended         Voyages 1 bzw.2 Klett Verlag           literature         Vexite language instruction </th <th>Module number</th> <th>ET.1.306.4</th>	Module number	ET.1.306.4
Department         Electrical Engineering and Information Technology           Degree program         ATTTI (Ba)           Module coordinator         Frau Wiedemann           Compulsory/ optional/ electiv         optional           Learning objectives         Students will be enabled to apply the French language in everyday and in occupational situations. They use the language receptively when reading and listening and productively when speaking and writing. The desired level is A1-A2 of the Common European framework, i.e. understanding simple written or spoken texts with their relevant content and some details when reading or listening; speaking or writing in personal everyday situations such as family, leisure, university issues, or welcoming guests, orientation in an unknown city, telephoning.           Module content         Based on the target of language learning focus is on reading, writing, listening and speaking in the example situations as listed: - Everyday situations - Leisure - Student life - Simple descriptions To improve listening comprehension audio and video material is frequently applied providing an insight into French-speakingcountries and making students aware of intercultural issues. Students acquire basic vocabulary and knowledge of elementary grammar in order to communicate effectively.           Course type         0L - 3E - 0S - 0P         (Lecture, Exercises, Seminar, practical course) Learning Material course books, dictionaries           Recommended         Voyages 1 bzw.2 Klett Verlag Literature Method(s) of instruction/ media being used Communicative language instruction Assessment APL – as		
Degree program         ATITi (Ba)           Module coordinator         Frau Wiedemann           Compulsory/ optional/ electiv         optional           Learning objectives         Students will be enabled to apply the French language in everyday and in occupational situations. They use the language receptively when reading and listening and productively when speaking and writing. The desired level is A1-A2 of the Common European framework, i.e. understanding simple written or spoken texts with their relevant content and some details when reading or listening; speaking or writing in personal everyday situations such as family, leisure, university issues, or welcoming guests, orientation in an unknown city, telephoning.           Module content         Based on the target of language learning focus is on reading, writing, listening and speaking in the example situations as listed: - Everyday situations - Leisure - Student life - Simple descriptions To improve listening comprehension audio and video material is frequently applied providing an insight into French-speakingcountries and making students avare of intercultural issues. Students avare of intercultural issues. Students avare of intercultural issues. Students acquire basic vocabulary and knowledge of elementary grammar in order to communicate effectively.           Course type         0L - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course)           Learning Material terature         course material, course books, dictionaries           Recommended iterature         Voyages 1 bzw.2 Klett Verlag           Method(s) of instruction/ media being used         communicative language instruction instruction/ media being used		
Module coordinator         Frau Wiedemann           Compulsory/ optional/ electiv         optional           Learning objectives         Students will be enabled to apply the French language in everyday and in occupational situations. They use the language receptively when reading and listening and productively when speaking and writing. The desired level is A1-A2 of the Common European framework, i.e. - understanding simple written or spoken texts with their relevant content and some details when reading or listening; - speaking or writing in personal everyday situations such as family, leisure, university issues, or welcoming guests, orientation in an unknown city, telephoning.           Module content         Based on the target of language learning focus is on reading, writing, listening and speaking in the example situations as listed: - Everyday situations - Leisure - Student life - Simple descriptions To improve listening comprehension audio and video material is frequently applied providing an insight into French-speakingcountries and making students aware of intercultural issues. Students acquire basic vocabulary and knowledge of elementary grammar in order to communicate effectively.           Course type         OL - 3E - 0S - 0P         (Lecture, Exercises, Seminar, practical course) course material, course books, dictionaries           Recommended         Voyages 1 bzw.2 Klett Verlag terature Communicative language instruction           Term         3th term communicative language instruction course material, presentation           Assessment         APL – assessment during the semester period (graded) ECTS cred		
Compulsory/ optional/ electiv         optional           Learning objectives         Students will be enabled to apply the French language in everyday and in occupational situations. They use the language receptively when reading and listening and productively when speaking and writing. The desired level is A1-A2 of the Common European framework, i.e. -understanding simple written or spoken texts with their relevant content and some details when reading or listening; -speaking or writing in personal everyday situations such as family, leisure, university issues, or welcoming guests, orientation in an unknown city, telephoning.           Module content         Based on the target of language learning focus is on reading, writing, listening and speaking in the example situations as listed: - Everyday situations - Leisure - Student life - Simple descriptions To improve listening comprehension audio and video material is frequently applied providing an insight into French-speakingcountries and making students aware of intercultural issues. Students avare of intercultural issues. Students avare of untercultural issues. Students avare of untercultural issues.           Course type         OL - 3E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)         Learning Material           course material, course books, dictionaries         Voyages 1 bzw.2 Klett Verlag         Level/ category         1         (Bachelor=1, Master=2)           Summer/ Winter         winter term         Term         3th term         Term           Compulsory         none         requirements         Assessment         APL – assessment during the semester period (graded)         ECTS cr		
electiv         Image: Constraint of the constraint		
Learning objectives         Students will be enabled to apply the French language in everyday and in occupational situations. They use the language receptively when reading and listening and productively when speaking and writing. The desired level is A1-A2 of the Common European framework, i.e.		optional
occupational situations. They use the language receptively when reading and listening and productively when speaking and writing. The desired level is A1-A2 of the Common European framework, i.e. understanding simple written or spoken texts with their relevant content and some details when reading or listening; speaking or writing in personal everyday situations such as family, leisure, university issues, or welcoming guests, orientation in an unknown city, telephoning.           Module content         Based on the target of language learning focus is on reading, writing, listening and speaking in the example situations as listed: - Everyday situations - Leisure - Student life - Student life - Simple descriptions To improve listening comprehension audio and video material is frequently applied providing an insight into French-speakingcountries and making students acquire basic vocabulary and knowledge of elementary grammar in order to communicate effectively.           Course type         0L - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course) Learning Material         Course material, course books, dictionaries           Recommended literature         Voyages 1 bzw.2 Klett Verlag         Verlag           Method(s) of instruction/ media being used         Communicative language instruction         Image: Applied provide language instruction           Term         3th term         Compulsory none         ApL - assessment during the semester period (graded)           Korkol(s) of instruction/ media being used         APL - assessment during the semester period (graded)         Stordend)	Learning objectives	Students will be enabled to apply the French language in everyday and in
-understanding simple written or spoken texts with their relevant content and some         adtails when reading or listening;         -speaking or writing in personal everyday situations such as family,         leisure, university issues, or welcoming guests, orientation in an unknown city, telephoning.         Module content       Based on the target of language learning focus is on reading, writing, listening and speaking in the example situations as listed:         - Everyday situations       - Leisure         - Student life       - Simple descriptions         To improve listening comprehension audio and video material is frequently applied providing an insight into French-speakingcountries and making students aware of intercultural issues.         Students acquire basic vocabulary and knowledge of elementary grammar in order to communicate effectively.         Course type       OL - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course)         Learning Material       course material, course books, dictionaries         Method(s) of instruction/       communicative language instruction         media being used       -         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       winter term         Term       3th term         Compulsory       none         requirements       APL – assessment during the semester period (graded)         Assessment       written test, presentation		occupational situations. They use the language receptively when reading and listening and productively when speaking and writing. The desired level
details when reading or listening; -speaking or writing in personal everyday situations such as family, leisure, university issues, or welcoming guests, orientation in an unknown city, telephoning.Module contentBased on the target of language learning focus is on reading, writing, listening and speaking in the example situations as listed: - Everyday situations - Leisure - Student life - Simple descriptions To improve listening comprehension audio and video material is frequently applied providing an insight into French-speakingcountries and making students aware of intercultural issues. Students aware of intercultural issues. Students aware of antercultural issues. Students aware of antercultural issues. Voyages 1 bzw.2 Klett VerlagCourse typeOL - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course) course material, course books, dictionariesMethod(s) of instruction/ media being usedcommunicate leffectively.Level/category1 (Bachelor=1, Master=2)Summer/Winter equirementswinter termTerm Compulsory requirements3 WorkloadMorkload90h of total work load, thereof		-understanding simple written or spoken texts with their relevant content
-speaking or writing in personal everyday situations such as family, leisure, university issues, or welcoming guests, orientation in an unknown city, telephoning.Module contentBased on the target of language learning focus is on reading, writing, listening and speaking in the example situations as listed: - Everyday situations - Leisure - Student life - Simple descriptions To improve listening comprehension audio and video material is frequently applied providing an insight into French-speakingcountries and making students aware of intercultural issues. Students aware of intercultural issues. Students aware of intercultural issues.Course type0L - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course)Learning Material course material, course books, dictionariesRecommended literatureVoyages 1 bzw.2 Klett VerlagMethod(s) of instruction/ media being used1Level/ category1Level/ category1Recomments Assessment gory requirements1Assessment molalitiesAPL – assessment during the semester period (graded)Burner/Winded gory requirements90h of total work load, thereof		
leisure,university issues, or welcoming guests, orientation in an unknown city, telephoning.Module contentBased on the target of language learning focus is on reading, writing, listening and speaking in the example situations as listed: - Everyday situations - Leisure - Student life - Student life - Simple descriptions To improve listening comprehension audio and video material is frequently applied providing an insight into French-speakingcountries and making students aware of intercultural issues. Students acquire basic vocabulary and knowledge of elementary grammar in order to communicate effectively.Course type0L - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course)Learning Material literaturecourse material, course books, dictionariesMethod(s) of instruction/ media being usedcommunicative language instructionLevel/ category1(Bachelor=1, Master=2)Summer/Winter requirementswritten test, presentationAsseessment Asseessment modalitiesAPL – assessment during the semester period (graded)Workload90h of total work load, thereof		
Module contentBased on the target of language learning focus is on reading, writing, listening and speaking in the example situations as listed: - Everyday situations - Leisure - Student life - Simple descriptions To improve listening comprehension audio and video material is frequently applied providing an insight into French-speakingcountries and making students aware of intercultural issues. Students acquire basic vocabulary and knowledge of elementary grammar in order to communicate effectively.Course type0L - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course)Learning Material ilteraturecourse material, course books, dictionariesMethod(s) of instruction/ media being usedcommunicative language instructionLevel/ category1 (Bachelor=1, Master=2)Summer/ Winter requirementswritten test, presentationAssessment Assessment modalitiesAPL – assessment during the semester period (graded)ECTS credits 33Workload90h of total work load, thereof		leisure, university issues, or welcoming guests, orientation in an unknown
<ul> <li>Student life         <ul> <li>Simple descriptions</li> <li>To improve listening comprehension audio and video material is frequently applied providing an insight into French-speakingcountries and making students aware of intercultural issues.</li> <li>Students acquire basic vocabulary and knowledge of elementary grammar in order to communicate effectively.</li> </ul> </li> <li>Course type         <ul> <li>OL - 3E - OS - OP (Lecture, Exercises, Seminar, practical course)</li> <li>Learning Material</li> <li>course material, course books, dictionaries</li> <li>Recommended</li> <li>Voyages 1 bzw.2 Klett Verlag</li> <li>literature</li> <li>Method(s) of</li> <li>communicative language instruction</li> <li>instruction/</li> <li>media being used</li> </ul> </li> <li>Level/ category         <ul> <li>1 (Bachelor=1, Master=2)</li> <li>Summer/Winter</li> <li>winter term</li> <li>Term</li> <li>3th term</li> <li>Assessment</li> <li>written test, presentation</li> <li>Assessment modalities</li> <li>APL – assessment during the semester period (graded)</li> <li>ECTS credits</li> <li>3</li> </ul> </li> </ul>	Module content	Based on the target of language learning focus is on reading, writing, listening and speaking in the example situations as listed: - Everyday situations
- Simple descriptions To improve listening comprehension audio and video material is frequently applied providing an insight into French-speakingcountries and making students aware of intercultural issues. Students acquire basic vocabulary and knowledge of elementary grammar in order to communicate effectively.Course type0L - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course)Learning Material literaturecourse material, course books, dictionariesRecommended literatureVoyages 1 bzw.2 Klett VerlagMethod(s) of instruction/ media being usedcommunicative language instructionLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm3th termCompulsory requirementsnoneAssessmentwritten test, presentationAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof		
To improve listening comprehension audio and video material is frequently applied providing an insight into French-speakingcountries and making students aware of intercultural issues. Students acquire basic vocabulary and knowledge of elementary grammar in order to communicate effectively.Course type0L - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course)Learning Materialcourse material, course books, dictionariesRecommendedVoyages 1 bzw.2 Klett VerlagliteratureMethod(s) of instruction/ media being usedcommunicative language instructionLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm3th termCompulsory requirementsnoneAssessmentwritten test, presentationAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof		
applied providing an insight into French-speakingcountries and making students aware of intercultural issues. Students acquire basic vocabulary and knowledge of elementary grammar in order to communicate effectively.Course type0L - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course)Learning Materialcourse material, course books, dictionariesRecommended literatureVoyages 1 bzw.2 Klett VerlagMethod(s) of instruction/ media being usedcommunicative language instructionLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm3th termCompulsory requirementsnoneAssessment Workloadwritten test, presentationAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof		
students aware of intercultural issues. Students acquire basic vocabulary and knowledge of elementary grammar in order to communicate effectively.Course type0L - 3E - 0S - 0P(Lecture, Exercises, Seminar, practical course)Learning Materialcourse material, course books, dictionariesRecommendedVoyages 1 bzw.2 Klett Verlagliteraturecommunicative language instructionMethod(s) of instruction/ media being usedcommunicative language instructionLevel/ category1(Bachelor=1, Master=2)Summer/ Winterwinter termTerm3th termCompulsory requirementsnoneAssessmentwritten test, presentationAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof		
Students acquire basic vocabulary and knowledge of elementary grammar in order to communicate effectively.Course type0L - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course)Learning Materialcourse material, course books, dictionariesRecommendedVoyages 1 bzw.2 Klett VerlagliteratureMethod(s) of instruction/ media being usedcommunicative language instructionLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm3th termCompulsory requirementsnoneAssessmentwritten test, presentationAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof		
in order to communicate effectively.Course type0L - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course)Learning Materialcourse material, course books, dictionariesRecommendedVoyages 1 bzw.2 Klett Verlagliteraturecommunicative language instructionMethod(s) of instruction/ media being usedcommunicative language instructionLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm3th termCompulsory requirementsnoneAssessmentwritten test, presentationAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof		
Course type0L - 3E - 0S - 0P(Lecture, Exercises, Seminar, practical course)Learning Materialcourse material, course books, dictionariesRecommendedVoyages 1 bzw.2 Klett Verlagliteraturecommunicative language instructionMethod(s) of instruction/ media being usedcommunicative language instructionLevel/ category1(Bachelor=1, Master=2)Summer/ Winterwinter termTerm3th termCompulsory requirementsnoneAssessmentwritten test, presentationAssessmentAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof		
Learning Materialcourse material, course books, dictionariesRecommendedVoyages 1 bzw.2 Klett VerlagliteratureCommunicative language instructionMethod(s) ofcommunicative language instructioninstruction/Communicative language instructionmedia being usedLevel/ categoryLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm3th termCompulsorynonerequirementsWritten test, presentationAssessmentwritten test, presentationAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof	Ocurrent trans	
Recommended literatureVoyages 1 bzw.2 Klett VerlagMethod(s) of instruction/ media being usedcommunicative language instructionLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm3th termCompulsory requirementsnoneAssessmentwritten test, presentationAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof		
literatureofMethod(s) of instruction/ media being usedcommunicative language instructionLevel/ category1 (Bachelor=1, Master=2)Summer/Winterwinter termTerm3th termCompulsory requirementsnoneAssessmentwritten test, presentationAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof		
instruction/       media being used         Level/ category       1 (Bachelor=1, Master=2)         Summer/Winter       winter term         Term       3th term         Compulsory       none         requirements		Voyages T bzw.z Kielt verlag
media being usedLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm3th termCompulsory requirementsnoneAssessmentwritten test, presentationAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof		communicative language instruction
Level/ category1(Bachelor=1, Master=2)Summer/ Winterwinter termTerm3th termCompulsory requirementsnoneAssessmentwritten test, presentationAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof	instruction/	
Summer/Winter       winter term         Term       3th term         Compulsory       none         requirements       -         Assessment       written test, presentation         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90h of total work load, thereof		
Term       3th term         Compulsory       none         requirements       -         Assessment       written test, presentation         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90h of total work load, thereof	Level/ category	1 (Bachelor=1, Master=2)
Compulsory     none       requirements     -       Assessment     written test, presentation       Assessment modalities     APL – assessment during the semester period (graded)       ECTS credits     3       Workload     90h of total work load, thereof	Summer/Winter	winter term
requirements     written test, presentation       Assessment modalities     APL – assessment during the semester period (graded)       ECTS credits     3       Workload     90h of total work load, thereof	Term	3th term
Assessment     written test, presentation       Assessment modalities     APL – assessment during the semester period (graded)       ECTS credits     3       Workload     90h of total work load, thereof	Compulsory	none
Assessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof	requirements	
ECTS credits     3       Workload     90h of total work load, thereof	Assessment	
Workload 90h of total work load, thereof		
45h of contact hours and	Workload	90h of total work load, thereof
		45h of contact hours and
45h of self-study, consisting of:		
35 h lecture (preparation and rework)		
10 h exam preparation		
Usability of this module semester abroad		
Time According time table		
Duration of module 1 term	Duration of module	
Place/ room EAH Jena	Place/ room	EAH Jena
Frequency of offer Annually	Frequency of offer	
Language German/ French	Language	German/ French

Module number	ET.1.306.5
Module name	Spanish
Department	Electrical Engineering and Information Technology ATITi (Ba)
Degree program	
Module coordinator	Dr. Dagmar Berndt
Compulsory/ optional/ electiv	optional
	Students will be enabled to apply the French language in everyday and in
Learning objectives	<ul> <li>Students will be enabled to apply the French language in everyday and in occupational situations. They use the language receptively when reading and listening and productively when speaking and writing. The desired level is A1-A2 of the Common European framework, i.e.</li> <li>understanding simple written or spoken texts with their relevant content and some details when reading or listening;</li> <li>speaking or writing in personal everyday situations such as family, leisure, university issues, or welcoming guests, orientation in an unknown city, telephoning.</li> </ul>
Module content	<ul> <li>Based on the target of language learning focus is on reading, writing, listening and speaking in the example situations as listed:</li> <li>Everyday situations</li> <li>Leisure</li> <li>Student life</li> <li>Simple descriptions</li> <li>To improve listening comprehension audio and video material is frequently applied providing an insight into French-speakingcountries and making students aware of intercultural issues.</li> <li>Students acquire basic vocabulary and knowledge of elementary grammar in order to communicate effectively.</li> </ul>
Course type	0L - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	scripts, dictionaries and course book
Recommended	"Universo.ele – A1"/ "Eñe – Ein Spanischbuch für Anfänger" - Hueber- Verlag
Method(s) of instruction/ media being used	scripts, dictionaries and course book
Level/ category	(Bachelor=1, Master=2)
Summer/Winter	winter term
Term	3. term
Compulsory requirements	Regular attendance is required
Recommended requirements	none or basic knowledge
Assessment	written test
Assessment modalities	APL – assessment during the semester period (graded)
Further Information	Regular attendance at the courses is required!
ECTS credits	3
Workload	90h of total work load, thereof
	45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 10 h exam preparation
Usability of this module	semester abroad
Usability of this module Time	According time table
Time	According time table
Time Duration of module	According time table 1 term

Module number	ET.1.306.6
Module name	Russian
	Electrical Engineering and Information Technology
Department	ATITi (Ba)
Degree program Module coordinator	Herr Ulrich Schuhknecht
Compulsory/ optional/	
electiv	optional
Learning objectives	<ul> <li>Students will be enabled to apply the French language in everyday and in occupational situations. They use the language receptively when reading and listening and productively when speaking and writing. The desired level is A1-A2 of the Common European framework, i.e.</li> <li>understanding simple written or spoken texts with their relevant content and some details when reading or listening;</li> <li>speaking or writing in personal everyday situations such as family, leisure, university issues, or welcoming guests, orientation in an unknown city, telephoning.</li> </ul>
Module content	<ul> <li>Based on the target of language learning focus is on reading, writing, listening and speaking in the example situations as listed:</li> <li>Everyday situations</li> <li>Leisure</li> <li>Student life</li> <li>Simple descriptions</li> <li>To improve listening comprehension audio and video material is frequently applied providing an insight into French-speakingcountries and making students aware of intercultural issues.</li> <li>Students acquire basic vocabulary and knowledge of elementary grammar in order to communicate effectively.</li> </ul>
Course type	0L - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	course material, dictionaries
Method(s) of instruction/ media being used	communicative language instruction
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	3th term
Compulsory	none
requirements	
Assessment	written test
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Workload	90h of total work load, thereof
	45h of contact hours and
	45h of self-study.
Usability of this module	semester abroad
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German/ Russian

Module number	ET.1.306.7
Module name	Chinese
Department	Electrical Engineering and Information Technology
Degree program	ATITi (Ba)
Module coordinator	Dr. Joachim Boldt
Compulsory/ optional/ electiv	optional
Learning objectives	Beginnings of the Chinese standard language according to level A1 GER,
Learning objectives	that means simple oral and written communication
Module content	The course is designed on the following learning objectives:
Module content	Greet, ask after the health; perform a simple small talk about the weather; to
	thank; say goodbye;
	make simple times, to make an appointment for the following day, ask for
	the name; greet someone after a long time, introduce yourself and others;
	somewhat negate decided; ask about the meaning of a word; initiate
	questions politely;
	Numbers to 10,000; ask for prices and negotiate; ask for the exchange rate,
	say what you want to buy, ask for repetition of what is said; exchange
	money;
	typical souvenirs shopping, make measurements, make assumptions, ask
	someone politely to something; ask for the total price; specify ownership and
	affiliations; determine objects closer.
	There are to acquire about 190 characters.
Course type	0L - 2E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	Listening exercises, handouts, whiteboard notes
Recommended	Liao Liao - Das Chinesisch-Lehrwerk für den Kursunterricht in der
literature	Erwachsenenbildung. Kursbuch und Arbeitsbuch. Hueber Verlag; Autorin
	Thekla Chabbi
Method(s) of	Practical lessons / Multimedia
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	3th term
Recommended	none or basic knowledge
requirements	
Assessment	oral exam, written test
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Workload	90h of total work load, thereof
	30h of contact hours and
	60h of self-study
Usability of this module	semester abroad
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German/ Chinese

Module number	ET.1.401
Module name	Microprocessor Technology
Department	Electrical Engineering and Information Technology
Degree program	ATITi (Ba), ET/IT (Ba)
Module coordinator	Prof. DrIng. Burkart Voß
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	After successful completion of the module the students are able to:
	- understand the working principles and application potential of
	microcontrollers.
	- apply the datasheet as a main source of information needed to use the
	microcontroller
	- program microcontrollers in C
Mashula asstant	- debug microcontroller based systems in a systematic way.
Module content	- General design of freely programmable hardware
	<ul> <li>Abstraction onto a programming model</li> <li>General design of peripheral modules</li> </ul>
	- general method of accessing peripheral modules via software
	- Programming procedure in C
Course type	2L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course)
Learning Material	datasheet, examples of solutions, tutorials for development tools
Recommended	Hennessy, J.L.; Patterson, D.A.: "Computer architecture: a quantitative
literature	approach", Morgan Kaufmann, 2002
	Schmitt, G.: "Mikrocomputertechnik mit Controllern der Atmel AVR-RISC-
	Familie", Oldenburg, 2007
	Clements, Alan: The principles of computer hardware, Oxford University
	Press, 2000
Method(s) of	Lecture, labs, self-study
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	4th semester
Compulsory	Basic programming skills, basics of digital circuit design
requirements Assessment	acurac attendance cartificate
Assessment modalities	course attendance certificate SL - ungraded course work during the lecture period
Further Information	The skills in using microcontrollers are proven with the successful
	completion of a team project. The success of the project is demonstrated in
	the frame of a robot competition. The inividual ability to use microcontrollers
	successfully is proven in an interview
ECTS credits	6
Workload	180h of total work load, thereof
	60h of contact hours and
	120h of self-study, consisting of:
	45 h lecture (preparation and rework)
	50 h practical training (preparation and evaluation)
	25 h exam preparation
Usability of this module	Real Time Operating Systems, Microcomputer Design, Digital Signal
<b>.</b>	Processors, Processor Design
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Madula number	
Module number	ET.1.402
Module name	Analog Circuit Design
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Module coordinator	Prof. DrIng. Thomas Reuter
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	The student should familiarise with fundamentals of analog circuit
	organisation and get to know possible applications of operational amplifiers. The main aim if the knowledge of methods for circuit analysis and synthesis.
Module content	- differential amplifier, characteristics and properties of operational amplifiers
Module content	- inverting / not-inverting amplifiers, current-to-voltage converter
	- transimpedance amplifier, computational circuits, constant sources
	- comparator, Schmitt-trigger
Course type	4. Term 2L – 2E – 0S – 0P (ET.1.402.1) ET/IT
eedlee type	5. Term $0L - 0E - 0S - 2P$ (Lecture, Exercises, Seminar, practical
	course)
Learning Material	exercises, lab instruction sheets
Recommended	Tietze. U.; Schenk. C.: Halbleiterschaltungstechnik
literature	Bystron/Borgmeyer: Grundlagen der technischen Elektronik
	Morgenstern, B: Elektronik, Band II: Schaltungen
Method(s) of	Lecture: work on the blackboard
instruction/	Tutorial exercises
media being used	experiments at the laboratory after instruction with written preparations
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	Sommer- Wintersemester
Term	4. und 5. Semester
Compulsory	none
requirements	
Recommended	4. und 5. Semester
requirements	
Assessment	exam 90 min, Laboratory internship certificate
Assessment modalities	PL – exam during audit period(graded)
Further Information	The exam takes place at the end of the 5th semester.
ECTS credits	6
Workload	180h of total work load, thereof
	90h of contact hours and
	90h of self-study, consisting of:
	45 h lecture (preparation and rework)
	30 h practical training (preparation and evaluation)
	15 h exam preparation
Usability of this module	Integrated Circuits, Integration of mixed-signal circuits (SD Master), Analog Design (SD Master),
	Usage of module in other study courses: BMT, PT, ME
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German
Language	Connun

ET.1.403
Digitaldesign
Electrical Engineering and Information Technology
ET/IT (Ba), ATITi (Ba)
AT, TI
Compulsory
The Student will be enabled to systematically design digital systems from the requirements analysis, the design, the simulation of the timing analysis to the implementation of complex functions in complex programmable circuits. Besides getting to know the design strategies the practical conversion for the design of a programmable SoC with a Hardware description language is emphasized. At the end of the module students know different design methodologies and are able to apply them in a given application context. The students know general methods of implementation for digital systems and they are able to evaluate their practicability. The students understand the design phases on different levels of abstraction and are able to establish appropriate design models. The students are able to apply basic synthesis approaches (such as, for example, high-level synthesis, scheduling and allocation, hierarchical decomposition, data- and control-path extraction, signal transition diagram and reachablity graph based synthesis of communication protocols, as well as ROBDD based logic synthesis) and ROBDD based verification approaches. At the end of the hands-on training students are able to design an application system on a FPGA development board, to create the behavioural specification and the architecture for the implementation, and to use the appropriate design tools.
<ul> <li>use the appropriate design tools.</li> <li>Systematic design methodology for application specific integrated systems (levels of abstraction on the basis of the Y-diagram, synthesis types, basic design flow for the top-down synthesis of digital systems);</li> <li>means of implementation for digital systems (programmable devices, application specific devices);</li> <li>hardware description languages, background information and history, basic concepts of HDL-based simulation, synthesis and verification (signals and variables, time modeling concept and delta cycles, test benches, formal verification);</li> <li>hardware description language VHDL, coding examples, special modeling techniques such as counters, utilization of RAM-Structures, finite state machine with data path (FSMD), process model graph (PMG), communication between synchronous and asynchronous FSMs, modeling on different levels of abstraction;</li> <li>differences and similarities of VHDL, Verilog and SystemC;</li> <li>practical exercise on the VHDL-based design of an individually defined application on an FPGA evaluation board.</li> </ul>
2L - 0E - 1S - 2P (Lecture, Exercises, Seminar, practical course)
Lecture notes, exercises, lab instructions, examples
<ul> <li>D. Gajski et al.: Specifications and Design of Embedded Systems.</li> <li>AddisonWesley, 1994</li> <li>D. Gajski et al.: High-Level-Synthesis: Introduction to Chip and System</li> <li>Design. Kluwer Academic Publishers, 1992</li> <li>G. Herrmann, D.Müller: ASIC - Entwurf und Test. Fachbuchverlag Leipzig, 2004</li> <li>F. Rammig: Systematischer Entwurf digitaler Systeme. B.G. Teubner, 1989</li> <li>T. Kropf: VLSI-Entwurf. Vorgehen, Methoden, Automatisierung. Int.</li> <li>Thomson Publishing, 1995</li> <li>K. ten Hagen: Abstrakte Modellierung digitaler Schaltungen. Springer, 1995</li> <li>T. Kropf: Introduction to Formal Hardware Verification. Springer Verlag</li> <li>S. Sjoholm, L. Lindh: VHDL for Designers. Prentice Hall Europe, 1997</li> <li>K. C. Chang: Digital Design and Modeling with VHDL and Synthesis. IEEE</li> <li>Computer Society Press, 1996</li> <li>Peter J. Ashenden: The Designer's Guide to VHDL. Morgan Kaufmann, 1995</li> </ul>

Method(s) of	Talk, peer instruction, individual work, hands-on training, group work, case
instruction/	study
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	4. term
Compulsory	none
requirements	
Recommended	Digital Systems, Computer Science Basics
requirements	
Assessment	project work, written test 75 min
Assessment modalities	APL – assessment during the semester period (graded)
Further Information	Project work (50%) and written test (50%)
ECTS credits	6
Workload	180h of total work load, thereof
	75h of contact hours and
	105h of self-study, consisting of:
	40 h lecture (preparation and rework)
	25 h practical training (preparation and evaluation)
	15 h exam preparation
Usability of this module	Digital Signal Processing, Microprocessor Technology, Embedded Systems;
	usable as compulsory optional module for CMT 6th semester
	usable as compulsory optional module for CMT 6th semester
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.403.1
Module name	Introduction in Digital Design
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	KMT
Module coordinator	Prof. DrIng. habil. Jürgen Kampe
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	The Student will be enabled to systematically design digital systems from the requirements analysis, the design, the simulation of the timing analysis to the implementation of complex functions in complex programmable circuits. Besides getting to know the design strategies the practical conversion for the design of a programmable SoC with a Hardware description language is emphasized. At the end of the module students know different design methodologies and are able to apply them in a given application context. The students know general methods of implementation for digital systems and they are able to evaluate their practicability. The students understand the design phases on different levels of abstraction and are able to establish appropriate design models. The students are able to apply basic synthesis approaches (such as, for example, high-level synthesis, scheduling and allocation, hierarchical decomposition, data- and control-path extraction, signal transition diagram and reachablity graph based synthesis of communication protocols, as well
Module content	<ul> <li>as ROBDD based logic synthesis) and ROBDD based verification approaches.</li> <li>Systematic design methodology for application specific integrated systems</li> </ul>
	<ul> <li>(levels of abstraction on the basis of the Y-diagram, synthesis types, basic design flow for the top-down synthesis of digital systems);</li> <li>means of implementation for digital systems (programmable devices, application specific devices);</li> <li>hardware description languages, background information and history, basic concepts of HDL-based simulation, synthesis and verification (signals and variables, time modeling concept and delta cycles, test benches, formal verification);</li> <li>hardware description language VHDL, coding examples, special modeling techniques such as counters, utilization of RAM-Structures, finite state machine with data path (FSMD), process model graph (PMG), communication between synchronous and asynchronous FSMs, modeling</li> </ul>
	on different levels of abstraction; - differences and similarities of VHDL, Verilog and SystemC.
Course type	2L - 0E - 1S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	Lecture notes, exercises, examples
Recommended	D. Gajski et al.: Specifications and Design of Embedded Systems.
literature	AddisonWesley, 1994 D. Gajski et al.: High-Level-Synthesis: Introduction to Chip and System Design. Kluwer Academic Publishers, 1992 G. Herrmann, D.Müller: ASIC - Entwurf und Test. Fachbuchverlag Leipzig, 2004
	<ul> <li>F. Rammig: Systematischer Entwurf digitaler Systeme. B.G. Teubner, 1989</li> <li>T. Kropf: VLSI-Entwurf. Vorgehen, Methoden, Automatisierung. Int. Thomson Publishing, 1995</li> <li>K. ten Hagen: Abstrakte Modellierung digitaler Schaltungen. Springer, 1995</li> <li>T. Kropf: Introduction to Formal Hardware Verification. Springer Verlag</li> <li>S. Sjoholm, L. Lindh: VHDL for Designers. Prentice Hall Europe, 1997</li> <li>K. C. Chang: Digital Design and Modeling with VHDL and Synthesis. IEEE Computer Society Press, 1996</li> <li>Peter J. Ashenden: The Designer's Guide to VHDL. Morgan Kaufmann, 1995</li> </ul>
Math ad(-) -f	D. Perry: VHDL. McGraw-Hill, 1998
Method(s) of instruction/	Talk, peer instruction, individual work, case study
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/ Winter	summer term

Term	6. term
Compulsory	none
requirements	
Recommended	Digital Systems, Computer Science Basics
requirements	
Assessment	written test 75 min
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Workload	90h of total work load, thereof
	45h of contact hours and
	45h of self-study, consisting of:
	35 h lecture (preparation and rework)
	0 h practical training (preparation and evaluation)
	10 h exam preparation
Usability of this module	Digital Signal Processing, Microprocessor Technology, Embedded Systems;
	usable as compulsory optional module for CMT 6th semester
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.404
Module name	Electrical Drives
Department	Electrical Engineering and Information Technology
Degree program	ATITi (Ba), ET/IT (Ba) - AT, Me (Ba)
Module coordinator	Prof. DrIng. Matthias Förster
Compulsory/ optional/ electiv	Compulsory
Learning objectives	The students will understand the work and the behavior of electrical machines. This gives the basic for understanding the typical solutions of power electronics for speed control. After successfully participating in this course, students are able to define the requirements for an electrical drive and to select the electrical machine and power electronics for the needed function.
Module content	<ul> <li>Topics of the lecture are <ul> <li>Introduction: Explanation of the structure of drive systems, the conversion of energy related to the principles for generating mechanical forces and basics of mechanics</li> <li>Basics of electrical machines with D.C. brush motors, induction motors and synchronous motors</li> <li>Rating of machines</li> <li>Control of machines: Control of D.C. motors, induction motors, AC-servomotors. Introduction to field orientated control and motion control</li> </ul> </li> <li>The main topics are trained in lab sessions with the following experiments: <ul> <li>DC- motoer and induction motors</li> <li>D.C. motor with phase controlled rectifier</li> <li>frequency converter</li> <li>AC-servo motor</li> </ul> </li> </ul>
	- positioning system
Course type	4L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course)
Learning Material	lecture papers and experiment instructions
Recommended	Fischer, F.: Elektrische Maschinen
literature	Müller, G.: Grundlagen Elektrischer Maschinen
	Specovius, J.: Grundkurs Leistungselektronik
	Gerke, W: Elektrische Maschinen und Aktoren
Method(s) of instruction/ media being used	Lecture and experiment
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	4. term
Compulsory	none
requirements	
Recommended	Electrical Engineering 1 and 2
requirements	
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	6
Workload	-
VVOIKIOAO	180h of total work load, thereof
	90h of contact hours and
	90h of self-study, consisting of:
	20 h lecture (preparation and rework)
	40 h practical training (preparation and evaluation)
	30 h exam preparation
Usability of this module	Motion Control, Automation Systems
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.405.1
Module name	Control Systems
Sub module	
	Control Systems/ PLC
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	
Module coordinator	Prof. DrIng. Jörg Müller
Compulsory/ optional/	Compulsory
electiv	After students have attended the source, they are able to
Learning objectives	After students have attended the course, they are able to - interpret verbal control tasks,
	- recognize task classes and demonstrate the corresponding solution
	approaches
	- outline solutions
	- demonstrate solutions from common industrial systems
Module content	- general survey of control technique in automation
	- description-methods and – techniques
	- logic control
	- sequential control
	- structure and function of programmable logic controller (PLC)
	- programming according to the IEC-norm
	- Safety of control
	- implementation
Course type	2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	lecture script, lab instruction sheets, extracts of standards
Recommended	Wellenreuther, G. u.a.: Automatisieren mit SPS – Theorie und Praxis;
literature	Wiesbaden: Vieweg
interaction	von Aspern, J: SPS-Softwareentwicklung mit IEC 61131; Heidelberg: Hüthig
	Seitz, M.: Speicherprogrammierbare Steuerungen; München, Leipzig: Carl
	Hanser
Method(s) of	Team work, reflections in the plenum, lab sessions
instruction/	· · · · · · · · · · · · · · · · · · ·
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	4th term
Compulsory	none
requirements	
Recommended	Digital Systems: Boolean Algebra, Flip Flops
requirements	
Assessment	exam 90 min, Laboratory internship certificate
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	6 for the whole module (ET1.405)
Workload	90h of total work load, thereof
	45h of contact hours and
	45h of self-study, consisting of:
	20 h lecture (preparation and rework)
	15 h practical training (preparation and evaluation)
	10 h exam preparation
Usability of this module	Automation Systems
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.405.2
Module name	Control Systems
Sub module	Motion Control
Department	Electrical Engineering and Information Technology
	Electrical Engineering and mormation rechnology
Degree program Module coordinator	Prof. DrIng. Matthias Förster
Compulsory/ optional/	Compulsory
electiv	Compulsory
Learning objectives	The knowledge in the areas of electrical drives, power electronics, electromagnetic compatibility, motion control and automatic control will be improved. The students test in practice how the different components work together. After attending the event, the students are able to put electric drives into operation and understand and measure power flows, additional students can present their results together in lectures.
Module content	Induction machines and D.C. brush machines with rated outputs of 3 kW to 5 kW together with frequency converters and phase controlled rectifiers are tested. The converters are linked with PC. Topics are the parameterization of the converters, the power flow in the arrangement, problems of electromagnetic compatibility, vector control of induction machines and the behavior in open- and closed loop control. The work is done in groups. The students will explain and discuss their results in oral presentations.
Course type	0L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course)
Learning Material	Lab instruction sheet
Recommended	Manuals of the used components
literature	
Method(s) of	Practical course
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	5. term
Compulsory	none
requirements	
Recommended	Electrical Drives
requirements	
Assessment	term paper
Assessment modalities	APL - during term(graded)
ECTS credits	6 for complete module control systems (ET.1.405)
Workload	90h of total work load, thereof
	30h of contact hours and
	60h of self-study, consisting of:
	40 h practical training (preparation and evaluation)
	20 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Madula number	
Module number	ET.1.406.1
Module name	Image Processing / Image Analysis
Sub module	Image Processing
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba), ATITi (Ba)
Module coordinator	Prof. DrIng. Sebastian Knorr
Compulsory/ optional/ electiv	Compulsory
Learning objectives	The student should learn the fundamental procedures for digitizing and processing images. He/She should be able to apply adequate software such as ImageJ and is able to implement basic image processing methods.
Module content	<ul> <li>Introduction to the fundamentals of digital image processing</li> <li>Digitisation: scanning, quantisation, scanning theorem</li> <li>Gray-scale statistic: average value, variance, entropy, co-occurrencematrix</li> <li>Point operators: E.g., histogram equalization, gamma correction</li> <li>Local operators: linear and non-linear filters, smoothing, median filtering, edge filtering, unsharp mask</li> <li>Global operators: 2D Fourier Transform, Discrete Cosine Transform</li> <li>Image segmentation, region labeling, simple region descriptors</li> <li>Color image processing, color spaces</li> <li>Fundamentals of feature extraction and pattern recognition</li> </ul>
Course type	(Lecture, Exercises, Seminar, practical course)
Recommended	Burger, Wilhelm und Burge, Mark J.: Digitale Bildverarbeitung: Eine
literature	algorithmische Einführung mit Java, Springer, Auflage 20. Erhardt, Angelika: Einführung in die Digitale Bildverarbeitung, Vieweg + Teubner, 2008.
Method(s) of instruction/ media being used	3L - 2E - 0S - 0P
Level/ category	1 (Bachelor=1, Master=2)
Summer/ Winter	summer term
Term	4. or 6. term
Compulsory requirements	none
Recommended	Signal Processing, Basics in computer programming, Algorithms and data
requirements	structures
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	6
Workload	180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 80 h lecture (preparation and rework) 25 h exam preparation
Usability of this module	Analysis 2, Numerical Mathematics/Optimization
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.406.2
Module name	Image Processing / Image Analysis
Sub module	Image Analysis
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	KMT
Module coordinator	Prof. DrIng. Sebastian Knorr
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	The students should learn the fundamental methods for describing and
	representing images via transformations and irrelevance reduction methods.
	Furthermore, the students get to know methods for pattern recognition in
	images via extraction of characteristic features and classification via
	different supervised learning methods. Finally, they are able to use common
Na dula soutout	software libraries for computer vision tasks such as OpenCV.
Module content	- Hough transform: Recognition of lines and simple curves
	<ul> <li>Interest point detection, Harris detector</li> <li>Transformations: Discrete Wavelet transform (1D and 2D), Haar Wavelets</li> </ul>
	- Feature extraction, representation of image regions, SIFT features, bag of
	words
	- Pattern recognition and machine learning, supervised and unsupervised
	learning methods: K-Means clustering, agglomerative clustering, Bayes
	classification, neural networks, support vector machines, Adaboost
	- Face detection and face recognition
	- Object detection and recognition
Course type	2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	Scripts and lab instruction sheets on the Internet
Recommended	-Burger, Wilhelm und Burge, Mark J.: Digitale Bildverarbeitung: Eine
literature	algorithmische Einführung mit Java, Springer Vieweg, 3. Auflage, 2015.
	<ul> <li>Burger, Wilhelm und Burge, Mark J.: Principles of Digital Image Processing, Vol. 3, Springer-Verlag, 2009, 2013.</li> </ul>
	- Tilo Strutz: Bilddatenkompression, Vieweg + Teubner, 4. Auflage (2009).
	- Nischwitz, Alfred, Fischer, Max, Haberäcker, Peter, Socher, Gudrun:
	Computergrafik und Bildverarbeitung, Band 2: Bildverarbeitung, Vieweg und
	Teubner, 3. Auflage, 2011.
	- Weitere Literaturangaben in der Vorlesung
Method(s) of	Interactive lecture, practical course, self-study, exercises
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	5. term
Compulsory	none
requirements Recommended	Signal Processing, Computer Science, Image Processing / Image Analysis 1
requirements	Signal Processing, Computer Science, image Processing / image Analysis 1
Assessment	Laboratory internship report, Programming assignment
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Workload	90h of total work load, thereof
	45h of contact hours and
	45h of self-study, consisting of:
	30 h lecture (preparation and rework)
	0 h practical training (preparation and evaluation)
	15 h exam preparation
Usability of this module	Video Engineering
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.407
Module name	Optoelectronics 1
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	AT, KMT
Module coordinator	Prof. Dr. Alexander Richter
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	The students acquire knowledge of the operating conditions of
	optoelectronic basic components. This enables them to design and develop
	simple optoelectronic assemblies and systems. Due to the intensive study of
	the basics of optoelectronics and technical optics, graduates are able to familiarize themselves with new tasks in optoelectronic system development
	at short notice.
Module content	- Mediation of the theoretical bases to photonics events in semiconductor
Module content	structures;
	- Functional conditions and qualities of optoelectronic transmitter and
	detection devices considering her specific use fields;
	- Interaction of the construction elements in typical application cases;
	- Application of optoelectronics in automation technology
	- Introduction to transmission technology
Course type	2L - 1E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	lecture script, collection of exercises
Recommended	- Paul: Optoelektronische Halbleiterbauelemente, Teubner-Verlag, 1992
literature	- Jansen: Optoelektronik, Vieweg, 1993
	- Jones: Optoelektronik, VCH, 1992
	- Brückner: Optische Nachrichtentechnik, Teubner, 2003
	- Krieg: Automatisieren mit Optoelektronik, Vogel, 1992
Method(s) of	lectures, self-study, discussion at the practical course
instruction/	
media being used	1 (Dechalar 1 Master 2)
Level/ category Summer/ Winter	1 (Bachelor=1, Master=2) summerterm
Term	4th term
Compulsory	none
requirements	none
Recommended	Electronic Components, Physics, Mathematics
requirements	
Assessment	written test
Assessment modalities	PL – exam during audit period(graded)
Further Information	The module examination consists of a written test. In the test, students
	create solutuions for selected optoelectronic questions, and calculate
	various technically relevant variables and parameters based on given
	practical examples
ECTS credits	6
Workload	180h of total work load, thereof
	60h of contact hours and
	120h of self-study, consisting of:
	55 h lecture (preparation and rework)
	35 h practical training (preparation and evaluation)
	30 h exam preparation
Usability of this module	Optoelectronics II
	Laser Techniques Optical and Optoelectronical Sensors
	Optoelectronical Systems
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German
Languago	

Module name         Introduction to optoelectronics           Department         Electrical Engineering and Information Technology           Degree program         ET/IT (Ba), ATITI (Ba)           Specialization/ Profil         Ti           Module coordinator         Prof. Dr. Alexander Richter           Compulsory/ optional/ electiv         optional           Learning objectives         - Knowledge of the effect conditions of the optoelectronic basic components; - Construction and testing of simple engineering samples of optoelectronic modules           Knowledge of applications of optoelectronics         - Knowledge of applications of optoelectronic ransmitter and detection of the construction elements in typical application cases; - Functional conditions and qualities of optoelectronic transmitter and detection of the construction elements in typical application cases; - Application of optoelectronics in automation technology           Learning Material         Iecture script. collection of exercises           Recommended         - Paul: Optoelektronik, Viewg, 1993 - Jones: Optoelektronik, Viewg, 1993 - Jones: Optoelektronik, Viewg, 1992           Method(s) of         Krieg: Automatisieren mit Optoelektronik, Viegel, 1992           Level/ category         1           Recommended         Electronic Components, Physics, Mathematics requirements           Recommended         Electronic Components, Physics, Mathematics           reguirements         Sth of contact hours and 4Sh of contact hours and 4	Modulo number	ET 4 407 4
Department         Electrical Engineering and Information Technology           Degree program         ET/IT (Ba), ATTIT (Ba)           Specialization/ Profil         Ti           Module coordinator         Prof. Dr. Alexander Richter           Compulsory/ optional/ electiv         optional           Learning objectives         - Knowledge of the effect conditions of the optoelectronic basic components; - Conception of simple modules; - Conception of the theoretical bases to photonics events in semiconductor structures; - Functional conditions and qualities of optoelectronic transmitter and detection devices considering her specific use fields; - Interaction of the construction elements in typical application cases; - Application of optoelectronics in automation technology           Course type         2L - 1 E · 0S · 0P (Lecture, Exercises, Seminar, practical course)           Learning Material         lecture script, collection of exercises           Recommended         - Paul: Optoelektronik, Viewag, 1993 - Jones: Optoelektronik, Viewag, 1993 - Jones: Optoelektronik, Viewag, 1993           Iterature         - Jansen: Optoelektronik, Viewag, 1992           Brückner: Optische Nachrichetnetchnik, Teubner, 2003 - Krieg: Automatisieren mit Optoelektronik, Vogel, 1992           Burdineent         Itecture script, Master=2)           Summer/Winter         summer term           Recommended         Electronic Components, Physics, Mathematics           requirements         Function of optoelectronical Sustandia	Module number	ET.1.407.1
Degree program         ET/IT (Ba), ÄTITI (Ba)           Specialization/Profil         Ti           Module coordinator         Prof. Dr. Alexander Richter           Compulsory/ optional/ electiv         optional           Learning objectives         - Knowledge of the effect conditions of the optoelectronic basic components; - Conception of simple modules; - Construction and testing of simple engineering samples of optoelectronic modules           Knowledge of applications of optoelectronics is semiconductor structures;         - Heriation of the theoretical bases to photonics events in semiconductor structures;           - Functional conditions and qualities of optoelectronic transmitter and detection devices considering her specific use fields;           - Interaction of the construction elements in typical application cases;           - Application of optoelectronics in automation technology           Introduction to transmission technology           Course type         2L - 1E - 0S - 0P           Learning Material         lecture script, collection of exercises           Recommended         - Paul: Optoelektronik, Vieweg, 1993           - Jones: Optoelektronik, Vieweg, 1993           - Jones: Optoelektronik, Vieweg, 1992           - Brückner: Optische Nachrichtentechnik, Teubner, 2003           - Krieg: Automatisieren mit Optoelektronik, Vogel, 1992           - Brückner: Optische Nachrichtentechnik, Vogel, 1992           - Brückner: Optische Nachr		
Specialization/ Prof.         Ti           Module coordinator         Prof. Dr. Alexander Richter           Compulsory/ optional/ electiv         optional           Learning objectives         - Knowledge of the effect conditions of the optoelectronic basic components; - Conception of simple modules; - Construction and testing of simple engineering samples of optoelectronic modules           Module content         - Mediation of the theoretical bases to photonics events in semiconductor structures; - Functional conditions and qualities of optoelectronic transmitter and detection devices considering her specific use fields; - Interaction of the construction elements in typical application cases; - Application of optoelectronics in automation technology           Course type         21 - 1E - 0S - 0P         Ceuture, Exercises, Seminar, practical course)           Learning Material         lecture script, collection of exercises           Recommended         - Paul: Optoelektronik, Vieweg, 1993           - Jones: Optoelektronik, Vieweg, 1993         - Jones: Optoelektronik, Vieweg, 1993           - Jones: Optoelektronik, Vieweg, 1993         - Jones: Optoelektronik, Vieweg, 1992           Brückner: Optische Nachrichtentechnik, Teubner, 2003         - Krieg: Automatisieren mit Optoelektronik, Vogel, 1992           Method(s) of instruction/         lectures, self-study, discussion at the practical course instruction/           media being used         Level category         1 (Bachelor=1, Master=2)           Summer term		
Module coordinator         Prof. Dr. Alexander Richter           Compulsory/ optional/ electiv         optional           Learning objectives         - Knowledge of the effect conditions of the optoelectronic basic components; - Conception of simple modules; - Construction and testing of simple engineering samples of optoelectronic modules           - Knowledge of applications of optoelectronics         - Knowledge of applications of optoelectronics           Module content         - Mediation of the theoretical bases to photonics events in semiconductor structures; - Functional conditions and qualities of optoelectronic transmitter and detection devices considering her specific use fields; - Interaction of the construction elements in typical application cases; - Application of optoelectronics in automation technology - Introduction to transmission technology           Course type         2L - 1E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         lecture script, collectronic KYCH, 1992         - Jansen: Optoelektronik, VCH, 1992           Iterature         - Janse: Optoelektronik, VCH, 1992         - Brückner: Optoelektronik, VCH, 1992           Wethod(s) of         lectures, self-study, discussion at the practical course           Isemer Vinter         summer term           Summer/ Winter         summer term           Summer/ Winter         Exam 60 min           Assessment         Electronic Components, Physics, Mathematics           requirements		
Compulsory/ optional/ electiv         optional           Learning objectives         - Knowledge of the effect conditions of the optoelectronic basic components; - Conscruction and testing of simple engineering samples of optoelectronic modules           Module content         - Mediation of the theoretical bases to photonics events in semiconductor structures; - Functional conditions and qualities of optoelectronic transmitter and detection devices considering her specific use fields; - Interaction of optoelectronics in automation technology           Course type         2L - 1E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         lecture script, collection of exercises         Seminar, practical course)           Learning Material         - Paul: Optoelektronik, Vieweg, 1993         - Jones: Optoelektronik, Vieweg, 1993           - Jones: Optoelektronik, Vieweg, 1993         - Jones: Optoelektronik, Vieweg, 1993         - Jones: Optoelektronik, Veley, 1992           Method(s) of instruction/ media being used         1         (Bachelor=1, Master=2)         Summer/ Winter           Summer/ Winter         summer term         - Same 60 min         - Assessment         -           Assessment         Exam 60 min         - Assessment         -           Assessment         Exam 60 min         - Assessment         -           Assessment         Exam 60 min         - Assessment         -           Asour		
electiv         -           Learning objectives         -           Knowledge of the effect conditions of the optoelectronic basic components; -         -           Construction and testing of simple engineering samples of optoelectronic modules         -           Module content         -         Mediation of the theoretical bases to photonics events in semiconductor structures; -           -         Functional conditions and qualities of optoelectronic transmitter and detection devices considering her specific use fields; -           -         Intraction of the construction elements in typical application cases; -         -           -         Application of optoelectronics in automation technology         -           Course type         2L - 1E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           -         -         -         -           -         -         -         -           -         -         -         -           -         -         -         -           -         -         -         -           -         -         -         -           -         -         -         -           -         -         -         -           -         -         -         -		
Learning objectives       - Knowledge of the effect conditions of the optoelectronic basic components;         - Construction and testing of simple engineering samples of optoelectronic modules       - Construction and testing of simple engineering samples of optoelectronic modules         Module content       - Mediation of the theoretical bases to photonics events in semiconductor structures;         - Functional conditions and qualities of optoelectronic transmitter and detection devices considering her specific use fields;         - Interaction of the construction elements in typical application cases;         - Application of optoelectronics in automation technology         Course type       2L - 1E - 0S - 0P         2L - 1E - 0S - 0P       Ceutre, Exercises, Seminar, practical course)         Learning Material       lecture script, collection of exercises         Recommended       - Paul: Optoelektronik, Vieweg, 1993         - Jansen: Optoelektronik, Vieweg, 1993       - Jansen: Optoelektronik, Velt, 1992         - Brückner: Optische Nachrichtentechnik, Teubner, 2003       - Krieg: Automatisieren mit Optoelektronik, Vogel, 1992         Method(s) of instruction/       lectures, self-study, discussion at the practical course         instruction/       sement etrm         Term       6. term         Compulsory       none         requirements       3         Assessment modalities       PL - exam during audit perio		optional
- Conception of simple modules;         - Construction and testing of simple engineering samples of optoelectronic modules         - Knowledge of applications of optoelectronics         Module content       - Mediation of the theoretical bases to photonics events in semiconductor structures;         - Functional conditions and qualities of optoelectronic transmitter and detection devices considering her specific use fields;         - Interaction of the construction elements in typical application cases;         - Application of optoelectronics in automation technology         Introduction to transmission technology         Learning Material         lecture script, collection of exercises, Seminar, practical course)         Learning Material         lecture script, collection of exercises, Seminar, practical course)         Learning Material         lecture script, collection of exercises, Seminar, practical course)         Learning Material         lecture script, collection of exercises, Seminar, practical course, Jones: Optoelektronik, Vieweg, 1992         - Jansen: Optoelektronik, Vieweg, 1992         - Brückner: Optische Nachrichtentechnik, Teubner, 2003         - Krieg: Automatisieren mit Optoelektronik, Vogel, 1992         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       Summer term         Recommended       Electronic Components, Physics, Mathematics		
<ul> <li>- Construction and testing of simple engineering samples of optoelectronic modules</li> <li>- Knowledge of applications of optoelectronics</li> <li>Module content</li> <li>- Knowledge of applications and qualities of optoelectronic transmitter and detection devices considering her specific use fields;</li> <li>- Interaction of the construction elements in typical application cases;</li> <li>- Application of optoelectronics in automation technology</li> <li>- Interaction of the construction elements in typical application cases;</li> <li>- Application of optoelectronics in automation technology</li> <li>- Interaction of the construction elements in typical application cases;</li> <li>- Application of optoelectronics in automation technology</li> <li>- Introduction to transmission technology</li> <li>- Introduction to transmission technology</li> <li>- Introduction to potoelektronik, Vieweg, 1993</li> <li>- Jansen: Optoelektronik, Vieweg, 1993</li> <li>- Jones: Optoelektronik, Vieweg, 1993</li> <li>- Jones: Optoelektronik, Vieweg, 1993</li> <li>- Brückner: Optoelektronik, Vogel, 1992</li> <li>- Brückner: Optoelektronik, Vogel, 1992</li> <li>Method(s) of lectures, self-study, discussion at the practical course</li> <li>instruction/</li> <li>media being used</li> <li>Level/ category</li> <li>1 (Bachelor=1, Master=2)</li> <li>Summer/ Winter</li> <li>summer term</li> <li>Compulsory</li> <li>none</li> <li>requirements</li> <li>Assessment</li> <li>Exam 60 min</li> <li>Assessment</li> <li>Exam 60 min</li> <li>Assessment</li> <li>St helcure (preparation and rework)</li> <li>10 he exam preparation</li> <li>Optoelectronics II</li> <li>Laser Techniques</li> <li>Optoelectronics II</li> <li>Laser Techniques</li> <li>Optoelectronical Systems</li> <li>Time</li> <li>According time table</li> <li>Duration of module</li> <li>1 term</li> <li>Plac</li></ul>	Learning objectives	
modules         - Knowledge of applications of optoelectronics           Module content         - Mediation of the theoretical bases to photonics events in semiconductor structures;           - Functional conditions and qualities of optoelectronic transmitter and detection devices considering her specific use fields;           - Interaction of the construction elements in typical application cases;           - Application of optoelectronics in automation technology           - Introduction of exercises           Recommended           Iterature           - Jansen: Optoelektronik, VCH, 1992           - Struker: Optoelektronik, VCH, 1992           - Krieg: Automatiseren mit Optoelektronik, Vogel, 1992           - Krieg: Automatiseren mit Optoelektronik, Vogel, 1992           Method(s) of           Instruction/           media being used           Level/ category           1           Recommended           Electronic Components, Physics, Mathematics           requirements           Recommended           Electronic Components, Physics, Mathematics           requirements           Assessment           Assessment modalities           PL – exam during audit period(graded)           ECTS credits           3           Workload           90h		
- Knowledge of applications of optoelectronics         Module content       - Mediation of the theoretical bases to photonics events in semiconductor structures;         - Functional conditions and qualities of optoelectronic transmitter and detection devices considering her specific use fields;         - Interaction of the construction elements in typical application cases;         - Application of optoelectronics in automation technology         - Introduction to transmission technology         Course type       2L - 1E - 0S - 0P         Learning Material       lecture script, collection of exercises         Recommended       - Paul: Optoelektronik, Vieweg, 1993         - Jansen: Optoelektronik, Vieweg, 1993         - Jones: Optoelektronik, Vieweg, 1993         - Strückner: Optische Nachrichtentechnik, Teubner, 2003         - Krieg: Automatisieren mit Optoelektronik, Vogel, 1992         Method(s) of       lectures, self-study, discussion at the practical course         instruction/       media being used         Level/ category       1         Recommended       Electronic Components, Physics, Mathematics         requirements       3         Assessment       Exam 60 min         Assessment modalities       PL – exam during audit period(graded)         ECTS credits       3         Workload       90h of total work load, thereof		
Module content       - Mediation of the theoretical bases to photonics events in semiconductor structures;         - Functional conditions and qualities of optoelectronic transmitter and detection devices considering her specific use fields;       - Interaction of the construction elements in typical application cases;         - Application of optoelectronics in automation technology       - Introduction to transmission technology         Course type       2L - 1E - 0S - 0P       (Lecture, Exercises, Seminar, practical course)         Learning Material       lecture script, collection of exercises         Recommended       - Paul: Optoelektronik, Vieweg, 1993         - Jansen: Optoelektronik, Vieweg, 1993         - Jansen: Optoelektronik, Vieweg, 1993         - Jansen: Optoelektronik, Vieth, 1992         - Krieg: Automatisieren mit Optoelektronik, Vogel, 1992         Method(s) of       lectures, self-study, discussion at the practical course         instruction/       media being used         Level/ category       1       (Bachelor=1, Master=2)         Summer/ Winter       summer term         Term       6. term         Compulsory       none         requirements       3         Assessment       Exam 60 min         Assessment       Exam 60 min         Assessment       Exam 60 min         Assessment		
structures; - Functional conditions and qualities of optoelectronic transmitter and detection devices considering her specific use fields; - Interaction of the construction elements in typical application cases; - Application of optoelectronics in automation technologyCourse type2L - 1E - 0S - 0P(Lecture, Exercises, Seminar, practical course)Learning Materiallecture script, collection of exercisesRecommended- Paul: Optoelektronische Halbleiterbauelemente, Teubner-Verlag, 1992literature- Jansen: Optoelektronik, Vieweg, 1993 - Jones: Optoelektronik, VCH, 1992Brückner: Optische Nachrichtentechnik, Teubner, 2003 - Krieg: Automatisieren mit Optoelektronik, Vogel, 1992lecures, self-study, discussion at the practical courseinstruction/ media being usedLevel/ category1RecommendedElectronic Components, Physics, MathematicsrequirementsRecommendedEctronic Components, Physics, MathematicsrequirementsAssessmentExam 60 minAssessmentAssessmentExam 60 minAssessmentExam 60 minAssessmentExam 60 minAssessmentUsability of this moduleOptoelectronical systemsTimeAccording time tableOptoelectronical SystemsTimeAccording time tableDuration of moduleDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Mashila asstant	
- Functional conditions and qualities of optoelectronic transmitter and detection devices considering her specific use fields;         - Interaction of the construction elements in typical application cases;         - Application of optoelectronics in automation technology         Course type       2L - 1E - 0S - 0P         Learning Material       lecture script, collection of exercises         Recommended       - Paul: Optoelektronik, Vewg, 1993         - Jansen: Optoelektronik, Vewg, 1993         - Jones: Optoelektronik, VCH, 1992         Bethod(s) of         Instruction/         media being used         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter         summer term         Compulsory         none         requirements         Assessment         Assessment         Assessment modalities         PL - exam during audit period(graded)         2CTS credits         3         Workload         90h of total work load, thereof         45h of sch=study, consisting of:         35 h lecture (preparation and rework)         10 h exam preparation         Usability of this module         Optoelectronical Systems         Time       According time table	Module content	•
detection devices considering her specific use fields;           - Interaction of the construction elements in typical application cases;           - Application of optoelectronics in automation technology           Course type         2L - 1E - 0S - 0P           Learning Material         lecture script, collection of exercises, Seminar, practical course)           Learning Material         lecture script, collection of exercises, Seminar, practical course)           Recommended         - Paul: Optoelektronis, VCH, 1993           - Jones: Optoelektronik, VCH, 1992         - Jones: Optoelektronik, VCH, 1992           - Brückner: Optische Nachrichtentechnik, Teubner, 2003         - Krieg: Automatisieren mit Optoelektronik, Vogel, 1992           Method(s) of         lectures, self-study, discussion at the practical course           instruction/         media being used           Level/ category         1           Bummer/ Winter         summer term           Term         6. term           Compulsory         none           requirements         Recommended           Recorner modalities         PL – exam during audit period(graded)           ECTS credits         3           Workload         90h of total work load, thereof           45h of self-study, consisting of:         35 h lecture (preparation and rework)           10 h exam prep		
<ul> <li>Interaction of the construction elements in typical application cases;         <ul> <li>Application of optoelectronics in automation technology</li> </ul> </li> <li>Course type 2L - 1E - 0S - 0P (Lecture, Exercises, Seminar, practical course)</li> <li>Learning Material lecture script, collection of exercises</li> <li>Recommended - Paul: Optoelektronische Halbleiterbauelemente, Teubner-Verlag, 1992 - Jansen: Optoelektronik, Velweg, 1993 - Jones: Optoelektronik, VCH, 1992 - Brückner: Optische Nachrichtentechnik, Teubner, 2003 - Krieg: Automatisieren mit Optoelektronik, Vogel, 1992</li> <li>Method(s) of lectures, self-study, discussion at the practical course instruction/ media being used lectures self-study, discussion at the practical course instruction/ mole</li> <li>Level/ category 1 (Bachelor=1, Master=2)</li> <li>Summer/ Winter summer term</li> <li>Compulsory none</li> <li>Recommended Electronic Components, Physics, Mathematics requirements</li> <li>Reseamended BL = exam 60 min</li> <li>Assessment modalities PL - exam during audit period(graded)</li> <li>Cortact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 10 h exam preparation</li> <li>Usability of this module</li> <li>Optoelectronical Systems</li> <li>Time According time table</li> <li>Place/ room EAH Jena</li> <li>Frequency of offer</li> <li>Annually</li> </ul>		
- Application of optoelectronics in automation technology         - Introduction to transmission technology         Course type       2L - 1E - 0S - 0P         Learning Material       lecture script, collection of exercises.         Recommended       - Paul: Optoelektronische Halbleiterbauelemente, Teubner-Verlag, 1992         literature       - Jansen: Optoelektronik, Vieweg, 1993         - Jones: Optoelektronik, Vieweg, 1993       - Jones: Optoelektronik, Vel, 1992         - Brückner: Optische Nachrichtentechnik, Teubner, 2003       - Krieg: Automatisieren mit Optoelektronik, Vogel, 1992         Method(s) of       lectures, self-study, discussion at the practical course         instruction/       media being used         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       summer term         Term       6. term         Compulsory       none         requirements       Electronic Components, Physics, Mathematics         requirements       3         Assessment modalities       PL – exam during audit period(graded)         ECTS credits       3         Workload       90h of total work load, thereof         45h of self-study, consisting of:       35 h lecture (preparation and rework)         10 h exam preparation       Lecter (preparation and rework)		
- Introduction to transmission technology         Course type       2L - 1E - 0S - 0P       (Lecture, Exercises, Seminar, practical course)         Learning Material       lecture script, collection of exercises         Recommended       - Paul: Optoelektronische Halbleiterbauelemente, Teubner-Verlag, 1992         literature       - Jansen: Optoelektronik, VEWeg, 1993         - Jones: Optoelektronik, VCH, 1992       - Brückner: Optische Nachrichtentechnik, Teubner, 2003         - Krieg: Automatisieren mit Optoelektronik, Vogel, 1992         Method(s) of       lectures, self-study, discussion at the practical course         instruction/       summer term         media being used		
Course type         2L - 1E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         lecture script, collection of exercises           Recommended         - Paul: Optoelektronische Habbeiterbauelemente, Teubner-Verlag, 1992           literature         - Jansen: Optoelektronik, Vieweg, 1993           - Jansen: Optoelektronik, Vieweg, 1993         - Jansen: Optoelektronik, Vieweg, 1993           - Venes: Optoelektronik, Vieweg, 1993         - Jones: Optoelektronik, Vieweg, 1992           Method(s) of         lectures, self-study, discussion at the practical course           instruction/         media being used           Level/ category         1           Gompulsory         none           requirements         Electronic Components, Physics, Mathematics           requirements         PL – exam during audit period(graded)           ECTS credits         3           Workload         90h of total work load, thereof           45h of self-study, consisting of:         35 h lecture (preparation and rework)           10 h exam preparation         Laser Techniques           Opticelectronical Systems         Opticelectronical Systems           Time         According time table           Duration of module         1 term           Place/ room         EAH Jena		
Learning Material         lecture script, collection of exercises           Recommended         - Paul: Optoelektronische Halbleiterbauelemente, Teubner-Verlag, 1992           literature         - Jansen: Optoelektronik, Vieweg, 1993           - Jones: Optoelektronik, VCH, 1992         - Brückner: Optische Nachrichtentechnik, Teubner, 2003           - Krieg: Automatisieren mit Optoelektronik, Vogel, 1992           leculor)         lecures, self-study, discussion at the practical course           instruction/         summer term           Term         6. term           Compulsory         none           requirements         Recommended           Resessment         Exam 60 min           Assessment         Exam 60 min           Assessment modalities         PL – exam during audit period(graded)           ECTS credits         3           Workload         90h of total work load, thereof           45h of self-study, consisting of:         35 h lecture (preparation and rework)           10 h exam preparation         Usability of this module           Optoelectronical Systems         Optoelectronical Systems           Time         According time table           Duration of module         1 term           Place/ room         EAH Jena		
Recommended literature- Paul: Optoelektronische Halbleiterbauelemente, Teubner-Verlag, 1992 - Jansen: Optoelektronik, Vieweg, 1993 - Jones: Optoelektronik, Vieweg, 1993 - Brückner: Optische Nachrichtentechnik, Teubner, 2003 - Krieg: Automatisieren mit Optoelektronik, Vogel, 1992Method(s) of instruction/ media being usedlectures, self-study, discussion at the practical course instruction/Level/ category1(Bachelor=1, Master=2)Summer/ Wintersummer termGenyulsory requirements6. termRecommended requirementsElectronic Components, Physics, Mathematics requirementsAssessmentExam 60 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 45h of self-study, consisting of: 35 h lecture (preparation and rework) 10 h exam preparationUsability of this moduleOptoelectronical Sensors Optical and Optoelectronical Sensors Optical and Optoelectroni		
literature- Jansen: Optoelektronik, Vieweg, 1993 - Jones: Optoelektronik, VCH, 1992 - Brückner: Optische Nachrichtentechnik, Teubner, 2003 - Krieg: Automatisieren mit Optoelektronik, Vogel, 1992Method(s) of instruction/ media being used Level/category1 (Bachelor=1, Master=2)Summer/Wintersummer termTerm6. term onone requirementsRecommended requirementsElectronic Components, Physics, MathematicsAssessmentExam 60 min Assessment modalitiesQuerkload 3 00 of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 3 5h lecture (preparation and rework) 10 h exam preparationUsability of this moduleOptoelectronics II Laser TechniquesUsability of this moduleOptoelectronical SystemsTimeAccording time table Duration of modulePlace/ roomEAH JenaFrequency of offerAnnually		
- Jones: Optoelektronik, VCH, 1992 - Brückner: Optische Nachrichtentechnik, Teubner, 2003 - Krieg: Automatisieren mit Optoelektronik, Vogel, 1992Method(s) of instruction/ media being usedlectures, self-study, discussion at the practical courseLevel/ category1 (Bachelor=1, Master=2)Summer/ Wintersummer termTerm6. termCompulsory requirementsnoneRecommended tequirementsElectronic Components, Physics, MathematicsAssessmentExam 60 minAssessmentSam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 10 h exam preparationUsability of this moduleOptoelectronical Sensors Optical and Optoelectronical Sensors Optoelectronical SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
- Brückner: Optische Nachrichtentechnik, Teubner, 2003         - Krieg: Automatisieren mit Optoelektronik, Vogel, 1992         Iectures, self-study, discussion at the practical course         instruction/         media being used         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       summer term         Term       6. term         Compulsory       none         requirements       Electronic Components, Physics, Mathematics         requirements       Electronic Components, Physics, Mathematics         Assessment       Exam 60 min         Assessment modalities       PL – exam during audit period(graded)         ECTS credits       3         Workload       90h of total work load, thereof         45h of self-study, consisting of:       35 h lecture (preparation and rework)         10 h exam preparation       Usability of this module         Usability of this module       Optoelectronics II         Laser Techniques       Optical and Optoelectronical Sensors         Optical and Optoelectronical Sensors       Optical and Optoelectronical Sensors         Opticelectronical Systems       Time         According time table       1 term         Place/ room       EAH Jena	literature	
- Krieg: Automatisieren mit Optoelektronik, Vogel, 1992         Method(s) of instruction/ media being used       lectures, self-study, discussion at the practical course         Image: Self-study, discussion at the practical course       media being used         Level/category       1 (Bachelor=1, Master=2)         Summer/Winter       summer term         Term       6. term         Compulsory       none         requirements       Electronic Components, Physics, Mathematics         Recommended       Electronic Components, Physics, Mathematics         requirements       Exam 60 min         Assessment       Exam 60 min         Assessment modalities       PL – exam during audit period(graded)         ECTS credits       3         Workload       90h of total work load, thereof         45h of self-study, consisting of:         35 h lecture (preparation and rework)         10 h exam preparation         Usability of this module       Optoelectronics II         Laser Techniques       Optoelectronical Sensors         Optoelectronical Systems       Optoelectronical Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena		
Method(s) of instruction/ media being used       lectures, self-study, discussion at the practical course         Level/ category       1 (Bachelor=1, Master=2)         Summer/Winter       summer term         Term       6. term         Compulsory       none         requirements       Electronic Components, Physics, Mathematics         requirements       Electronic Components, Physics, Mathematics         Assessment       Exam 60 min         Assessment modalities       PL – exam during audit period(graded)         ECTS credits       3         Workload       90h of total work load, thereof         45h of contact hours and       45h of contact hours and         45h of self-study, consisting of:       35 h lecture (preparation and rework)         10 h exam preparation       Usability of this module         Optoelectronics II       Laser Techniques         Optical and Optoelectronical Sensors       Optoelectronical Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
instruction/ media being used       I       (Bachelor=1, Master=2)         Level/ category       1       (Bachelor=1, Master=2)         Summer/ Winter       summer term         Term       6. term         Compulsory       none         requirements       Electronic Components, Physics, Mathematics         Recommended       Electronic Components, Physics, Mathematics         requirements       Exam 60 min         Assessment       Exam 60 min         Assessment modalities       PL – exam during audit period(graded)         ECTS credits       3         Workload       90h of total work load, thereof         45h of self-study, consisting of:       35 h lecture (preparation and rework)         10 h exam preparation       Usability of this module         Usability of this module       Optoelectronics II         Laser Techniques       Optoelectronical Sensors         Optoelectronical Systems       Optoelectronical Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually	Method(s) of	
media being usedLevel/ category1 (Bachelor=1, Master=2)Summer/ Wintersummer termTerm6. termCompulsorynonerequirementsElectronic Components, Physics, MathematicsRecommendedElectronic Components, Physics, MathematicsrequirementsElectronic Components, Physics, MathematicsAssessmentExam 60 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 10 h exam preparationUsability of this moduleOptoelectronics II Laser Techniques Optical and Optoelectronical Sensors Optoelectronical SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Level/ category1 (Bachelor=1, Master=2)Summer/ Wintersummer termTerm6. termCompulsorynonerequirementsElectronic Components, Physics, MathematicsRecommendedElectronic Components, Physics, Mathematicsrequirements		
Summer/Winter       summer term         Term       6. term         Compulsory       none         requirements       Recommended         Recommended       Electronic Components, Physics, Mathematics         requirements       Electronic Components, Physics, Mathematics         Assessment       Exam 60 min         Assessment modalities       PL – exam during audit period(graded)         ECTS credits       3         Workload       90h of total work load, thereof         45h of contact hours and       45h of self-study, consisting of:         35 h lecture (preparation and rework)       10 h exam preparation         Usability of this module       Optoelectronics II         Laser Techniques       Optoelectronical Sensors         Optoelectronical Systems       Optoelectronical Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		1 (Bachelor=1 Master=2)
Term6. termCompulsory requirementsnoneRecommended requirementsElectronic Components, Physics, MathematicsAssessmentExam 60 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 10 h exam preparationUsability of this moduleOptoelectronics II Laser Techniques Optoelectronical SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Compulsory requirementsnoneRecommended requirementsElectronic Components, Physics, MathematicsAssessmentExam 60 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 10 h exam preparationUsability of this moduleOptoelectronics II Laser Techniques Optoelectronical SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
requirementsElectronic Components, Physics, MathematicsRecommended requirementsElectronic Components, Physics, MathematicsAssessmentExam 60 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 10 h exam preparationUsability of this moduleOptoelectronics II Laser Techniques Optical and Optoelectronical Sensors Optoelectronical SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Recommended requirementsElectronic Components, Physics, MathematicsAssessmentExam 60 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 10 h exam preparationUsability of this moduleOptoelectronics II Laser Techniques Optical and Optoelectronical Sensors Optoelectronical SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
requirements       Exam 60 min         Assessment modalities       PL – exam during audit period(graded)         ECTS credits       3         Workload       90h of total work load, thereof         45h of contact hours and       45h of contact hours and         45h of self-study, consisting of:       35 h lecture (preparation and rework)         10 h exam preparation       0ptoelectronics II         Laser Techniques       Optoelectronical Sensors         Optoelectronical Systems       0ptoelectronical Sensors         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		Electronic Components Physics Mathematics
AssessmentExam 60 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 10 h exam preparationUsability of this moduleOptoelectronics II Laser Techniques Optical and Optoelectronical Sensors Optoelectronical SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Assessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 10 h exam preparationUsability of this moduleOptoelectronics II Laser Techniques Optoelectronical SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		Exam 60 min
ECTS credits       3         Workload       90h of total work load, thereof         45h of contact hours and       45h of self-study, consisting of:         35 h lecture (preparation and rework)       10 h exam preparation         Usability of this module       Optoelectronics II         Laser Techniques       Optoelectronical Sensors         Optoelectronical Systems       Optoelectronical Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 10 h exam preparationUsability of this moduleOptoelectronics II Laser Techniques Optical and Optoelectronical Sensors Optoelectronical SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 10 h exam preparationUsability of this moduleOptoelectronics II Laser Techniques Optical and Optoelectronical Sensors Optoelectronical SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
45h of self-study, consisting of: 35 h lecture (preparation and rework) 10 h exam preparationUsability of this moduleOptoelectronics II Laser Techniques Optical and Optoelectronical Sensors Optoelectronical SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
35 h lecture (preparation and rework)         10 h exam preparation         Usability of this module       Optoelectronics II         Laser Techniques         Optical and Optoelectronical Sensors         Optoelectronical Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
10 h exam preparation         Usability of this module       Optoelectronics II         Laser Techniques       Optical and Optoelectronical Sensors         Optoelectronical Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
Usability of this module       Optoelectronics II         Laser Techniques       Optical and Optoelectronical Sensors         Optoelectronical Systems       Optoelectronical Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
Laser Techniques         Optical and Optoelectronical Sensors         Optoelectronical Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually	Usability of this module	
Optical and Optoelectronical Sensors           Optoelectronical Systems           Time         According time table           Duration of module         1 term           Place/ room         EAH Jena           Frequency of offer         Annually		
Optoelectronical Systems           Time         According time table           Duration of module         1 term           Place/ room         EAH Jena           Frequency of offer         Annually		
TimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Duration of module     1 term       Place/ room     EAH Jena       Frequency of offer     Annually	Time	
Frequency of offer Annually	Duration of module	
Frequency of offer Annually	Place/ room	EAH Jena
	Frequency of offer	
	Language	German

Module number	ET.1.408
Module name	
	Introduction in Communication Engineering Electrical Engineering and Information Technology
Department	ET/IT (Ba)
Degree program Specialization/ Profil	KMT
Module coordinator	Prof. Dr. Ludwig Niebel
Compulsory/ optional/ electiv	Compulsory
Learning objectives	Upon completion of the module, students
Learning objectives	- have a general idea of telecommunication engineering, its history and the
	specific fields and are able to relate issues to these fields
	- understand basic functions and relations of communikation networks
	- are able to solve some simple problems in theory of information and
	coding, radio frequency technology and communication networks
Module content	- basics of telecommunication engineering
	- historical development of telecommunication engineering
	- communication networks: basic principles, structures, layer model and
	services
	- information and coding theory: basic principles, sources, source coding,
	channel coding and Modulation
	- radio frequency technology: basic principles, Maxwell equations,
	electromagnetic waves, processes in waveguides, basics of antennas and
	rf-transmission
Course type	2L - 0E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	Books, scripts and exercises on the Internet
Recommended	- Bossert, M.: Einführung in die Nachrichtentechnik. Oldenbourg Verlag
literature	- Werner, M: Nachrichtentechnik. Verlag Vieweg
	- Mayer, M.: Kommunikationstechnik. Verlag Vieweg
	- Meinke, H, Gundlach, F. W.: Taschenbuch der Hochfrequenztechnik.
	Springer-Verlag
Method(s) of instruction/	Lectures will take the form of seminars, exercises, simulations and self study
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/ Winter	summer term
Term	4. term
Compulsory	none
requirements	
Assessment	exam 60 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	3
Workload	90 h of total work load, thereof
	30 h of contact hours and
	60 h of self-study, consisting of:
	- 30 h lecture (preparation and rework)
	- 30 h exam preparation
Usability of this module	Radio Frequency Technology, Transmission Technique, Communication
	Networks
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.409
Module name	Databases
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	
Module coordinator	Prof. DrIng. Oliver Jack
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	Students knowtoolsfor modeling and implement database systems and can this also apply. Students are able to analyze data sets and arrange in the form of data models. Students are able to implement relational databases. Students are capable to implement standard interfaces.
Module content	Basic Database Concepts, Architecture and Components of database systems, - Entity-Relationship Model, Basics of relational databases including Normal Forms, Standard query language SQL, Current database systems, standard interfaces for database integration
Course type	1,5L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	PowerPoint slides, DB programs, laboratory excercises
Recommended	- Elmasri/Navathe: Grundlagen von Datenbanksystemen, Addison Wesley
literature	- SQL Grundlagen und Datenbankdesign, RRZN Hannover, HERDT-Verlag
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	4. term
Compulsory requirements	none
Recommended requirements	Informatik
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	3
Workload	90h of total work load, thereof
	37,5h of contact hours and
	52,5h of self-study, consisting of:
	22 h lecture (preparation and rework)
	15 h practical training (preparation and evaluation)
	15 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Notable Induced         E11.440           Depart program         ATTI (Ba), ET/IT (	Module number	ET.1.410
Department         Electrical Engineering and Information Technology           Degree program         ATITi (Ba), ET/IT (Ba)           Specialization/ Profit         Tit           Module coordinator         Prof. DrIng. Oliver Jack           Compulsory optional/ electiv         Compulsory           Learning objectives         At the end of the module students are able: - to understand methods for sysematic software design - to assess requirements analysis methods by example problems - to aspely best practice methods of software quality assurrance           Module content         Principles, Procedures, Methods, Tools for Development, Service and Support of Software, Software Development Models and Phases, V-Model, Basic Concepts of Object-Oriented Software Test and Validation Methods           Course type         2L - 2E - 0S - 0P           Learning Material         2L - 2E - 0S - 0P           Learning Material         2L - 2E - 0S - 0P           Learning Material         2L - 2E - 0S - 0P           Learning Material         2L - 2E - 0S - 0P           Learning Material         2L - 2E - 0S - 0P           Learning Material         2L - 2E - 0S - 0P           Learning Material         2L - 2E - 0S - 0P           Learning Material         2L - 2E - 0S - 0P           Learning Material         2L - 2E - 0S - 0P           Learning Material         2L - 2E - 0S - 0P <t< td=""><td></td><td></td></t<>		
Degree program         ATTIT (Ba), ET/IT (Ba)           Specialization/ Profil         TI           Module coordinator         Prof. DrIng. Oliver Jack           Compulsory/ optional/ electiv         Compulsory           Learning objectives         At the end of the module students are able: - to understand methods for sysematic software design - to aspess requirements analysis methods by example problems - to apply application software planning methods for micro computers and micro controllers - to apply application software publication software models and Phases, V-Model, Basic Concepts of Object-Oriented Software Development, Fundamentals of the Unified Modelling Language (UML), Software Test and Validation Methods           Course type         2L - 2E - 0S - 0P (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P (Lecture, Exercises, Seminar, practical course)           Recommended         Helmut Balzert. Lehrbuch der Software-Technik, Band 1. Software- Entwicklung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 2000.           - Helmut Balzert. Lehrbuch der Software-Technik, Band 2. Software- Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.           Method(s) of instruction/ media being used         - Kern - FT/IT-TI 6. term - ATITi           Level category         1 (Bachelor=1, Master=2)           Summer/ Winter         Summer term paper           Assessment modalities         APL – assessment during the semester period (graded)		
Specialization/ Profil         T1           Module coordinator         Porf. DrIng. Oliver Jack           Compulsory/ optional/ electiv         Compulsory           Learning objectives         At the end of the module students are able: - to understand methods for sysematic software design - to assess requirements analysis methods by example problems - to assess requirements analysis methods by example problems - to assess requirements analysis methods by example problems - to asply best practice methods of software quality assurrance           Module content         Principles, Procedures, Methods, Tools for Development, Fundamentals of the Unified Modelling Language (UML), Software Test and Validation Methods           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Recommended         - Helmut Balzert. Lehrbuch der Software-Technik, Band 1. Software Entwicklung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 2000.         - Aufl., 1998.           - Ian Sommerville. Software-Qualitätssicherung und Uniternehmensmodellierung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1998.         - Ian Sommerville. Software-Qualitätssicherung und Monika Köhle. Software- Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.           Method(s) of instructon/ media being used         Iecture, practical course, exercises, self-study           Level category         1 (Bachelor=1, Master		
Module coordinator         Prof. DrIng. Oliver Jack           Compulsory/ optional/ leactiv         Compulsory         Compulsory           Learning objectives         At the end of the module students are able: - to assess requirements analysis methods by example problems - to aspess practice methods of software design - to apply post practice methods of software quality assurrance           Module content         Principles, Procedures, Methods, Tools for Development, Service and Support of Software, Software Development, Fundamentals of the Unified Modelling Language (UML), Software Test and Validation Methods           Course type         2L - 2E - 0S - 0P         Clecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         Clecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         Clecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         Clecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         Clecture, Exercises, Seminar, Dractical course)           Learning Material         2L - 2E - 0S - 0P         Clecture, Exercises, Seminar, Dractical course)           Learning Material         2L - 2E - 0S - 0P         Clecture, Exercises, Seminar, Dractical course)           Learning Material         2L - 2E - 0S - 0P         Clecture, Exercises, Seminar, Dractical course)           Learning Materi		
Compulsory/ optional/ electiv         Compulsory           Learning objectives         At the end of the module students are able: - to understand methods for sysematic software design - to assess requirements analysis methods by example problems - to apply application software planning methods for micro computers and micro controllers           Module content         Principles, Procedures, Methods, Tools for Development, Service and Support of Software, Software Development Models and Phases, V-Model, Basic Concepts of Object-Oriented Software Development, Fundamentals of the Unified Modelling Language (UML), Software Test and Validation Methods           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, practical course)           Learning Material         2L - 2E - 0S - 0P		
electiv         Intervention           Learning objectives         At the end of the module students are able: - to understand methods for sysematic software design - to aspess requirements analysis methods by example problems - to apply petropication software planning methods for micro computers and micro controllers           Module content         Principles, Procedures, Methods, Tools for Development, Service and Support of Software, Software Development, Fundamentals of the Unified Modelling Language (UML), Software Test and Validation Methods           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)         Learning Material           Recommended         1- Helmut Balzert. Lehrbuch der Software-Technik, Band 1. Software Entwicklung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 2000.         - Helmut Balzert. Lehrbuch der Software-Technik, Band 2. Software- Management, Software-Qualitässicherung und Unternehmensmodellierung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1998.         - Ian Sommerville. Software-Qualitässicherung und Unternehmensmodellierung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1998.           - Ian Sommerville. Software-Qualitässicherung und Monika Köhle. Software- Engineering mit UML und den Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.           Method(s) of Iustructon/ media being used         Iesthere1, Master=2)           Level/ category         1 (Bachelor=1, Master=2)           Summer/ Winter         Summer term Assessment modalities           APL – assessment during the semester period (graded)		
Learning objectives       At the end of the module students are able: - to understand methods for sysematic software design - to assess requirements analysis methods by example problems - to apply application software planning methods for micro computers and micro controllers - to apply best practice methods of software quality assurrance         Module content       Principles, Procedures, Methods, Tools for Development, Service and Support of Software, Software Development, Models and Phases, V-Model, Basic Concepts of Object-Oriented Software Development, Fundamentals of the Unified Modelling Language (UML), Software Test and Validation Methods         Course type       2L - 2E - 0S - 0P       (Lecture, Exercises, Seminar, practical course)         Learning Material       2L - 2E - 0S - 0P       (Lecture, Exercises, Seminar, practical course)         Learning Material       2L - 2E - 0S - 0P       (Lecture, Exercises, Seminar, practical course)         Learning Material       2L - 2E - 0S - 0P       (Lecture, Exercises, Seminar, practical course)         Learning Material       2L - 2E - 0S - 0P       (Lecture, Exercises, Seminar, practical course)         Learning Material       2L - 2E - 0S - 0P       (Lecture, Exercises, Seminar, practical course)         Learning Material       2L - 2E - 0S - 0P       (Lecture, Practical course)         Learning Material       2L - 2E - 0S - 0P       (Lecture, Practical course)         Learning Material       2L - 2E - 0S - 0P		Compulsory
<ul> <li>- to understand methods for sysematic software design         <ul> <li>- to assess requirements analysis methods by example problems</li> <li>- to asply application software planning methods for micro computers and micro controllers</li> <li>- to apply best practice methods of software quality assurrance</li> </ul> </li> <li>Module content</li> <li>Principles, Procedures, Methods, Tools for Development, Service and Support of Software Development Models and Phases, V-Model, Basic Concepts of Object-Oriented Software Development, Fundamentals of the Unified Modelling Language (UML), Software Test and Validation Methods</li> <li>Course type</li> <li>2L - 2E - 0S - 0P</li> <li>Learning Material</li> <li>2L - 2E - 0S - 0P</li> <li>Learning Material</li> <li>2L - 2E - 0S - 0P</li> <li>Learning Material</li> <li>- Helmut Balzert. Lehrbuch der Software-Technik, Band 1. Software Entwicklung, Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 2000.</li> <li>- Helmut Balzert. Lehrbuch der Software-Technik, Band 2. Software-Management, Software-Qualitätssicherung und Unternehmensmodellierung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1988.</li> <li>- Ian Sommerville. Software engineering, Addison-Wesley, Harlow [u.a.], 8. edition, 2007.</li> <li>- Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. Software-Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.</li> <li>Method(s) of instruction/</li> <li>media being used</li> <li>Level/ category</li> <li>(Bachelor=1, Master=2)</li> <li>Summer/Winter</li> <li>summer term</li> <li>Term</li> <li>4. term - ET/IT-TI</li> <li>term - ATITi</li> <li>Compulsory</li> <li>none</li> <li>Recommended</li> <li>for students have to conduct an extensive software development project</li> <li>ECTS credits</li> <li>Mort is module</li> <li>Ob of</li></ul>		At the end of the module students are able:
- to assess requirements analysis methods by example problems           - to apply application software planning methods for micro computers and micro controllers           - to apply best practice methods of software quality assurrance           Module content         Principles, Procedures, Nethods, Tools for Development, Service and Support of Software, Software Development, Models and Phases, V-Model, Basic Concepts of Object-Oriented Software Test and Validation Methods           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Practical Science           Recommended         Introvicul Addition Methods for Musere-Elensing into Muser Management, Software-Qualitätssicherung und Monika Köhle. Software- Engineering mit UML und dem Unified Process. Pearson Studi	20011119 00 00 000	
- to apply application software planning methods for micro computers and micro controllers           - to apply best practice methods of software quality assurrance           Module content         Principles, Procedures, Methods, Tools for Development, Fundamentals of the Unified Modelling Language (UML), Software Test and Validation Methods           Course type         2L - 2E - 0S - 0P           Learning Material         2L - 2E - 0S - 0P           Recommended         - Helmut Balzert. Lehrbuch der Software-Technik, Band 1. Software Entwicklung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 2000.           - Helmut Balzert. Lehrbuch der Software-Technik, Band 2. Software- Berlin, Software-Qualitätssicherung und Unternehmensmodellierung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1998.           - Ian Sommerville. Software ouglitätssicher Verlag, Heidelberg Berlin, 2. Aufl., 1998.           - Ian Sommerville. Software engineering. Addison-Wesley, Harlow [u.a.], 8. edition, 2007.           - Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. Software- Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.           Method(s) of instructor/ media being used         lecture, practical course, exercises, self-study           Level/ category         1 (Bachelor=1, Master=2)           Summer/ Winter         summer term           Recommended requirements         Computer Science           Recommended requirements         Computer Science           Recom		
micro controllers           - to apply best practice methods of software quality assurrance           Module content           Principles, Procedures, Methods, Tools for Development, Service and Support of Software, Software Development Models and Phases, V-Model, Basic Concepts of Object-Oriented Software Development, Fundamentals of the Unified Modelling Language (UML), Software Test and Validation Methods           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Recommended         - Helmut Balzert. Lehrbuch der Software-Technik, Band 1. Software Entwicklung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 2000.         - Helmut Balzert. Lehrbuch der Software-Technik, Band 2. Software- Management, Software engineering. Addison-Wesley, Harlow [u.a.], 8. edition, 2007.         - Volfgang Zuser, Thomas Grechenig, und Monika Köhle. Software- Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überatb. Aufl., 2004.           Method(s) of instruction/ media being used         - Letrue, practical course, exercises, self-study           Level/ category         1 (Bachelor=1, Master=2)           Summer Vinter         summer term           requirements         - ETIT-T1           Recommended         Computer Science           req		
- to apply best practice methods of software quality assurrance           Module content         Principles, Procedures, Methods, Tools for Development, Service and Support of Software, Software Development, Fundamentals of the Unified Modelling Language (UML), Software Test and Validation Methods           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Data Software-Technik, Band 1. Software           Envicklung, Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 2000.         - Helmut Balzert. Lehrbuch der Software-Technik, Band 2. Software- Endition, 2007.         - Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. Software- Engineering mit UML und den Unified Process. Pearson Studium, München [u.a.], 2. überarb. Aufl., 2004.           Method(s) of         lecture, practical course, exercises, self-study         .           Instruction/         mere		
Module content         Principles, Procedures, Methods, Tools for Development, Service and Support of Software, Software Development Models and Phases, V-Model, Basic Concepts of Object-Oriented Software Development, Fundamentals of the Unified Modelling Language (UML), Software Test and Validation Methods           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Date Software-Technik, Band 1. Software           Recommended         Internet Natagement, Software-Qualitätsischerung und Unternehmensmodellierung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1998.         -           Ian Sommerville. Software engineering. Addison-Wesley, Harlow [u.a.], 8.         edition, 2007.         -           Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. So		
Support of Software, Software Development Models and Phases, V-Model, Basic Concepts of Object-Oriented Software Development, Fundamentals of the Unified Modelling Language (UML), Software Test and Validation Methods           Course type         2L - 2E - 0S - 0P           Learning Material         2L - 2E - 0S - 0P           Recommended         - Helmut Balzert. Lehrbuch der Software-Technik, Band 1. Software           literature         Entwicklung, Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 2000.           - Helmut Balzert. Lehrbuch der Software-Technik, Band 2. Software- Management, Software-Qualitätssicherung und Unternehmensmodellierung, Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1998.           - Ian Sommerville. Software-Qualitätssicherung und Monika Köhle. Software- Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.           Method(s) of Instructor/ media being used         Iecture, practical course, exercises, self-study           Level/ category         1 (Bachelor=1, Master=2)           Summer/ Winter         Summer term           Term         4. term - ET/IT-TI 6. term - ATITi           Compulsory requirements         Computer Science           Recommended         Computer Science           requirements         6           Workload         180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 30 h lecture (preparation 20 h lecture (preparation and rework) 30 h lexam preparation </td <td>Module content</td> <td></td>	Module content	
Basic Concepts of Object-Oriented Software Develpoment, Fundamentals of the Unified Modelling Language (UML), Software Test and Validation Methods           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P         (Lecture, Practical course, Settware-Technik, Band 1. Software           Bootson         Software-Qualitätssicherung und Unternehmensmodellierung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 198. - Ian Sommerville. Software engineering. Addison-Wesley, Harlow [u.a.], 8. edition, 2007. - Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. Software- Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.           Method(s) of instruction/         lecture, practical course, exercises, self-study           instruction/         media being used		
the Unified Modelling Language (UML), Software Test and Validation Methods           Course type         2L - 2E - 0S - 0P           Learning Material         2L - 2E - 0S - 0P           Recommended         - Helmut Balzert. Lehrbuch der Software-Technik, Band 1. Software           Entwicklung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 2000.         - Helmut Balzert. Lehrbuch der Software-Technik, Band 2. Software- Management, Software-Qualitätssicherung und Unternehmensmodellierung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1998.           - Ian Sommerville. Software engineering. Addison-Wesley, Harlow [u.a.], 8. edition, 2007.         - Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. Software- Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.           Method(s) of         lecture, practical course, exercises, self-study           instruction/ media being used         -           Level/ category         1 (Bachelor=1, Master=2)           Summer / Winter         summer term           Term         4. term - ET/IT-TI           6. term - ATITi         -           Recommended         Computer Science           requirements         -           Assessment         4PL – assessment during the semester period (graded)           Further Information         The students have to conduct an extensive software development project           ECTS credits         6		
Methods           Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P           Recommended         - Helmut Balzert. Lehrbuch der Software-Technik, Band 1. Software           Entwicklung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 2000.         - Helmut Balzert. Lehrbuch der Software-Technik, Band 2. Software-Management, Software-Qualitätssicherung und Unternehmensmodellierung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1998.           - Ian Sommerville. Software engineering. Addison-Wesley, Harlow [u.a.], 8. edition, 2007.         - Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. Software-Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.           Method(s) of         lecture, practical course, exercises, self-study           instruction/         media being used           Level/ category         1 (Bachelor=1, Master=2)           Summer/ Winter         summer term           Term         4. term - ET/IT-TI           6. term - ATITI         Compulsory           Recommended         Computer Science           requirements         6           Assessment modalities         APL – assessment during the semester period (graded)           Further Information         The students have to conduct an extensive software development project           ECTS credits		
Course type         2L - 2E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         2L - 2E - 0S - 0P           Recommended         - Helmut Balzert. Lehrbuch der Software-Technik, Band 1. Software Entwicklung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 2000.           - Helmut Balzert. Lehrbuch der Software-Technik, Band 2. Software- Management, Software-Qualitätssicherung und Unternehmensmodellierung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1998.           - Ian Sommerville. Software engineering. Addison-Wesley, Harlow [u.a.], 8. edition, 2007.           - Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. Software- Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.           Method(s) of instruction/ media being used         lecture, practical course, exercises, self-study           Level/ category         1 (Bachelor=1, Master=2)           Summer/ Winter         summer term           Term         4. term - ET/IT-TI 6. term - ATITi           Compulsory requirements         Computer Science           Assessment         term paper           Assessment         4.PL – assessment during the semester period (graded)           Further Information         The students have to conduct an extensive software development project           ECTS credits         6           Workload         180h of total work load, thereof 60h of contact hours and 120h of self-s		
Learning Material         2L - 2E - 0S - 0P           Recommended literature         - Helmut Balzert. Lehrbuch der Software-Technik, Band 1. Software Entwicklung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 2000.           - Helmut Balzert. Lehrbuch der Software-Technik, Band 2. Software- Management, Software-Qualitätssicherung und Unternehmensmodellierung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1998.           - Ian Sommerville. Software engineering. Addison-Wesley, Harlow [u.a.], 8. edition, 2007.         - Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. Software- Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.           Method(s) of instruction/ media being used         lecture, practical course, exercises, self-study           Level/ category         1 (Bachelor=1, Master=2)           Summer/ Winter         summer term           Term         4. term - ET/IT-TI 6. term - ATITi           Compulsory requirements         none           Assessment         term paper           Assessment         term paper           Assessment modalities         APL – assessment during the semester period (graded)           Further Information         The students have to conduct an extensive software development project           ECTS credits         6           Workload         180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparation <td>Course type</td> <td></td>	Course type	
Recommended       - Helmut Balzert. Lehrbuch der Software-Technik, Band 1. Software         literature       Entwicklung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 2000.         - Helmut Balzert. Lehrbuch der Software-Technik, Band 2. Software-Management, Software-Qualitätssicherung und Unternehmensmodellierung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1998.         - Ian Sommerville. Software-Qualitätssicherung und Unternehmensmodellierung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1998.         - Ian Sommerville. Software engineering. Addison-Wesley, Harlow [u.a.], 8. edition, 2007.         - Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. Software-Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.         Method(s) of       lecture, practical course, exercises, self-study         instruction/       media being used         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       summer term         Term       4. term - ET/IT-TI         6. term - ATITi       Computer Science         requirements       Assessment         Assessment       term paper         Assessment modalities       APL – assessment during the semester period (graded)         Further Information       The students have to conduct an extensive software development project         ECTS credits       6         Workload       180h of		
literatureEntwicklung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 2000. - Helmut Balzert. Lehrbuch der Software-Technik, Band 2. Software- Management, Software-Qualitätssicherung und Unternehmensmodellierung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1998. - lan Sommerville. Software engineering. Addison-Wesley, Harlow [u.a.], 8. edition, 2007. - Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. Software- Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.Method(s) of instruction/ media being usedlecture, practical course, exercises, self-studyLevel/ category1(Bachelor=1, Master=2)Summer/ Wintersummer termTerm4. term - ET/IT-TI 6. term - ATITiCompulsory requirementsnoneRecommended computer Science requirementsComputer Science 1. 4. term paperAssessment Assessment term paperAssessment during the semester period (graded)Further InformationThe students have to conduct an extensive software development projectECTS credits6Workload180 nf total work load, thereof 60 h of contact hours and 120 h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparationUsability of this moduleOperating SystemsTime Place/ roomAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
2000.       - Helmut Balzert. Lehrbuch der Software-Technik, Band 2. Software-Management, Software-Qualitätssicherung und Unternehmensmodellierung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1998.         - Ian Sommerville. Software engineering. Addison-Wesley, Harlow [u.a.], 8. edition, 2007.         - Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. Software-Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.         Method(s) of instruction/       lecture, practical course, exercises, self-study         Instruction/       media being used         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       summer term         Term       4. term - ET/IT-TI         6. term - ATITi       none         requirements       computer Science         Recommended       computer Science         requirements       APL – assessment during the semester period (graded)         Further Information       The students have to conduct an extensive software development project         ECTS credits       6         Workload       180h of total work load, thereof         60h of contact hours and       120h of self-study, consisting of:         90 h lecture (preparation and rework)       30 h exam preparation         Usability of this module       Operating Systems         Time       According time table		
- Helmut Balzert. Lehrbuch der Software-Technik, Band 2. Software- Management, Software-Qualitätssicherung und Unternehmensmodellierung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1998.         - Ian Sommerville. Software engineering. Addison-Wesley, Harlow [u.a.], 8. edition, 2007.         - Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. Software- Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.         Method(s) of instruction/ media being used       lecture, practical course, exercises, self-study         Level/ category       1. (Bachelor=1, Master=2)         Summer/ Winter       summer term         Term       4. term - ET/IT-TI         6. term - ATITi       6. term - ATITi         Compulsory       none         requirements       Recommended         Assessment       term paper         Assessment modalities       APL – assessment during the semester period (graded)         Further Information       The students have to conduct an extensive software development project         ECTS credits       6         Workload       180h of total work load, thereof         60h of contact hours and       120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparation         Usability of this module       Operating Systems         Time       According time table         Duration of module	incrature	
Management, Software-Qualitätssicherung und Unternehmensmodellierung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1998. - lan Sommerville. Software engineering. Addison-Wesley, Harlow [u.a.], 8. edition, 2007. - Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. Software- Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.Method(s) of instruction/ media being usedlecture, practical course, exercises, self-studyLevel/ category1 (Bachelor=1, Master=2)Summer/ Wintersummer termTerm4. term - ET/IT-TI 6. term - ATITiCompulsory requirementsnoneRecommended requirementsComputer ScienceAssessmentterm paperAssessment Of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparationUsability of this module Duration of moduleOperating SystemsTime Place/ roomAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl., 1998.         - Ian Sommerville. Software engineering. Addison-Wesley, Harlow [u.a.], 8.         edition, 2007.         - Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. Software- Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.         Method(s) of instruction/ media being used         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       summer term         Term       4. term - ET/IT-TI 6. term - ATITI         6. term - ATITI       for term paper         Assessment       computer Science         requirements       computer Science         Assessment modalities       APL – assessment during the semester period (graded)         Further Information       The students have to conduct an extensive software development project         ECTS credits       6         Workload       180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparation         Usability of this module       Operating Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
- Ian Sommerville. Software engineering. Addison-Wesley, Harlow [u.a.], 8.         edition, 2007.         - Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. Software- Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.         Method(s) of instruction/ media being used       lecture, practical course, exercises, self-study         Level/ category       1 (Bachelor=1, Master=2)         Summer/Winter       summer term         Term       4. term - ET/IT-TI         6. term - ATITi       6. term - ATITi         Compulsory       none         requirements       Computer Science         Assessment       term paper         Assessment modalities       APL – assessment during the semester period (graded)         Further Information       The students have to conduct an extensive software development project         ECTS credits       6         Workload       180h of total work load, thereof         60h of contact hours and       120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparation         Usability of this module       Operating Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
edition, 2007.       -Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. Software- Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überab. Aufl., 2004.         Method(s) of instruction/ media being used       lecture, practical course, exercises, self-study         Level/category       1 (Bachelor=1, Master=2)         Summer/Winter       summer term         Term       4. term - ET/IT-TI         6. term - ATITi       6. term - ATITi         Compulsory       none         requirements       Recommended         Recommended       Computer Science         requirements       6         Assessment       term paper         Assessment modalities       APL – assessment during the semester period (graded)         Further Information       The students have to conduct an extensive software development project         ECTS credits       6         Workload       180h of total work load, thereof         60h of contact hours and       120h of self-study, consisting of: 90 h lecture (preparation and rework)         30 h exam preparation       Usability of this module         Usability of this module       1 term         Place/room       EAH Jena         Frequency of offer       Annually		
- Wolfgang Zuser, Thomas Grechenig, und Monika Köhle. Software- Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.], 2., überarb. Aufl., 2004.         Method(s) of instruction/ media being used       lecture, practical course, exercises, self-study         Level/ category       1 (Bachelor=1, Master=2)         Summer/Winter       summer term         Term       4. term - ET/IT-TI         6. term - ATITi       6. term - ATITi         Compulsory       none         requirements       Computer Science         Assessment       term paper         Assessment       term paper         Assessment       term paper         Assessment       APL – assessment during the semester period (graded)         Further Information       The students have to conduct an extensive software development project         ECTS credits       6         Workload       180h of total work load, thereof         60h of contact hours and       120h of self-study, consisting of: 90 h lecture (preparation and rework)         30 h exam preparation       Joh exam preparation         Usability of this module       Operating Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Ann		
Engineering mit UML und dem Unified Process. Pearson Studium, München [u.a.]. 2., überarb. Aufl., 2004.Method(s) of instruction/ media being usedlecture, practical course, exercises, self-studyLevel/category1 (Bachelor=1, Master=2)Summer/Wintersummer termTerm4. term - ET/IT-TI 6. term - ATITiCompulsory requirementsnoneRecommended requirementsComputer ScienceAssessmentterm paperAssessment Summer/ InformationThe students have to conduct an extensive software development projectECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparationUsability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
[u.a.], 2., überarb. Aufl., 2004.Method(s) of instruction/ media being usedlecture, practical course, exercises, self-studyLevel/ category1 (Bachelor=1, Master=2)Summer/ Wintersummer termTerm4. term - ET/IT-TI 6. term - ATITiCompulsory requirementsnoneRecommended requirementsComputer ScienceAssessmentterm paperAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)Further InformationThe students have to conduct an extensive software development projectECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparationUsability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Method(s) of instruction/ media being used       Iecture, practical course, exercises, self-study         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       summer term         Term       4. term - ET/IT-TI         6. term - ATITi       6. term - ATITi         Compulsory       none         requirements       Computer Science         Assessment       term paper         Assessment modalities       APL – assessment during the semester period (graded)         Further Information       The students have to conduct an extensive software development project         ECTS credits       6         Workload       180h of total work load, thereof         60h of contact hours and       120h of self-study, consisting of:         90 h lecture (preparation and rework)       30 h exam preparation         Usability of this module       Operating Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
instruction/ media being usedI(Bachelor=1, Master=2)Level/ category1(Bachelor=1, Master=2)Summer/ Wintersummer termTerm4. term - ET/IT-TI 6. term - ATITiCompulsory requirementsnoneRecommended requirementsComputer ScienceAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)Further InformationThe students have to conduct an extensive software development projectECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparationUsability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Mothod(c) of	
media being usedLevel/ category1 (Bachelor=1, Master=2)Summer/ Wintersummer termTerm4. term - ET/IT-TI 6. term - ATITiCompulsory requirementsnoneRecommended requirementsComputer ScienceAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)Further InformationThe students have to conduct an extensive software development projectECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparationUsability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		iecture, practical course, exercises, self-study
Level/ category       1 (Bachelor=1, Master=2)         Summer/Winter       summer term         Term       4. term - ET/IT-TI         6. term - ATITi       6. term - ATITi         Compulsory       none         requirements       Computer Science         Recommended       Computer Science         requirements       Assessment         Assessment       term paper         Assessment modalities       APL – assessment during the semester period (graded)         Further Information       The students have to conduct an extensive software development project         ECTS credits       6         Workload       180h of total work load, thereof         60h of contact hours and       120h of self-study, consisting of:         90 h lecture (preparation and rework)       30 h exam preparation         Usability of this module       Operating Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
Summer/Wintersummer termTerm4. term - ET/IT-TI 6. term - ATITiCompulsorynonerequirementsRecommendedComputer SciencerequirementsAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)Further InformationThe students have to conduct an extensive software development projectECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparationUsability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		1 (Dashalar 1 Master 2)
Term       4. term - ET/IT-TI         6. term - ATITi         Compulsory         requirements         Recommended         requirements         Assessment         term paper         Assessment modalities         APL – assessment during the semester period (graded)         Further Information         The students have to conduct an extensive software development project         ECTS credits       6         Workload       180h of total work load, thereof         60h of contact hours and       120h of self-study, consisting of:         90 h lecture (preparation and rework)       30 h exam preparation         Usability of this module       Operating Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
6. term - ATITiCompulsory requirementsnoneRecommended requirementsComputer ScienceAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)Further InformationThe students have to conduct an extensive software development projectECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparationUsability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Compulsory requirementsnoneRecommended requirementsComputer ScienceAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)Further InformationThe students have to conduct an extensive software development projectECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparationUsability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Term	
requirementsComputer SciencerequirementsAssessmentAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)Further InformationThe students have to conduct an extensive software development projectECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparationUsability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Recommended requirementsComputer ScienceAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)Further InformationThe students have to conduct an extensive software development projectECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparationUsability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		none
requirementsterm paperAssessment modalitiesAPL – assessment during the semester period (graded)Further InformationThe students have to conduct an extensive software development projectECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparationUsability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		Oceanantes Ocianae
Assessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)Further InformationThe students have to conduct an extensive software development projectECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparationUsability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		Computer Science
Assessment modalities       APL – assessment during the semester period (graded)         Further Information       The students have to conduct an extensive software development project         ECTS credits       6         Workload       180h of total work load, thereof         60h of contact hours and       120h of self-study, consisting of:         90 h lecture (preparation and rework)       30 h exam preparation         Usability of this module       Operating Systems         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually	•	
Further Information         The students have to conduct an extensive software development project           ECTS credits         6           Workload         180h of total work load, thereof           60h of contact hours and         120h of self-study, consisting of:           90 h lecture (preparation and rework)         30 h exam preparation           Usability of this module         Operating Systems           Time         According time table           Duration of module         1 term           Place/ room         EAH Jena           Frequency of offer         Annually		
ECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparationUsability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparationUsability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
60h of contact hours and 120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparationUsability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		-
120h of self-study, consisting of: 90 h lecture (preparation and rework) 30 h exam preparationUsability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Workload	
90 h lecture (preparation and rework) 30 h exam preparationUsability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
30 h exam preparationUsability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Usability of this moduleOperating SystemsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
TimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Duration of module     1 term       Place/ room     EAH Jena       Frequency of offer     Annually		
Place/ room     EAH Jena       Frequency of offer     Annually		
Frequency of offer Annually		
	Place/ room	EAH Jena
Language German	Frequency of offer	
	Language	German

Modulo numbor	ET 4 444
Module number	ET.1.411
Module name	Digital Signal Processing
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba), ATITi (Ba)
Specialization/ Profil	EAT, TI, KMT
Module coordinator	Prof. DrIng. Frank Giesecke
Compulsory/ optional/ electiv	Compulsory
Learning objectives	Obtain the skills for design, simulation and evaluation of digital systems using transformation as well as for estimation of the impact resulted by the quantization of values
Module content	Sampling theorem for low- and bandpass signals – discrete Fourier- Transform – windowing – z-Transform – FIR- and IIR-Structures – quantization noise – signal to noise ratio – sampling rate conversion – approximation of continuous-time by discrete-time processes – transmission behaviour of digital systems in z-domain – test of stability
Course type	2L - 1E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	Lecture scripts, tasks and solutions, simulation scripts
Recommended	Scheithauer, R.: Signale und Systeme
literature	Kreß, D.; Irmer, R: Angewandte Systemtheorie
	Meyer, M.: Grundlagen der Informationstechnik
	v. Grünigen, D. Ch.: Digitale Signalverarbeitung
	Brigham, E. O.: FFT-Anwendungen
Method(s) of	Lectures, exercises, simulations by software tool MATLAB
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	4. term
Compulsory	none
requirements	
Recommended	Mathematics, Basics of Electrical Engineering, Computer Science, Theory of
requirements	Signals and Systems, Control Engineering, MATLAB
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	3
Workload	90 h of total work load, thereof
	- 45 h of contact hours and
	- 45 h of self-study, consisting of:
	preparation and rework
	lecture 15 h
	practical training 15 h (preparation and evaluation)
	exam preparation 15 h
Usability of this module	Usable for modules related to processing of informations.
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.501
Module name	Nontechnical complusory elective modules
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Compulsory/ optional/	optional
electiv	
Module content	The compulsory elective module (6 ECTS credits) makes it possible to select modules from a range of different compulsory elective modules according to the interests and inclinations of the students. The following modules are available: ET.1.501.1 Business Administration ET.1.501.2 Management of projects ET.1.501.3 Working world of the future ET.1.501.4 Business game company foundation ET.1.501.5 E-Business Innovation startup foundation ET.1.501.6 Business Administration and Business Planning I and II ET.1.501.7 Innovation Management For more information see module description.
	Exact content see corresponding module description.
Course type	(Lecture, Exercises, Seminar, practical course)
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winterterm or Summer term
	5th or 6th term
ECTS credits	6 100 h
Workload	180 h
Time Duration of module	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module name         Applied Business Administration           Sub module         Business Administration           Department         Business Administration           Degree program         ET/IT (Ba)           Module coordinator         Fachbereich Betriebswirtschaft, Department Business Administration           Compulsory/ optional/ electiv         optional           Learning objectives         - Ability of scientific, economic thinking as well as recognition of basic interrelations in industrial enterprises. - Getting to know fundamental management functions and their application.           Module content         - Basic model of an enterprise and its constitutive characteristics. - Structures and processes within an enterprise. - The management of enterprises and decision-oriented methods.           Course type         OL - 0E - 2S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture script, additional material           Recommended         - Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl., München, Wien 2007. - Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.           Method(s) of instruction/ media being used         Serminar, self study           Level/ category         1         (Bachelor=1, Master=2)           Summer/ Winter         winter term           Term         5th term         Scensester period (graded)      <		
Sub module         Business Administration           Department         Business Administration           Degree program         ET/IT (Ba)           Module coordinator         Fachbereich Betriebswirtschaft, Department Business Administration           Compulsory/ optional/ electiv         optional           Learning objectives         - Ability of scientific, economic thinking as well as recognition of basic interrelations in industrial enterprises. - Getting to know fundamental management functions and their application.           Module content         - Basic model of an enterprise and its constitutive characteristics. - Structures and processes within an enterprise. - The management of enterprises and decision-oriented methods.           Course type         0L - 0E - 2S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture script, additional material           Recommended         - Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl., München, Wien 2007. - Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.           Method(s) of instruction/ media being used         Seminar, self study           Level/ category         1           I (Bachelor=1, Master=2)           Summer/ Winter         written test           Assessment         written test           Assessment modalities         APL – assessment during the semester period (graded)	Module number	ET.1.501.1
Department         Business Administration           Degree program         ET/IT (Ba)           Module coordinator         Fachbereich Betriebswirtschaft, Department Business Administration           Compulsory/ optional/ electiv         optional           Learning objectives         - Ability of scientific, economic thinking as well as recognition of basic interrelations in industrial enterprises. - Getting to know fundamental management functions and their application.           Module content         - Basic model of an enterprise and its constitutive characteristics. - Structures and processes within an enterprise. - The management of enterprises and decision-oriented methods.           Course type         OL - 0E - 2S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture script, additional material           Recommended         - Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl., München, Wien 2007. - Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.           Method(s) of instruction/ media being used         Seminar, self study           Level/ category         1           Vasther term         Compulsory none requirements           Assessment         written test           Assessment modalities         APL – assessment during the semester period (graded)           ECTS credits         6 (for the entire module ET.1.501)           Work		
Degree program         ET/IT (Ba)           Module coordinator         Fachbereich Betriebswirtschaft, Department Business Administration           Compulsory/ optional/ electiv         optional           Learning objectives         - Ability of scientific, economic thinking as well as recognition of basic interrelations in industrial enterprises. - Getting to know fundamental management functions and their application.           Module content         - Basic model of an enterprise and its constitutive characteristics. - Structures and processes within an enterprise. - The management of enterprises and decision-oriented methods.           Course type         OL - OE - 2S - OP           Learning Material         Lecture script, additional material           Recommended         - Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl., München, Wien 2007. - Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.           Method(s) of instruction/ media being used         Seminar, self study           Level/ category         1           Level/ category         1           Seminar, self study           None           requirements           Assessment           Written test           Assessment modalities           APL – assessment during the semester period (graded)           ECTS credits         6 (for the entire module ET.1.501)           <		
Module coordinator         Fachbereich Betriebswirtschaft, Department Business Administration           Compulsory/ optional/ electiv         optional           Learning objectives         - Ability of scientific, economic thinking as well as recognition of basic interrelations in industrial enterprises. - Getting to know fundamental management functions and their application.           Module content         - Basic model of an enterprise and its constitutive characteristics. - Structures and processes within an enterprise. - The management of enterprises and decision-oriented methods.           Course type         OL - 0E - 2S - 0P         (Lecture, Exercises, Seminar, practical course)         Learning Material           Learning Material         Lecture script, additional material         - Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl., München, Wien 2007. - Steimmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.           Method(s) of instruction/ media being used         Seminar, self study           Level/ category         1         (Bachelor=1, Master=2)           Summer/ Winter         winter term           Term         5th term           Compulsory         none           requirements         APL – assessment during the semester period (graded)           ECTS credits         6 (for the entire module ET.1.501)           Workload         90h of total work load, thereof 30h of contact hours and 60h of self-study, consist	•	
Department Business AdministrationCompulsory/ optional/ electivoptionalLearning objectives- Ability of scientific, economic thinking as well as recognition of basic interrelations in industrial enterprises. - Getting to know fundamental management functions and their application.Module content- Basic model of an enterprise and its constitutive characteristics. - Structures and processes within an enterprise. - The management of enterprises and decision-oriented methods.Course typeOL - 0E - 2S - 0P(Lecture, Exercises, Seminar, practical course)Learning MaterialLecture script, additional materialRecommended literature- Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl., München, Wien 2007. - Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.Method(s) of instruction/ media being usedSeminar, self studyLevel/ category1(Bachelor=1, Master=2)Summer/ Winterwinter termTerm5th termCompulsory requirementsAPL – assessment during the semester period (graded)ECTS credits6 (for the entire module ET.1.501)Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework)		
Compulsory/ optional/ electiv         optional           Learning objectives         - Ability of scientific, economic thinking as well as recognition of basic interrelations in industrial enterprises. - Getting to know fundamental management functions and their application.           Module content         - Basic model of an enterprise and its constitutive characteristics. - Structures and processes within an enterprise. - The management of enterprises and decision-oriented methods.           Course type         OL - 0E - 2S - 0P         (Lecture, Exercises, Seminar, practical course)         Learning Material           Learning Material         Lecture script, additional material         - Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl., München, Wien 2007. - Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.           Method(s) of instruction/ media being used         Seminar, self study           Level/ category         1         (Bachelor=1, Master=2)           Summer/ Winter         winter term           Term         5th term           Compulsory requirements         APL – assessment during the semester period (graded)           ECTS credits         6 (for the entire module ET.1.501)           Workload         90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework)	Module coordinator	
electiv       - Ability of scientific, economic thinking as well as recognition of basic interrelations in industrial enterprises.         - Getting to know fundamental management functions and their application.         Module content       - Basic model of an enterprise and its constitutive characteristics.         - Structures and processes within an enterprise.       - The management of enterprises and decision-oriented methods.         Course type       OL - 0E - 2S - 0P (Lecture, Exercises, Seminar, practical course)         Learning Material       Lecture script, additional material         Recommended       - Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl., München, Wien 2007.         - Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.         Method(s) of instruction/ media being used       Seminar, self study         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       winter term         Term       5th term         Compulsory       none         requirements       APL – assessment during the semester period (graded)         ECTS credits       6 (for the entire module ET.1.501)         Workload       90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework)		
Learning objectives       - Ability of scientific, economic thinking as well as recognition of basic interrelations in industrial enterprises.         - Getting to know fundamental management functions and their application.         Module content       - Basic model of an enterprise and its constitutive characteristics.         - Structures and processes within an enterprise.         - The management of enterprises and decision-oriented methods.         Course type       OL - 0E - 2S - 0P         Learning Material       Lecture script, additional material         Recommended       - Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl., München, Wien 2007.         - Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.         Method(s) of instruction/       Seminar, self study         media being used       -         Level/ category       1         Level/ category       1         Macheler=1, Master=2)         Summer/Winter       winter term         Term       5th term         Compulsory       none         requirements       Assessment         Assessment       Written test         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       6 (for the entire module ET.1.501)         Workload		optional
interrelations in industrial enterprises.       - Getting to know fundamental management functions and their application.         Module content       - Basic model of an enterprise and its constitutive characteristics.         - Structures and processes within an enterprise.       - The management of enterprises and decision-oriented methods.         Course type       OL - 0E - 2S - 0P       (Lecture, Exercises, Seminar, practical course)         Learning Material       Lecture script, additional material         Recommended       - Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl., München, Wien 2007.         - Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.         Method(s) of instruction/       Seminar, self study         media being used       -         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       winter term         Term       5th term         Compulsory       none         requirements       APL – assessment during the semester period (graded)         ECTS credits       6 (for the entire module ET.1.501)         Workload       90h of total work load, thereof         30h of contact hours and       60h of self-study, consisting of:         40 h lecture (preparation and rework)       40 h lecture (preparation and rework)		
- Getting to know fundamental management functions and their application.         Module content       - Basic model of an enterprise and its constitutive characteristics.         - Structures and processes within an enterprise.       - The management of enterprises and decision-oriented methods.         Course type       OL - OE - 2S - OP (Lecture, Exercises, Seminar, practical course)         Learning Material       Lecture script, additional material         Recommended       - Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl., München, Wien 2007.         - Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.         Method(s) of instruction/       Seminar, self study         media being used       -         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       winter term         Term       5th term         Compulsory       none         requirements       Assessment         Assessment       written test         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       6 (for the entire module ET.1.501)         Workload       90h of total work load, thereof         30h of contact hours and       60h of self-study, consisting of:         40 h lecture (preparation and rework)       60h of self-s	Learning objectives	
Module content       - Basic model of an enterprise and its constitutive characteristics.         - Structures and processes within an enterprise.       - The management of enterprises and decision-oriented methods.         Course type       0L - 0E - 2S - 0P       (Lecture, Exercises, Seminar, practical course)         Learning Material       Lecture script, additional material         Recommended       - Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl., München, Wien 2007.         - Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.         Method(s) of instruction/       Seminar, self study         media being used       -         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       winter term         Term       5th term         Compulsory       none         requirements       APL – assessment during the semester period (graded)         ECTS credits       6 (for the entire module ET.1.501)         Workload       90h of total work load, thereof         30h of contact hours and       60h of self-study, consisting of:         40 h lecture (preparation and rework)       40 h lecture (preparation and rework)		
- Structures and processes within an enterprise. - The management of enterprises and decision-oriented methods.Course typeOL - OE - 2S - OP(Lecture, Exercises, Seminar, practical course)Learning MaterialLecture script, additional materialRecommended literature- Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl., München, Wien 2007. - Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.Method(s) of instruction/ media being usedSeminar, self studyLevel/ category1(Bachelor=1, Master=2)Summer/ Winterwinter termTerm5th termCompulsory requirementsnoneAssessment Morkloadwritten testAssessment Morkload6 (for the entire module ET.1.501)Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework)		
- The management of enterprises and decision-oriented methods.         Course type       0L - 0E - 2S - 0P       (Lecture, Exercises, Seminar, practical course)         Learning Material       Lecture script, additional material         Recommended       - Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl., München, Wien 2007.         Iterature       Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.         Method(s) of instruction/ media being used       Seminar, self study         Level/ category       1       (Bachelor=1, Master=2)         Summer/Winter       winter term         Term       5th term         Compulsory requirements       on one         Assessment       written test         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       6 (for the entire module ET.1.501)         Workload       90h of total work load, thereof         30h of contact hours and       60h of self-study, consisting of: 40 h lecture (preparation and rework)	Module content	
Course type0L - 0E - 2S - 0P(Lecture, Exercises, Seminar, practical course)Learning MaterialLecture script, additional materialRecommended literature- Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl., München, Wien 2007. - Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.Method(s) of instruction/ media being usedSeminar, self studyLevel/ category1(Bachelor=1, Master=2)Summer/ Winterwinter termTerm5th termCompulsory requirementsnoneAssessmentwritten testAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits6 (for the entire module ET.1.501)Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework)		
Learning MaterialLecture script, additional materialRecommended literature- Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl., München, Wien 2007. - Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.Method(s) of instruction/ media being usedSeminar, self studyLevel/ category1(Bachelor=1, Master=2)Summer/ Winterwinter termTerm5th termCompulsory requirementsnoneAssessmentwritten testAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits6 (for the entire module ET.1.501)Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework)		
Recommended literature- Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl., München, Wien 2007. - Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.Method(s) of instruction/ media being usedSeminar, self studyLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm5th termCompulsory requirementsnoneAssessmentwritten testAssessmentAPL – assessment during the semester period (graded)ECTS credits6 (for the entire module ET.1.501)Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework)		
literatureMünchen, Wien 2007. - Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.Method(s) of instruction/ media being usedSeminar, self studyLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm5th termCompulsory requirementsnoneAssessmentwritten testAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits6 (for the entire module ET.1.501)Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework)	Learning Material	
- Steinmann, H.; G. Schreyögg: Management – Grundlagen der Unternehmensführung, 6. Aufl., Wiesbaden 2005.Method(s) of instruction/ media being usedSeminar, self studyLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm5th termCompulsory requirementsnoneAssessmentwritten testAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits6 (for the entire module ET.1.501)Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework)	Recommended	
Unternehmensführung, 6. Aufl., Wiesbaden 2005.Method(s) of instruction/ media being usedSeminar, self studyLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm5th termCompulsory requirementsnoneAssessmentwritten testAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits6 (for the entire module ET.1.501)Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework)	literature	
Method(s) of instruction/ media being usedSeminar, self studyLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm5th termCompulsory requirementsnoneAssessmentwritten testAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits6 (for the entire module ET.1.501)Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework)		
instruction/       media being used         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       winter term         Term       5th term         Compulsory       none         requirements       written test         Assessment       written test         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       6 (for the entire module ET.1.501)         Workload       90h of total work load, thereof         30h of contact hours and       60h of self-study, consisting of:         40 h lecture (preparation and rework)		
media being usedLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm5th termCompulsory requirementsnoneAssessmentwritten testAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits6 (for the entire module ET.1.501)Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework)		Seminar, self study
Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       winter term         Term       5th term         Compulsory       none         requirements       written test         Assessment       written test         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       6 (for the entire module ET.1.501)         Workload       90h of total work load, thereof         30h of contact hours and       60h of self-study, consisting of:         40 h lecture (preparation and rework)		
Summer/Winter       winter term         Term       5th term         Compulsory       none         requirements       -         Assessment       written test         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       6 (for the entire module ET.1.501)         Workload       90h of total work load, thereof         30h of contact hours and       60h of self-study, consisting of:         40 h lecture (preparation and rework)		
Term       5th term         Compulsory       none         requirements		1 (Bachelor=1, Master=2)
Compulsory requirements       none         Assessment       written test         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       6 (for the entire module ET.1.501)         Workload       90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework)	Summer/ Winter	winter term
requirements       written test         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       6 (for the entire module ET.1.501)         Workload       90h of total work load, thereof         30h of contact hours and       60h of self-study, consisting of:         40 h lecture (preparation and rework)	Term	5th term
Assessment       written test         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       6 (for the entire module ET.1.501)         Workload       90h of total work load, thereof         30h of contact hours and       60h of self-study, consisting of:         40 h lecture (preparation and rework)	Compulsory	none
Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       6 (for the entire module ET.1.501)         Workload       90h of total work load, thereof         30h of contact hours and       60h of self-study, consisting of:         40 h lecture (preparation and rework)	requirements	
ECTS credits       6 (for the entire module ET.1.501)         Workload       90h of total work load, thereof         30h of contact hours and       60h of self-study, consisting of:         40 h lecture (preparation and rework)	Assessment	written test
Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework)	Assessment modalities	APL – assessment during the semester period (graded)
30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework)	ECTS credits	6 (for the entire module ET.1.501)
60h of self-study, consisting of: 40 h lecture (preparation and rework)	Workload	90h of total work load, thereof
40 h lecture (preparation and rework)		30h of contact hours and
		60h of self-study, consisting of:
0 h practical training (preparation and evaluation)		
		0 h practical training (preparation and evaluation)
20 h exam preparation		
Usability of this module Applied Business Administration/Management of Projects	Usability of this module	
Time According time table		According time table
Duration of module 1 term	Duration of module	
Place/ room EAH Jena	Place/ room	EAH Jena
Frequency of offer Annually	Frequency of offer	
Language German	Language	German

Module number	ET.1.501.2
Module name	Management of Projects
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba), ATITi (Ba)
Module coordinator	Nina Hauser
Compulsory/ optional/ electiv	optional
Learning objectives	<ul> <li>Ability of scientific, economic thinking as well as recognition of basic interrelations in industrial enterprises.</li> <li>Getting to know fundamental management functions and their application.</li> </ul>
Module content	<ul> <li>Basic model of an enterprise and its constitutive characteristics.</li> <li>Structures and processes within an enterprise.</li> <li>The management of enterprises and decision-oriented methods.</li> </ul>
Course type	0L - 0E - 2S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	Lecture script, additional material
Recommended literature	<ul> <li>Härdler, J. (Hrsg.): Betriebswirtschaftslehre für Ingenieure, 2. Aufl.,</li> <li>München, Wien 2007.</li> <li>Steinmann, H.; G. Schreyögg: Management – Grundlagen der</li> <li>Unternehmensführung, 6. Aufl., Wiesbaden 2005.</li> </ul>
Method(s) of instruction/ media being used	Seminar, self study
Level/ category	1 (Bachelor=1, Master=2)
Summer/ Winter	summer term
Term	6th term
Compulsory requirements	none
Recommended requirements	Applied Business Administration (ET.1.501.1)
Assessment	written test
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	6 (for the entire module)
Workload	90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.501.3
Module name	Working world of the future
Department	Industrial Engineering
Degree program	ET/IT (Ba)
Module coordinator	Prof. Dr. Christian Erfurth, Prof. Dr. Oliver Jack
Compulsory/ optional/ electiv	optional
Course type	0L - 0E - 2S - 0P (Lecture, Exercises, Seminar, practical course)
Recommended	http://www.bmas.de/DE/Service/Medien/Publikationen/a883-weissbuch.html;
literature	aufgerufen am 21.03.2017
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winterterm or Summer term
Term	5th or 6th term
Compulsory	none
requirements	
Assessment	written test
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Workload	30 h contact hours and
	60 0h of self-study
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.501.4
Module name	Business game company foundation
Department	Business Administration
Degree program	ET/IT (Ba)
Module coordinator	Dr. Arndt Lautenschläger / Prof. Dr. Heiko Haase
Compulsory/ optional/ electiv	optional
Course type	0L - 0E - 2 - 0P (Lecture, Exercises, Seminar, practical course)
Recommended	Nagl, Anna: Der Businessplan: Geschäftspläne professionell erstellen,
literature	Springer Gabler, 7. Aufl., 2013.
Level/ category	1 (Bachelor=1, Master=2)
Summer/ Winter	5. oder 6. Semester
Term	5th or 6th term
Compulsory	none
requirements	
Assessment	Presentation, game results
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Workload	30 h contact hours and
	60 0h of self-study
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.501.5
Module name	E-business innovation and startup foundation
Department	Business Administration
Degree program	ET/IT (Ba)
Module coordinator	Prof. Dr. Andrej Werner, Prof. Dr. Heiko Haase
Compulsory/ optional/ electiv	optional
Course type	0L - 0E - 4S - 0P (Lecture, Exercises, Seminar, practical course)
Recommended literature	<ul> <li>/1/ Wirtz: Business Model Management. Springer-Gabler 2013.</li> <li>/2/ Clement; Schreiber: Internet-Ökonomie. Springer 2013</li> <li>/3/ Krause: Kreativität, Innovation, Entrepreneurship. Springer-Gabler 2013.</li> </ul>
	/4/ Schallmo: Kompendium Geschäftsmodell-Innovation. Springer-Gabler 2014.
	/5/ Osterwalder: Business Model Canvas. Dissertation. 2004.
	/6/ Klandt: Gründungsmanagement. Oldenbourg, 2. Aufl., 2005.
	/7/ Oehlrich: Betriebswirtschaftslehre - Eine Einführung am Businessplan-
	Prozess, 3. Aufl., Vahlen 2013.
	/8/ Kußmaul: Betriebswirtschaftslehre für Existenzgründer, 7. Aufl.,
	Oldenbourg 2011.
	/9/ Grichnik; Brettel; Koropp; Mauer: Entrepreneurship - Unternehmerisches
	Denken, Entscheiden und Handeln in innovativen und
	technologieorientierten Unternehmungen, Schäffer-Poeschel 2010.
Level/ category	1 (Bachelor=1, Master=2)
Summer/ Winter	Winter term or summer term
Term	5th or 6th term
Compulsory	none
requirements	
Assessment	written test
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	6
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.501.6
Module name	Business Administration and Business Planning
Department	Business Administration
Degree program	ET/IT (Ba)
Module coordinator	Fachbereich Betriebswirtschaft, Department Business Administration
Compulsory/ optional/ electiv	optional
Course type	4L - 0E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Recommended	Klandt, Heinz, Gründungsmanagement, Oldenbourg Wissenschaftsverlag,
literature	2. Aufl., 2005.
	Oehlrich, Marcus: Betriebswirtschaftslehre - Eine Einführung am
	Businessplan-Prozess, 3. Auflage, Verlag Vahlen 2013.
	Kußmaul, Heinz: Betriebswirtschaftslehre für Existenzgründer, 7.
	Auflage, Oldenbourg Verlag 2011
Level/ category	1 (Bachelor=1, Master=2)
Summer/ Winter	summer term and winter term
Term	5th and 6th term
Compulsory	none
requirements	
Assessment	written test
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	6
Workload	60 h contact hours and
	120 0h of self-study
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.501.7
Module name	Innovation management
Department	Business Administration
Degree program	ET/IT (Ba)
Module coordinator	Prof. Dr. Heiko Haase
Compulsory/ optional/ electiv	optional
Course type	0L - 0E - 2 - 0P (Lecture, Exercises, Seminar, practical course)
Recommended literature	Vahs, Dietmar; Brem, Alexander: Innovationsmanagement: Von der Idee zur erfolgreichen Vermarktung, 4. Auflage, Schäffer-Poeschel: Stuttgart 2013. Hauschildt, Jürgen; Salomo, Sören: Innovationsmanagement, 6. Aufl., Vahlen: München 2013. Disselkamp, Marcus: Innovationsmanagement, 2. Aufl., Springer Gabler: Wiesbaden 2012.
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term or summer term
Term	5th or 6th term
Compulsory requirements	none
Assessment	written test
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Workload	30 h contact hours and 60 0h of self-study
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Madula number	ET.1.502
Module number Module name	
	Modelling/ Simulation
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba) - AT
Module coordinator	Prof. DrIng. habil. Klaus-Peter Döge
Compulsory/ optional/ electiv	Compulsory
Learning objectives	Basic skills of the experimental and theoretical modelling using MATLAB and Simulink.
Module content	- Experimental modeling, theoretical modelling
	-static signal models, static system models
	-dynamic signal models, dynamic system models
	-determined and stochastic signals and systems
Course type	4L - 1E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	- graphical material of the lecture
	- transformation table
	- excercises with Matlab/Simulink
Recommended	B. Girod, (2003) Einführung in die Systemtheorie, 2.Auflage, Teubner Verlag
literature	Stuttgart
	R. Isermann, (1991) Identifikation dynamischer Systeme 1, Springer Verlag
	Berlin R. Isermann, (1992) Identifikation dynamischer Systeme 2, Springer Verlag
	Berlin
	J. Lunze (2002) Regelungstechnik 2, Springer Verlag Berlin
	R. Storm, (2001) Wahrscheinlichkeitsrechnung, mathematische Statistik und
	statistische
	Qualitätskontrolle, 11. Auflage, Fachbuchverlag Leipzig
	H. Strobel, (1975) Experimentelle Systemanalyse, Akademie Verlag Berlin
	J. Wernstedt (1989) Experimentelle Prozeßanalyse, Verlag Technik Berlin
Method(s) of	lecture, excercise, blackboard and graphical material via data projector
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/ Winter	winter term
Term	5. term
Compulsory	Control Theory
requirements	Theory of Signals and Systems
Recommended	- analysis
requirements	- algebra
	- stochastic
	- physics
Assessment	written university exam 90 min
Assessment modalities	PL – during period of exams (graded)
ECTS credits	
Workload	180h of total work load, thereof
	75h of contact hours and
	105h of self-study, consisting of:
	80 h lecture (preparation and rework)
Loobility of this model.	25 h exam preparation
Usability of this module	- digital control Systems
Time	- optimal control theory
Duration of module	According time table
Place/ room	EAH Jena
Frequency of offer	Annually German
Language	German

Modulo number	ET.1.503
Module number	
Module name	Automation Systems
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	ET/IT (Ba)
Module coordinator	Prof. DrIng. Jörg Müller
Compulsory/ optional/ electiv	Compulsory
Learning objectives	After students have attended the course, they are able to - clarify and describe an automation concept for a simple technical system - select devices and device structures and assess and compare their
	reliability
	- demonstrate solutions on commonly used systems
Module content	- tasks of automation
	- devices systems and their structures
	- periphery to process periphery
	- components close to process
	- display and control components
	- Open systems vs. compact systems
	- availability, reliability, redundancy, safety, explosion protection
	- design: phases, methods, product concept catalogue, customer
	requirement specification, processing
Course type	3L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course)
Recommended	-Bergmann, J.: Automatisierungs- und Prozessleittechnik; Leipzig:
literature	Fachbuchverlag
	-Bindel, T. u.a.: Projektierung von Automatisierungsanlagen; Wiesbaden:
	Vieweg
	-Langmann, R.: Taschenbuch der Automatisierung; Leipzig:Fachbuchverlag
Method(s) of instruction/	Lecture script, lab instruction sheets, extracts of standards
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/ Winter	winter term
Term	5th term
Compulsory requirements	none
Assessment	exam 90 min, Laboratory internship certificate
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	6
Workload	180h of total work load, thereof
	75h of contact hours and
	105h of self-study, consisting of:
	50 h lecture (preparation and rework)
	35 h practical training (preparation and evaluation)
	20 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German
Language	Coman

Module number	ET.1.504.1
Module name	Process Communication
Sub module	Field Bus
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	AT, TI
Module coordinator	Prof. DrIng. Jörg Müller
Compulsory/ optional/ electiv	Compulsory
Learning objectives	After students have attended the course, they are able to
	- interpret a task related to process communication,
	- generalize the task,
	- compare different industrial solutions,
	- select devices and device structures,
	- demonstrate solutions on commonly used systems
Module content	- communication in automation technology: requirements, technologies
	- Basics of communication, logical models of LAN, embedding in concept of
	common communication systems
	- classification by topology, transmission, and access methods
	- Internetworking (Bridging, Switching, Routing)
	- wireless LAN, Industrial Ethernet
	- ProfiNet, CANopen, Powerlink, OPC-UA
Course type	2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	Lecture script, lab instruction sheets, extracts of standards
Recommended	Furrer, F. J.: Industrieautomation mit Ethernet-TCP/IP und Web-
literature	Technologie; Heidelberg: Hüthig
	Etschberger, K.: Controller-Area-Network; München, Wien: Hanser
	Popp, M.: Das PROFINET IO-Buch; Heidelberg: Hüthig
	Schnell, G.: Bussysteme in der Automatisierungstechnik; Braunschweig,
	Wiesbaden: Vieweg
Method(s) of	teamwork, reflections in plenum, practical course (in 6th semester - during
instruction/	sub-module ET.1.504.2)
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term, summer term
Term	5th term lecture
	6th term practical course
Compulsory	none
requirements	
Assessment	exam 90 min, Laboratory internship certificate
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	6
Workload	90h of total work load, thereof
	45h of contact hours and
	45h of self-study, consisting of:
	40 h lecture (preparation and rework)
Time	According time table
Duration of module	2 terms
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module name         Process Communication           Sub module         Local Area Networks (LAN)           Department         Electrical Engineering and Information Technology           Degree program         ET/T (Ba), Me (Ma)           Specialization/Profil         AT, Ti -> ET/T (Ba)           Module coordinator         Prof. Dr. Ludwig Niebel, Prof. DrIng, Jörg Müller           Compulsory optional/ electiv         Compulsory optional/ compulsory optional/ electiv           Learning objectives         Upon completion of the module, students - have a basic knowledge about networks using internet protocols - are able to chandle some simple configuration and test tasks           Module content         - Basics of communication systems - Classification by topology, transmission techniques and access methods - LAN-standardisation and open systems interconnection model - Wiring systems - Overview of access methods - CSMACD-Ethernet basics and historical development - 10 M, 100M, 10 G und 10G Ethernet - additional technologies (AUTONEG and others) - Internetworking (Bridging, Switching, Routing) - wireless LAN           Learning Material         books, script and lab instruction sheets           Recommended         - Spurgeon, C. E.: Ethernet, OReilly 2000 - Wireless LAN           Learning Material         books, script and lab instruction sheets           Recommended         - Spurgeon, C. E.: Ethernet, Prentice Hall PTR 1996 - Halsall, F: Data Communications, Computernetworking-Protokolle, Addison-Wesley 2005           Method(s) of Instructio	Module number	ET 4 504 2
Sub module         Local Area Networks (LAN)           Department         Electrical Engineering and Information Technology           Degree program         ET/T (Ba), Me (Ma)           Specialization/ Profil         AT, Ti -> ET/T (Ba)           Module coordinator         Prof. Dr. Ludwy Niebel, Prof. DrIng. Jörg Müller           Compulsory/ optional/ electiv         Compulsory with the module, students           Learning objectives         Upon completion of the module, students           - have a general idea of local area networks and understand importand functions         - have a basic knowledge about networks using internet protocols           - are able to calculate network loads,         - are able to calculate network loads,           - are able to provide the topology, transmission techniques and access methods         - Classificaction by topology, transmission techniques and access methods           - Classificaction KG und 10G Ethernet         - additional technologies (AUTONEG and others)           - Internetworking (Bridging, Switching, Routing)         - wireless LAN           Course type         2L - 0E - 0S - 1P         Cleating Networks and Open Systems, Addison-Wesley 1995           - Halsall, F: Data Communication, Soutching, Switching, Routing)         - wireless LAN           Course type         2L - 0E - 0S - 1P         Cleating Viewg 2005           - Halsall, F: Data Communication, specis         Addison-Wesley 1995 <td></td> <td>ET.1.504.2 Process Communication</td>		ET.1.504.2 Process Communication
Department         Electrical Engineering and Information Technology           Degree program         ET/IT (Ba), Me (Ma)           Specialization/ Profil         AT, Ti -> ET/IT (Ba)           Module coordinator         Prof. Dr. Ludwig Niebel, Prof. DrIng. Jörg Müller           Compulsory/ optional/ electiv         Compulsory (optional/ compulsory) optional/ electiv         Compulsory           Learning objectives         Upon completion of the module, students - have a general idea of local area networks using internet protocols - are able to handle some simple configuration and test tasks           Module content         - Basics knowledge about networks using internet protocols - are able to handle some simple configuration and test tasks           Module content         - Basics of communication, logical LAN-models, embedding into the concept of common communication systems           - Classification by topology, transmission techniques and access methods - CSMA/CD-Ethernet basics and historical development - 10 M, 100M, 1G und 10G Ethernet - additional technologies (AUTONEG and others) - Internetworking (Bridging, Switching, Routing) - wireless LAN           Course type         2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course) - Bata Communications, Computernetworks and Open Systems, Addison-Wesley 1995 - Martin Werner. Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005 - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, - Hatasil, F.: Data Communications, Computernetworking-Protokolle, - Addison Wesley 2003           Method(s) of instructon/ media being used Level category<		
Degree program         ET/IT (Ba), Me (Ma)           Specialization/ Profil         AT, Ti >> ET/IT (Ba)           Module coordinator         Prof. Dr. Ludwig Niebel, Prof. DrIng. Jörg Müller           Compulsory/ optional/ learting objectives         Upon completion of the module, students - have a general idea of local area networks using internet protocols - rare able to calculate network loads, - are able to calculate network loads, - calcassification by topology, transmission techniques and access methods - LAN-standardisation and open systems interconnection model - Wiring systems - Overview of access methods - CSMA/CD-Ethernet basics and historical development - 10 M, 100M, 16 und 10G Ethernet - additional technologies (AUTONEG and others) - Internetworking (Bridging, Switching, Routing) - wireless LAN - Surpero, C. E: Ethernet, OReilly 2000 - solutional technologies (AUTONEG and others) - Internetworking (Bridging, Switching, Routing) - wireless LAN - Sourceon, C. E: Ethernet, OReilly 2000 - Johnson, H. W.: Fast Ethernet, Prentice Hall PTR 1996 - Halisall, F.: Data Communications, Computernetworking-Protokolle, Addison-Wesley 1995 - Martin Werner. Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005 - Perfiman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003           Method(s) of Instruction/ media being used         Lecture, teamwork, reflections in plenum, practical course instruction/ media being used           Level/ category         1 (Bachelor=1, Master=2) Summer / Winter Seasesment         Sasessment           Addison-Viesley 1000 - Definemants </td <td></td> <td></td>		
Specialization/ Profil         AT, Ti -> ET/JT (Ba)           Module coordinator         Prof. Dr. Ludwig Niebel, Prof. DrIng. Jörg Müller           Compulsory         electiv           Learning objectives         Upon completion of the module, students           - have a general idea of local area networks and understand importand functions         - have a general idea of local area networks using internet protocols           - are able to handle some simple configuration and test tasks         - are able to handle some simple configuration and test tasks           Module content         - Basics of communication, logical LAN-models, embedding into the concept of common communication systems           - Classification by topology, transmission techniques and access methods         - LAN-standardisation and open systems interconnection model           - Wiring systems         - Overview of access methods         - CSMA/CD-Ethernet basics and historical development           - 10 M, 100M, 10 und 10G Ethernet         - additional technologies (AUTONEG and others)         - Internetworking (Bridging, Switching, Routing)           - wireless LAN         Easting Material         books, script and lab instruction sheets           Recommended         - Spurgeon, C. E.: Ethernet, ORelity 2000         - Johnson, H. W.: Fast Ethernet, Prentice Hail PTR 1996           - Hatsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995         - Martin Werner. Netze, Protokolle, Schrittstellen und Nachrichtenverkehr, V		
Module coordinator         Prof. Dr. Ludwig Niebel, Prof. DrIng. Jörg Müller           Compulsory/ optional/ lectiv         Compulsory           Learning objectives         Upon completion of the module, students - have a general idea of local area networks using internet protocols - are able to calculate network loads, - are able to calculate network loads, - are able to nandle some simple configuration and test tasks           Module content         - Basics of communication, pojcal LAX-models, embedding into the concept of common communication, pojcal LAX-models, embedding into the concept of common by topology, transmission techniques and access methods - Classification by topology, transmission techniques and access methods - CSMA/CD-Ethernet basics and historical development - 10 M, 100M, 10G und 10G Ethernet - additional technologies (AUTONEG and others) - Internetworking (Bridging, Switching, Routing) - wireless LAN           Course type         2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course) - Johnson, H. W.: Fast Ethernet, Prentice Hall PTR 1996 - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995 - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005 - Perlman, R: Bridges, Router, Switches und internetworking-Protokolle, Addison-Wesley 2003           Method(s) of Instruction/ media being used         - Lecture, teamwork, reflections in plenum, practical course - Mation Wesley 2003           Level/ category         1 (Bachelor=1, Master=2) - Summer /Winter           Summer /Winter         summer term - Ghi term           Gen/ Set/ study, consisting of: 25 h lecture (preparation and rework), 15 h practical tra		
Compulsory/ optional/ electiv         Compulsory           Learning objectives         Upon completion of the module, students - have a general idea of local area networks and understand importand functions           - have a basic knowledge about network using internet protocols - are able to calculate network loads, - are able to handle some simple configuration and test tasks           Module content         - Basics of communication, logical LAN-models, embedding into the concept of common communication systems           - Classification by topology, transmission techniques and access methods - LAN-standardisation and open systems interconnection model - Wiring systems           - Overview of access methods - CSMA/CD-Ethernet basics and historical development - 10 M, 100M, 1G und 10G Ethernet - additional technologies (LAUTONEG and others) - Internetworking (Bridging, Switching, Routing) - wireless LAN           Course type         ZL - 0E - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         books, script and lab instruction sheets           Recommended         - Spurgeon, C. E: Ethernet, OReilly 2000           - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995           - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005           - Perlman, R:: Bridges, Router, Switches und internetworking-Protokolle, Addison-Wesley 2003           Method(s) of Instruction/ media being used         Lecture, tearwork, reflections in plenum, practical course           Lew		
electiv         Image: constraint of the module, students           Learning objectives         Upon completion of the module, students           - have a general idea of local area networks and understand importand functions         - have a basic knowledge about networks using internet protocols           - are able to calculate network loads,         - are able to handle some simple configuration and test tasks           Module content         - Basics of communication, logical LAN-models, embedding into the concept of common communication systems           - Classification by topology, transmission techniques and access methods         - Classification by topology, transmission techniques and access methods           - Cassification by topology, transmission techniques and access methods         - Cassification by topology, transmission techniques           - Wiring systems         - Overview of access methods         - Cassification and open systems interconnection model           - Wiring systems         - Overview of access methods         - Cassification, Switching, Routing)           - internetworking (Bridging, Switching, Routing)         - wireless LAN           Course type         21 - 0E - 0S - 1P         - Lecture, Exercises, Seminar, practical course)           Learning Material         books, script and lab instruction sheets         - Addison-Wesley 1995           Recommended         - Spurgeon, C. E: Ethernet, ORelily 2000         - Halsall, F:: Data Communications, Computernetworks and Open Systems, Addis		
- have a general idea of local area networks and understand importand functions     - have a basic knowledge about networks using internet protocols     - are able to calculate network loads,     - are able to handle some simple configuration and test tasks  Module content     - Basics of communication, logical LAN-models, embedding into the concept     of common communication systems     - Classification by topology, transmission techniques and access methods     - LAN-standardisation and open systems interconnection model     - Wring systems     - Overview of access methods     - CSMA/CD-Ethernet basics and historical development     - 10 M, 100M, 1G und 10G Ethernet     - additional technologies (AUTONEG and others)     - Internetworking (Bridging, Switching, Routing)     - wireless LAN  Course type     2L - 0E - 0S - 1P     (Lecture, Exercises, Seminar, practical course)     Learning Material     bocks, script and lab instruction sheets     Recommended     - Spurgeon, C, E.: Ethernet, O'Reilly 2000     - Halsall, F.: Data Communications, Computernetworking -Protokolle,     - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr,     Verlag Vieweg 2005     - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle,     Addison-Wesley 1995     - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr,     Verlag Vieweg 2005     - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle,     Addison Wesley 2003  Method(s) of     Lecture, teamwork, reflections in plenum, practical course     instruction/     media being used     Lewel (rategory     1 (Bachelor=1, Master=2)     Summer/ Winter     summer term     Term     6th term     Compulsory     none     requirements     According time adult period(graded)     ECTS credits     4. According time adult period(graded)     ECTS credits     4. According time adult period(graded)     ECTS credits     4. According time table     Duration of module     2 terms     Place/ room     EAH Jena     Frequency	electiv	
functions         - have a basic knowledge about networks using internet protocols           - are able to calculate network loads,         - are able to calculate network loads,           - are able to calculate network loads,         - are able to handle some simple configuration and test tasks           Module content         Basics of communication logical LAN-models, embedding into the concept of common communication systems           - Classification by topology, transmission techniques and access methods         - LAN-standardisation and open systems interconnection model           - Wiring systems         - Overview of access methods         - CSMA/CD-Ethernet basics and historical development           - 10 M, 100 M, 16 und 100 G Ethernet         - additional technologies (AUTONEG and others)         - Internetworking (Bridging, Switching, Routing)           - wireless LAN         - wireless LAN         - Spurgeon, C. E: Ethernet, OReilly 2000           Iterature         - Spurgeon, C. E: Ethernet, Prentice Hall PTR 1996         - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995           - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005         - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003           Method(s) of instruction/ media being used         Lecture, teamwork, reflections in plenum, practical course           Level (category         1 (Bachelor=1, Master=2)           Summer/ Winter	Learning objectives	
- have a basic knowledge about network using internet protocols           - are able to calculate network loads,           - are able to handle some simple configuration and test tasks           Module content         - Basics of communication, logical LAN-models, embedding into the concept of common communication systems           - Classification by topology, transmission techniques and access methods         - LAN-standardisation and open systems interconnection model           - Wiring systems         - Overview of access methods         - CSMA/CD-Ethernet basics and historical development           - 10 M, 100M, 1G und 10G Ethernet         - additional technologies (AUTONEG and others)         - Internetworking (Bridging, Switching, Routing)           - wireless LAN         - wireless LAN         - Spurgeon, C. E.: Ethernet, O'Reilly 2000           - durating Material         books, script and lab instruction sheets         - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995           - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2003         - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003           Method(s) of instruction/ media being used         Lecvel/ category         1         (Bachelor=1, Master=2)           Summer/ Winter         summer term         - Grassition         - Addison Wesley 2003           Assessment         exam 00 min, Laboratory internship certificate         -		
- are able to calculate network loads,         - are able to handle some simple configuration and test tasks         Module content       - Basics of communication, logical LAN-models, embedding into the concept of common communication systems         - Classification by topology, transmission techniques and access methods         - UAN-standardisation and open systems interconnection model         - Wiring systems         - Overview of access methods         - CSMA/CD-Ethernet basics and historical development         - 10 M, 100M, 1G und 10G Ethernet         - additional technologies (AUTONEG and others)         - Internetworking (Bridging, Switching, Routing)         - wireless LAN         Course type       2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)         Learning Material       books, script and lab instruction sheets         Recommended       - Spurgeon, C. E: Ethernet, O'Reilly 2000         - Halsall, F: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995         - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005         - Perlman, R: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003         Method(s) of       Lecture, teamwork, reflections in plenum, practical course         instruction/       summer term         Term       6th term         Compulsory		
- are able to handle some simple configuration and test tasks           Module content         - Basics of communication, logical LAN-models, embedding into the concept of common communication systems           - Classification by topology, transmission techniques and access methods           - LAN-standardisation and open systems interconnection model           - Wiring systems           - Overview of access methods           - CSBA/CD-Ethernet basics and historical development           - 10 M, 100M, 1G und 10G Ethernet           - additional technologies (AUTONEG and others)           - Internetworking (Bridging, Switching, Routing)           - wireless LAN           Course type         2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)           Learning Material         books, script and lab instruction sheets           Recommended         - Spurgeon, C. E: Ethernet, O'Reilly 2000           Iterature         - Halsall, F:: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995           - Harsall, F:: Data Communications, Computernetworking-Protokolle, Addison Wesley 2003           Method(s) of instruction/ media being used           Level/ category         1 (Bachelor=1, Master=2)           Summer term           Compulsory requirements           Assessment         exam 90 min, Laboratory internship certificate           Assessment         ex		
Module content       - Basics of communication, logical LAN-models, embedding into the concept of common communication systems         - Classification by topology, transmission techniques and access methods         - LAN-standardisation and open systems interconnection model         - Wiring systems         - Overview of access methods         - Surgets LAN         Course type       2L - OE - 0S - 1P         Learning Material       books, script and lab instruction sheets         Recommended       - Spurgeon, C. E: Ethernet, OReilly 2000         Iterature       - Johnson, H. W.: Fast Ethernet, Prentice Hall PTR 1996         - Matisult, F: Data Communications, Computernetworks and Open Systems, Addison-Wesley 2003         - Perlman, R:: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003         - Level/ category       1         Level/ category       1		
of common communication systems         - Classification by topology, transmission techniques and access methods           - LAN-standardisation and open systems interconnection model         - Wiring systems           - Overview of access methods         - CSMA/CD-Ethermet basics and historical development           - 10 M, 100M, 1G und 10G Ethernet         - additional technologies (AUTONEG and others)           - Internetworking (Bridging, Switching, Routing)         - wireless LAN           Course type         2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)           Learning Material         books, script and lab instruction sheets           Recommended         - Spurgeon, C. E.: Ethernet, O'Reilly 2000           - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995           - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005           - Perman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison-Wesley 2003           Method(s) of         Lecture, teamwork, reflections in plenum, practical course           instruction/         media being used           Level/ category         1 (Bachelor=1, Master=2)           Summer/Winter         summer term           Term         6th term           Compulsory         none           requirements         Assessment           Assessment		
- Classification by topology, transmission techniques and access methods         - LAN-standardisation and open systems interconnection model         - Wiring systems         - Overview of access methods         - CSMA/CD-Ethernet basics and historical development         10 M, 100M, 1G und 10G Ethernet         - additional technologies (AUTONEG and others)         - Internetworking (Bridging, Switching, Routing)         - wireless LAN         Course type       2L - 0E - 0S - 1P         Learning Material       books, script and lab instruction sheets         Recommended       - Spurgeon, C. E: Ethernet, OrRelily 2000         literature       - Johnson, H. W: Fast Ethernet, Prentice Hall PTR 1996         - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995         - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2003         Method(s) of       Lecture, teamwork, reflections in plenum, practical course         instruction/       summer Vinter         Summer/ Winter       summer term         Gerits       6, in combination with modul Field Bus         Assessment       exam 90 min, Laboratory internship certificate         Assessment modalities       PL – exam during audit period(graded)         Cortecits       6, in combination with modul Field Bus	Module content	
- LAN-standardisation and open systems interconnection model         - Wiring systems         - Overview of access methods         - CSMA/CD-Ethernet basics and historical development         - 10 M, 100 M, 1G und 10G Ethernet         - additional technologies (AUTONEG and others)         - Internetworking (Bridging, Switching, Routing)         - wireless LAN         Course type       2L - 0S - 1P (Lecture, Exercises, Seminar, practical course)         Learning Material       books, script and lab instruction sheets         Recommended       - Spurgeon, C. E.: Ethernet, O'Reilly 2000         literature       - Johnson, H. W.: Fast Ethernet, Prentice Hall PTR 1996         - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995         - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005         - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003         Method(s) of       Lecture, teamwork, reflections in plenum, practical course instruction/ media being used         Level/ category       1         Bummer /Winter       summer term         Term       6th term         Compulsory       none         requirements       - exam during audit period(graded)         Assessment       exam doring audit period(graded)		
- Wiring systems         - Overview of access methods         - Overview of access methods         - CSMA/CD-Ethernet basics and historical development         - 10 M, 100M, 1G und 10G Ethernet         - additional technologies (AUTONEG and others)         - Internetworking (Bridging, Switching, Routing)         - wireless LAN         Course type       2L - 0E - 0S - 1P         Learning Material       books, script and lab instruction sheets         Recommended       - Spurgeon, C. E.: Ethernet, O'Reilly 2000         - Johnson, H. W.: Fast Ethernet, Prentice Hall PTR 1996         - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995         - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005         - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003         Method(s) of       Lecture, teamwork, reflections in plenum, practical course         instruction/       media being used         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       summer term         Term       6th term         Compulsory       none         requirements       exam 90 min, Laboratory internship certificate         Assessment       exam 90 min, Laboratory internship certificate <td< td=""><td></td><td></td></td<>		
- Overview of access methods         - CSMA/CD-Ethernet basics and historical development         - 10 M, 100M, 1G und 10G Ethernet         - additional technologies (AUTONEG and others)         - Internetworking (Bridging, Switching, Routing)         - wireless LAN         Course type       2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)         Learning Material       books, script and lab instruction sheets         Recommended       - Spurgeon, C. E.: Ethernet, O'Reilly 2000         Iterature       - Johnson, H. W.: Fast Ethernet, Prentice Hall PTR 1996         - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995         - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005         - Perlman, R.:: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003         Method(s) of instruction/media being used         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       summer term         Term       6th term         Compulsory       none         requirements       6., in combination with modul Field Bus         Morkload       110h of total work load, thereof         45h of self-study, consisting of: 25 h lecture (preparation and rework)       15 h practical training (preparation and evaluation)         25 h lecture		
- CSMA/CD-Ethernet basics and historical development         - 10 M, 100M, 1G und 10G Ethernet         - additional technologies (AUTONEG and others)         - Internetworking (Bridging, Switching, Routing)         - wireless LAN         Course type       2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)         Learning Material       books, script and lab instruction sheets         Recommended       - Spurgeon, C. E.: Ethernet, O'Reilly 2000         Ilterature       - Johnson, H. W.: Fast Ethernet, Prentice Hall PTR 1996         - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995         - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005         - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003         Method(s) of       Lecture, teamwork, reflections in plenum, practical course         instruction/       media being used         Leevel/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       summer term         Term       6th term         Compulsory       none         requirements       Assessment         Assessment       exam 90 min, Laboratory internship certificate         Assessment       6, in combination with modul Field Bus         Workload       110h of total		
- 10 M, 100M, 1G und 10G Ethernet         - additional technologies (AUTONEG and others)         - Internetworking (Bridging, Switching, Routing)         - wireless LAN         Course type       2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)         Learning Material       books, script and lab instruction sheets         Recommended       - Spurgeon, C. E.: Ethernet, Prentice Hall PTR 1996         literature       - Johnson, H. W.: Fast Ethernet, Prentice Hall PTR 1996         - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995         - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005         - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003         Method(s) of       Lecture, teamwork, reflections in plenum, practical course         instruction/       summer term         Term       6th term         Compulsory       none         requirements       exam 90 min, Laboratory internship certificate         Assessment       exam 90 min, Laboratory internship certificate         Assessment       6, in combination with modul Field Bus         Workload       110h of total work load, thereof         45h of contact hours and       65h of self-study, consisting of:         25 h lecture (preparation and rework)		
- additional technologies (AUTONEG and others)         - Internetworking (Bridging, Switching, Routing)         - wireless LAN         Course type       2L - OE - 0S - 1P       (Lecture, Exercises, Seminar, practical course)         Learning Material       books, script and lab instruction sheets         Recommended       - Spurgeon, C. E.: Ethernet, O'Reilly 2000         literature       - Johnson, H. W.: Fast Ethernet, Prentice Hall PTR 1996         - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995         - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005         - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003         Method(s) of       Lecture, teamwork, reflections in plenum, practical course         instruction/       exet etherm         Term       6th term         Compulsory       none         requirements       Assessment         Assessment       exam 90 min, Laboratory internship certificate         Assessment		
- Internetworking (Bridging, Switching, Routing)         - wireless LAN         Course type       2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)         Learning Material       books, script and lab instruction sheets         Recommended       - Spurgeon, C. E.: Ethernet, O'Reilly 2000         literature       - Johnson, H. W.: Fast Ethernet, Prentice Hall PTR 1996         - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995         - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005         - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       summer term         Term       6th term         Compulsory       none         requirements       Assessment         Assessment modalities       PL – exam during audit period(graded)         ECTS credits       6, in combination with modul Field Bus         Workload       110h of total work load, thereof         45h of contact hours and       65h of self-study, consisting of:         25 h lecture (preparation and rework)       15 h practical training (preparation and evaluation)         25 h lecture (preparation and rework)       15 h practical training (preparation and evaluation)		
- wireless LAN         Course type       2L - 0E - 0S - 1P       (Lecture, Exercises, Seminar, practical course)         Learning Material       books, script and lab instruction sheets         Recommended       - Spurgeon, C. E.: Ethernet, O'Reilly 2000         literature       - Johnson, H. W.: Fast Ethernet, Prentice Hall PTR 1996         - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995         - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005         - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003         Method(s) of       Lecture, teamwork, reflections in plenum, practical course         instruction/       media being used         Level/ category       1         Gachelor=1, Master=2)         Summer/ Winter       summer term         Term       6th term         Compulsory       none         requirements       PL – exam during audit period(graded)         Assessment       exam 90 min, Laboratory internship certificate         Assessment modalities       PL – exam during audit period(graded)         ECTS credits       6, in combination with modul Field Bus         Workload       110h of total work load, thereof         45h of contact hours and       65h of self-study, consisting of:		<b>o</b> (
Course type         2L - 0E - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         books, script and lab instruction sheets           Recommended         - Spurgeon, C. E.: Ethernet, O'Reilly 2000           Iterature         - Johnson, H. W.: Fast Ethernet, Prentice Hall PTR 1996           - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995           - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005           - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003           Lecture, teamwork, reflections in plenum, practical course           instruction/           media being used           Level/ category         1           Summer/ Winter           Summer/ Winter           Summer term           Term           Coh term           Compulsory           requirements           Assessment           exam 90 min, Laboratory internship certificate           Assessment modalities           PL – exam during audit period(graded)           ECTS credits           6, in combination with modul Field Bus           Workload           110h of total work load, thereof           45h of contact hours and		
Learning Material         books, script and lab instruction sheets           Recommended         - Spurgeon, C. E.: Ethernet, O'Reilly 2000           literature         - Johnson, H. W.: Fast Ethernet, Prentice Hall PTR 1996           - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995           - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005           - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003           Method(s) of         Lecture, teamwork, reflections in plenum, practical course           instruction/         media being used           Level/ category         1 (Bachelor=1, Master=2)           Summer/Winter         summer term           Term         6th term           Compulsory         none           requirements         exam 90 min, Laboratory internship certificate           Assessment         exam 90 min, Laboratory internship certificate           Assessment modalities         PL – exam during audit period(graded)           ECTS credits         6, in combination with modul Field Bus           Workload         110h of total work load, thereof           45h of contact hours and         65h of self-study, consisting of:           25 h lecture (preparation and rework)         15 h practical training (preparation and evaluation)		
Recommended literature- Spurgeon, C. E.: Ethernet, O'Reilly 2000 - Johnson, H. W.: Fast Ethernet, Prentice Hall PTR 1996 - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995 - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005 - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003Method(s) of instruction/ media being usedLecture, teamwork, reflections in plenum, practical courseLevel/ category1(Bachelor=1, Master=2)Summer/ Wintersummer termTerm6th termCompulsory requirementsnoneAssessmentexam 90 min, Laboratory internship certificateAssessmentexam 90 min, Laboratory internship certificateAssessment6, in combination with modul Field BusWorkload110h of total work load, thereof 45h of contact hours and 65h of self-study, consisting off: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		
literature- Johnson, H. W.: Fast Ethernet, Prentice Hall PTR 1996 - Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995 - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005 - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003Method(s) of instruction/ media being usedLecture, teamwork, reflections in plenum, practical courseLevel/ category1(Bachelor=1, Master=2)Summer/ Wintersummer termTerm6th termCompulsory requirementsnoneAssessmentexam 90 min, Laboratory internship certificateAssessment6, in combination with modul Field BusWorkload110h of total work load, thereof 45h of contact hours and 65h of self-study, consisting of: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		
- Halsall, F.: Data Communications, Computernetworks and Open Systems, Addison-Wesley 1995 - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005 - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003Method(s) of instruction/ media being used Level/ categoryLecture, teamwork, reflections in plenum, practical courseLevel/ category1 (Bachelor=1, Master=2)Summer/ Wintersummer termTerm6th termCompulsory requirementsnoneAssessmentexam 90 min, Laboratory internship certificateAssessmentexam 90 min, Laboratory internship certificateAssessmentfor contact hours and 65h of self-study, consisting of: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		
Addison-Wesley 1995 - Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005 - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003Method(s) of instruction/ media being usedLecture, tearnwork, reflections in plenum, practical courseLevel/ category1(Bachelor=1, Master=2)Summer/Wintersummer termTerm6th termCompulsory requirementsnoneAssessmentexam 90 min, Laboratory internship certificateAssessment6, in combination with modul Field BusWorkload110h of total work load, thereof 45h of contact hours and 65h of self-study, consisting of: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually	literature	
- Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr, Verlag Vieweg 2005 - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003Method(s) of instruction/ media being usedLecture, teamwork, reflections in plenum, practical courseLevel/ category1 (Bachelor=1, Master=2)Summer/ Wintersummer termTerm6th termCompulsory requirementsnoneAssessmentexam 90 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)ECTS credits6, in combination with modul Field BusWorkload110h of total work load, thereof 45h of contact hours and 65h of self-study, consisting of: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h lecare training (preparation and evaluation) 25 h lecare training (preparation and evaluation) 25 h lecare tableTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		
Verlag Vieweg 2005 - Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003Method(s) of instruction/ media being usedLecture, teamwork, reflections in plenum, practical courseLevel/ category1 (Bachelor=1, Master=2)Summer/ Wintersummer termTerm6th termCompulsory requirementsnoneAssessmentexam 90 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)ECTS credits6, in combination with modul Field BusWorkload110h of total work load, thereof 45h of contact hours and 65h of self-study, consisting of: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		
- Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle, Addison Wesley 2003Method(s) of instruction/ media being usedLecture, teamwork, reflections in plenum, practical courseLevel/ category1 (Bachelor=1, Master=2)Summer/ Wintersummer termTerm6th termCompulsory requirementsnoneAssessmentexam 90 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)ECTS credits6, in combination with modul Field BusWorkload110h of total work load, thereof45h of contact hours and 65h of self-study, consisting of: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/roomEAH JenaFrequency of offerAnnually		
Addison Wesley 2003Method(s) of instruction/ media being usedLecture, teamwork, reflections in plenum, practical courseLevel/ category1 (Bachelor=1, Master=2)Summer/ Wintersummer termTerm6th termCompulsory requirementsnoneAssessmentexam 90 min, Laboratory internship certificateAssessmentexam 90 min, Laboratory internship certificateAssessmentof in combination with modul Field BusWorkload110h of total work load, thereof 45h of contact hours and 65h of self-study, consisting of: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		
Method(s) of instruction/ media being usedLecture, teamwork, reflections in plenum, practical courseLevel/ category1 (Bachelor=1, Master=2)Summer/ Wintersummer termTerm6th termCompulsory requirementsnoneAssessmentexam 90 min, Laboratory internship certificateAssessmentexam 90 min, Laboratory internship certificateAssessmentfor combination with modul Field BusWorkload110h of total work load, thereof 45h of contact hours and 65h of self-study, consisting of: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		
instruction/ media being used1(Bachelor=1, Master=2)Level/ category1(Bachelor=1, Master=2)Summer/ Wintersummer termTerm6th termCompulsory requirementsnoneAssessmentexam 90 min, Laboratory internship certificateAssessment modalitiesPL - exam during audit period(graded)ECTS credits6, in combination with modul Field BusWorkload110h of total work load, thereof 45h of contact hours and 65h of self-study, consisting of: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		
media being usedLevel/ category1 (Bachelor=1, Master=2)Summer/ Wintersummer termTerm6th termCompulsory requirementsnoneAssessmentexam 90 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)ECTS credits6, in combination with modul Field BusWorkload110h of total work load, thereof45h of contact hours and 65h of self-study, consisting of: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		Lecture, teamwork, reflections in plenum, practical course
Level/ category1 (Bachelor=1, Master=2)Summer/ Wintersummer termTerm6th termCompulsory requirementsnoneAssessmentexam 90 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)ECTS credits6, in combination with modul Field BusWorkload110h of total work load, thereof45h of contact hours and 65h of self-study, consisting of: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		
Summer/Wintersummer termTerm6th termCompulsory requirementsnoneAssessmentexam 90 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)ECTS credits6, in combination with modul Field BusWorkload110h of total work load, thereof45h of contact hours and 65h of self-study, consisting of: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		
Term6th termCompulsory requirementsnoneAssessmentexam 90 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)ECTS credits6, in combination with modul Field BusWorkload110h of total work load, thereof 45h of contact hours and 65h of self-study, consisting of: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		
Compulsory requirementsnoneAssessmentexam 90 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)ECTS credits6, in combination with modul Field BusWorkload110h of total work load, thereof 45h of contact hours and 65h of self-study, consisting of: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		
requirementsAssessmentexam 90 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)ECTS credits6, in combination with modul Field BusWorkload110h of total work load, thereof45h of contact hours and65h of self-study, consisting of:25 h lecture (preparation and rework)15 h practical training (preparation and evaluation)25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		6th term
Assessmentexam 90 min, Laboratory internship certificateAssessment modalitiesPL – exam during audit period(graded)ECTS credits6, in combination with modul Field BusWorkload110h of total work load, thereof45h of contact hours and65h of self-study, consisting of:25 h lecture (preparation and rework)15 h practical training (preparation and evaluation)25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		none
Assessment modalities       PL – exam during audit period(graded)         ECTS credits       6, in combination with modul Field Bus         Workload       110h of total work load, thereof         45h of contact hours and       65h of self-study, consisting of:         25 h lecture (preparation and rework)       15 h practical training (preparation and evaluation)         25 h exam preparation         Time       According time table         Duration of module       2 terms         Place/ room       EAH Jena         Frequency of offer       Annually	•	
ECTS credits       6, in combination with modul Field Bus         Workload       110h of total work load, thereof         45h of contact hours and       65h of self-study, consisting of:         25 h lecture (preparation and rework)       15 h practical training (preparation and evaluation)         25 h exam preparation         Time       According time table         Duration of module       2 terms         Place/ room       EAH Jena         Frequency of offer       Annually		
Workload110h of total work load, thereof 45h of contact hours and 65h of self-study, consisting of: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		
45h of contact hours and 65h of self-study, consisting of: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		
65h of self-study, consisting of: 25 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 25 h exam preparationTimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually	Workload	
25 h lecture (preparation and rework)         15 h practical training (preparation and evaluation)         25 h exam preparation         Time       According time table         Duration of module       2 terms         Place/ room       EAH Jena         Frequency of offer       Annually		
15 h practical training (preparation and evaluation)         25 h exam preparation         Time       According time table         Duration of module       2 terms         Place/ room       EAH Jena         Frequency of offer       Annually		
25 h exam preparation         Time       According time table         Duration of module       2 terms         Place/ room       EAH Jena         Frequency of offer       Annually		
TimeAccording time tableDuration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		
Duration of module2 termsPlace/ roomEAH JenaFrequency of offerAnnually		
Place/ room     EAH Jena       Frequency of offer     Annually	Time	According time table
Frequency of offer Annually	Duration of module	2 terms
	Place/ room	EAH Jena
	Frequency of offer	Annually
	Language	

Module number	ET.1.505
Module name	
	Computer Graphics
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	TI, KMT
Module coordinator	Prof. DrIng. Oliver Jack
Compulsory/ optional/ electiv	Compulsory
Learning objectives	The students should learn fundamental procedures and methods for 3D
Learning objectives	modelling and for visualising (and animation of) of virtual worlds, and apply them on suitable software (3D-StudioMax, Blender, RenderMan).
Module content	- Geometric modelling: Polygons, splines, Bezier
	- 3D description: projections, camera description, canonical image space, parallel projection
	- Screening: Pixel, polygons, scan line algorithm
	- Visibility: Coherence, painters, BSP-Trees, back face culling, Z-buffer, level
	of detail
	- Models for illumination: illumination, light source, ambient light, diffuse
	reflection, direct reflection, reduction, colour
	- Textures: global illumination models, ray tracing, radiosity, texture
	modulation, texture sources, filtering, bump maps, light maps, shadow
Course of the sec	maps, aliasing
Course type	2L - 1E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	2L - 1E - 0S - 1P
Recommended	- Nischwitz, A., Fischer, M., Haberäcker, P., Socher, Gudrun:
literature	Computergrafik und Bildverarbeitung, Band 1: Computergrafik, 3. Auflage,
	Vieweg+ Teubner, 2011. - Schiele, H.G.: Compuergrafik für Ingenieure: Eine anwendungsorientierte
	Einführung, Springer Vieweg, Berlin Heidelberg, 2012.
Method(s) of	Interactive lecture, practical course, work in little teams, self-study, exercises
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/ Winter	winter term
Term	5. term
Compulsory	none
requirements	
Recommended	Computer Science, Image Processing
requirements	
Assessment	project work
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	6
Workload	180h of total work load, thereof
	60h of contact hours and
	120h of self-study, consisting of:
	65 h lecture (preparation and rework)
	25 h practical training (preparation and evaluation)
	30 h exam preparation
Usability of this module	Digital Image Processing I, Video Engineering
Time	According time table
Duration of module	1 term
Duration of module Place/ room	1 term EAH Jena

Module number	ET.1.506.1
Module name	Radio Frequency Technique
Sub module	Radio Frequency Technique 1
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	KMT
Module coordinator	Prof. Dr. Ludwig Niebel
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	Upon completion of the module, students
5,	- understand the influence of transmission lines on high frequent signals, the
	function as a waveguide
	- are able to use lines for different applications
	- are able to use the model of waves for different problems in RF
	engineering
	- understand the effect and the parameters of antennas and the
	propagation of electromagnetic waves
	- are able to calculate the free space propagation
Module content	- Transmission Line Model and Solution of Wave Equations in stationary
	case
	- Reflection and Standing Waves on Transmission Lines - Transmission Lines used as Circuit Elements
	- The Smith-Chart and its applications
	- Basics and technical description of Antennas
	- radio propagation, different conditiones for using
Course type	2L - 0E - 1S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	script and exercises on the Internet
Recommended	- Meinke; Gundlach: Taschenbuch der Hochfrequenztechnik.Springer
literature	- Zinke; Brunswig: Lehrbuch der Hochfrequenztechnik Band 1 und Band 2.
	Springer
	- Hoffmann: Hochfrequenztechnik, ein systemtheoretischer Zugang.
	Springer
Method(s) of	lecture, exercises, simulations, self-study
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	5th term
Compulsory	none
requirements	Electrical Engineering, Signal Dracessing, Introduction in Communication
Recommended	Electrical Engineering, Signal Processing, Introduction in Communication
requirements	Engineering, linear ordinary and partial differential equations
Further Information	The assessment takes place at the end of the second submodule Radio
	Frequency Technique 2.
ECTS credits	6, in combination with Radio Frequency Technique 2Frequency Technique
	1+2
Workload	90h of total work load, thereof
	45h of contact hours and
	45h of self-study, consisting of:
	30 h lecture (preparation and rework)
	15 h seminar (preparation and evaluation)
Usability of this module	Radio Frequency Technique 2
Time	According time table
Duration of module	2 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.506.2
Module name	Radio Frequency Technique
Sub module	Radio Frequency Technique 2
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	КМТ
Module coordinator	Prof. Dr. Ludwig Niebel
Compulsory/ optional/	Compulsory
electiv	Lines consisting of the second is students
Learning objectives	Upon completion of the module, students
	- understands the main function blocks of RF devices and functions of RF
	devices
	- are able to use major function blocks
Module content	- are able to determine major parameters of some function blocks
Module content	Amplifiers, HF-transistors and noise
	oscillation generation, oscillators frequency conversion, composition
	frequency selective elements receiver and transmitter
Course type	
Learning Material	books, script, exercises and lab instruction sheets on the Internet
Recommended	Meinke; Gundlach: Taschenbuch der Hochfrequenztechnik.
literature	Springer
	Zinke; Brunswig: Lehrbuch der Hochfrequenztechnik Band 1 und Band 2.
	Springer
	Hoffmann: Hochfrequenztechnik, ein systemtheoretischer Zugang
Mathad(a) of	Springer
Method(s) of	Lecture, seminar, simulations, lab sessions, self-study
instruction/	
media being used	1 (Bachelor=1, Master=2)
Level/ category Summer/ Winter	
	summer term
Term	6th term
Compulsory	none
requirements	
Recommended	
	Electrical Engineering, Signal Processing, Introduction in Communication
requirements	Engineering,
	Engineering, linear ordinary and partial differential equations, Radio Frequency
requirements	Engineering, linear ordinary and partial differential equations, Radio Frequency Technique 1
requirements Assessment	Engineering, linear ordinary and partial differential equations, Radio Frequency Technique 1 exam 120 min, Laboratory internship certificate
requirements Assessment Assessment modalities	Engineering, linear ordinary and partial differential equations, Radio Frequency Technique 1 exam 120 min, Laboratory internship certificate PL – exam during audit period(graded)
requirements Assessment Assessment modalities ECTS credits	Engineering, linear ordinary and partial differential equations, Radio Frequency Technique 1 exam 120 min, Laboratory internship certificate PL – exam during audit period(graded) 6, in combination with Radio Frequency Technique 1
requirements Assessment Assessment modalities	Engineering, linear ordinary and partial differential equations, Radio Frequency Technique 1 exam 120 min, Laboratory internship certificate PL – exam during audit period(graded) 6, in combination with Radio Frequency Technique 1 90h of total work load, thereof
requirements Assessment Assessment modalities ECTS credits	Engineering, linear ordinary and partial differential equations, Radio Frequency Technique 1 exam 120 min, Laboratory internship certificate PL – exam during audit period(graded) 6, in combination with Radio Frequency Technique 1 90h of total work load, thereof 45h of contact hours and
requirements Assessment Assessment modalities ECTS credits	Engineering, linear ordinary and partial differential equations, Radio Frequency Technique 1 exam 120 min, Laboratory internship certificate PL – exam during audit period(graded) 6, in combination with Radio Frequency Technique 1 90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of:
requirements Assessment Assessment modalities ECTS credits	Engineering, linear ordinary and partial differential equations, Radio Frequency Technique 1 exam 120 min, Laboratory internship certificate PL – exam during audit period(graded) 6, in combination with Radio Frequency Technique 1 90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 10 h lecture (preparation and rework)
requirements Assessment Assessment modalities ECTS credits	Engineering, linear ordinary and partial differential equations, Radio Frequency Technique 1 exam 120 min, Laboratory internship certificate PL – exam during audit period(graded) 6, in combination with Radio Frequency Technique 1 90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 10 h lecture (preparation and rework) 10 h seminar (preparation and rework)
requirements Assessment Assessment modalities ECTS credits	Engineering, linear ordinary and partial differential equations, Radio Frequency Technique 1 exam 120 min, Laboratory internship certificate PL – exam during audit period(graded) 6, in combination with Radio Frequency Technique 1 90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 10 h lecture (preparation and rework) 10 h seminar (preparation and rework) 10 h practical training (preparation and evaluation)
requirements Assessment Assessment modalities ECTS credits Workload	Engineering, linear ordinary and partial differential equations, Radio Frequency Technique 1 exam 120 min, Laboratory internship certificate PL – exam during audit period(graded) 6, in combination with Radio Frequency Technique 1 90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 10 h lecture (preparation and rework) 10 h seminar (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparation
requirements Assessment Assessment modalities ECTS credits Workload	Engineering, linear ordinary and partial differential equations, Radio Frequency Technique 1 exam 120 min, Laboratory internship certificate PL – exam during audit period(graded) 6, in combination with Radio Frequency Technique 1 90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 10 h lecture (preparation and rework) 10 h seminar (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparation
requirements Assessment Assessment modalities ECTS credits Workload Time Duration of module	Engineering, linear ordinary and partial differential equations, Radio Frequency Technique 1 exam 120 min, Laboratory internship certificate PL – exam during audit period(graded) 6, in combination with Radio Frequency Technique 1 90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 10 h lecture (preparation and rework) 10 h seminar (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparation According time table 2 terms
requirements Assessment Assessment modalities ECTS credits Workload Time Duration of module Place/ room	Engineering, linear ordinary and partial differential equations, Radio Frequency Technique 1 exam 120 min, Laboratory internship certificate PL – exam during audit period(graded) 6, in combination with Radio Frequency Technique 1 90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 10 h lecture (preparation and rework) 10 h seminar (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparation According time table 2 terms EAH Jena
requirements Assessment Assessment modalities ECTS credits Workload Time Duration of module	Engineering, linear ordinary and partial differential equations, Radio Frequency Technique 1 exam 120 min, Laboratory internship certificate PL – exam during audit period(graded) 6, in combination with Radio Frequency Technique 1 90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 10 h lecture (preparation and rework) 10 h seminar (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparation According time table 2 terms

Module number	ET.1.507
Module name	Communication Networks
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	KMT
Module coordinator	Prof. Dr. Ludwig Niebel
Compulsory/ optional/	Compulsory
electiv	Computery
Learning objectives	Upon completion of the module, students
	- have a general idea of communication networks and understand important
	main functions and principles
	- knows technologies and protocols of line-switched and packet-switched
	networks
	- are able to calculate network loads,
	- are able to handle configuration and test tasks
Module content	- wide area networks, connection oriented systems (PDH, SDH, ISDN)
	- wide area networks, packet systems (ATM, MPLS, Metro Ethernet, IP
	networks)
	- wide area networks
	- access networks, DSL systems - local networks, Ethernet and Wireless LAN
	- important features and apllications aspects
	- network management
Course type	4L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	Books, Script and lab instruction sheets on the Internet
Recommended	Bossert, M., Breitbach, M.: Digitale Netze, Verlag B.G. Teubner 1999
literature	Martin Werner: Netze, Protokolle, Schnittstellen und Nachrichtenverkehr,
	Verlag Vieweg 2005
	Hochmut, M., Wildenhain, F.: ATM-Netze, Architektur und Funktionsweise,
	International Thomson Publishing 1995
	Minei, I., Lucek, J.: MPLS-enabled Applications, John Wileyand sons 2008
	Spurgeon, C. E.: Ethernet, O'Reilly 2000
	Johnson, H. W.: Fast Ethernet, Prentice Hall PTR 1996
	Perlman, R.: Bridges, Router, Switches und internetworking-Protokolle,
	Addison Wesley 2003
Method(s) of	Lecture in the form of a seminar, lab session, self study
instruction/	
media being used	(Decheler 4 Meeter 2)
Level/ category Summer/ Winter	1 (Bachelor=1, Master=2)
	winter term
Term Compulsory	5th term none
requirements	
Recommended	Signal Processing, Computer Science, Digital Systems, Introduction in
requirements	Communication Engineering
Assessment	exam 120 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	6
Workload	170 h Gesamtarbeitsaufwand, davon
	- 75 h Präsenzstunden (SWS)
	- 95 h Selbststudium, bestehend aus:
	- 60 h Vorlesung (Vor- und Nachbereitung)
	- 15 h Praktikum 15 (Vorbereitung und Auswertung
	- 20 h Prüfungsvorbereitung
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.508
Module name	
	Mobile Computing / Software Engineering for mobile systems
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	Computer Engineering (CE), Communication and Media Technology (CMT)
Module coordinator	Prof. DrIng. Oliver Jack
Compulsory/ optional/ electiv	compulsory in specialization CE, optional in specialization CMT
Learning objectives	At the end of the module students are able:
	- to apply software development method for mobile devices
	- to assess specifics of distributed mobile application compared to standard
	PC-applications
	- to generate and adapt mobile apps
	- to understand the Android operating system
Module content	Fundamentals of Software Development for Mobile Systems, Introduction to
	Platform-Specific Programming Languages and Paradigms. Application
	Architecture and User Interaction, and Generation and Connection of the
	User Interface, Access to Internal Device Hardware, such as GPS, Compass, Camera), Using Standard APIs and Handling Error States,
	Connection to Servers and Web Services: Client / Server Communication
Course type	2L - 2E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	Scripts and exercises
Recommended	- Uwe Post: Android-Apps entwickeln. Galileo Computing, 2012
literature	- Florian Franke, Johannes Ippen: Apps mit HTML5 und CSS3: Für iPhone,
literature	iPad und Android. Galileo Computing, 2013
	- Raj Kamal: Mobile Computing. Oxford University Press, 2012
Method(s) of	Interactive lecture, work in little teams, self-study, exercises
instruction/	Interactive recture, work in fittle teams, self-study, exercises
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	5. term
Compulsory	none
requirements	
Recommended	Computer Science, Knownledge in object-oriented programming
requirements	
Assessment	term paper and presentation
Assessment modalities	APL – assessment during the semester period (graded)
Further Information	The students have to conduct an extensive software development project.
ECTS credits	6
Workload	180h of total work load, thereof
	60h of contact hours and
	120h of self-study, consisting of:
	95 h lecture (preparation and rework)
	25 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number         ET.1.509.1           Module name         Operating Systems           Sub module         Operating Systems	
Sub module Operating Systems	
Department         Electrical Engineering and Information Technology           Degree program         ET/IT (Ba)	
Module coordinator Prof. Dr. Oliver Jack	
Compulsory/ optional/ Compulsory	
Learning objectives Upon completion of the module, students are able to characterisetasks function modes of operating systems, and to analyse fundamental operating system concepts, their implementations, and th properties.	
Additionally they can apply operating system function in application programming.	
Module content         - Functions of operating systems, composition of computers, operating system concepts, system calls, architecture of operating systems, virtua machines	al
<ul> <li>Processes and threads: Fundamentals, condition models</li> <li>Synchronisation: critical ranges, barriers, semaphors, monitors, deadle</li> <li>Process communication: Signals, RPC</li> <li>Scheduling: FIFO, Round Robin, priorities</li> </ul>	ocks
<ul> <li>Scheduling, FFO, Round Robin, phonies</li> <li>Storage management: Address area, swapping, virtual storage management systems</li> </ul>	
<ul> <li>File systems: Files and file access, listings, structure of a file system</li> <li>Input/output: Devices, access to devices</li> <li>Command shells</li> </ul>	
Course type 2L - 1E - 0S - 0P (Lecture, Exercises, Seminar, practical course)	
Learning Material     Lecture script	
Recommended Andrew S. Tanenbaum: Moderne Betriebssysteme, 2. Auflage, Pearson	<b>`</b>
literature Studium, 2003. William Stallings: Betriebssysteme, 4. Auflage, Pearson Studium, 2003 A. Silberschatz, P. Galvin, J. Peteron: Operating System Concepts, Joh Wiley and Sons, 2001	
Method(s) of Lecture, practical course instruction/ media being used	
Level/ category 1 (Bachelor=1, Master=2)	
Summer/ Winter winter term	
Term 5. term	
Compulsory none requirements	
Recommended         Basics of Programming, Algorithms and data structures           requirements         Basics of Programming, Algorithms and data structures	
Assessment course attendance certificate	
Assessment modalities SL - ungraded course work during the lecture period	
ECTS credits 3	
ECTS credits     3       Workload     90h of total work load, thereof	
Workload 90h of total work load, thereof	
Workload         90h of total work load, thereof           45h of contact hours and         45h of contact hours and	
Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of:	
Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 10 h exam preparationUsability of this moduleReal Time Operating Systems (ET.1.509.2)	
Workload90h of total work load, thereof45h of contact hours and45h of self-study, consisting of:35 h lecture (preparation and rework)10 h exam preparation	
Workload       90h of total work load, thereof         45h of contact hours and       45h of contact hours and         45h of self-study, consisting of:       35 h lecture (preparation and rework)         10 h exam preparation         Usability of this module       Real Time Operating Systems (ET.1.509.2)         Time       According time table         Duration of module       1 term	
Workload       90h of total work load, thereof         45h of contact hours and         45h of self-study, consisting of:         35 h lecture (preparation and rework)         10 h exam preparation         Usability of this module       Real Time Operating Systems (ET.1.509.2)         Time       According time table	
Workload       90h of total work load, thereof         45h of contact hours and       45h of contact hours and         45h of self-study, consisting of:       35 h lecture (preparation and rework)         10 h exam preparation         Usability of this module       Real Time Operating Systems (ET.1.509.2)         Time       According time table         Duration of module       1 term	

Module number	ET.1.509.2
Module name	Operating Systems
Sub module	Real Time Operating Systems
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	
Module coordinator	Prof. Dr. Oliver Jack
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	At the end of the module students are able:
	- to categorize objectives and functionality of real-time systems
	- to distinguish basic real-time operating system concepts and their potential
	pitfalls
	- to assess real-time scheduling Methods
	- to apply methods and tools for application proramming using real-time operation systems
	- to apply real-time system design methods
Module content	Typical Applications of Real-Time Systems, Structure of a Real-Time
	System,
	Characteristics of Real-Time Systems: Time and Event-Controlled Systems,
	Periodic and Sporadic Tasks, Task Coordination, Architecture
	Characteristics of a Real-Time Processing System, Real-Time Scheduling:
	Static Process Planning, Dynamic Process Planning, Algorithms for
	Dynamic Process Planning, Scheduling Analysis, Systematic Design of
0	Real-Time Systems: Structured Analysis, Real-Time Analysis
Course type	3L - 1E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material Recommended	Lecture script
literature	- D.L. Buhr, R.J.A.and Bailey. An Introduction to Real-Time Systems: From Design to Multitasking with C/C++. Prentice Hall, Upper Saddle River, 1998.
literature	- Hermann Kopetz. Real-Time Systems. Design Principles for Distributed
	Embedded Applications. Kluwer Academic Publishers, Dordrecht, London,
	1997.
	- Phillip A. Laplante. Real-Time Systems Design and Analysis. IEEE
	Computer Society Press, Los Alamitos, second edition, 1997.
	- Dieter Zöbel and Wolfgang Albrecht. Echtzeitsysteme: Grundlagen und
	Techniken. International Thomson Publishing, Bonn, 1995.
Method(s) of	Lecture, practical course
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/ Winter	summer term
Term	6. term
Compulsory	none
requirements	
Recommended	Computer Science, Operating Systems, Software Engineering
requirements	
Assessment	term paper
Assessment modalities	APL – assessment during the semester period (graded)
Further Information	The students have to conduct a software development project for a real-time
	system
ECTS credits	9 (for the total modul)
Workload	180h of total work load, thereof
	60h of contact hours and
	120h of self-study, consisting of:
	90 h lecture (preparation and rework)
Time	30 h exam preparation
Time Duration of module	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.510
Module name	Intercultural Communication 2
Department	Electrical Engineering and Information Technology
Degree program	ATITi (Ba)
Module coordinator	Prof. Dr. Alexander Richter
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	Achieving intercultural competence in international engineering processes and international business, development of synergies, win-win-strategies, attitudes and problem-solving strategies which are different from those in one's own culture; ability to recognize and analyse hidden misunderstandings.
Module content	The students develop within the framework of a semester abroad an intercultural case studie. The work should referring to the target culture in which the student is staying. It should be related to engineering and especially to topics of automation and information technology. The context of the host country and the host university, the contrast to German culture and own experianecs are to discuss.
Course type	0L - 0E - 2S - 0P (Lecture, Exercises, Seminar, practical course)
Recommended	- Thomas, Alexander (Hg.), Handlungskompetenz im Ausland. Buchreihe
literature	"Beruflich in …" <zielländer>. Göttingen. Vandenhoek&amp; Ruprecht</zielländer>
Method(s) of instruction/ media being used	Exchange of information via internet in the time of study abroad.
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	5. term
Compulsory requirements	none
Recommended requirements	Modul Intercultural Communication 1
Assessment	report
Assessment modalities	SL - ungraded course work during the lecture period
ECTS credits	6
Workload	180h of total work load, thereof
	30h of contact hours and
	150h of self-study
Time	According time table
Duration of module	1 term
Place/ room	University abroad
Frequency of offer	Annually
Language	German

Module number	ET.1.511
Module name	Modules abroad
Department	Electrical Engineering and Information Technology
Degree program	ATITi (Ba)
Module coordinator	Prof. Dr. Alexander Richter
Compulsory/ optional/ electiv	Compulsory
Learning objectives	The students should acquire solid knowledge in the areas of the elected courses. Moreover they will broaden their scientific knowledge and practical skills through the foreign perspective onto their field of work. By becoming familiar with the other country and its culture they will develop a better understanding for other cultures. Self-responsibility and flexibility will be facilitated as well as the understanding of a foreign language.
Module content	The students should take part in courses of a foreign university with following topics or with topics which are comparable to the following topics - Curcuit Design - Analogue Circuit Design - Control Systems - Modelling/ Simulation - Automation Systems - Field Bus - Microcomputer Design - Signal Processors - Web Design - Distributed Systems/Mobile Computing - Operating Systems - Real-Time-Operating Systems - Computer Graphics - Optoelectronics - Database The contents will be aligned by the students between the foreign university and the examination board of the department. The results will be fixed in a Learning Agreement. The agreement will be proved and recommended by the leader of the degree programme. The examination board has to certificate it. A suitable level of quality and a suitable work load are to ensure. The topics of the courses can be seen in the description's of the single modules. This topics, the way of teaching, the amount of teaching and the way of examination are recommendations. In minimum 50 % of the courses
Course type	abroadshould be comparable to the mentioned courses (core area). according to the module of the foreign university. (Lecture, Exercises, Seminar, practical course)
Learning Material	according to the module of the foreign university.
Recommended literature	according to the module of the foreign university.
Method(s) of instruction/ media being used	according to the module of the foreign university.
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	5th term
Compulsory	completion of modules up to th e3rd smesers, signing of a learning
requirements	agreement
Assessment	see Learning Agreement
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	24
Usability of this module	See module description of the respective module
Time	According time table
Duration of module	1 term
Place/ room	University abroad
Frequency of offer	Annually
Language	language of university abroad

Module name         Digital Control Systems           Department         Electrical Engineering and Information Technology           Degree program         ETIT (Ba), ATITi (Ba)           Module coordinator         Prof. DrIng. habil. Klaus-Peter Döge           Compulsory/ optional/         Compulsory           electiv         Students will be enabled to develop and analyze control loop structures with discrete-time controllers.           Module content         - Introduction and demands for time-discrete control systems           - Time-discrete PID-Controller         - Compensating Controller and Deadbeat Controller           - state space control         - state space control           Recommended         - Luzze, J. Regelungstechnik 2: Mehrgrößensysteme Digitale Regelung, Springer Verlag           Springer Verlag 1997         - Isermann, R.: Digitale Regelungstechnik, Verlag Harri Deutsch, Thun/ Frankfurt 1988           Method(s) of         Iab instruction sheets on the Internet, CAE- Software           Instruction/         summer term           Term         Scortrol erret           Summert Winter         summer term           Seesment         written university exam 90 min           Assessment modallites         PL - during period of exams (graded)           ECTS credits         6           Workload         180 of total work load, thereof	Module number	ET.1.601
Department         Electrical Engineering and Information Technology           Degree program         ET/IT (Ba), ATITI (Ba)           Module coordinator         Prof. DrIng, habil. Klaus-Peter Döge           Compulsory/optional/ electiv         Compulsory           Learning objectives         Students will be enabled to develop and analyze control loop structures with discrete-time controllers.           Module content         - Introduction and demands for time-discrete control systems - Mathematical description time-discrete dynamic systems - Time-discrete PID-Controller           Course type         3L - 1E - 0S - 1P           Learning Material         Lecture script, lab instruction sheets           Recommended         - Lurze, J: Regelungstechnik 2: Mehrgrößensysteme Digitale Regelung, Springer Verlag 1997           Isermann, R.: Digitale Regelsysteme: Band 1: Grundlagen, deterministische Regelungen, Springer Verlag           - Grassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch, Thur/ Frankfurt 1998           Method(s) of instruction/ media being used           Level/ category         1           Baio instruction sheets on the Internet, CAE- Software           Summer Winter         Summer term           Term         6. term           Compulsory         Basics of control engineering requirements           Assessment modalities         PL - during period of exams (graded)           ECT		
Degree program         ET/IT (Ba), ATITi (Ba)           Module coordinator         Prof. DrIng. habil. Klaus-Peter Döge           Compulsory/optional/ electiv         Compulsory           Learning objectives         Students will be enabled to develop and analyze control loop structures with discrete-time controllers.           Module content         - Introduction and demands for time-discrete control systems - Mathematical description time-discrete dynamic systems - Time-discrete PID-Controller           Course type         3L - 1E - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture script, lab instruction sheets           Recommended         - Lurze, J: Regelungstechnik 2: Mehrgrößensysteme Digitale Regelung, Springer Verlag 1997           - Isermann, R.: Digitale Regelsysteme: Band 1: Grundlagen, deterministische Regelungen, Springer Verlag           - Grassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch, Thun/ Frankfurt 1998           Method(s) of instruction/ media being used           Level/ category         1 (Bachelor=1, Master=2)           Summer term           Compulsory requirements           Recommended           2-transformation requirements           Recommended           2-transformation           requirements           Recormended           2-transformation           requireme		
Module coordinator         Prof. DrIng. habil. Klaus-Peter Döge           Compulsory/ optional/ electiv         Compulsory           Learning objectives         Students will be enabled to develop and analyze control loop structures with discrete-time controllers.           Module content         - Introduction and demands for time-discrete control systems - Mathematical description time-discrete dynamic systems - Time-discrete PID-Controller - State space control           Course type         3L - 1E - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture script, lab instruction sheets           Recommended         - Lurze, J: Regelungstechnik 2: Mehrgrößensysteme Digitale Regelung, Springer Verlag 1997           Iterature         Springer Verlag 1997           - Isermann, R.: Digitale Regelsysteme: Band 1: Grundlagen, deterministische Regelungen, Springer Verlag           Grassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch, Thur/ Frankfurt 1998           Method(s) of instruction/ media being used           Level/ category         1           Grassmann, Bartur           Zermended           Z-transformation           requirements           Recommended           Structori           Basics of control engineering           requirements           Recommended         Z-transformation <t< td=""><td></td><td></td></t<>		
Compulsory/ optional/ electiv         Compulsory           Learning objectives         Students will be enabled to develop and analyze control loop structures with discrete-time controllers.           Module content         - Introduction and demands for time-discrete control systems - Mathematical description time-discrete dynamic systems - Time-discrete PID-Controller - State space control           Course type         3L - 1E - 0S - 1P         (Lecture script, lab instruction sheets           Recommended         - Lunze, J: Regelungstechnik 2: Mehrgrößensysteme Digitale Regelung, Springer Verlag 1997 - Isermann, R.: Digitale Regelsysteme: Band 1: Grundlagen, deterministische Regelungen, Springer Verlag - Grassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch, Thun/Frankfurt 1998           Method(s) of instruction/ media being used         lab instruction sheets on the Internet, CAE- Software           Level/ category         1         (Bachelor=1, Master=2)           Summer/ Winter         summer term           Recommended         Z-transformation           requirements         Recommended           Recommended         Z-transformation           Recommended         States soft control engineering           Compulsory         Basics of control engineering           Recommended         PL – during period of exams (graded)           ECTS credits         6           Workload         180h of total work load, thereof <tr< td=""><td></td><td></td></tr<>		
electiv         Students will be enabled to develop and analyze control loop structures with discrete-time controllers.           Module content         - Introduction and demands for time-discrete control systems           - Mathematical description time-discrete dynamic systems         - Mathematical description time-discrete dynamic systems           - Time-discrete PID-Controller         - Compensating Controller and Deadbeat Controller           - state space control         - State space control           Course type         3L - 1E - 0S - 1P           Learning Material         Lecture script, lab instruction sheets           Recommended         - Lunze, J: Regelungstechnik 2: Mehrgrößensysteme Digitale Regelung, Springer Verlag           - Isermann, R.: Digitale Regelungen, Springer Verlag         - Grassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch, Thur/ Frankfurt 1998           Method(s) of         Iab instruction sheets on the Internet, CAE- Software           instruction/         media being used           Level/ category         1           Gachelor=1, Master=2)           Summer/ Winter         summer term           Term         6. term           Compulsory         Basics of control engineering           requirements         Assessment           Assessment         written university exam 90 min           Assessment         180h of total work l		
discrete-time controllers.         Module content       - Introduction and demands for time-discrete control systems         - Introduction and demands for time-discrete dynamic systems         - Time-discrete PID-Controller         - Compensating Controller and Deadbeat Controller         - state space control         Course type       3L - 1E - 0S - 1P         Learning Material       Lecture script, lab instruction sheets         Recommended       - Lunze, J: Regelungstechnik 2: Mehrgrößensysteme Digitale Regelung, Springer Verlag 1997         - Isermann, R.: Digitale Regelsysteme: Band 1: Grundlagen, deterministische Regelungen, Springer Verlag         - Grassmann, H.: Theorie der Regelungstechnik, Verlag         - Grassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch, Thun/ Frankfurt 1998         Method(s) of       lab instruction sheets on the Internet, CAE- Software         instruction/       media being used         Level/ category       1         Summer/ Winter       summer term         Term       6. term         Compulsory       Basics of control engineering         requirements       Assessment         Assessment       written university exam 90 min         Assessment       Mitten (preparation and rework)         15 h practical training (preparation and evaluation)       20 h exam preparation	electiv	
- Mathematical description time-discrete dynamic systems         - Time-discrete PID-Controller         - Compensating Controller and Deadbeat Controller         - state space control         Course type       3L - 1E - 0S - 1P         Learning Material       Lecture script, lab instruction sheets         Recommended       - Lunze, J: Regelungstechnik 2: Mehrgrößensysteme Digitale Regelung, Springer Verlag 1997         - Isermann, R.: Digitale Regelungstechnik, Verlag Harri Deutsch, Thun/ Frankfurt 1998         Method(s) of       Iab instruction sheets on the Internet, CAE- Software         instruction/       errassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch, Thun/ Frankfurt 1998         Method(s) of       Iab instruction sheets on the Internet, CAE- Software         instruction/       summer term         Term       6. term         Compulsory       Basics of control engineering         requirements       Assessment         Assessment       written university exam 90 min         Assessment       written university exam 90 min         Assessment       Vorkload         180h of total work load, thereof         75 h of contact hours and         105 h of self-study, consisting of:         70 h lecture (preparation and rework)         15 h practical training (preparation and evaluation)	Learning objectives	
- Mathematical description time-discrete dynamic systems         - Time-discrete PID-Controller         - Compensating Controller and Deadbeat Controller         - state space control         Course type       3L - 1E - 0S - 1P         Learning Material       Lecture script, lab instruction sheets         Recommended       - Lunze, J: Regelungstechnik 2: Mehrgrößensysteme Digitale Regelung, Springer Verlag 1997         - Isermann, R.: Digitale Regelungstechnik, Verlag Harri Deutsch, Thun/ Frankfurt 1998         Method(s) of       Iab instruction sheets on the Internet, CAE- Software         instruction/       errassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch, Thun/ Frankfurt 1998         Method(s) of       Iab instruction sheets on the Internet, CAE- Software         instruction/       summer term         Term       6. term         Compulsory       Basics of control engineering         requirements       Assessment         Assessment       written university exam 90 min         Assessment       written university exam 90 min         Assessment       Vorkload         180h of total work load, thereof         75 h of contact hours and         105 h of self-study, consisting of:         70 h lecture (preparation and rework)         15 h practical training (preparation and evaluation)	Module content	- Introduction and demands for time-discrete control systems
- Time-discrete PID-Controller         - Compensating Controller and Deadbeat Controller         - State space control         Course type       3L - 1E - 0S - 1P       (Lecture, Exercises, Seminar, practical course)         Learning Material       Lecture script, lab instruction sheets         Recommended       - Lunze, J: Regelungstechnik 2: Mehrgrößensysteme Digitale Regelung, Springer Verlag 1997         - Isermann, R.: Digitale Regelsysteme: Band 1: Grundlagen, deterministische Regelungen, Springer Verlag         - Grassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch, Thun/ Frankfurt 1998         Method(s) of       Iab instruction sheets on the Internet, CAE- Software         instruction/       summer term         Term       6. term         Compulsory       Basics of control engineering         requirements       Recommended         Z-transformation       requirements         Assessment       Written university exam 90 min         Assessment modalities       PL – during period of exams (graded)         ECTS credits       6         Workload       180h of total work load, thereof         75h of contact hours and       105h of self-study, consisting of:         70 h lecture (preparation and rework)       15 h practical training (preparation and evaluation)         20 h exam preparation       Usability of t		
- state space control         Course type       3L - 1E - 0S - 1P       (Lecture, Exercises, Seminar, practical course)         Learning Material       Lecture script, lab instruction sheets         Recommended       - Lunze, J: Regelungstechnik 2: Mehrgrößensysteme Digitale Regelung, Springer Verlag 1997         - Isermann, R.: Digitale Regelsysteme: Band 1: Grundlagen, deterministische Regelungen, Springer Verlag         - Grassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch, Thun/ Frankfurt 1998         Method(s) of       lab instruction sheets on the Internet, CAE- Software         instruction/ media being used       1         Level/ category       1         Summer/ Winter       summer term         Term       6. term         Compulsory       Basics of control engineering         requirements       Recommended         Z-transformation       euring period of exams (graded)         ECTS credits       6         Workload       180h of total work load, thereof         75h of contact hours and       105h of self-study, consisting of:         70 h lecture (preparation and rework)       15 h practical training (preparation and evaluation)         20 h exam preparation       Usage of module in other study courses: Mechatronics         Time       According time table         Duration of module       <		
- state space control         Course type       3L - 1E - 0S - 1P       (Lecture, Exercises, Seminar, practical course)         Learning Material       Lecture script, lab instruction sheets         Recommended       - Lunze, J: Regelungstechnik 2: Mehrgrößensysteme Digitale Regelung, Springer Verlag 1997         - Isermann, R.: Digitale Regelsysteme: Band 1: Grundlagen, deterministische Regelungen, Springer Verlag         - Grassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch, Thun/ Frankfurt 1998         Method(s) of       lab instruction sheets on the Internet, CAE- Software         instruction/ media being used       1         Level/ category       1         Recommended       2-transformation         requirements       Recommended         Recommended       2-transformation         requirements       6         Assessment       written university exam 90 min         Assessment modalities       PL – during period of exams (graded)         ECTS credits       6         Workload       180h of total work load, thereof         75h of contact hours and       105h of self-study, consisting of:         70 h lecture (preparation and rework)       15 h practical training (preparation and evaluation)         20 h exam preparation       Usage of module in other study courses: Mechatronics         Time		- Compensating Controller and Deadbeat Controller
Course type         3L - 1E - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture script, lab instruction sheets           Recommended         - Lunze, J: Regelungstechnik 2: Mehrgrößensysteme Digitale Regelung, Springer Verlag 1997           - Isermann, R.: Digitale Regelungen, Springer Verlag         - Grassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch, Thun/ Frankfurt 1998           Method(s) of         lab instruction sheets on the Internet, CAE- Software           instruction/         summer term           Compulsory         Basics of control engineering           requirements         - Leruing period of exams (graded)           ECTS credits         6           Workload         180 hof total work load, thereof           75h of contact hours and         105h of self-study, consisting of:           70 h lecture (preparation and rework)         15 h practical training (preparation and evaluation)           20 h exam preparation         20 h exam preparation		
Learning Material         Lecture script, lab instruction sheets           Recommended         - Lunze, J: Regelungstechnik 2: Mehrgrößensysteme Digitale Regelung, Springer Verlag 1997           Iiterature         - Sermann, R.: Digitale Regelsysteme: Band 1: Grundlagen, deterministische Regelungen, Springer Verlag           - Grassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch, Thun/ Frankfurt 1998           Method(s) of         lab instruction sheets on the Internet, CAE- Software           instruction/ media being used         -           Level/ category         1 (Bachelor=1, Master=2)           Summer/ Winter         summer term           Term         6. term           Compulsory         Basics of control engineering requirements           Assessment         written university exam 90 min           Assessment         vritten university exam 90 min           Assessment modalities         PL – during period of exams (graded)           ECTS credits         6           Workload         180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and evaluation) 20 h exam preparation           Usability of this module         Usage of module in other study courses: Mechatronics           Time         According time table           Duration of module         1 term           Place/ room         EAH Je	Course type	
Recommended literature- Lunze, J: Regelungstechnik 2: Mehrgrößensysteme Digitale Regelung, Springer Verlag 1997 - Isermann, R.: Digitale Regelsysteme: Band 1: Grundlagen, deterministische Regelungen, Springer Verlag - Grassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch, Thun/ Frankfurt 1998Method(s) of instruction/ media being usedlab instruction sheets on the Internet, CAE- SoftwareLevel/ category1(Bachelor=1, Master=2)Summer/ Wintersummer termTerm6. termCompulsory requirementsBasics of control engineeringRecommended zessmentZ-transformationAssessment Morkloadwritten university exam 90 minAssessment Morkload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTime Place/ roomAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
literatureSpringer Verlag 1997 - Isermann, R.: Digitale Regelsysteme: Band 1: Grundlagen, deterministische Regelungen, Springer Verlag - Grassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch, Thun/ Frankfurt 1998Method(s) of instruction/ media being usedlab instruction sheets on the Internet, CAE- SoftwareLevel/ category1(Bachelor=1, Master=2)Summer/ Wintersummer termTerm6. termCompulsory requirementsBasics of control engineeringRecommended requirementsZ-transformationAssessment Workloadwritten university exam 90 minAssessment modalitiesPL - during period of exams (graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTime Place/ roomAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
- İsermann, R.: Digitale Regelsysteme: Band 1: Grundlagen,         deterministische Regelungen, Springer Verlag         - Grassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch,         Thun/ Frankfurt 1998         Method(s) of         instruction/         media being used         Level/ category         1       (Bachelor=1, Master=2)         Summer/ Winter         summer term         Term       6. term         Compulsory         requirements         Recommended         Z-transformation         requirements         Assessment         Morkload         180h of total work load, thereof         75h of contact hours and         105h of self-study, consisting of:         70 h lecture (preparation and rework)         15 h practical training (preparation and evaluation)         20 h exam preparation         Usability of this module       Usage of module in other study courses: Mechatronics         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually	literature	
deterministische Regelungen, Springer Verlag         - Grassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch, Thun/ Frankfurt 1998         Method(s) of instruction/ media being used         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       summer term         Term       6. term         Compulsory       Basics of control engineering         requirements       Z-transformation         Assessment       written university exam 90 min         Assessment modalities       PL – during period of exams (graded)         ECTS credits       6         Workload       180h of total work load, thereof         75h of contact hours and       105h of self-study, consisting of:         70 h lecture (preparation and rework)       15 h practical training (preparation and evaluation)         20 h exam preparation       Usability of this module       Usage of module in other study courses: Mechatronics         Time       According time table       Duration of module       1 term         Place/ room       EAH Jena       Frequency of offer       Annually		
- Grassmann, H.: Theorie der Regelungstechnik, Verlag Harri Deutsch, Thun/ Frankfurt 1998         Method(s) of instruction/ media being used       Iab instruction sheets on the Internet, CAE- Software         Level/category       1 (Bachelor=1, Master=2)         Summer/Winter       summer term         Term       6. term         Compulsory       Basics of control engineering         requirements       -         Assessment       written university exam 90 min         Assessment       written university exam 90 min         Assessment modalities       PL – during period of exams (graded)         ECTS credits       6         Workload       180h of total work load, thereof         75h of contact hours and       105h of self-study, consisting of:         70 h lecture (preparation and rework)       15 h practical training (preparation and evaluation)         20 h exam preparation       20 h exam preparation         Usability of this module       Usage of module in other study courses: Mechatronics         Time       According time table         Duration of module       1 term         Place/room       EAH Jena         Frequency of offer       Annually		
Thun/ Frankfurt 1998Method(s) of instruction/ media being usedlab instruction sheets on the Internet, CAE- SoftwareLevel/ category1 (Bachelor=1, Master=2)Summer/Wintersummer termTerm6. termCompulsory requirementsBasics of control engineeringRecommended requirementsZ-transformationAssessmentwritten university exam 90 minAssessment modalitiesPL – during period of exams (graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
instruction/ media being used       I       (Bachelor=1, Master=2)         Level/ category       1       (Bachelor=1, Master=2)         Summer/ Winter       summer term         Term       6. term         Compulsory       Basics of control engineering         requirements		
media being usedLevel/ category1 (Bachelor=1, Master=2)Summer/ Wintersummer termTerm6. termCompulsoryBasics of control engineering requirementsRecommended requirementsZ-transformationAssessmentwritten university exam 90 minAssessment modalitiesPL – during period of exams (graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Method(s) of	lab instruction sheets on the Internet, CAE- Software
Level/ category1(Bachelor=1, Master=2)Summer/ Wintersummer termTerm6. termCompulsory requirementsBasics of control engineeringRecommended requirementsZ-transformationAssessmentwritten university exam 90 minAssessment modalitiesPL – during period of exams (graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	instruction/	
Summer/Wintersummer termTerm6. termCompulsory requirementsBasics of control engineeringRecommended requirementsZ-transformationAssessmentwritten university exam 90 minAssessment modalitiesPL – during period of exams (graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	media being used	
Term6. termCompulsory requirementsBasics of control engineeringRecommended requirementsZ-transformationAssessmentwritten university exam 90 minAssessment modalitiesPL – during period of exams (graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Level/ category	1 (Bachelor=1, Master=2)
Compulsory requirements       Basics of control engineering         Recommended requirements       Z-transformation         Assessment       written university exam 90 min         Assessment modalities       PL – during period of exams (graded)         ECTS credits       6         Workload       180h of total work load, thereof         75h of contact hours and       105h of self-study, consisting of:         70 h lecture (preparation and rework)       15 h practical training (preparation and evaluation)         20 h exam preparation       Usability of this module         Usability of this module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually	Summer/ Winter	summer term
requirementsZ-transformationRecommended requirementsZ-transformationAssessmentwritten university exam 90 minAssessment modalitiesPL – during period of exams (graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Term	6. term
Recommended requirementsZ-transformationAssessmentwritten university exam 90 minAssessment modalitiesPL – during period of exams (graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Compulsory	Basics of control engineering
requirementswritten university exam 90 minAssessment modalitiesPL – during period of exams (graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Assessmentwritten university exam 90 minAssessment modalitiesPL – during period of exams (graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Recommended	Z-transformation
Assessment modalities       PL – during period of exams (graded)         ECTS credits       6         Workload       180h of total work load, thereof         75h of contact hours and       105h of self-study, consisting of:         70 h lecture (preparation and rework)       15 h practical training (preparation and evaluation)         20 h exam preparation       Usage of module in other study courses: Mechatronics         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually	requirements	
ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Assessment	written university exam 90 min
Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Assessment modalities	PL – during period of exams (graded)
75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	ECTS credits	6
105h of self-study, consisting of: 70 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Workload	180h of total work load, thereof
70 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
70 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		105h of self-study, consisting of:
15 h practical training (preparation and evaluation) 20 h exam preparationUsability of this moduleUsage of module in other study courses: MechatronicsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
20 h exam preparation         Usability of this module       Usage of module in other study courses: Mechatronics         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
Usability of this moduleUsage of module in other study courses: MechatronicsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		20 h exam preparation
Time     According time table       Duration of module     1 term       Place/ room     EAH Jena       Frequency of offer     Annually	Usability of this module	
Duration of module     1 term       Place/ room     EAH Jena       Frequency of offer     Annually		
Place/ room         EAH Jena           Frequency of offer         Annually	Duration of module	
Frequency of offer Annually		EAH Jena
	Frequency of offer	
	Language	German

Module number	ET.1.602
Module name	Transmission Technique
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	KMT
Module coordinator	Prof. Dr. Ludwig Niebel
Compulsory/ optional/	Compulsory
electiv	Compulsory
Learning objectives	Upon completion of the module, students
	- understands the sections of information transmission in space and time
	- are able to use some major methodes
	- are able to use math methodes to rate these
	- are able to identify Parameters of different methodes
Module content	- Information sources, source encoding and decoding
	- Cryptography
	- Channel encoding and decoding
	- Binary Signal Transmission, Line encoding
	- Bit Error Rate in Case of Biary transmission Signals
	- 1st and 2nd Nyquist Criterion
	- Band pass signals and band pass transmission
	- digital modulation techniques (ASK, PSK, FSK, GMSK, QAM)
	- Multiplexing technologies
Course type	2L - 0E - 1S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	books, script, exercises and lab instruction sheets on the Internet
Recommended	Bossert, M.: Einführung in die Nachrichtentechnik, Oldenbourg Verlag 2012
literature	Ohm, Lüke: Signalübertragung, Springer-Verlag 2005 Rohling, Müller: Einführung in die Informations- und Codierungstheorie,
	Teubner 1995
	Kreß ,Irmer: Angewandte Systemtheorie, Verlag Technik 1989
	Kreß: Theoretische Grundlagen der Übertragung digitaler Signale,
	Akademie-Verlag 1979
	Friedrichs: Kanalcodierung, Springer 1996
	Schneider-Obermann: Kanalkodierung, Vieweg 1998
	Lipp, M.: VPN – virtuelle private Netzwerke, Pearson 2001 oder Addison-
	Wesley 2001
Method(s) of	lecture, exercises, lab sessions and self-study
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	6th term
Compulsory	none
requirements	Circul Dessessing Theory of Circula and Customs Desire of Circul
Recommended	Signal Processing, Theory of Signals and Systems, Basics of Signal
requirements	Transformation
Assessment Assessment modalities	exam 90 min, Laboratory internship certificate PL – exam during audit period(graded)
ECTS credits	6
Workload	160h of total work load, thereof
	60h of contact hours and
	100h of self-study
	consisting of:
	30 h lecture (preparation and rework)
	15 h seminar
	15 h practical training (preparation and evaluation)
	40 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.603
Module name	
	Audio Engineering
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Module coordinator	Prof. Dr. Frank Giesecke
Compulsory/ optional/ electiv	Compulsory
Learning objectives	Students are able to measure and interpret parameters for audio transmitting systems, apply methods of digital signal processing to audio signals and develop and test of digital audio filters/effects in MATLAB
Module content	Sound propagation, room acoustics, psychoacoustics, measured variables, microphones and loudspeakers, audio data formats, audio filters, audio effects
Course type	2L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course)
Learning Material	Technical literature, lab instruction sheets
Recommended	Udo Zölzer: Digitale Audiotechnik
literature	Franz, Dieter: Elektroakustik, Franzis Handbuch
	Ballou, Glen: Handbook for Sound Engineers, Focal Press, Boston
	Henle, Hubert: Das Tonstudio Handbuch, GC Carstensen
	Dickreiter, Michael: Handbuch der Tonstudiotechnik, 1 u. 2, K. G. Saur
	Pieper, Frank: Das P.A. Handbuch, G.C. Carstensen
	Görne, Thomas: Mikrofone in Theorie und Praxis, elektor
	Mellor, David: Recording Techniques for small studios, PC Publishing
	Export House, Tonbridge
	Fachzeitschriften "Production Partner", "Keyboards"
Method(s) of	lecture, practical course, use of software ProTools and MATLAB
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	6. term
Compulsory	none
requirements	
Recommended	Analog Circuit Design, Theory of Signals and Systems, Digital Signal
requirements	Processing
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	6
Workload	180 h of total work load, thereof
	- 60 h of contact hours
	- 120 h of self-study, consisting of:
	preparation and rework lecture 40 h
	exercise -
	seminar -
	practical training 50 h (preparation and evaluation)
	exam preparation 30 h
Usability of this module	Video Technology
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German
Language	German

Modulo number	ET.1.604
Module number Module name	
	Video Engineering
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	KMT
Module coordinator	Prof. DrIng. Sebastian Knorr
Compulsory/ optional/ electiv	Compulsory
Learning objectives	The student should learn the fundamentals of video signals, coding, and image and video compression formats. Main points are video formats with compression, video production and post production in theory and practice.
Module content	<ul> <li>Video signals: RGB, YUV, Y/C, BAS, FBAS</li> <li>Video recording and playback</li> <li>Camera technique and operating: black balance, white balance, electronic shutter, recording technique, illumination</li> <li>Fundamentals of image and video compression: DCT, quantisation, runlength coding</li> <li>Video compression: motion estimation and compensation</li> <li>Image and video formats: JPEG, JPEG2000, DV, MPEG-1, MPEG-2, MPEG-4/H.264 etc.</li> <li>Post production: Linear and, non-linear editing, assemble, insert, clip, reel, title, graphics, aperture, cut, animation, chroma keying</li> <li>Streaming video: video server and formats</li> </ul>
Course type Recommended	2L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course) - Ulrich Schmidt: Professionelle Videotechnik,:Springer Vieweg, Berlin
literature	<ul> <li>[u.a.], 6. Auflage, 2013.</li> <li>Tilo Strutz: Bilddatenkompression, Vieweg + Teubner, 4. Auflage, 2009</li> <li>Thomas Petrasch und Joachim Zinke: Videofilm – Konzeption und Produktion, Hanser-Verlag, 2012.</li> </ul>
Method(s) of instruction/ media being used	Scripts and lab instruction sheets on the Internet
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summerterm
Term	6. term
Compulsory	none
requirements	
Recommended	Theory of Signals and Systems, Computer Sciences, Digital Image
requirements	Processing
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	6
Workload	180h of total work load, thereof
Workioad	60h of contact hours and 120h of self-study, consisting of: 40 h lecture (preparation and rework) 40 h practical training (preparation and evaluation) 40 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German
Language	

Module number	ET.1.605
Module name	Microcomputer Design
	Electrical Engineering and Information Technology
Department	ET/IT (Ba)
Degree program	
Specialization/ Profil	
Module coordinator	Prof. DrIng. Burkart Voß
Compulsory/ optional/ electiv	Compulsory
Learning objectives	After sussessful completion of the module the students are able to
Learning objectives	After successful completion of the module the students are able to:
	<ul> <li>understand the working principles and application potential of different processor architectures.</li> </ul>
	- develop and build extension modules at PCB level.
	- connect extension modules to microcontrollers and write the needed
	software drivers.
	- develop microcontroller based systems in a systematic way.
Module content	- Architecture and classification of microprocessors
Module content	- Programming Model of microprocessors
	- Memory hierarchy and bus systems
	- Peripheral Components
	- Design, manufacturing and use of a microcomputer system
Course type	2L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course)
Learning Material	Lecture script, lab instruction sheets
Recommended	Tanenbaum. Computerarchitektur Pearson Studium 2001
literature	Hermann. Rechnerarchitektur Vieweg 2001
incrature	Clements. The Principles of Computer Hardware Oxford 2000
Method(s) of	Lecture, lab session
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	6th term
Compulsory	none
requirements	
Recommended	Extended programming skills, basic knowledge of microcontrollers and their
requirements	programming in C, circuit engineering fundamentals, basic knowledge in
·	PCB design
Assessment	term paper
Assessment modalities	APL – assessment during the semester period (graded)
Further Information	The ability to systematically design a microcontroller based system is shown
	with the documentation of the design steps of a project aiming at designing
	a relatively complex microcontroller based system.
ECTS credits	6
Workload	180 h of total work load, thereof
	60 h of contact hours and
	120 h of self-study, consisting of:
	40 h lecture (preparation and rework)
	50 h practical training (preparation and evaluation)
	30 h exam preparation
Usability of this module	Industrial placement, Bachelor thesis
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.606
Module name	Intercultural Communication 3 (Foreign Trade)
Department	Electrical Engineering and Information Technology
Degree program	ATITi (Ba)
Module coordinator	Prof. Dr. rer.oec. Kathrin Reger-Wagner
Compulsory/ optional/ electiv	Compulsory
Learning objectives	Basics of Technical Sales
	<ul> <li>problem area and topic relevance</li> <li>Development and importance of technical sales , Conditions and challenges under consideration of specific application fields</li> <li>Systematic Marketing Management as the basis of sales control Specifics of the B-to- B marketing , distribution systems</li> <li>Organizational and behavioral theoretical foundations</li> <li>Features and explanations for industrial decision-making, business type specification and its peculiarities (system investment business , etc.)</li> <li>situation analysis , goal and strategy determination</li> <li>Tools of information retrieval , potential analysis , target definition , segmentation and positioning</li> <li>Technical sales in the application to the customer: The procedural and marketing mix -related application perspective</li> <li>Holistic Process Management , Acquisition, needs identification, proposal design and programming, pricing methods , base camp of the negotiation and sales techniques , customer retention tools</li> <li>Organizational and staffing requirements of technical sales</li> <li>Sales organization , partnership distribution and interface issues</li> <li>Controlling in technical sales</li> <li>Basic performance indicators and survey techniques (customer valuation models )</li> </ul>
	models ) Foreign Trade
	<ul> <li>problem area and topic relevance</li> <li>Development and importance of foreign trade for businesses, conditions and challenges in consideration of current and future developments,</li> <li>Basics of Foreign Trade</li> <li>International trade and trade policy, distinct from economic issues, internationalization process and basic motives</li> <li>Strategic Foreign Trade Marketing</li> </ul>
	<ul> <li>Environment conditions, intelligence gathering by international market research, formulation of objectives, policy options (manifestations of foreign trade, market selection and market entry, etc.)</li> <li>Operating Foreign Trade Marketing</li> <li>Decision-making criteria of product adaptation and standardization, product</li> </ul>
	regulations, contracts International pricing policy Foreign trade calculation including procurement issues, payment, international payments International Distribution
	Forms of transport and international logistics , delivery , documentation of shipments , customs and other import regulations International communication policy
	Cultural specifics of consumer behavior , communication forms and channels International human resource policies and organizational structure
	<ul> <li>Personnel management in different cultures , organizational architecture and coordination mechanisms</li> <li>Foreign trade -related Controlling</li> <li>Performance indicators and survey methods</li> </ul>
Module content	Ethical issues in an international context Basics of Technical Sales
	<ul> <li>problem area and topic relevance</li> <li>Development and importance of technical sales , Conditions and challenges</li> <li>under consideration of specific application fields</li> </ul>

- Systematic Marketing Management as the basis of sales control
Specifics of the B-to- B marketing, distribution systems
- Organizational and behavioral theoretical foundations
Features and explanations for industrial decision-making, business type
specification and its peculiarities (system investment business, etc.)
- situation analysis, goal and strategy determination
Tools of information retrieval , potential analysis , target definition , segmentation and positioning
- Technical sales in the application to the customer: The procedural and
marketing mix -related application perspective
Holistic Process Management , Acquisition, needs identification, proposal
design and programming, pricing methods , base camp of the negotiation
and sales techniques , customer retention tools
- Organizational and staffing requirements of technical sales
Sales organization, partnership distribution and interface issues
- Controlling in technical sales
Basic performance indicators and survey techniques (customer valuation
models )
Foreign Trade
- problem area and topic relevance
Development and importance of foreign trade for businesses , conditions
and challenges in consideration of current and future developments,
- Basics of Foreign Trade
International trade and trade policy, distinct from economic issues,
internationalization process and basic motives
- Strategic Foreign Trade Marketing
Environment conditions , intelligence gathering by international market research, formulation of objectives , policy options ( manifestations of
foreign trade, market selection and market entry, etc.)
- Operating Foreign Trade Marketing
Decision-making criteria of product adaptation and standardization, product
regulations, contracts
International pricing policy
Foreign trade calculation including procurement issues, payment,
international payments
International Distribution
Forms of transport and international logistics, delivery, documentation of
shipments , customs and other import regulations International communication policy
Cultural specifics of consumer behavior, communication forms and
channels
International human resource policies and organizational structure
Personnel management in different cultures, organizational architecture
and coordination mechanisms
- Foreign trade -related Controlling
Performance indicators and survey methods
- Ethical issues in an international context
The students should - be able to absatzgerichtetem thinking with the inclusion of complex cross-
border decision-making criteria.
- learn what macro-and microeconomic environment factors represent
present and future, the central framework for market-oriented technical-
oriented companies and how to respond to this on the sales side.
- the key elements of foreign trade-related rules in Germany, and know how
these are to be considered suitable in sales management.
- be able to discuss the ethical aspects of cross-border sales in the context
of country-specific economic conditions and the individual business situation
is critical.
Basics of Technical Sales
The students should

	be able to discuss the specifies of organizational behavior theoretical
	- be able to discuss the specifics of organizational behavior theoretical purchasing behavior and, based on formulating the requirements for an
	effective sales work .
	- know which strategic analysis techniques to derive a sales measures
	available and how to apply it and to be linked with each other.
	- in terms of a decision-oriented management know the sales strategy
	alternatives and evaluate them.
	- can discuss which methods of selling psychology in the B-to -B services
	are particularly efficient and how they come in specific situations actually
	used.
	- be able to respond to technical embossed distribution function in their role
	as an interface between customers and companies through the use of
	appropriate instruments.
	- Key performance indicators to evaluate sales performance compute,
	interpret and propose appropriate measures for improvement in terms of a
	holistic sales management.
	Foreign Trade
	The students should
	- having recourse to know the latest trends challenges for cross- border
	trade and to derive implications for international management .
	- Can name strategic decision-making criteria of international trade and
	thereby select appropriate management tools and apply safe. The
	knowledge is at the center that can not be described solely by international
	strategies of the tension between globalization and localization. - be able to analyze internationally minded, complex problems, to create
	appropriate concepts and to present it positively .
	- can the close relationship between strategy and structure in an
	international context to understand and classify essential organizational
	structures and coordination instruments
Course type	1L - 1E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	PowerPoint presentations, overhead transparencies, whiteboard, teaching
3	videos, (multimedia) case studies, inclusion of guest speakers
Recommended	Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen
Recommended literature	
	Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.
	Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen. Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl.,
	Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.
	Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen. Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.
	Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen. Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München. Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business:
	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper</li> </ul>
	Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen. Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München. Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business:
	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> </ul>
	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend:</li> </ul>
	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und</li> </ul>
	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend:</li> </ul>
	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und</li> </ul>
	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und innergemeinschaftlicher Handelsbeziehungen, Heidelberg.</li> </ul>
	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und innergemeinschaftlicher Handelsbeziehungen, Heidelberg.</li> <li>Schlick, H. (aktl. Aufl.): Außenhandel. Internationale Handelsgeschäfte, 3. Aufl., Troisdorf.</li> </ul>
	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und innergemeinschaftlicher Handelsbeziehungen, Heidelberg.</li> <li>Schlick, H. (aktl. Aufl.): Außenhandel. Internationale Handelsgeschäfte, 3. Aufl., Troisdorf.</li> <li>Schmeisser, W./ Krimphove, D. (aktl. Aufl.): Internationales</li> </ul>
	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und innergemeinschaftlicher Handelsbeziehungen, Heidelberg.</li> <li>Schlick, H. (aktl. Aufl.): Außenhandel. Internationale Handelsgeschäfte, 3. Aufl., Troisdorf.</li> </ul>
	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und innergemeinschaftlicher Handelsbeziehungen, Heidelberg.</li> <li>Schlick, H. (aktl. Aufl.): Außenhandel. Internationale Handelsgeschäfte, 3. Aufl., Troisdorf.</li> <li>Schmeisser, W./ Krimphove, D. (aktl. Aufl.): Internationales Personalmanagement und Internationales Arbeitsrecht, München.</li> </ul>
literature	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und innergemeinschaftlicher Handelsbeziehungen, Heidelberg.</li> <li>Schlick, H. (aktl. Aufl.): Außenhandel. Internationale Handelsgeschäfte, 3. Aufl., Troisdorf.</li> <li>Schmeisser, W./ Krimphove, D. (aktl. Aufl.): Internationales Personalmanagement und Internationales Arbeitsrecht, München.</li> <li>sowie aktuelle Beiträge aus Fachzeitschriften</li> </ul>
literature Method(s) of	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und innergemeinschaftlicher Handelsbeziehungen, Heidelberg.</li> <li>Schlick, H. (aktl. Aufl.): Außenhandel. Internationale Handelsgeschäfte, 3. Aufl., Troisdorf.</li> <li>Schmeisser, W./ Krimphove, D. (aktl. Aufl.): Internationales Personalmanagement und Internationales Arbeitsrecht, München.</li> <li>sowie aktuelle Beiträge aus Fachzeitschriften</li> <li>Problem based learning by simulating practical situations in combination</li> </ul>
literature Method(s) of instruction/	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und innergemeinschaftlicher Handelsbeziehungen, Heidelberg.</li> <li>Schlick, H. (aktl. Aufl.): Außenhandel. Internationale Handelsgeschäfte, 3. Aufl., Troisdorf.</li> <li>Schmeisser, W./ Krimphove, D. (aktl. Aufl.): Internationales Personalmanagement und Internationales Arbeitsrecht, München.</li> <li>sowie aktuelle Beiträge aus Fachzeitschriften</li> <li>Problem based learning by simulating practical situations in combination with video-based learning, review of journal articles, English case study</li> </ul>
literature Method(s) of instruction/ media being used	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und innergemeinschaftlicher Handelsbeziehungen, Heidelberg.</li> <li>Schlick, H. (aktl. Aufl.): Außenhandel. Internationale Handelsgeschäfte, 3. Aufl., Troisdorf.</li> <li>Schmeisser, W./ Krimphove, D. (aktl. Aufl.): Internationales Personalmanagement und Internationales Arbeitsrecht, München.</li> <li>sowie aktuelle Beiträge aus Fachzeitschriften</li> <li>Problem based learning by simulating practical situations in combination with video-based learning, review of journal articles, English case study Problem based learning based on the discussion of real business problems</li> </ul>
literature Method(s) of instruction/ media being used Level/ category	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und innergemeinschaftlicher Handelsbeziehungen, Heidelberg.</li> <li>Schlick, H. (aktl. Aufl.): Außenhandel. Internationale Handelsgeschäfte, 3. Aufl., Troisdorf.</li> <li>Schmeisser, W./ Krimphove, D. (aktl. Aufl.): Internationales Personalmanagement und Internationales Arbeitsrecht, München.</li> <li>sowie aktuelle Beiträge aus Fachzeitschriften</li> <li>Problem based learning by simulating practical situations in combination with video-based learning, review of journal articles, English case study Problem based learning based on the discussion of real business problems 1 (Bachelor=1, Master=2)</li> </ul>
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und innergemeinschaftlicher Handelsbeziehungen, Heidelberg.</li> <li>Schlick, H. (aktl. Aufl.): Außenhandel. Internationale Handelsgeschäfte, 3. Aufl., Troisdorf.</li> <li>Schmeisser, W./ Krimphove, D. (aktl. Aufl.): Internationales Personalmanagement und Internationales Arbeitsrecht, München.</li> <li>sowie aktuelle Beiträge aus Fachzeitschriften</li> <li>Problem based learning by simulating practical situations in combination with video-based learning, review of journal articles, English case study Problem based learning based on the discussion of real business problems</li> <li>1 (Bachelor=1, Master=2)</li> <li>summer term</li> </ul>
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und innergemeinschaftlicher Handelsbeziehungen, Heidelberg.</li> <li>Schlick, H. (aktl. Aufl.): Außenhandel. Internationale Handelsgeschäfte, 3. Aufl., Troisdorf.</li> <li>Schmeisser, W./ Krimphove, D. (aktl. Aufl.): Internationales Personalmanagement und Internationales Arbeitsrecht, München.</li> <li>sowie aktuelle Beiträge aus Fachzeitschriften</li> <li>Problem based learning by simulating practical situations in combination with video-based learning, review of journal articles, English case study Problem based learning based on the discussion of real business problems</li> <li>1 (Bachelor=1, Master=2)</li> <li>summer term</li> <li>6th term</li> </ul>
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und innergemeinschaftlicher Handelsbeziehungen, Heidelberg.</li> <li>Schlick, H. (aktl. Aufl.): Außenhandel. Internationale Handelsgeschäfte, 3. Aufl., Troisdorf.</li> <li>Schmeisser, W./ Krimphove, D. (aktl. Aufl.): Internationales Personalmanagement und Internationales Arbeitsrecht, München.</li> <li>sowie aktuelle Beiträge aus Fachzeitschriften</li> <li>Problem based learning by simulating practical situations in combination with video-based learning, review of journal articles, English case study Problem based learning based on the discussion of real business problems</li> <li>1 (Bachelor=1, Master=2)</li> <li>summer term</li> </ul>
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und innergemeinschaftlicher Handelsbeziehungen, Heidelberg.</li> <li>Schlick, H. (aktl. Aufl.): Außenhandel. Internationale Handelsgeschäfte, 3. Aufl., Troisdorf.</li> <li>Schmeisser, W./ Krimphove, D. (aktl. Aufl.): Internationales Personalmanagement und Internationales Arbeitsrecht, München.</li> <li>sowie aktuelle Beiträge aus Fachzeitschriften</li> <li>Problem based learning, review of journal articles, English case study Problem based learning based on the discussion of real business problems 1 (Bachelor=1, Master=2) summer term</li> <li>6th term</li> <li>none</li> </ul>
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Assessment	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und innergemeinschaftlicher Handelsbeziehungen, Heidelberg.</li> <li>Schlick, H. (aktl. Aufl.): Außenhandel. Internationale Handelsgeschäfte, 3. Aufl., Troisdorf.</li> <li>Schmeisser, W./ Krimphove, D. (aktl. Aufl.): Internationales Personalmanagement und Internationales Arbeitsrecht, München.</li> <li>sowie aktuelle Beiträge aus Fachzeitschriften</li> <li>Problem based learning by simulating practical situations in combination with video-based learning, review of journal articles, English case study Problem based learning based on the discussion of real business problems</li> <li>1 (Bachelor=1, Master=2)</li> <li>summer term</li> <li>6th term</li> <li>none</li> </ul>
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements	<ul> <li>Jahrmann, FU. (akt. Aufl.): Außenhandel. Kompendium der praktischen Betriebswirtschaft, 12. Aufl., Ludwigshafen.</li> <li>Kutschker, M./Schmid, S. (aktl. Aufl.): Internationales Management, 6. Aufl., München.</li> <li>Daniels, J./ Radebaugh, L./ Sullivan, D. (aktl. Aufl.): International Business: Environments and Operations, internationale Ausgabe, 12. Aufl., Upper Saddle River.</li> <li>Ergänzend: Büter, C. (aktl. Aufl.): Außenhandel: Grundlagen globaler und innergemeinschaftlicher Handelsbeziehungen, Heidelberg.</li> <li>Schlick, H. (aktl. Aufl.): Außenhandel. Internationale Handelsgeschäfte, 3. Aufl., Troisdorf.</li> <li>Schmeisser, W./ Krimphove, D. (aktl. Aufl.): Internationales Personalmanagement und Internationales Arbeitsrecht, München.</li> <li>sowie aktuelle Beiträge aus Fachzeitschriften</li> <li>Problem based learning, review of journal articles, English case study Problem based learning based on the discussion of real business problems 1 (Bachelor=1, Master=2) summer term</li> <li>6th term</li> <li>none</li> </ul>

Workload	90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 35 h lecture (preparation and rework) 10 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.701
Module name	Industrial Internship
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba), ATITi (Ba)
Module coordinator	Prof. Dr. Matthias Förster
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	In industrial practice, the students should learn engineering activities The students get an insight into the work of an engineer and the technical
	and social requirements.
Module content	Students will receive practical training on specific projects that correspond to the content of each selected focus of the main study and perform engineering activities independently.
	The practical training can be done,. B. In the fields of electronics, hardware, and software development as well as for tasks of designing, manufacturing, assembly, testing, production planning, quality assurance in Electrical Engineering / Information Technology.
Course type	(Lecture, Exercises, Seminar, practical course)
Recommended	A general bibliographical reference cannot be given because it depends on
literature	the topic.
Method(s) of instruction/	Industrial practice
media being used	1 (Bachelor=1, Master=2)
Level/ category	
Summer/Winter	Winter term
Term	7th term
Compulsory	All examinations of the first to sixth semester up to 3 must be passed. The
requirements	internship contract between student and company must be approved by the
	Internship Office of the university.
Assessment	Laboratory internship report, presentation
Assessment modalities	SL - ungraded course work during the lecture period
ECTS credits	12
Workload	12 Weeks = 450 h
Duration of module	12 Weeks
Language	German

Module number	ET.1.702
Module name	bachelor thesis
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba), ATITi (Ba)
Module coordinator	Prof. DrIng. Oliver Jack
Compulsory/ optional/	Compulsory
electiv	Compusory
Learning objectives	At the end of the module students are able:
Learning objectives	- to discretely create a scientific report
	- to determine a scientific problem
	- to plan and conduct a scientific task to solve a scientific problem
	- to evaluate a scientic problem
Module content	Scientific report in order to finish the Bachelor Degree. The subject of the
	Bachelor Thesis may be issued by the university or an external organisation,
	e. g. an industry company.
Course type	(Lecture, Exercises, Seminar, practical course)
Recommended	Scheld, G;Anleitung zur Anfertigung von Praktikums-, Seminar- und
literature	Diplomarbeiten sowie Bachelor- und Masterarbeiten
Method(s) of	independent editing of the final thesis, review of the literature, interviews
instruction/	with the supervisor of the thesis
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	Winter term
Term	7. term
Compulsory requirements	All compulsory and elective modules, Internship
Assessment	Scientific work
Assessment modalities	Final examination
Further Information	The processing time of the final thesis is 9 weeks and can be extended max.
	3 weeks (see §23 PO). The Bachelor's thesis must be submitted to deliver in
	duplicate together with the theses (6x) a poster (A4) on the main results in
	the
	deanery. The poster must be signed by the company supervisor. Please
	note the opening hours of the dean's office.
ECTS credits	15
Workload	450 h
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	
	Annually

Module number	ET.1.703
Module name	Colloquium
Department	Electrical Engineering and Information Technology
Degree program	ATITi (Ba), ET/IT (Ba)
Module coordinator	Prof. DrIng. Oliver Jack
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	At the end of the module students are able:
	- to explain a discretely generated scientific report
	- to defend scientific solutions and results
Module content	Presentation of the Bachelor Thesis, discussion of the scientific results
Course type	(Lecture, Exercises, Seminar, practical course)
Learning Material	Technical literature, patents, special application software, technical
	manufacturer information
Recommended	Leopold-Wildburger; Schütze: Verfassen und Vortragen - wissenschaftliche
literature	Arbeiten und Vorträge leicht gemacht. Berlin: Springer, 2002
	Franck: Rhetorik für Wissenschaftler - selbstbewusst auftreten, selbstsicher
	reden. München : Vahlen, 2001
	Huth: Duden - Reden gut und richtig halten! -Ratgeber für wirkungsvolles
	und modernes Reden. Mannheim: Dudenverlag, 2000
	Lucas: Überzeugend reden - mehr Erfolg durch richtige Rhetorik.
	Düsseldorf: Econ-Taschenbuch-Verlag, 1999
Method(s) of	Independent scientific work, Presentation
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	Wintersemester
Term	7. Semester
Compulsory	Successful completion of all compulsory modules and selected elective
requirements	modules of the course, timely submission of the thesis and supervisor
	reports
Recommended	Grundkenntnisse in Präsentationstechniken und Rhetorik
requirements	
Assessment	presentation
Assessment modalities	Final Exam
ECTS credits	3
Workload	90 h Preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.900
Module name	Elective Modules
Department	Electrical Engineering and Information Technology
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	The concrete learning objectives can be found in the accordant module
Learning objectives	description.
Module content	The Optional required modules 1 allow a selection of 4 modules (in each
	case 3 ECTS-credits) according to your interests.
	The following modules are available:
	- ET.1.901 Electromagnetic Compatibility (EE/IE)
	- ET.1.902Power Electronics (Sp.: AE)
	- ET.1.903 Sensor Technology (Sp.: ÁE)
	- ET.1.904 Integrated Circuits(EE/IE)
	- ET.1.905 Process Measurement Technology(Sp.: AE)
	- ET.1.906 Electronic Design(Sp.: CMT, CE)
	- ET.1.907 Automation Objects (Sp.: AE; AE/lei)
	- ET.1.908 Selected Sections on Analogue Circuitry(EE/IE, AE/Iei)
	- ET.1.909 Filter Design (Sp.: CMT, IE)
	- ET.1.911 Web Design (Sp.: CMT)
	- ET.1.912 Signal Processors (Sp.: CMT, CE)
	- ET.1.505 Mobile Computing/ Software-Engineering for mobile Systems
	(Sp.: CMT)
	- ET.1.915 Binary Arithmetic Operations(Sp.: CE)
	- ET.1.916 Stochastics
	- ET.1.403.1 Introduction in Digital Design (Sp.: CMT)
	- ET.1.407.1 Introduction in Optoelectronics (Sp.: CE; AE/lei)
	- ET.1.601.1 Introduction in Digital Control Systems (Sp.: CE) - ET.1.9XX List tobe continued
	The concrete module content can be found in the accordant module
	description.
Course type	(Lecture, Exercises, Seminar, practical course)
Level/ category	1 (Bachelor=1, Master=2)
Summer/ Winter	winterterm or summer term
Term	5th or 6th term
Compulsory	compulsory modules of 1st to 4th term
requirements	
ECTS credits	overall min. 12 ECTS
Workload	360 h
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.901
Module name	Electromagnetic Compatibility
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Module coordinator	Prof. Dr. Ludwig Niebel
Compulsory/ optional/	optional
electiv	optional
Learning objectives	Upon completion of the module, students
	- understand the importance of EMC
	- are able to explane major relations to law
	- understand the physical and technical fundamentals of interferences
	between devices and equipments
	- know measuring and testing methods
	- are able to handle some measuring an testing tasks
Module content	- Introduction to Electromagnetic Compatibility
	- Governmental regulations and standards
	- Signals and coupling mechanisms, models
	- EMI measurement, - Checking of EMS
	- Surroundings for measurement: OATS, (G)TEM Cells, Anechoic
	chambers, reverberation chambers
	- Screening properties of materials
	- Examples for EMC measuring systems
	- Board design and EMC
	- (protection of persons in electrical, magnetic and electromagnetic fields)
Course type	2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material Recommended	books, script and lab instruction sheets on the Internet
literature	GOEDBLOED, J. J.: Elektromagnetische Verträglichkeit. München: Pflaum 1990
literature	SCHWAB, A.: Elektromagnetische Verträglichkeit. Berlin, Tokio: Springer
	1996
	THUMM, WIESBECK, KERN: Hochfrequenzmesstechnik.
Method(s) of	Lecture, lab sessions, self-study
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	5th term
Compulsory	none
requirements	
Recommended	Basic Measurement Techniques
requirements	
Assessment	term paper
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Workload	90h of total work load, thereof
	45h of contact hours and
	45h of self-study, consisting of:
	15 h lecture (preparation and rework)
	15 h practical training (preparation and evaluation)
Timo	15 h exam preparation
Time Duration of module	According time table 1 term
Duration of module	EAH Jena
Place/ room	
Frequency of offer	Annually German
Language	German

Module number	ET.1.902
Module name	Power Electronics
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Module coordinator	Prof. DrIng. Matthias Förster
Learning objectives	The students will understand the basic structure, the static behaviour, the switching characteristic and the limits of the devices. This will give them the possibility for the choice and the rating of the elements.
	They will also know the generic power electronic circuits and their
	simulation. After successfully participating in this course, students are able to select power electronic devices for spezial power electronics circuits and the students are able to calculate and simulate the behavior of the power
	electronic circuits.
Module content	The topics of the lecture are
	<ul> <li>Introduction with an overview of the tasks, the principles and the components of power electronics</li> </ul>
	- Power semiconductor switches with power diodes, power MOSFET and IGBT
	- Heat transfer, snubber circuits, power modules
	- Dc-dc switch mode converter with step-down, step up, buck-boost, flyback
	and forward converters
	- Application of power electronics (power factor correction)
	Typical problems like EMC-problems will be explained.
	In the practical course the students work with the following experiments:
	- Semiconductor power switch with inductive load
	- dc-dc converter
	- simulation of power electronic circuits with SIMPLORER.
Course type	2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	lecture papers and experiment instructions
Recommended	Michel, M: Leistungselektronik
literature	Specovius, J.: Grundkurs Leistungselektronik
	Schröder, D.: Leistungselektronische Bauelemente
Mathad(a) of	Schröder, D.: Leistungselektronische Schaltungen lecture and experiment
Method(s) of instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/ Winter	winter term
Term	5. term
Compulsory	none
requirements	
Recommended	Electronic Components, Electrical Drives
requirements	
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	3
Workload	90h of total work load, thereof
	45h of contact hours and
	45h of self-study, consisting of:
	25 h lecture (preparation and rework)
	15 h practical training (preparation and evaluation)
	10 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.903
Module name	Sensor Technology
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	AT
Module coordinator	Prof. Dr. Alexander Richter
Compulsory/ optional/	optional
electiv	optional
Learning objectives	The students acquire knowledge of the operating conditions of sensoric basic components. This enables them to design and develop simple sensoric assemblies and systems. Due to the intensive study of the basics of sensor technology, graduates are able to familiarize themselves with new tasks in sensor system development at short notice.
Module content	Physical and technological basics and applications of modern electronic and optoelectronic sensors
Course type	2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	Lecture transparencies, lab instruction sheets (on the internet)
Recommended literature	<ul> <li>HR. Tränkler, E. Obermeier (Herausg.) "Sensortechnik" Handbuch für Praxis und Wissenschaft, Springer-Verlag 1998</li> <li>W. Heiwang (Herausg.) "Sensorik", Reihe: Halbleiter-Elektronik Bd. 17, Springer-Verlag 1993 (4. Auflage)</li> <li>P. Hauptmann "Sensoren: Prinzipien und Anwendungen" C. Hanser-Verlag</li> </ul>
Mathad(a) of	München, Wien 1990
Method(s) of	lecture, practical course
instruction/	
media being used	1 (Bachelor=1, Master=2)
Level/ category Summer/ Winter	1 (Bachelor=1, Master=2) summer or winter term
Term	5th or 6th term
Compulsory requirements	none
Recommended	Basic knowledge in Physics, Microtechnology and Optoelectronics, Basic
requirements	Measurement Techniques
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	3
Workload	<ul> <li>90h of total work load, thereof</li> <li>45h of contact hours and</li> <li>45h of self-study, consisting of:</li> <li>20 h lecture (preparation and rework)</li> <li>15 h practical training (preparation and evaluation)</li> <li>10 h exam preparation</li> </ul>
Usability of this module	Master programme Scientific Instrumentation (sub-modules)
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.904
Module name	Integrated Circuits
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Module coordinator	Prof. DrIng. habil. Jürgen Kampe
Compulsory/ optional/	optional
electiv	
Learning objectives	The student will be introduced to the design of integrated analog circuits. The constructive understanding of circuits, the assessment of structural alternatives and the dimensioning of integrated bipolar circuits is emphasized. The students will be familiar with integrated analog function
	blocks and their application. At the end of the module students are able to understand the principle of operation of almost any complex integrated subcircuit on the basis of the knowledge about the basic and elementary circuit configurations and there characteristics. The students are able to adapt integrated subcircuits to different semiconductor technologies.
Module content	<ul> <li>Construction principles for integrated analog circuits (degrees of freedom, composability, basic principles of circuitry, realisation principles of circuitry);</li> <li>analysis of electrical networks, functional analysis, symbolic analysis and empiric sizing methods;</li> <li>basic circuit configurations, negative feedback and its principle effects;</li> <li>elementary circuits, there properties and application requirements;</li> <li>circuit technology of integrated analog function blocks (which typical quality parameters characterise the function block? Which basic principles can be chosen? What does the most simple realisation of the basic principles look like? Which circuit principles are used to increase the performance?);</li> <li>systemisation of circuit principles.</li> </ul>
Course type	2L - OE - 1S - OP (Lecture, Exercises, Seminar, practical course)
Learning Material	Literature, lecture notes, exercises, examples
Recommended literature Method(s) of	<ul> <li>Hering, E.,K. Bressler und J. Gutekunst: Elektronik für Ingenieure. Springer Verlag, 1998.</li> <li>Tietze, U. und C. Schenk: Halbleiterschaltungstechnik. Springer Verlag, 2002.</li> <li>Köstner und Möschwitzer: Elektronische Schaltungstechnik. Hanser Verlag, 1993.</li> <li>Goerth, J.: Bauelemente und Grundschaltungen. Teubner-Verlag, 1999.</li> <li>Lindner, Brauer und Lehmann: Elektrotechnik — Elektronik.</li> <li>Fachbuchverlag, Leipzig, 1998.</li> <li>Koss, G. und W. Reinhold: Lehr- und Übungsbuch Elektronik.</li> <li>Fachbuchverlag Leipzig, 1998.</li> <li>Seifahrt: Analoge Schaltungen und Schaltkreise. Verlag Technik, Berlin, 2001.</li> <li>Hartl, H., E. Krasser, G.Winkler et al.: Elektronische Schaltungstechnik mit Beispielen in PSpice. Pearson Studium, München, 2008.</li> <li>Riedel, F.: MOS-Analogtechnik. Akademischer Verlag, Berlin, 1988.</li> <li>Allen, P. E. and D. R. Holberg: CMOS analog circuit design. Oxford University Press, New York, 2002.</li> <li>Talk, peer instruction, individual work, case study, self-study</li> </ul>
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term, winter term
Term	5. or 6. term
Compulsory	none
requirements	
Recommended	Electrical Engineering I and II, Electronic Components, Signals and
requirements	Systems, Analog Circuit Design
Assessment	exam 75 min
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Workload	90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework)

	0 h practical training (preparation and evaluation)
	10 h exam preparation
Usability of this module	Applicable in the Master Courses SD: Module Integration of mixed-signal
	circuits, Module Analog Design
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.905
Module name	Process Measurement Technology
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	AT
Module coordinator	
	Prof. DrIng. Jörg Müller optional
Compulsory/ optional/ electiv	
Learning objectives	After students have attended the course, they are able to
	- interpret a task for industrial measurement of non-electrical quantities,
	- generalize the task,
	- compare different industrial solutions,
	- select devices taking into account their application limits,
	- demonstrate solutions on commonly used systems
Module content	basic elements of a measuring device;
	measurement inaccurac;
	measurement of the following dimension:
	- temperature
	- compression, fortitude
	- discharge
	- charging level, limit state, distance
	- analysis
Course tone	- humidity
Course type	2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	Script, lab instruction sheets, extracts of standards
Recommended	- Hesse, S. u.a.: Sensoren für die Prozess- und Fabrikautomation;
literature	Wiesbaden: Vieweg + Teubner
	- Hoffmann, J.: Taschenbuch der Messtechnik; Leipzig: Fachbuchverlag
	- Prock, J.: Einführung in die Prozessmesstechnik B.G. Teubner-Verlag,
Mathad(a) of	Stuttgart
Method(s) of instruction/	Team work, reflections in the plenum, lab sessions
media being used	1 (Bachelor=1, Master=2)
Level/ category Summer/ Winter	summer term or winter term
Term	5th or 6th term
Compulsory	none
requirements	Laboratory internship certificate, seminar paper
Assessment Assessment modalities	
	APL – assessment during the semester period (graded) 3
ECTS credits	3 90h of total work load, thereof
Workload	,
	45h of contact hours and 45h of self-study, consisting of:
	25 h lecture (preparation and rework)
	10 h practical training (preparation and evaluation)
	10 h exam preparation
Time	According time table
	1 term
Duration of module	
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.906
Module name	Electronic Design
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	KMT, TI
Module coordinator	Prof. Dr. Detlef Redlich
Compulsory/ optional/	optional
electiv	•
Learning objectives	Basic knowledge of technical representation of electronic components using CAD are to be taught.
	Students can apply the aquired knowlage to PCB design.
Module content	- technical illustrations in electronics
	<ul> <li>technical illustrations of mechatronical devices with 3D CAD Software</li> <li>Simulation of electronic devices with FEM tools</li> </ul>
Course type	1L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course)
Learning Material	Will be announced during the lecture.
Recommended	1.Fucke, Rudolf; Kirch, Konrad; Nickel, Heinz: Darstellende Geometrie für
literature	Ingenieure, Carl Hanser 2004, ISBN 3-446-22723-7
	2.Vogel, Harald: Einstieg in CAD; Hanser, München und Wien, 2004; ISBN
	3-446-22381-9
Method(s) of	Lecture and practical course
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer or winter term
Term	5th or 6th term
Compulsory	none
requirements	
Assessment	term paper
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Workload	90h of total work load, thereof
	45h of contact hours and
	45h of self-study, consisting of:
	15 h lecture (preparation and rework)
	20 h practical training (preparation and evaluation)
	10 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Madula number	ET 4 007
Module number	ET.1.907
Module name	Automation Objects
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba), ATITi (Ba)
Module coordinator	Prof. DrIng. habil. Klaus-Peter Döge
Compulsory/ optional/ electiv	optional
Learning objectives	The students are able to design controls for basic applications in process engineering and to calculate the related actuators.
Module content	<ul> <li>Technological process and automation</li> <li>Summary to select chapters of the process measurement technique and actuating technique</li> <li>Multi-loop control structures</li> <li>General arithmetic circuit</li> <li>base control conceptions for technical systems (basis operations).</li> </ul>
Course type	2L - 0E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	Lecture script
Recommended literature	<ul> <li>Strohrmann, G.: Automatisierung verfahrenstechnischer Prozesse, R.</li> <li>Oldenbourg-Verlag, München/Wien 2002</li> <li>Breckner, K.: Regel- und Rechenschaltungen in der</li> <li>Prozessautomatisierung, R. Oldenbourg-Verlag, München/Wien 1999</li> <li>Gevatter, HJ.; u.a.: Handbuch der Mess- und Automatisierungstechnik,</li> <li>Springer-Verlag, Berlin/Heidelberg 1999</li> </ul>
Method(s) of	Lecture with practical course
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter or summer term
Term	5. or 6. term
Compulsory requirements	none
Recommended requirements	Automatic Control
Assessment	term paper
Assessment modalities	APL - alternative exam during period of lectures (graded)
ECTS credits	3
Workload	90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 35 h lecture (preparation and rework) 25 h exam preparation
Usability of this module	-
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.908
Module name	Selected Sections on Analogue Circuitry
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba), ATITi (Ba), ME (Ba)
Module coordinator	Prof. DrIng. Thomas Reuter
Compulsory/ optional/	optional
electiv	
Learning objectives	The student should familiarise with special analog circuit organisation and get to know possible applications of operational amplifiers. The main aim if the knowledge of methods for circuit analysis and synthesis.
Module content	Multiplier, negative-inpedance-converters, gyrators, lock-in amplifier, phase detector, voltage controlled oscillator, phase-locked loop, dc- supply, analog filters
Course type	0L - 0E - 2S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	exercises, lab instruction sheets
Recommended	- Tietze. U.; Schenk. C.: Halbleiterschaltungstechnik
literature	- Bystron/Borgmeyer: Grundlagen der technischen Elektronik
	- Morgenstern, B: Elektronik, Band II: Schaltungen
Method(s) of	Lecture: work on the blackboard, Tutorial exercises
instruction/	experiments at the laboratory after instruction with written preparations
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	6th term
Compulsory	none
requirements	
Recommended	Electrical Engineering 1 and 2, Mathematics, Electronic Components,
requirements	Electronics
Assessment	Laboratory internship certificate, Laboratory internship report
Assessment modalities	SL - ungraded course work during the lecture period
ECTS credits	3
Workload	90h of total work load, thereof
	45h of contact hours and
	45h of self-study, consisting of:
	20 h lecture (preparation and rework)
	15 h practical training (preparation and evaluation)
	10 h exam preparation
Usability of this module	Master ET/IT, RE und ME
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number         E11.399           Module number         Electrical Engineering and Information Technology           Degree program         ET/IT (Ba)           Specialization/ Profil         EAT, TI, KMT           Module coordinator         Prof. DrIng. Frank Giesecke           Compulsory/ optional/         Compulsory/ optional/           Learning objectives         The students are able to choose an adequate filter technology for a given filter problem and to find an optimal problem solution.           Module content         Types of filters and applications - analysis of filters in s - and z-domain - analog filter design by standard approximations - design of digital FIR-filters - digital filter realizations           Course type         1L - 1E - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         lecture scripts, textbooks, tasks and solutions, software MATLAB           Recommended         - Achenbach, JJ.: System-Synthese, VDI-Verlag           Iterature         - Achenbach, JJ.: System-Synthese, VDI-Verlag           - Achenbach, JJ.: Analoge und digital Filter und Systeme (Band 1: Grundlagen), BI-Wissenschaftsverlag           Wethod(s) of         simulations by software tool MATLAB/SIMULINK           instruction/         simulations by software filter selications           Recommended         Mathematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Di		
Department         Electrical Engineering and Information Technology           Degree program         ET/T (Ba)           Specialization/ Profil         EAT, TI, KMT           Module coordinator         Prof. DrIng. Frank Giesecke           Compulsory/ optional/         Compulsory           Learning objectives         The students are able to choose an adequate filter technology for a given filter problem and to find an optimal problem solution.           Module content         Types of filters and applications - analysis of filters in s - and z-domain - analog filter design by standard approximations - design of digital IR-filters - digital filter realizations           Course type         1L - 1E - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Iecture scripts, textbooks, tasks and solutions, software MATLAB           Recommended         - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 1: Grundlagen), BH-Wissenschartsverlag           - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 2: Ubungsaufgaben mit Lösungen), BH-Wissenschartsverlag           - Achenbach, JJ.: Analoge und digital Processing, Analog and Digital or Compulsory           media being used         Iever/ category           Lever/ category         1           Recommended           Recommended           Recommended           Recommended           Recommended <td>Module number</td> <td>ET.1.909</td>	Module number	ET.1.909
Degree program         ET/T (Ba)           Specialization/ Profil         EAT, TI, KMT           Module coordinator         Prof. DrIng. Frank Giesecke           Compulsory/ optional/ electiv         Compulsory           Learning objectives         The students are able to choose an adequate filter technology for a given filter problem and to find an optimal problem solution.           Module content         Types of filters and applications - analysis of filters in s - and z-domain - analog filter design by standard approximations - design of digital FIR-filters - design of digital IIR-filters - digital filter realizations           Course type         1L - 1E - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         lecture scripts, textbooks, tasks and solutions, software MATLAB           Recommended         - Achenbach, JJ.: System-Synthese, VDI-Verlag           Iterature         - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 1: Grundlagen), BI-Wissenschaftsverlag           Method(s) of         simulations by software tool MATLAB/SIMULINK           instruction/         simulations by software tool MATLAB/SIMULINK           Level/ category         1         (Bachelor=1, Master=2)           Summer/ Winter         winter term           Term         5. term           Compulsory         none           requirements         APL – assessment during th		
Specialization/ Profil         EAT, TI, KMT           Module coordinator         Prof. DrIng. Frank Giesecke           Compulsory/optional/ electiv         Compulsory           Learning objectives         The students are able to choose an adequate filter technology for a given filter problem and to find an optimal problem solution.           Module content         Types of filters and applications - analysis of filters in s - and z-domain - analog filter design by standard approximations - design of digital FIR-filters - design of digital IIR-filters - digital filter realizations           Course type         flt - 1E - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         lecture soripts, textbooks, tasks and solutions, software MATLAB           Recommended         - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 1: Grundlagen), BI-Wissenschaftsverlag           Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 2: Ubungsaufgaben mit Lösungen), BI-Wissenschaftsverlag           Method(s) of instruction/ media being used         simulations by software tool MATLAB/SIMULINK           Level/ category         1           Gachelor=1, Master=2)           Summer/ Winter         winter term           Term         5. term           Compulsory         none           requirements         APL – assessment during the semester period (graded)           ECTS credits         3 </td <td></td> <td></td>		
Module coordinator         Prof. DrIng. Frank Giesecke           Compulsory/optional/ electiv         Compulsory           Learning objectives         The students are able to choose an adequate filter technology for a given filter problem and to find an optimal problem solution.           Module content         Types of filters and applications - analysis of filters in s - and z-domain - analog filter design by standard approximations - design of digital FIR-filters - design of digital IIR-filters - digital filter realizations           Course type         1 1E - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         lecture scripts, textbooks, tasks and solutions, software MATLAB           Recommended         - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 1: Grundlagen), BI-Wissenschaftsverlag           - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 2: Übungsaufgaben mit Lösungen), BI-Wissenschaftsverlag           Method(s) of instruction/ media being used         simulations by software tool MATLAB/SIMULINK           Level/ category         1         (Bachelor=1, Master=2)           Summer/ Winter         winter term           Term         5. term           Compulsory         none           requirements         Athematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit Design           Assessment <t< td=""><td></td><td></td></t<>		
Compulsory/ optional/ electiv         Compulsory           Learning objectives         The students are able to choose an adequate filter technology for a given filter problem and to find an optimal problem solution.           Module content         Types of filters and applications - analog filter design by standard approximations - design of digital FIR-filters - design of digital IIR-filters - digital filter realizations           Course type         1L - 1E - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         lecture scripts, textbooks, tasks and solutions, software MATLAB           Recommended         - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 1: Grundlagen), BI-Wissenschaftsverlag           - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 2: Ubungsaufgaben mit Lösungen), BI-Wissenschaftsverlag           Method(s) of instruction/ media being used         simulations by software tool MATLAB/SIMULINK           Level/ category         1         (Bachelor=1, Master=2)           Summer/ Winter         situations and Systems, Digital Signal Processing, Analog and Digital Circuit Design           Assessment         term paper           Assessment         term paper           Assessment modalities         APL – assessment during the semester period (graded)           ECTS credits         3           Workload         90 h of total work load, thereof - 45h of self-study, consisting of: preparation and rework		
electiv         Interval           Learning objectives         The students are able to choose an adequate filter technology for a given filter problem and to find an optimal problem solution.           Module content         Types of filters and applications - analysis of filters in s- and z-domain - analog filter design by standard approximations - design of digital FIR-filters - design of digital IIR-filters - digital filter realizations           Course type         1L - 1E - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         lecture scripts, textbooks, tasks and solutions, software MATLAB           Recommended         - Achenbach, JJ.: System-Synthese, VDI-Verlag           - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 1: Grundlagen), BI-Wissenschaftsverlag           wethod(s) of         simulations by software tool MATLAB/SIMULINK           instruction/         media being used           Level/ category         1           Compulsory         none           requirements         Mathematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit Design           Assessment         term paper           Assessment modalities         APL – assessment during the semester period (graded)           ECTS credits         3           Workload         90 h of total work load, thereof - 45h of contact hours and -		
Learning objectives         The students are able to choose an adequate filter technology for a given filter problem and to find an optimal problem solution.           Module content         Types of filters and applications - analysis of filters in s - and z-domain - analog filter design by standard approximations - design of digital FIR-filters - design of digital IIR-filters - digital filter realizations           Course type         1L - 1E - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         lecture scripts, textbooks, tasks and solutions, software MATLAB           Recommended         - Achenbach, JJ.: Naloge und digitale Filter und Systeme (Band 1: Grundlagen), BI-Wissenschaftsverlag           - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 2: Übungsaufgaben mit Lösungen), BI-Wissenschaftsverlag           Method(s) of instruction/ media being used         simulations by software tool MATLAB/SIMULINK           Level/ category         1         (Bachelor=1, Master=2)           Summer/ Winter         winter term           Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit Design           Assessment         term paper           Assessment modalities         APL – assessment during the semester period (graded)           ECTS credits         3           Workload         90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2		Compulsory
filter problem and to find an optimal problem solution.           Module content         Types of filters and applications - analysis of filters in s - analog filter design by standard approximations - design of digital FIR-filters - design of digital IIR-filters - digital filter realizations           Course type         1L - 1E - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         lecture scripts, textbooks, tasks and solutions, software MATLAB           Recommended         - Achenbach, JJ.: System-Synthese, VDI-Verlag           Iterature         - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 1: Grundlagen), BI-Wissenschaftsverlag           Method(s) of         simulations by software tool MATLAB/SIMULINK           instruction/         media being used           Level/ category         1           Bechenzent, Provide term         Sterm           Compulsory         none           requirements         Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit Design           Assessment         term paper           Assessment         APL - assessment during the semester period (graded)           ECTS credits         3           Workload         90 h of total work load, thereof           - 45h of contact hours and         - 45h of contact hours and           - 45h of contact hours and         - 45h of co		
analog filter design by standard approximations - design of digital FIR-filters         - design of digital IIR-filters - digital filter realizations         Course type       1L - 1E - 0S - 1P         Learning Material       lecture scripts, textbooks, tasks and solutions, software MATLAB         Recommended       - Achenbach, JJ.: System-Synthese, VDI-Verlag         - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 1: Grundlagen), BI-Wissenschaftsverlag         - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 2: Übungsaufgaben mit Lösungen), BI-Wissenschaftsverlag         Method(s) of instruction/ media being used       ismulations by software tool MATLAB/SIMULINK         Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       winter term         Term       5. term         Compulsory       none         requirements       ARthematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit Design         Assessment       term paper         Assessment       4PL – assessment during the semester period (graded)         ECTS credits       3         Workload       90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 h         Usabili		filter problem and to find an optimal problem solution.
Learning Material         lecture scripts, textbooks, tasks and solutions, software MATLAB           Recommended         - Achenbach, JJ.: System-Synthese, VDI-Verlag           literature         - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 1: Grundlagen), BI-Wissenschaftsverlag           - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 2: Übungsaufgaben mit Lösungen), BI-Wissenschaftsverlag           Method(s) of instruction/ media being used         simulations by software tool MATLAB/SIMULINK           Level/ category         1 (Bachelor=1, Master=2)           Summer/ Winter         winter term           Term         5. term           Compulsory         none           requirements         Recommended           Assessment         Mathematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit Design           Assessment         term paper           Assessment         APL – assessment during the semester period (graded)           ECTS credits         3           Workload         90 h of total work load, thereof           -45h of self-study, consisting of: preparation and rework lecture 4 h           exam preparation 35 h           Usability of this module         Control engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal	Module content	analog filter design by standard approximations - design of digital FIR-filters
Recommended       - Achenbach, JJ.: System-Synthese, VDI-Verlag         literature       - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 1: Grundlagen), BI-Wissenschaftsverlag         Method(s) of instruction/       - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 2: Übungsaufgaben mit Lösungen), BI-Wissenschaftsverlag         Method(s) of instruction/       simulations by software tool MATLAB/SIMULINK         media being used       -         Level/ category       1         Bachelor=1, Master=2)         Summer/ Winter       winter term         Term       5. term         Compulsory       none         requirements       Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit Design         Assessment       Athematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit Design         Assessment       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 h         Usability of this module       Control engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processors	Course type	1L - 1E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
literature- Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 1: Grundlagen), BI-Wissenschaftsverlag - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 2: Ubungsaufgaben mit Lösungen), BI-WissenschaftsverlagMethod(s) of instruction/ media being usedsimulations by software tool MATLAB/SIMULINKLevel/ category1(Bachelor=1, Master=2)Summer/ Winterwinter termTerm5. termCompulsory requirementsnoneRecommended multicia circuit DesignMathematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit DesignAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 hUsability of this moduleControl engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processorsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Grundlagen), BI-Wissenschaftsverlag - Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 2: Übungsaufgaben mit Lösungen), BI-WissenschaftsverlagMethod(s) of instruction/ media being usedsimulations by software tool MATLAB/SIMULINKLevel/category1 (Bachelor=1, Master=2)Summer/Winterwinter termTerm5. termCompulsory requirementsnoneRecommended requirementsMathematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit DesignAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 hUsability of this moduleControl engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processorsTimeAccording time tableDuration of module1 termPlace/roomEAH JenaFrequency of offerAnnually		
- Achenbach, JJ.: Analoge und digitale Filter und Systeme (Band 2: 	literature	
Übungsaufgaben mit Lösungen), BI-WissenschaftsverlagMethod(s) of instruction/ media being usedsimulations by software tool MATLAB/SIMULINKLevel/category1 (Bachelor=1, Master=2)Summer/Winterwinter termTerm5. termCompulsory requirementsnoneRecommended requirementsMathematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit DesignAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 hUsability of this moduleControl engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processorsTimeAccording time tableDuration of module1 termPlace/roomEAH JenaFrequency of offerAnnually		
Method(s) of instruction/ media being used       simulations by software tool MATLAB/SIMULINK         Level/category       1       (Bachelor=1, Master=2)         Summer/Winter       winter term         Term       5. term         Compulsory       none         requirements       Recommended         Resemmended       Mathematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit Design         Assessment       term paper         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 h         Usability of this module       Control engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processors         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
instruction/ media being used       I (Bachelor=1, Master=2)         Level/ category       1 (Bachelor=1, Master=2)         Summer/Winter       winter term         Term       5. term         Compulsory requirements       none         Recommended requirements       Mathematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit Design         Assessment       term paper         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 h         Usability of this module       Control engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processors         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
media being usedLevel/ category1 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm5. termCompulsorynonerequirementsRecommendedRecommendedMathematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit DesignAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 hUsability of this moduleControl engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processorsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		simulations by software tool MATLAB/SIMULINK
Level/ category       1 (Bachelor=1, Master=2)         Summer/ Winter       winter term         Term       5. term         Compulsory       none         requirements       mathematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit Design         Assessment       term paper         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 h         Usability of this module       Control engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processors         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
Summer/Winterwinter termTerm5. termCompulsory requirementsnoneRecommendedMathematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit DesignAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 hUsability of this moduleControl engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processorsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	<u>v</u>	
Term       5. term         Compulsory       none         requirements       Mathematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit Design         Assessment       term paper         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 h         Usability of this module       Control engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processors         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
Compulsory requirementsnoneRecommended requirementsMathematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit DesignAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 hUsability of this moduleControl engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processorsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
requirementsMathematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit DesignAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 hUsability of this moduleControl engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processorsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		5. term
Recommended requirementsMathematics, Basics of Electrical Engineering, Basics of Computer Science, Theory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit DesignAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 hUsability of this moduleControl engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processorsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		none
requirementsTheory of Signals and Systems, Digital Signal Processing, Analog and Digital Circuit DesignAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 hUsability of this moduleControl engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processorsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Assessment       term paper         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 h         Usability of this module       Control engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processors         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		Theory of Signals and Systems, Digital Signal Processing, Analog and
Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90 h of total work load, thereof         - 45h of contact hours and       - 45h of self-study, consisting of:         preparation and rework       preparation and rework         lecture 4 h       exercise 4 h         practical training 2 h (preparation and evaluation)         exam preparation 35 h         Usability of this module         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually	Assessment	term paper
ECTS credits3Workload90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 hUsability of this moduleControl engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processorsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Assessment modalities	
Workload90 h of total work load, thereof - 45h of contact hours and - 45h of self-study, consisting of: preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 hUsability of this moduleControl engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processorsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
<ul> <li>- 45h of contact hours and</li> <li>- 45h of self-study, consisting of: preparation and rework lecture 4 h</li> <li>exercise 4 h</li> <li>practical training 2 h (preparation and evaluation)</li> <li>exam preparation 35 h</li> <li>Usability of this module</li> <li>Control engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processors</li> <li>Time</li> <li>According time table</li> <li>Duration of module</li> <li>1 term</li> <li>Place/ room</li> <li>EAH Jena</li> <li>Frequency of offer</li> <li>Annually</li> </ul>	Workload	90 h of total work load, thereof
preparation and rework lecture 4 h exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 hUsability of this moduleControl engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processorsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Iecture 4 hexercise 4 hpractical training 2 h (preparation and evaluation)exam preparation 35 hUsability of this moduleControl engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processorsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		- 45h of self-study, consisting of:
exercise 4 h practical training 2 h (preparation and evaluation) exam preparation 35 hUsability of this moduleControl engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processorsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		preparation and rework
practical training 2 h (preparation and evaluation) exam preparation 35 hUsability of this moduleControl engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processorsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		lecture 4 h
exam preparation 35 h         Usability of this module       Control engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processors         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		exercise 4 h
Usability of this moduleControl engineering, measurement technology, audio and video processing, communication technology, computer sciences and signal processorsTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
communication technology, computer sciences and signal processors           Time         According time table           Duration of module         1 term           Place/ room         EAH Jena           Frequency of offer         Annually		
TimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Usability of this module	
Duration of module     1 term       Place/ room     EAH Jena       Frequency of offer     Annually	Time	
Place/ room     EAH Jena       Frequency of offer     Annually	Duration of module	
Frequency of offer Annually		
	Frequency of offer	

Module number	ET.1.911
Module name	Web Design
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba)
Specialization/ Profil	KMT Deaf. De Justeie Niebel
Module coordinator	Prof. Dr. Ludwig Niebel
Compulsory/ optional/ electiv	optional
Learning objectives	Upon completion of the module, students
	- are able to use fundamental methods to build simple web pages
	- are able to implement user interactions
	- are able to use methodes for efficient formatting
	- understands the importance of design rules for good useability
Module content	Introduction HTML, HTTP and URL
	MS Expression Web4: Production of HTML-based Internet sites (layout,
	CSS, navigation)
	Interactive Internet site (using PHP)
	Introduction Author systems - environment for interactive Multimediaprojekte
	and Rich Internet Applications
	interactive multimedia and learning aid, means of publicity, banner, Internet
Course time	shop, interactive instructional films
Course type	1L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course)
Learning Material	books, script and lab instruction sheets on the internet
Recommended	WorldWideWeb-Consortium http://www.w3.org/
literature	Seimert, W.: Microsoft Expression Web, Franzis Verlag 2008
	Münz, S.: Professionelle Websites. Addison-Wesley, 2005 Agular, R.: HTML und CSS, mitp 2008
Method(s) of	Interactive lecture, practical course, team work in small groups, self study
instruction/	Interactive recture, practical course, team work in small groups, sen study
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/ Winter	summer or winter term
Term	5th or 6th term
Compulsory	none
requirements	
Recommended	Basics of Programming, Algorithms and data structures
requirements	basics of Frogramming, Algonantis and data structures
Assessment	Laboratory internship certificate, colloquium, web site
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Workload	90h of total work load, thereof
Wondodd	45h of contact hours and
	45h of self-study, consisting of:
	15 h lecture (preparation and rework)
	20 h practical training (preparation and evaluation)
	10 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German
Language	Comun

Module number	ET.1.912
Module name	Digital Signal Processors
Department	Electrical Engineering and Information Technology
	Electrical Engineering and mormation rechnology
Degree program Specialization/ Profil	KMT, TI
Module coordinator	Prof. DrIng. Burkart Voß
Compulsory/ optional/	optional
electiv	
Learning objectives	After successful completion of the module the students are able to: - understand the working principles and typical fields of application of digital signal processors - evaluate signal processing algorithms regarding their suitability to solve a given problem - adopt the algorithms to suit the given problem and implement them on a digital signal processor - implement fixed point arithmetics in a digital signal processor
Module content	<ul> <li>Architecture of DSP micro processors</li> <li>Implementation of signal processing algorithms on a digital signal processor in Assembler and C</li> <li>Analysis and optimization of program runtime</li> <li>Influence of characteristics of signal processing algorithms on the architecture of digital signal processors</li> </ul>
Course type	2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	Lecture script, Lab instruction sheets
Recommended	Smith, Steven W.: "The Scientist and Engineer's Guide to Digital Signal
literature	Processing". California Technical Publishing, 1997
Method(s) of	Interactive lecture, practical course, work in little teams, self-study
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term or winter term
Term	5th or 6th term
Compulsory	none
requirements Recommended	Programming skills, knowledge of programming language C, basic
requirements	knowledge in signal and system theory, basic skills in programming microcontrollers
Assessment	term paper
Assessment modalities	APL – assessment during the semester period (graded)
Further Information	The ability to chose suitable digital signal processing algorithms for a given problem, to modify the chosen algorithm and to implement it on a DSP is proven by the documentation of the results of a project.
ECTS credits	3
Workload	90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of work on an individually assigned project
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.915
Module name	Binary Arithmetic Operations
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba), ATITi (Ba)
Specialization/ Profil	EAT, TI, KMT
Compulsory/ optional/ electiv	optional
	Learning of methods for digital realization of arithmetic approximations in real
Learning objectives	Learning of methods for digital realization of arithmetic operations in real- time applications. These operations represent base elements of complex algorithms implemented in digital hardware (discrete circuit design, programmable logic, application-specific integrated circuit design) and real- time software (programming of digital signal processors).
Module content	Number conversation – Carry-look-ahead adders – Carry-save multioperand adders – Fast incrementers – Overflow detection and correction – Saturation adders – Hardware emulation by means of modulo-operations - Add-shift multipliers and array multipliers – Canonical sign-digit operand representation for constant factors
Course type	2L - 1E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	lecture scripts, tasks and solutions
Recommended	Hwang, K.: Computer Arithmetic
literature	Waser, S.; Flynn, M.: Introduction to Arithmetic for Digital Systems Designers Jorke, G.; Lampe, B.; Wengel, N.: Arithmetische Algorithmen der
	Mikrorechentechnik
Method(s) of	lectures, exercises, self-study
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	6. term
Compulsory	none
requirements	
Recommended requirements	Basics of Computer Science, Digital Circuit Design
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	3
Workload	90 h of total work load, thereof
Wondodd	- 45 h of contact hours and
	- 45 h of self-study, consisting of:
	preparation and rework
	lecture 20 h
	exercise 10 h
	exam preparation 15 h
Usability of this module	Usable for modules containing applications which take use of digital
	arithmetic operations, such as signal processors, microcomputer
	engineering, programmable logic, digital integrated circuit design, digital
	control engineering, digital filter design, audio and video technology and
	digital transmission technology.
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.1.916
	Stochastics
Module name	
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ba), ATITi (Ba)
Module coordinator	Prof. Dr. Mario Walther
Compulsory/ optional/ electiv	optional
Learning objectives	- Fundamentals of probabilities
	- Confidence limits and tests for normal and binomial distributions
	- Experimental design
	- Nonparametric methods
	- Mathematical techniques and methods which are important for solving
	linear and nonlinear optimization problems
	- Using statistical toolboxes of MATLAB, R or Python
Module content	Probability, Random variables, Distributions, Limit theorems
	Confidence limits, Parametric significance tests
	Nonparametric methods for location measures and proportions,
0	Testing goodness of fit and independence
Course type	2L - 1E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	Script for lecture, additional transparencies, exercises with solutions, worksheets
Recommended	Fahrmeir, L. u.a. Statistik, Springer 2003
literature	Kühlmeyer, M., Statistische Auswertungsmethoden für Ingenieure, Springer
	2001
	Kähler, W., Statistische Datenanalyse, Vieweg+Teubner, 2010
	Beichelt, Stochastik für Ingenieure
	Beucher, O., Wahrscheinlichkeitsrechnung und Statistik mit MATLAB,
	Springer 2007
	Papula, L. Mathematik für Ingenieure, Bd. 3, Vieweg
Method(s) of	Lecture and tutorial for deepening the material dealt with in the lecture and
instruction/	discussion on tasks given for individual work. Solving tasks using MATLAB
media being used	(Optimization Toolbox)
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	6st term
Recommended	Mathematics 1 and Mathematics 2
requirements	
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	6 4 DOb of total work load, thereof
Workload	180h of total work load, thereof
	60h of contact hours and
	120h of self-study, consisting of: 75 h lecture (preparation and rework)
	20 h practical training (preparation and evaluation) 25 h exam preparation
Time	According time table
Duration of module	1 term
	EAH Jena
Place/ room	
Frequency of offer	Annually
Language	German

Module number	ET.1.917
Module name	Project Autonomous Model Vehicle
Department	Electrical Engineering and Information Technology
Module coordinator	Prof. Voß (ET/IT), Prof. Dienerowitz (SciTec)
Compulsory/ optional/ electiv	optional
Course type	(Lecture, Exercises, Seminar, practical course)
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	winter term
Compulsory	none
requirements	
Assessment	project
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Workload	90 h
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.2.101
Module name	Theoretical Information Sciences
	Electrical Engineering and Information Technology
Department Degree program	RFE (Ma),ET/IT (Ma)
Module coordinator	Prof. DrIng. Oliver Jack
Compulsory/ optional/	Electiv
electiv	
Learning objectives	At the end of the module students are able:
	- to assess the Chomsky-Hierarchy of formal languages
	- to assess the concept of computability
	- to distinguish complexity classes
	- to aply logic calculus, specifically the resolution calculus
	- to construct concurrent systems using Petri-Nets
Module content	Theoretical Foundations of Computer Science, Automata Theory, Formal
	Languages, Graph Theory, Complexity Theory, Logic Calculus,
	Computability, Decidability
Course type	0L - 0E - 3S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	Literature recommendation specific to the seminar sessions
Recommended	- John E. Hopcroft, Rajeev Motwani, Jerey D. Ullman: Einführung in
literature	Automatentheorie, Formale Sprachen und Berechenbarkeit, 3., aktualisierte
	Au age, Pearson Studium 2011.
	- Dirk W. Hoffmann: Theoretische Informatik, Hanser, 2009.
	- Michael Sipser: Introduction to the Theory of Computation, 3rd Edition,
	Cengage Learning 2013.
	- Michael Schenke: Logikkalk⊡ule in der Informatik: Wie wird Logik vom
	Rechner genutzt?, Springer 2013.
	- Wolfgang Reisig: Petrinetze: Modellierungstechnik,
Mathad(a) of	Analysemethoden, Fallstudien, Vieweg 2010.
Method(s) of instruction/	Seminar, Exercisises
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/ Winter	winter term
Term	2. term
Compulsory	none
requirements	
Recommended	Computer science basic knowledge, programming skills in at least one
requirements	common programming language, basic knowledge in discrete mathematics
Assessment	term paper
Assessment modalities	APL – assessment during the semester period (graded)
Further Information	The students have to prepare a report according to one of the session
	topics
ECTS credits	6
Workload	180h of total work load, thereof
	45h of contact hours and
	135h of self-study, consisting of:
	100 h lecture (preparation and rework)
	35 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.2.102
Module name	
	Software Engineering
Department	Electrical Engineering and Information Technology
Degree program	ET/ IT (Ma)
Module coordinator	Prof. DrIng. Oliver Jack
Compulsory/ optional/ electiv	Electiv
Learning objectives	At the end of the module students are able:
	- to apply methods for model-based software development
	- to apply requirements analysis and system design methods using UML to
	selected application examples
	- to assess an object-oriented system design
	- to plan a software development project
Module content	Model based software development, Unified Modelling Language,
	Application modelling, Class and state modelling, Modelling of system
	dynamics
Course type	(Lecture, Exercises, Seminar, practical course)
Recommended	- Helmut Balzert. Lehrbuch der Objektmodellierung - Analyse und Entwurf.
literature	Spektrum Akademischer Verlag, Heidelberg Berlin, 2. edition, 2004.
	- Helmut Balzert. Lehrbuch der Software-Technik, Band 1. Software
	Entwicklung. Spektrum Akademischer Verlag, Heidelberg Berlin, 2. Aufl.,
	2000.
	- Wolfgang Zuser, Thomas Grechenig, and Monika Köhle. Software-
	Engineering mit UML und dem Unified Process. Pearson Studium, München
	[u.a.], 2., überarb. Aufl., 2004.
	- Harald Störrle. UML2 für Studenten. Pearson Studium, München [u.a.],
	2005.
Method(s) of	2L - 0E - 0S - 2P
instruction/	
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	1. term
Compulsory	none
requirements	
Recommended	Computer Science, Software Engineering
requirements	
Assessment	term paper
Assessment modalities	APL – assessment during the semester period (graded)
Further Information	The students have to conduct an extensive software design project.
ECTS credits	
Workload	180h of total work load, thereof
	60h of contact hours and
	120h of self-study, consisting of:
	50 h lecture (preparation and rework)
	45 h practical training (preparation and evaluation)
Lloobility of this module	25 h exam preparation
Usability of this module	Embedded Systems
Time Duration of module	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number         ET.2.104           Module name         Reliability Theory           Department         Electrical Engineering and Information Technology           Degree program         ETIT (Ma), RFE (Ma), ME (Ma)           Specialization/ Profil         EAT, TI, KMT           Module coordinator         Prof. DrIng. Frank Giesecke           Compulsory/ optional/ electiv         optional           Learning objectives         Learning of basics and methods for reliability of complex technical system           Module content         Introduction and terms of reliability – mean time to failure – development of model and planning of reliability – mean time to failure – development of model and planning of reliability – series-, parallel- and mixed series- parallel-systems – parallel systems with hot and cold redundancy – exemplary solutions for reliability of circuit components, devices and systems           Course type         (Lecture, Exercises, Seminar, practical course)           Recommended literature         Meyna, A.; Pauli, B.: Taschenbuch der Zuverlässigkeits- und Sicherheitstechnik, C. Hanser Verlag, München/Wien, 2003 Birolini, A.: Zuverlässigkeit von Geräten und Systemen, Springer- Verlag, Berlin/Heidelberg, 4. Auflage, 1997           Deutsche Gesellschaft für Qualität: Zuverlässigkeit komplexer Systeme au Hardware und Software, DGQ- Band 17-01, Frankfurt/M., 1998	odule name epartment egree program oecialization/ Profil odule coordinator ompulsory/ optional/ ectiv earning objectives odule content
Department         Electrical Engineering and Information Technology           Degree program         ETIT (Ma), RFE (Ma), ME (Ma)           Specialization/ Profil         EAT, TI, KMT           Module coordinator         Prof. DrIng. Frank Giesecke           Compulsory/ optional/ electiv         optional           Learning objectives         Learning of basics and methods for reliability of complex technical system           Module content         Introduction and terms of reliability – mathematical basics and parameters analysis and proof of reliability – mean time to failure – development of model and planning of reliability – series-, parallel- and mixed series- parallel-systems – parallel systems with hot and cold redundancy – exemplary solutions for reliability of circuit components, devices and systems           Course type         (Lecture, Exercises, Seminar, practical course)           Recommended literature         Meyna, A.; Pauli, B.: Taschenbuch der Zuverlässigkeits- und Sicherheitstechnik, C. Hanser Verlag, München/Wien, 2003 Birolini, A.: Zuverlässigkeit von Geräten und Systemen, Springer- Verlag, Berlin/Heidelberg, 4. Auflage, 1997 Deutsche Gesellschaft für Qualität: Zuverlässigkeit komplexer Systeme at	epartment egree program becialization/ Profil odule coordinator ompulsory/ optional/ ectiv earning objectives odule content
Degree program         ETIT (Ma), RFE (Ma), ME (Ma)           Specialization/ Profil         EAT, TI, KMT           Module coordinator         Prof. DrIng. Frank Giesecke           Compulsory/ optional/ electiv         optional           Learning objectives         Learning of basics and methods for reliability of complex technical system           Module content         Introduction and terms of reliability – mathematical basics and parameters analysis and proof of reliability – mean time to failure – development of model and planning of reliability – series-, parallel- and mixed series- parallel-systems – parallel systems with hot and cold redundancy – exemplary solutions for reliability of circuit components, devices and systems           Course type         (Lecture, Exercises, Seminar, practical course)           Recommended literature         Meyna, A.; Pauli, B.: Taschenbuch der Zuverlässigkeits- und Sicherheitstechnik, C. Hanser Verlag, München/Wien, 2003 Birolini, A.: Zuverlässigkeit von Geräten und Systemen, Springer- Verlag, Berlin/Heidelberg, 4. Auflage, 1997 Deutsche Gesellschaft für Qualität: Zuverlässigkeit komplexer Systeme au	egree program becialization/ Profil odule coordinator ompulsory/ optional/ ectiv earning objectives odule content ourse type ecommended
Specialization/ Profil         EAT, TI, KMT           Module coordinator         Prof. DrIng. Frank Giesecke           Compulsory/ optional/ electiv         optional           Learning objectives         Learning of basics and methods for reliability of complex technical system           Module content         Introduction and terms of reliability – mathematical basics and parameters analysis and proof of reliability – mean time to failure – development of model and planning of reliability – series-, parallel- and mixed series- parallel-systems – parallel systems with hot and cold redundancy – exemplary solutions for reliability of circuit components, devices and systems           Course type         (Lecture, Exercises, Seminar, practical course)           Recommended literature         Meyna, A.; Pauli, B.: Taschenbuch der Zuverlässigkeits- und Sicherheitstechnik, C. Hanser Verlag, München/Wien, 2003 Birolini, A.: Zuverlässigkeit von Geräten und Systemen, Springer- Verlag, Berlin/Heidelberg, 4. Auflage, 1997 Deutsche Gesellschaft für Qualität: Zuverlässigkeit komplexer Systeme au	ourse type ecommended
Module coordinator         Prof. DrIng. Frank Giesecke           Compulsory/ optional/ electiv         optional           Learning objectives         Learning of basics and methods for reliability of complex technical system           Module content         Introduction and terms of reliability – mathematical basics and parameters analysis and proof of reliability – mean time to failure – development of model and planning of reliability – series-, parallel- and mixed series- parallel-systems – parallel systems with hot and cold redundancy – exemplary solutions for reliability of circuit components, devices and systems           Course type         (Lecture, Exercises, Seminar, practical course)           Recommended literature         Meyna, A.; Pauli, B.: Taschenbuch der Zuverlässigkeits- und Sicherheitstechnik, C. Hanser Verlag, München/Wien, 2003 Birolini, A.: Zuverlässigkeit von Geräten und Systemen, Springer- Verlag, Berlin/Heidelberg, 4. Auflage, 1997 Deutsche Gesellschaft für Qualität: Zuverlässigkeit komplexer Systeme au	odule coordinator ompulsory/ optional/ ectiv earning objectives odule content ourse type ecommended
Compulsory/ optional/ electiv       optional         Learning objectives       Learning of basics and methods for reliability of complex technical system         Module content       Introduction and terms of reliability – mean time to failure – development of model and planning of reliability – series-, parallel- and mixed series- parallel-systems – parallel systems with hot and cold redundancy – exemplary solutions for reliability of circuit components, devices and systems         Course type       (Lecture, Exercises, Seminar, practical course)         Recommended literature       Meyna, A.; Pauli, B.: Taschenbuch der Zuverlässigkeits- und Sicherheitstechnik, C. Hanser Verlag, München/Wien, 2003 Birolini, A.: Zuverlässigkeit von Geräten und Systemen, Springer- Verlag, Berlin/Heidelberg, 4. Auflage, 1997 Deutsche Gesellschaft für Qualität: Zuverlässigkeit komplexer Systeme au	ompulsory/ optional/ ectiv earning objectives odule content ourse type ecommended
electiv       Learning objectives       Learning of basics and methods for reliability of complex technical system         Module content       Introduction and terms of reliability – mean time to failure – development of model and planning of reliability – series-, parallel- and mixed series-parallel-systems – parallel systems with hot and cold redundancy – exemplary solutions for reliability of circuit components, devices and systems         Course type       (Lecture, Exercises, Seminar, practical course)         Recommended       Meyna, A.; Pauli, B.: Taschenbuch der Zuverlässigkeits- und Sicherheitstechnik, C. Hanser Verlag, München/Wien, 2003         Birolini, A.: Zuverlässigkeit von Geräten und Systemen, Springer- Verlag, Berlin/Heidelberg, 4. Auflage, 1997         Deutsche Gesellschaft für Qualität: Zuverlässigkeit komplexer Systeme autore	ectiv earning objectives odule content ourse type ecommended
Learning objectivesLearning of basics and methods for reliability of complex technical systemModule contentIntroduction and terms of reliability – mathematical basics and parameters analysis and proof of reliability – mean time to failure – development of model and planning of reliability – series-, parallel- and mixed series- parallel-systems – parallel systems with hot and cold redundancy – exemplary solutions for reliability of circuit components, devices and systemsCourse type(Lecture, Exercises, Seminar, practical course)Recommended literatureMeyna, A.; Pauli, B.: Taschenbuch der Zuverlässigkeits- und Sicherheitstechnik, C. Hanser Verlag, München/Wien, 2003 Birolini, A.: Zuverlässigkeit von Geräten und Systemen, Springer- Verlag, Berlin/Heidelberg, 4. Auflage, 1997 Deutsche Gesellschaft für Qualität: Zuverlässigkeit komplexer Systeme au	earning objectives odule content ourse type ecommended
Module contentIntroduction and terms of reliability – mathematical basics and parameters analysis and proof of reliability – mean time to failure – development of model and planning of reliability – series-, parallel- and mixed series- parallel-systems – parallel systems with hot and cold redundancy – exemplary solutions for reliability of circuit components, devices and systemsCourse type(Lecture, Exercises, Seminar, practical course)Recommended literatureMeyna, A.; Pauli, B.: Taschenbuch der Zuverlässigkeits- und Sicherheitstechnik, C. Hanser Verlag, München/Wien, 2003 Birolini, A.: Zuverlässigkeit von Geräten und Systemen, Springer- Verlag, Berlin/Heidelberg, 4. Auflage, 1997 Deutsche Gesellschaft für Qualität: Zuverlässigkeit komplexer Systeme au	odule content
Recommended literatureMeyna, A.; Pauli, B.: Taschenbuch der Zuverlässigkeits- und Sicherheitstechnik, C. Hanser Verlag, München/Wien, 2003 Birolini, A.: Zuverlässigkeit von Geräten und Systemen, Springer- Verlag, Berlin/Heidelberg, 4. Auflage, 1997 Deutsche Gesellschaft für Qualität: Zuverlässigkeit komplexer Systeme au	ecommended
literature Sicherheitstechnik, C. Hanser Verlag, München/Wien, 2003 Birolini, A.: Zuverlässigkeit von Geräten und Systemen, Springer- Verlag, Berlin/Heidelberg, 4. Auflage, 1997 Deutsche Gesellschaft für Qualität: Zuverlässigkeit komplexer Systeme au	
Method(s) of 2L - 1E - 0S - 0P	ethod(s) of
instruction/	
media being used	edia being used
Level/ category 2 (Bachelor=1, Master=2)	evel/ category
Summer/Winter summer term	ummer/ Winter
Term 1. term	ərm
Compulsory none requirements	
Recommended Mathematics	ecommended
requirements	
Assessment exam 90 min	
Assessment modalities PL – exam during audit period(graded)	
ECTS credits 3	
Workload 90 h of total work load, thereof	orkload
- 45 h of contact hours and	
- 45 h of self-study, consisting of:	
preparation and rework lecture 15 h	
exercise 15 h	
exampreparation 15 h	
Time According time table	me
Duration of module 1 term	
Place/ room EAH Jena	
Frequency of offer Annually	
Language German	

Include nomices         Entities           Department         Electrical Engineering and Information Technology           Degree program         ET/TT (Ma)           Specialization' Profil         KMT           Module control 'Profil         KMT           Module control 'Profil         Compulsory optional/ electiv           Learning objectives         The student will be familiarized with the design of integrated analog circuits. The basic steps for the design of integrated circuits, the constructive understanding of circuits as well as the evaluation of structure alternatives for complex integrated bipolar circuits are emphasized. At the end of the module students are able to use behavioural and structural models on different levels of abstraction and to rate them. The students understand the principle of operation of a phase-locked loop and they are able to evaluate the PLLs properties. The students are able to evaluate and choose the best component implementation and to adopt it to a given application. For this purpose, the students are able to recognise basic principles of operation. Supthesis for analog circuits, modelling on different levels of abstraction: - PLL principles of operation. The students are able to apply methods for analysis and sizing of linear and non-linear analog circuits.           Module content         - Systematisation of the design development, traditional and top-down design methodology for mixed-signal systems, structural synthesis for analog circuits, modelling on different levels of abstractions - non-linear analog circuits and pipications (regulated and unregulated amplifiers, phase detektors, oscillators and VCO).           Couruse type         2L - OE - 2S - 1P	Module number	ET.2.105
Department         Electrical Engineering and Information Technology           Degree program         ET/IT (Ma)           Specialization/ Profil         KMT           Module coordinator         Prof. Dr.Ing. habil. Jürgen Kampe           Compulsory optional/ electiv         Compulsory           Learning objectives         The student will be familiarized with the design of integrated analog circuits. The basic steps for the design of integrated circuits, the constructive understanding of circuits as well as the evaluation of structure alternatives for complex integrated bipolar circuits are emphasized. At the end of the module students are able to be behavioural and structural models on different levels of abstraction and to rate them. The students understand the principle of operation of a phase-locked loop and they are able to evaluate the PLLs propreties. The students are able to evaluate and choose the best component implementation and to adopt it to a given application. For this purpose, the students are able to recognise basic principles of circuits, word to understand there principles of operation. The students are able to apply methods for analysis and sizing of linear and non-linear analog circuits.           Module content         - Systematisation of the design development, traditional and top-down design methodology for mixed-signal systems, structural synthesis for analog circuits, modeling on different levels of abstract modeling schemata, and applications; - non-linear circuitry for integrated analog systems, integrated analog unregulated amplifiers,phase detektors, oscillators and VCO).           Course type         2. Le 2. S - 1P (Lecture, Exercises, Seminar parctical course)           Learning		
Degree program         ETAT (Ma)           Module coordinator         Prof. DrIng. habil. Jürgen Kampe           Compulsory/ optional/         Compulsory           Learning objectives         The student will be familiarized with the design of integrated analog circuits.           The basic steps for the design of integrated circuits, the constructive understanding of circuits as well as the evaluation of structure alternatives for complex integrated bipolar circuits are amphasized.           At the end of the module students are able to use behavioural and structural models on different levels of abstraction and to rate them.           The students understand the principle of operation of a phase-locked loop and they are able to evaluate the PLLs properties. The students are able to apply methods for analysis and sizing of linear and non-linear analog circuits.           Module content         - Systematisation of the design development, traditional and top-down design methodology for mixed signal systems, structural synthesis for analog circuits, modelling on different levels of abstract modeling schemata, and applications: - non-linear analog circuits.           Module content         - Systematisation of the design development, traditional and top-down design methodology for mixed signal systems, structural synthesis for analog circuits, and their uncellogita schemata.           Module content         - Systematisation of the design development, traditional and top-down design methodology for mixed signal systems. Integrated analog circuits.           Module content         - Systematisation of the design of evelopment, traditional schoptang integrated anal		
Specialization/         Froit         KMT           Module coordinator         Prof. Dr. Ing. habil. Jürgen Kampe         Compulsory           Ecompulsory/ optional/ electiv         Compulsory         Compulsory           Learning objectives         The student will be familiarized with the design of integrated analog circuits. The basic steps for the design of integrated circuits, the constructive understanding of circuits as well as the evaluation of structure alternatives for complex integrated bipolar circuits are emphasized. At the end of the module students are able to use behavioural and structural models on different levels of abstraction and to rate them. The students understand the principle of operation of a phase-locked loop and they are able to evaluate the PLLs properties. The students are able to evaluate and choose the best component implementation and to adopt it to a given application. For this purpose, the students are able to recognise basic principles of circuitry and to understand there principles of operation. The students are able to apply methods for analysis and sizing of linear and non-linear analog circuits.           Module content         - Systematisation of the design development, traditional and top-down design methodology for mixed-signal systems, structural synthesis for analog circuits, modelling on different levels of abstraction; - PLL principles of operation, abstract modeling schemata, and applications; - non-linear circuitry for integrated analog systems, integrated analog functional blocks and their usage for PLL applications (regulated and unregulated amplifiers, phase detektors, oscillators and VCO).           Course type         2L - G - S - 1P (Lecture, Exercises, Seminar practical course)           Learning Ma	· · ·	
Module coordinator         Prof. DrIng. habil. Jürgen Kampe           Compulsory/ optional/ electiv         Compulsory         Compulsory           Learning objectives         The student will be familiarized with the design of integrated analog circuits. The basic steps for the design of integrated circuits, the constructive understanding of circuits as well as the evaluation of structure alternatives for complex integrated bipolar circuits are able to use behavioural and structural models on different levels of abstraction and to rate them. The students understand the principle of operation of a phase-locked loop and they are able to evaluate the PLLs properties. The students are able to evaluate and choose the best component implementation and to adopt it to a given application. For this purpose, the students are able to one-linear ranalog circuits.           Module content         - Systematisation of the design development, traditional and top-down design methodology for mixed-signal systems, structural synthesis for analog circuits, modelling on different levels of abstractions; - non-linear ranale detectors, oscillators and VCO).           Course type         2L - 0E - 2S - 1P         Lecture, Exercises, Seminar, practical course)           Learning Material         Literature notes, seminar exercises, laboratory instructions           Recommended         - Tietze, U.; Schenk, C.: Halbieterschaltungstechnik.           Iterature         - Meer, J.: Mixed-signal circuit design.           Kurz, C.; Mathis, W.; Oscillatore and VCO).         - Baker, R.J.: Mixed-signal circuit design.           Learning Material         Literature, lecture notes, se		
Compulsory/ optional/ electiv         Compulsory           Learning objectives         The student will be familiarized with the design of integrated analog circuits. The basic steps for the design of integrated circuits, the constructive understanding of circuits as well as the evaluation of structure alternatives for complex integrated bipolar circuits are emphasized. At the end of the module students are able to use behavioural and structural models on different levels of abstraction and to rate them. The students understand the principle of operation of a phase-locked loop and they are able to evaluate the PLLs properties. The students are able to evaluate and choose the best component implementation and to adopt it to a given application. For this purpose, the students are able to recognise basic principles of operation of analysis and sizing of linear and non-linear analog circuits.           Module content         • Systematisation of the design development, traditional and top-down design methodology for mixed-signal systems, structural synthesis for analog circuits, modelling on different levels of abstraction; • PLL principles of operation, abstract modeling schemata, and applications; • non-linear circuitry for integrated analog systems, integrated analog functional blocks and their usage for PLL applications (regulated and unregulated amplifiers, phase detkors, oscillators and VCO), • Course type           Leo - 2: - 19         Leture, Exterve, Exterve, Exterve, Seminar, Parcical course)           Learning Material         Literature, lecture networks, coscillators, • Nert, C.; Mathis, W.; Oszillatorn. • Baker, R.J.; Mixed-signal circuit design. • Kurz, C.; Mathis, W.; Oszillatorn. • Baker, R.J.; Mixed-signal circuit design. • Kurz, C.; Mathis, W.; Oszillatorn. • Baker, R.J.; Mixed-signal circuit design. • Kurz, C.; Mathis, W.; Os		
electiv         The student will be familiarized with the design of integrated analog circuits. The basic steps for the design of integrated circuits, the constructive understanding of circuits as well as the evaluation of structure alternatives for complex integrated bipolar circuits are able to use behavioural and structural models on different levels of abstraction and to rate them. The students understand the principle of operation of a phase-locked loop and they are able to evaluate the PLLs properties. The students are able to evaluate and choose the best component implementation and to adopt it to a given application. For this purpose, the students are able to ecognise basic principles of circuitry and to understand there principles of operation. The students are able to apply methods for analysis and sizing of linear and non-linear analog circuits.           Module content         - Systematisation of the design development, traditional and top-down design methodology for mixed-signal systems, structural synthesis for analog circuits, modelling on different levels of abstractions; - non-linear analynifers,phase detektors, oscillators and VCO).           Course type         2L - 0E - 2S - 1P         Lecture notes, seminar exercises, laboratory instructions           Recommended         - Tietze, U, Schenk, C: Halbleiterschaltungen: Entwurf, Berechnung und Simulation.           Retord(s) of instruction/ media being used         - Werekey, W.: Analoge Schaltungen. Entwurf, Berechnung und Simulation.           Level category         2 (Bachelor=1, Master=2)           Summer/ Wither         Sumulation, sestudy, hands-on training, self-study instruction/ media being used           Level category         2 (Bachelor=1, Master=2)<		
Learning objectives         The student will be familiarized with the design of integrated analog circuits. The basic steps for the design of integrated circuits, the constructive understanding of circuits as well as the evaluation of structure alternatives for complex integrated bipolar circuits are emphasized. At the end of the module students are able to use behavioural and structural models on different levels of abstraction and to rate them. The students understand the principle of operation of a phase-locked loop and they are able to evaluate the PLLs properties. The students are able to evaluate and choose the best component implementation and to adopt it to a given application. For this purpose, the students are able to recognise basic principles of circuitry and to understand there principles of operation. The students are able to apply methods for analysis and sizing of linear and non-linear analog circuits.           Module content         - Systematisation of the design development, traditional and top-down design methodology for mixed-signal systems, structural synthesis for analog circuits, modelling on different levels of abstraction; - PLL principles of operation, abstract modeling schemata, and applications; - non-linear circuitry for integrated analog systems, integrated analog functional blocks and their usage for PLL applications (regulated and unregulated amplifiers, phase detektors, oscillators and VCO).           Course type         2L - 0E - 2S - 1P (Lecture, Exercises, laboratory instructions           Recommended         - Tietze, U.; Schenk, C.; Halbieiterschaltungstechnik. - Baker, R. J: Mixed-signal circuit design. - Kurz, C; Mathis, W.; Oszillatoren. - Bask, R. J: Mixed-signal circuit design. - Kurz, C; Mathis, W:: Oszillatoren. - Basker, R. J: Mixed-signal circuit design. - Kurz, C; Mathis, W: Casage study, hands-on training, self-study instructi		
evaluate and choose the best component implementation and to adopt it to a given application. For this purpose, the students are able to recognise basic principles of circuitry and to understand there principles of operation. The students are able to apply methods for analysis and sizing of linear and non-linear analog circuits.           Module content         - Systematisation of the design development, traditional and top-down design methodology for mixed-signal systems, structural synthesis for analog circuits, modelling on different levels of abstraction; - PLL principles of operation, abstract modeling schemata, and applications; - non-linear circuitry for integrated analog systems, integrated analog functional blocks and their usage for PLL applications (regulated and unregulated amplifiers, phase detektors, oscillators and VCO).           Course type         2L - 0E - 2S - 1P (Lecture, Exercises, Seminar, practical course)           Learning Material         Literature, lecture notes, seminar exercises, laboratory instructions           Recommended         - Tietze, U; Schenk, C: Hableiterschaltungstechnik.           Bitreature         - Meier, U.; Nerreter, W.: Analoge Schaltungen: Entwurf, Berechnung und Simulation.           Best, R.: Theorie und Anwendung des Phase-locked Loops         - Method(s) of           Talk, individual work, case study, hands-on training, self-study instructor/ media being used         - Level/ category           Level/ category         2 (Bachelor=1, Master=2)           Summer/ Winter         - exam during audit period(graded)           ECTS credits         6           Workload	Learning objectives	The basic steps for the design of integrated circuits, the constructive understanding of circuits as well as the evaluation of structure alternatives for complex integrated bipolar circuits are emphasized. At the end of the module students are able to use behavioural and structural models on different levels of abstraction and to rate them. The students understand the principle of operation of a phase-locked loop
design methodology for mixed-signal systems, structural synthesis for analog circuits, modelling on different levels of abstraction; - PLL principles of operation, abstract modeling schemata, and applications; - non-linear circuitry for integrated analog systems, integrated analog functional blocks and their usage for PLL applications (regulated and unregulated amplifiers,phase detektors, oscillators and VCO).           Course type         2L - 0E - 2S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Literature, lecture notes, seminar exercises, laboratory instructions           Recommended         - Tietze, U.; Schenk, C.: Halbleiterschaltungstechnik.           Iterature         - Meier, U.; Nerretr, W.: Analoge Schaltungen: Entwurf, Berechnung und Simulation. - Baker, R.J.: Mixed-signal circuit design. - Kurz, C.: Mathis, W.: Oszillatoren. - Best, R.: Theorie und Anwendung des Phase-locked Loops           Method(s) of instruction/ media being used         Taik, individual work, case study, hands-on training, self-study           Level/ category         2 (Bachelor=1, Master=2)           Summer/ Winter         summer, winter           Term         1. term           Compulsory         none           requirements         Assessment           Assessment         exam 90 min           Assessment         exam 90 min           Assessment         exam 90 min           Assessment         for ontact hours and 105h of self-study, consisting of: 70 h lecture (pre		evaluate and choose the best component implementation and to adopt it to a given application. For this purpose, the students are able to recognise basic principles of circuitry and to understand there principles of operation. The students are able to apply methods for analysis and sizing of linear and non-linear analog circuits.
Learning Material       Literature, lecture notes, seminar exercises, laboratory instructions         Recommended       - Tietze, U.; Schenk, C.; Halbleiterschaltungstechnik.         literature       - Meier, U.; Nerreter, W.; Analoge Schaltungen: Entwurf, Berechnung und Simulation.         - Baker, R.J.: Mixed-signal circuit design.       - Kurz, C.; Mathis, W.; Oszillatoren.         - Best, R.: Theorie und Anwendung des Phase-locked Loops         Method(s) of       Talk, individual work, case study, hands-on training, self-study         instruction/       media being used         Level/ category       2 (Bachelor=1, Master=2)         Summer/ Winter       summer, winter         Term       1. term         Compulsory       none         requirements       Assessment         Assessment modalities       PL – exam during audit period(graded)         ECTS credits       6         Workload       180h of total work load, thereof         75h of contact hours and       105h of self-study, consisting of:         70 h lecture (preparation and rework)       20 h practical training (preparation and evaluation)         15 h exam preparation       14         Usability of this module       I term         Time       According time table         Duration of module       1 term         Pla	Module content	<ul> <li>design methodology for mixed-signal systems, structural synthesis for analog circuits, modelling on different levels of abstraction;</li> <li>PLL principles of operation, abstract modeling schemata, and applications;</li> <li>non-linear circuitry for integrated analog systems, integrated analog functional blocks and their usage for PLL applications (regulated and</li> </ul>
Recommended       - Tietze, U.; Schenk, C.: Halbleiterschaltungstechnik.         literature       - Meier, U.; Nerreter, W.: Analoge Schaltungen: Entwurf, Berechnung und Simulation.         - Baker, R.J.: Mixed-signal circuit design.         - Kurz, C.; Mathis, W.: Oszillatoren.         - Best, R.: Theorie und Anwendung des Phase-locked Loops         Method(s) of         instruction/         media being used         Level/ category       2 (Bachelor=1, Master=2)         Summer/ Winter         summer, winter         Term       1. term         Compulsory       none         requirements         Assessment       exam 90 min         Assessment modalities       PL – exam during audit period(graded)         ECTS credits       6         Workload       180h of total work load, thereof         75h of contact hours and       105h of self-study, consisting of:         70 h lecture (preparation and rework)       20 h practical training (preparation and evaluation)         15 h exam preparation       Integration of mixed-signal circuits, Complex Lab Session, IC-Design, Masterarbeit         Time       According time table       Duration of module         Duration of module       1 term         Place/ room       EAH Jena         Frequency of o	Course type	
literature- Meier, U.; Nerreter, W.: Analoge Schaltungen: Entwurf, Berechnung und Simulation. - Baker, R.J.: Mixed-signal circuit design. - Kurz, C.; Mathis, W.: Oszillatoren. - Best, R.: Theorie und Anwendung des Phase-locked LoopsMethod(s) of instruction/ media being usedTalk, individual work, case study, hands-on training, self-studyLevel/category2 (Bachelor=1, Master=2)Summer/Wintersummer, winterTerm1. termCompulsory requirementsnoneAssessmentexam 90 minAssessmentexam 90 minAssessmentBoh of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 20 h practical training (preparation 15 h exam preparationUsability of this moduleIntegration of mixed-signal circuits, Complex Lab Session, IC-Design, MasterarbeitTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offertwice a year		Literature, lecture notes, seminar exercises, laboratory instructions
Simulation. - Baker, R.J.: Mixed-signal circuit design. - Kurz, C.; Mathis, W.: Oszillatoren. - Best, R.: Theorie und Anwendung des Phase-locked LoopsMethod(s) of instruction/ media being usedTalk, individual work, case study, hands-on training, self-studyLevel/ category2(Bachelor=1, Master=2)Summer/ Wintersummer, winterTerm1. termCompulsory requirementsnoneAssessmentexam 90 minAssessment modalitiesPL - exam during audit period(graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleIntegration of mixed-signal circuits, Complex Lab Session, IC-Design, MasterarbeitTimeAccording time tableDuration of module1 termPlace/roomEAH JenaFrequency of offertwice a year	Recommended	
Method(s) of instruction/ media being usedTalk, individual work, case study, hands-on training, self-studyLevel/ category2(Bachelor=1, Master=2)Summer/Wintersummer, winterTerm1. termCompulsory requirementsnoneAssessmentexam 90 minAssessment modalitiesPL - exam during audit period(graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleIntegration of mixed-signal circuits, Complex Lab Session, IC-Design, MasterarbeitTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offertwice a year	literature	Simulation. - Baker, R.J.: Mixed-signal circuit design. - Kurz, C.; Mathis, W.: Oszillatoren.
instruction/       media being used         Level/ category       2 (Bachelor=1, Master=2)         Summer/ Winter       summer, winter         Term       1. term         Compulsory       none         requirements       exam 90 min         Assessment       exam 90 min         Assessment modalities       PL – exam during audit period(graded)         ECTS credits       6         Workload       180h of total work load, thereof         75h of contact hours and       105h of self-study, consisting of:         70 h lecture (preparation and rework)       20 h practical training (preparation and evaluation)         15 h exam preparation       15 h exam preparation         Usability of this module       Integration of mixed-signal circuits, Complex Lab Session, IC-Design, Masterarbeit         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       twice a year	Method(s) of	
Level/ category2 (Bachelor=1, Master=2)Summer/ Wintersummer, winterTerm1. termCompulsorynonerequirementsexam 90 minAssessmentexam 90 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and evaluation) 15 h exam preparationUsability of this moduleIntegration of mixed-signal circuits, Complex Lab Session, IC-Design, MasterarbeitTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offertwice a year		
Summer/Wintersummer, winterTerm1. termCompulsorynonerequirements-Assessmentexam 90 minAssessment modalitiesPL - exam during audit period(graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleIntegration of mixed-signal circuits, Complex Lab Session, IC-Design, MasterarbeitTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offertwice a year	media being used	
Term1. termCompulsory requirementsnoneAssessmentexam 90 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleIntegration of mixed-signal circuits, Complex Lab Session, IC-Design, MasterarbeitTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offertwice a year		2 (Bachelor=1, Master=2)
Compulsory requirementsnoneAssessmentexam 90 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleIntegration of mixed-signal circuits, Complex Lab Session, IC-Design, MasterarbeitTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offertwice a year		summer, winter
requirementsAssessmentexam 90 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleIntegration of mixed-signal circuits, Complex Lab Session, IC-Design, MasterarbeitTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offertwice a year		1. term
Assessmentexam 90 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits6Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleIntegration of mixed-signal circuits, Complex Lab Session, IC-Design, MasterarbeitTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offertwice a year		none
Assessment modalities       PL – exam during audit period(graded)         ECTS credits       6         Workload       180h of total work load, thereof         75h of contact hours and       105h of self-study, consisting of:         70 h lecture (preparation and rework)       20 h practical training (preparation and evaluation)         15 h exam preparation       15 h exam preparation         Usability of this module       Integration of mixed-signal circuits, Complex Lab Session, IC-Design, Masterarbeit         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       twice a year		
ECTS credits       6         Workload       180h of total work load, thereof         75h of contact hours and       105h of self-study, consisting of:         70 h lecture (preparation and rework)       20 h practical training (preparation and evaluation)         15 h exam preparation       15 h exam preparation         Usability of this module       Integration of mixed-signal circuits, Complex Lab Session, IC-Design, Masterarbeit         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       twice a year		
Workload180h of total work load, thereof 75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleIntegration of mixed-signal circuits, Complex Lab Session, IC-Design, MasterarbeitTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offertwice a year		
75h of contact hours and 105h of self-study, consisting of: 70 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleIntegration of mixed-signal circuits, Complex Lab Session, IC-Design, MasterarbeitTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offertwice a year		-
105h of self-study, consisting of: 70 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 15 h exam preparationUsability of this moduleIntegration of mixed-signal circuits, Complex Lab Session, IC-Design, MasterarbeitTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offertwice a year	vvorkload	
70 h lecture (preparation and rework)         20 h practical training (preparation and evaluation)         15 h exam preparation         Usability of this module       Integration of mixed-signal circuits, Complex Lab Session, IC-Design, Masterarbeit         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       twice a year		
20 h practical training (preparation and evaluation)         15 h exam preparation         Usability of this module       Integration of mixed-signal circuits, Complex Lab Session, IC-Design, Masterarbeit         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       twice a year		
15 h exam preparation         Usability of this module       Integration of mixed-signal circuits, Complex Lab Session, IC-Design, Masterarbeit         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       twice a year		
Usability of this moduleIntegration of mixed-signal circuits, Complex Lab Session, IC-Design, MasterarbeitTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offertwice a year		
TimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offertwice a year	Usability of this module	Integration of mixed-signal circuits, Complex Lab Session, IC-Design,
Duration of module1 termPlace/ roomEAH JenaFrequency of offertwice a year	Time	
Place/ room     EAH Jena       Frequency of offer     twice a year		
Frequency of offer twice a year		

Module number	ET.2.106
Module name	Electromagnetic Fields
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ma)
Module coordinator	Prof. DrIng. Martin Hoffmann
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	The students acquire advanced and applicable knowledge at
	electromagnetic fields. They are able to solve the Maxwell equations for
	selected field problems. They have learned different strategies to solve
	electromagnetic problems and can apply these practically. Students are
	familiar with ANSYS Maxwell analysis software for the simulation of
Mar I. I. State of	electromagnetic fields and can apply them.
Module content	The lecture teaches basic strategies and tools for the treatment of electrical
	and magnetic field systems:
	- Maxwell equations in differential and integral form
	- static electric and magnetic fields - scalar fields / vector fields
	- mirroring method, field analogies
	- boundary value problem, material properties
	- dynamic electromagnetic fields, electromagnetic waves
	- wave propagation in conductive medium
	- wave propagation in waveguides
	- FEM analysis of electrical and magnetical problems
Course type	2L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course)
Learning Material	Literature, lab instruction sheets, handouts
Recommended	Recommended literature will be announced in the lecture.
literature	
Method(s) of	lecture, practical course, self-study
instruction/	
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/ Winter	summer term
Term	1. term
Compulsory	none
requirements	
Recommended	Electrical Engineering 1/2, Analysis 1/2, Physiks
requirements	
Assessment	exam 90 min, Laboratory internship certificate
Assessment modalities	PL - test performance (graded)
	APL - certificate (nongraded)
ECTS credits	6 180h of total work load, thereof
Workload	180h of total work load, thereof - 60h of contact hours and
	- 120h of self-study, consisting of:
	- 35h lecture (preparation and rework)
	- 35h practical training (preparation and evaluation)
	- 50h exam preparation
Usability of this module	Complex Lab Session, Design of Electronic Systems, Applied Actuators
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German
<u> </u>	·

Mashula wuxuu han	ET 0.407
Module number	ET.2.107
Module name	Servo Drive Systems and Components
Department	Electrical Engineering and Information Technology
Degree program	Me (Ma), RFE (Ma), ET/IT (Ma)
Specialization/ Profil	Automation Technology
Module coordinator	Prof. DrIng. Matthias Förster
Compulsory/ optional/ electiv	elective
Learning objectives	Based on the basics of electric machines and field-oriented control, in-depth mathematical and systemic knowledge of the control and control of electric drives will be imparted. Additionally the communication – and control possibilities for electric drives are to be learned. After successfully participating in this course, students are able to develop, design and simulate an electric drive with a wide variety of types of control.
Module content	<ul> <li>The topics of the lecture are</li> <li>Introduction and describtion of electrival drive systems</li> <li>repeat the construction and operation of dc- and ac- motors</li> <li>mathematical description of DC- and AC-machines (especially with field- oriented control)</li> <li>calculation and description of speed- and positioncontrol</li> <li>introduction into the control- and communication technology of electrical drives</li> <li>In the practical course the students work with the following experiments:</li> <li>Simulation of DC- and AC-machines</li> <li>Positioning System</li> <li>Drive control</li> </ul>
Course type	2L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course)
Learning Material	lecture papers and experiment instructions
Recommended literature	Brosch, P.: Antriebspraxis Schulze, M.:Elektrische Servoantriebe Schröder, D.: Elektrische Antriebe – Regelung von Antriebssystemen
Method(s) of instruction/ media being used	lecture and experiment
Level/ category	2 (Bachelor=1, Master=2)
Summer/ Winter	summer term
Term	1. term
Compulsory	none
requirements	Leastrical Drives
Recommended	Electrical Drives
requirements	
Assessment	exam 60 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	
Workload	<ul> <li>180h of total work load, thereof</li> <li>60h of contact hours and</li> <li>120h of self-study, consisting of:</li> <li>35h lecture (preparation and rework)</li> <li>60 h practical training (preparation and evaluation)</li> <li>25 h exam preparation</li> </ul>
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Place/ room	
	EAH Jena Annually German

Module number	ET.2.110
Module name	Nontechnical elective modules
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ma), RFE (Ma), Me (Ma)
Compulsory/ optional/ electiv	optional
Module content	The Nontechnical elective modules (3 ECTS-credits) allow a selection of 1 module according to your interests. These modules are available: ET.2.112 – Industrial Property ET.2.113 – English for Specific Purposes ET.2.114 – Business administration compulsory lesson You can find the concrete module content in the relevant module description.
Course type	(Lecture, Exercises, Seminar, practical course)
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	summer term or winter term
Term	1st or 2nd term
Compulsory requirements	none
ECTS credits	3
Workload	90 h
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Inclusion Induct         Entitie           Module name         Industrial Property           Degree program         Industrial Property           Module coordinator         Prof. Dr. Enders, Prof. Dr. Görg           Compulsory optional/ electiv         Compulsory           Learning objectives         The module "Intellectual Property " has the following objectives : - learning to identify all necessary strategic decisions on Intellectual PropertyLegal;           - The intellectual property rights as private rights subjective to distinguish absolute rights and intellectual property rights : - Main features of the intermational intellectual property capture , in particular between ubiquity, territoniality, protection principle of the country , the country of origin principle and country of origin principle to differentiate ; - Key international agreements such as the ParisConvention and the TRIPS Agreement and theritrow practical application ; - Learn the similarities and the differences between patent and utility model law ; - Practical application of the claims and their enforcements from the different intellectual property rights.           Module content         Subject of the event is industrial property law which surrounds the strategic IP management with the individual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right is sillustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.           Course type         0L - 0E - 2S - 0P         (Lecture, Exercises, Seminar, practical course)           Recommended         Enders, T: Produkteinführung u	Module number	ET.2.112
Department         Business Administration           Degree program         Industrial Property           Module coordinator         Prof. Dr. Enders, Prof. Dr. Görg           Compulsory/ optional/         Compulsory           Learning objectives         The module " Intellectual Property " has the following objectives : - International intellectual property rights as private rights subjective to distinguish absolute rights and intellectual property rights : - Main features of the international intellectual property capture , in particular between ubiquity, territoriality, protection principle of the country , the country of origin principle and country of origin principle to differentiate; - Key international agreements such as the ParisConvention and the TRIPS Agreement and theirknow practical application ; - Learn the similarities and the differences between patent and utility model law : - Practical application of the principles of design right, theCopyright law, trademark law, as well as important aspects ofLaw of unfair competition ; - Practical application of the claims and their enforcements from the different intellectual property rights.           Module content         Subject of the event is industrial property law which surrounds the strategic irple management with the induvidual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.           Course type         0L - 0E - 2S - 0P         (Lecture, Exercises, Seminar, practical course)         • Enders, T: Produkteinführung und Gewerbli		
Degree program         Industrial Property           Module coordinator         Prof. Dr. Enders, Prof. Dr. Görg           Compulsory/ electiv         Compulsory           Learning objectives         The module " Intellectual Property "has the following objectives : - learning to identify all necessary strategic decisions on Intellectual PropertyLegal;           - The intellectual property rights a private rights subjective to distinguish absolute rights and intellectual property rights ; - Main features of the international intellectual property capture , in particular between ubiquity, territoriality, protection principle of the country , the country of origin principle and country of origin principle and country of origin principle and country of origin principle and their RNPS Agreement and their RNP practical application ; - Learn the similarities and the differences between patent and utility model law; - Elaboration of the principles of design right, theCopyright law, trademark law, as well as important aspects ofLaw of unfair competition ; - Practical application of the claims and their enforcements from the different intellectual property rights.           Module content         Subject of the event is industrial property law which surrounds the strategic IP management with the individual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstack to investment.           Course type         OL - 0 25 - 0.Pr         (Lecture, Exercises, Seminar, practical course)           Recommended literature </td <td></td> <td></td>		
Module coordinator         Prof. Dr. Enders, Prof. Dr. Görg           Compulsory/ optional/ dectiv         Compulsory         Compulsory           Learning objectives         The module " Intellectual Property "has the following objectives : - Haring to identify all necessary strategic decisions on Intellectual PropertyLega;           - The intellectual property rights as private rights subjective to distinguish absolute rights and intellectual property rights : - Main features of the international intellectual property capture , in particular between ubiquity , territoriality , protection principle of the country, the country of origin principle and country of origin principles of the differentiate : - Key international agreements such as the ParisConvention and the TRIPS Agreement and theirknow practical application ; - Learn the similarities and the differences between patent and utility model law : - Practical application of the principles of design right, theCopyright law, trademark law, as well as important aspects ofLaw of unfair competition ; - Practical application of the claims and their anothe different intellectual property rights.           Module content         Subject of the event is industrial property law which surrounds the strategic IP management with the individual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstack to investment.           Course type         OL - 0E - 2S - 0P         Lecture, Exercises, Seminar, practical course)         - Enders, T. : Fodukteinfuhrung und Gewerbliche Schutzrechte, in: Steckler, - Enders		
Compulsory/ optional/ electiv         Compulsory           Learning objectives         The module " Intellectual Property " has the following objectives : - learning to identify all necessary strategic decisions on Intellectual PropertyLegal; - The intellectual property rights as private rights subjective to distinguish absolute rights and intellectual property rights; - Main features of the international intellectual property capture, in particular between ubiquity, territoriality, protection principle of the country, the country of origin principle and country of origin principle to differentiate : - Key international agreements such as the ParisConvention and the TRIPS Agreement and theirKnow practical application ; - Learn the similarities and the differences between patent and utility model law; - Elaboration of the principles of design right, theCopyright law, trademark law, as well as important aspects off.aw of unfair competition; - Practical application of the claims and their enforcements from the different intellectual property rights.           Module content         Subject of the event is industrial property law which surrounds the strategic IP management with the individual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights is illustrated by concrestes, Seminar, practical course)           Recommended investment protection and an obstacle to investment.         Euders, T.: Gewerblicher Rechtsschutz, Urbeber- und Medienrecht, neueste Auflage; - Enders, T.: Fordukteinführung und Gewerbliche Schutzrechte, in: Steckler, - B./Pepels, W.: Handbuch für Rechtschutz, und Urheberrecht, neueste Auflage; - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage; - Ensthaler, J.: Gewerblicher Rechtschutz und U		
electiv         Intervention           Learning objectives         The module * Intellectual Property * has the following objectives : - learning to identify all necessary strategic decisions on Intellectual PropertyLega;           - The intellectual property rights as private rights subjective to distinguish absolute rights and intellectual property rights : - Main features of the international intellectual property capture , in particular between ubiquity , territoriality , protection principle to differentiate : - Key international agreements such as the ParisConvention and the TRIPS Agreement and theirknow practical application ; - Learn the similarities and the differences between patent and utility model law : - Elaboration of the principles of design right, theCopyright law, trademark law , as well as important aspects ofLaw of unfair competition : - Practical application of the claims and their enforcements from the different intellectual property rights is illustrated property law which surrounds the strategic of personality on the other hand worked out. The importance of individual rights and copyright. The economic dimension on the one hand and the right of personality on the other kand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.           Course type         OL - 0E - 25 - 0P (Lecture, Exercises, Seminar, practical course)           - Enders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage; - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage; - Ens		
Learning objectives         The module " Intellectual Property " has the following objectives : - learning to identify all necessary strategic decisions on Intellectual PropertyLegal;           - The intellectual property rights as private rights subjective to distinguish absolute rights and intellectual property rights;         - In particular between ubiquity, protection principle of the country, the country of origin principle and country of origin principle to differentiate;           - Key international agreements such as the ParisConvention and the TRIPS Agreement and theirknow practical application;         - Learn the similarities and the differences between patent and utility model law;           - Elaboration of the principles of design right, theCopyright law, trademark law, as well as important aspects ofLaw of unfair competition;         - Practical application of the claims and their enforcements from the different intellectual property rights.           Module content         Subject of the event is industrial property law which surrounds the strategic IIP management with the individual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstack to investment.           Course type         0L - 0E - 2S - 0P         (Lecture, Exercises, Seminar, practical course)         - Enders, T.: Fordukteinführung und Gewerbliche Schutzrecht, in: Steckler, - B./Pepeis, W.: Handbuch für Rechtschutz und Urheberrecht, neueste Auflage;           Method(s) of instructon/ media being used         Seminar with case studie		Compulsory
- learning to identify all necessary strategic decisions on Intellectual PropertyLegal;       - The intellectual property rights as private rights subjective to distinguish absolute rights and intellectual property rights;         - Main features of the international intellectual property capture, in particular between ubiquity, iterritoriality, protection principle of the country, the country of origin principle and country of origin principle to differentiate;         - Key international agreements such as the ParisConvention and the TRIPS Agreement and theirknow practical application;         - Learn the similarities and the differences between patent and utility model law;         - Elaboration of the principles of design right, theCopyright law, trademark law, as well as important aspects ofLaw of unfair competition;         - Practical application of the claims and their enforcements from the different intellectual property rights.         Module content       Subject of the event is industrial property law which surrounds the strategic of personality on the other hand worked out. The importance of individual rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.         Course type       0L - 0E - 2S - 0P       (Lecture, Exercises, Seminar, practical course)         - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, - B./Pepels, W.: Handbuch für Rechtsschutz, Urbeer- und Medienrecht, neueste Auflage;         - Entaler, J.: Gewerblicher Rechtsschutz, und Urheberrecht, neu		The module "Intellectual Property " has the following objectives :
PropertyLegal;       - The intellectual property rights a private rights subjective to distinguish absolue rights and intellectual property rights;         - Main features of the international intellectual property capture , in particular between ubiquity, territoricon principle of the country, the country of origin principle and country of origin principle to differentiate;         - Key international agreements such as the ParisConvention and the TRIPS Agreement and theirknow practical application;         - Learn the similarities and the differences between patent and utility model law;         - Elaboration of the principles of design right, theCopyright law, trademark law, as well as important aspects of Law of unfair competition :         - Practical application of the claims and their enforcements from the different intellectual property rights.         Module content       Subject of the event is industrial property law which surrounds the strategic IP management with the individual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between linvestiment protection and an obstacle to investment.         Course type       OL - 0E - 2S - 0P       (Lecture, Exercises, Seminar, practical course)         Recommended       - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, e. B./Pepels, W: Handbuch für Rechtsrschutz, Urheber- und Medienrecht, neueste Auflage;         - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, e. B./Pepels, W: Handbuch für Rechts		
- The intellectual property rights as private rights subjective to distinguish absolute rights and intellectual property capture , in particular between ubiquity , territoriality , protection principle of the country, the country of origin principle and country of origin principle to differentiate ; - Key international agreements such as the ParisConvention and the TRIPS Agreement and theirknow practical application ; - Learn the similarities and the differences between patent and utility model law ; - Elaboration of the principles of design right, theCopyright law, trademark law , as well as important aspects ofLaw of unfair competition ; - Practical application of the claims and their enforcements from the different intellectual property rights.            Module content         Subject of the event is industrial property law which surrounds the strategic IP management with the individual areas of patent law, utility models, design rights is illustrated by concrete examples in the case of individual rights is illustrated by concrete examples in the case of individual rights is illustrated by concrete examples in the case of individual rights is illustrated by concrete examples in the case of tension between investiment protection and an obstacle to investment.            Course type         0L - 0E · 2S · 0P (Lecture, Exercises, Seminar, practical course) - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, - B/Pepels, W.: Handbuch für Rechtsschutz und Urheberrecht, neueste Auflage; - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.		
absolute rights and intellectual property rights :       - Main features of the international intellectual property capture , in particular between ubiquity , territoriality , protection principle of the country , the country of origin principle and country of origin principle to differentiate ;         . Key international agreements such as the ParisConvention and the TRIPS Agreement and theirknow practical application ;       - Learn the similarities and the differences between patent and utility model law ;         . Elaboration of the principles of design right, theCopyright law, trademark law , as well as important aspects of Law of unfair competition ;       - Practical application of the claims and their enforcements from the different intellectual property rights.         Module content       Subject of the event is industrial property law which surrounds the strategic IP management with the individual areas of patent law, utility models, design rights is illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.         Course type       OL - 0E - 2S - 0P (Lecture, Exercises, Seminar, practical course)         Recommended       1E-nders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage;         - Enders, T.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage;         - Level / degrey       2 (Bachelor=1, Master=2)         Summer/ Winter       summer term or winter term         Iterature       1st or 2 nd term         Auflage.       2 (Bachelor=1, Master=2)         Summer/ Winter       summer term or winte		
• Main features of the international intellectual property capture, in particular between ubiquity, territoriality, protection principle of the country of origin principle and country of origin principle to differentiate;           • Key international agreements such as the ParisConvention and the TRIPS Agreement and theirknow practical application ;           • Learn the similarities and the differences between patent and utility model law ;           • Elaboration of the principles of design right, theCopyright law, trademark law, as well as important aspects ofLaw of unfair competition ;           • Practical application of the claims and their normet intellectual property rights.           Module content         Subject of the event is industrial property law which surrounds the strategic IIP management with the individual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.           Course type         OL - 0E - 2S - 0P         (Leure, Exercises, Seminar, practical course)           • Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, - B./Pepels, W.: Handbuch für Rechtsschutz, Urheber- und Medienrecht, neueste Auflage;           • Level/ category         2 (Bachelor=1, Master=2)           Summer term or winter term           Compulsory         none           Assessment         exam 90 min           Assessment         exam 90 min<		
between ubiquity, territoriality, protection principle of the country, the country of origin principle and country of origin principle to differentiate : <ul></ul>		
country of origin principle and country of origin principle to differentiate ;           - Key international agreements such as the ParisConvention and the TRIPS Agreement and theirknow practical application ;           - Learn the similarities and the differences between patent and utility model law;           - Elaboration of the principles of design right, theCopyright law, trademark law, as well as important aspects of Law of unfair competition ;           - Practical application of the claims and their enforcements from the different intellectual property rights.           Module content         Subject of the event is industrial property law which surrounds the strategic IP management with the individual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.           Course type         OL - 0E - 2S - 0P         (Lecture, Exercises, Seminar, practical course)           Recommended         - Enders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage;         - Enders, T.: Steckler, - B./Pepels, W.: Handbuch für Rechtsrchutz und Urheberrecht, neueste Auflage.           Method(s) of instruction/ media being used         Seeminar with case studies           Level/ category         2 (Bachelor=1, Master=2)           Summer term or winter term         Assessment           Assessment         exam during audit period(graded)		
Agreement and theirknow practical application ; - Learn the similarities and the differences between patent and utility model law ; - Elaboration of the principles of design right, theCopyright law, trademark law , as well as important aspects ofLaw of unfair competition ; - Practical application of the claims and their enforcements from the different intellectual property rights.Module contentSubject of the event is industrial property law which surrounds the strategic IP management with the individual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.Course type0L · OE · 2S · OP (Lecture, Exercises, Seminar, practical course)Recommended literature- Enders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage; - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, - B./Pepels, W.: Handbuch für Rechtsschutz und Urheberrecht, neueste Auflage.Method(s) of instruction/ media being usedSeminar with case studies instruction/ media being usedLevel/ category2 (Bachelor=1, Master=2)Summer/ Wintersummer term or winter termTerm1st or 2nd termAssessmentexam 90 minAssessmentexam 90 minAssessment modalitiesPL - exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20		
- Learn the similarities and the differences between patent and utility model law ;         - Elaboration of the principles of design right, theCopyright law, trademark law , as well as important aspects of Law of unfair competition ;         - Practical application of the claims and their enforcements from the different intellectual property rights.         Module content       Subject of the event is industrial property law which surrounds the strategic IP management with the individual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.         Course type       OL - OE - 2S - OP (Lecture, Exercises, Seminar, practical course)         Recommended       Enders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage;         - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, B./Pepels, W.: Handbuch für Rechtsschutz und Urheberrecht, neueste Auflage;         Method(s) of       Seminar with case studies         instruction/       Summeri Vinter         Term       1st or 2nd term         Corrus type       0. A cording undit period(graded)         ECTS credits       3         Workload       90h of total work load, thereof 30h of contact hours and 60h of self-study, consting of: 40 h lecture (preparation and rework) 20 h exam preparation and rework) 20 h exam preparation and rework) 20 h exam p		- Key international agreements such as the ParisConvention and the TRIPS
law ; - Elaboration of the principles of design right, theCopyright law, trademark law , as well as important aspects ofLaw of unfair competition ; - Practical application of the claims and their enforcements from the different intellectual property rights.Module contentSubject of the event is industrial property law which surrounds the strategic IP management with the individual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.Course typeOL - OE - 2S - OP (Lecture, Exercises, Seminar, practical course)Recommended literature- Enders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage; - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, - B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage; - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.Method(s) of instruction/ media being usedSeminar with case studiesLevel/ category2 (Bachelor=1, Master=2)Summer/ Wintersummer term or winter termTerm1st or 2nd termCompulsory requirementsput exam 90 minAssessment Assessment modalities90 h of total work load, thereof 30 h of contact hours and 60 h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTime Duration of module1 termPlace/ room EAH JenaEAH Jena		
- Elaboration of the principles of design right, theCopyright law, trademark         law, as well as important aspects ofLaw of unfair competition;         - Practical application of the claims and their enforcements from the different intellectual property rights.         Module content       Subject of the event is industrial property law which surrounds the strategic IP management with the individual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.         Course type       0L - 0E - 2S - 0P (Lecture, Exercises, Seminar, practical course)         Recommended       - Enders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage;         - Enders, T.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage;         - Enders, T.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage;         - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage;         - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage;         - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage;         - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage;         - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage;         - Ensthaler, J.: Gewerblicher Rechtsschutz         Method(s) of       Seminar with		
law, as well as important aspects of Law of unfair competition : - Practical application of the claims and their enforcements from the different intellectual property rights.Module contentSubject of the event is industrial property law which surrounds the strategic IP management with the individual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.Course type0L - 0E - 2S - 0P (Lecture, Exercises, Seminar, practical course)Recommended Iterature- Enders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage; - Enders, T.: Produkteinfürkrung und Gewerbliche Schutzrechte, in: Steckler, - B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage; - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.Method(s) of instruction/ media being used Level/ category2 (Bachelor=1, Master=2)Summer/ Wintersummer term or winter termTerm1st or 2nd termCompulsory nonenoneAssessment modalitiesPL - exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 30h of contact hours and 		
- Practical application of the claims and their enforcements from the different intellectual property rights.         Module content       Subject of the even is industrial property law which surrounds the strategic IP management with the individual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.         Course type       0L - 0E - 2S - 0P (Lecture, Exercises, Seminar, practical course)         Recommended       - Enders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage;         - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, - B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;         - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage;         - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage;         - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage;         Level/ category       2 (Bachelor=1, Master=2)         Summer/ Winter       summer term or winter term         Term       1st or 2nd term         Assessment modalities       PL – exam during audit period(graded)         ECTS credits       3         Workload       90 hof total work load, thereof         30h of contact hours and       60h of self-study, c		
Intellectual property rights.           Module content         Subject of the event is industrial property law which surrounds the strategic IP management with the individual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.           Course type         OL - 0E - 2S - 0P         (Lecture, Exercises, Seminar, practical course)           Recommended         - Enders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage;           - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, - B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;           - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.           Method(s) of instruction/ media being used         Seminar with case studies           Level/ category         2 (Bachelor=1, Master=2)           Summer term or winter term         Assessment           Assessment         exam 90 min           Assessment         exam 90 min           Assessment         90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparation           Time         According time table           Duration of module         1 term           Place/ room		
Module content       Subject of the event is industrial property law which surrounds the strategic IP management with the individual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.         Course type       0L - 0E - 2S - 0P       (Lecture, Exercises, Seminar, practical course)         Recommended literature       - Enders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage; - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, - B/Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage; - Enders, T.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.         Method(s) of instruction/ media being used       Seminar with case studies         Level/ category       2 (Bachelor=1, Master=2)         Summer/ Winter       summer term or winter term         Term       1st or 2nd term         Compulsory requirements       none         Assessment       exam 90 min         Assessment       90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparation         Time       According time table         Duration of module       1 term         Place/ room       EAH		
IP management with the individual areas of patent law, utility models, design rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.Course type0L - 0E - 2S - 0P 0L - 0E - 2S - 0P 0Lecture, Exercises, Seminar, practical course)Recommended literature- Enders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage; - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, - B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage; - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.Method(s) of instruction/ media being usedSeminar with case studiesLevel/ category2 (Bachelor=1, Master=2)Summer/ Wintersummer term or winter termTerm1st or 2nd termCompulsory requirementsnoneAssessment exasesment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Madula contont	
rights and copyright. The economic dimension on the one hand and the right of personality on the other hand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.Course type0L - 0E - 2S - 0P - Enders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage; - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, - B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage; - Enstaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.Method(s) of instruction/ media being usedSeminar with case studiesLevel/ category2 (Bachelor=1, Master=2)Summer/ Wintersummer term or winter term - 1st or 2nd termCompulsory requirementsnoneAssessmentexam 90 minAssessment modalitiesPL - exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof - 30h of contact hours and - 60h of self-study, consisting of: - 40 h lecture (preparation and rework) - 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Module content	
of personality on the other hand worked out. The importance of individual rights is illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.Course type0L - 0E - 2S - 0P (Lecture, Exercises, Seminar, practical course)Recommended literature- Enders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage; - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, - B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage; - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.Method(s) of instruction/ media being usedSeminar with case studiesLevel/category2 (Bachelor=1, Master=2)Summer/Wintersummer term or winter termTerm1st or 2nd termCompulsory requirementsPL - exam during audit period(graded)Assessment Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTime Place/roomAccording time tableDuration of module1 termPlace/roomEAH JenaFrequency of offerAnnually		
rights is illustrated by concrete examples in the case of tension between investment protection and an obstacle to investment.Course typeOL - 0E - 2S - OP (Lecture, Exercises, Seminar, practical course)Recommended literature- Enders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage; - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, - B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage; - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.Method(s) of instruction/ media being usedSeminar with case studiesLevel/ category2(Bachelor=1, Master=2)Summer/ Wintersummer term or winter termTerm1st or 2nd termCompulsory requirementsPL - exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
investment protection and an obstacle to investment.Course type0L - 0E - 2S - 0P(Lecture, Exercises, Seminar, practical course)Recommended- Enders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage; - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, - B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage; - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.Method(s) of instruction/ media being usedSeminar with case studiesLevel/ category2(Bachelor=1, Master=2)Summer/Wintersummer term or winter termTerm1st or 2nd termCompulsory requirementsnoneAssessmentexam 90 minAssessment 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Course type         OL - 0E - 2S - 0P         (Lecture, Exercises, Seminar, practical course)           Recommended literature         - Enders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage; - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, - B/Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage; - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.           Method(s) of instruction/ media being used         Seminar with case studies           Level/ category         2           Summer/ Winter         summer term or winter term           Term         1st or 2nd term           Compulsory requirements         none           Assessment         exam 90 min           Assessment modalities         PL – exam during audit period(graded)           ECTS credits         3           Workload         90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparation           Time         According time table           Duration of module         1 term           Place/ room         EAH Jena           Frequency of offer         Annually		
Recommended literature       - Enders, T.: Gewerblicher Rechtsschutz, Urheber- und Medienrecht, neueste Auflage;         - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, - B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;         - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.         Method(s) of instruction/ media being used         Level/ category       2 (Bachelor=1, Master=2)         Summer/ Winter       summer term or winter term         Term       1st or 2nd term         Compulsory       none         requirements       assessment         Assessment       exam 90 min         Assessment modalities       PL – exam during audit period(graded)         ECTS credits       3         Workload       90h of total work load, thereof         30h of contact hours and       60h of self-study, consisting of: 40 h lecture (preparation and rework)         20 h exam preparation       20 h exam preparation         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually	Course type	
literatureneueste Auflage; - Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, - B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage; - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.Method(s) of instruction/ media being usedSeminar with case studiesLevel/ category2(Bachelor=1, Master=2)Summer/ Wintersummer term or winter termTerm1 st or 2nd termCompulsory requirementsnoneAssessmentexam 90 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
- Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler, - B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage; - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.Method(s) of instruction/ media being usedSeminar with case studiesLevel/ category2 (Bachelor=1, Master=2)Summer/ Wintersummer term or winter termTerm1st or 2nd termCompulsory requirementsexam 90 minAssessmentexam 90 minAssessment90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
- B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage; - Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.Method(s) of instruction/ media being usedSeminar with case studiesLevel/ category2 (Bachelor=1, Master=2)Summer/ Wintersummer term or winter termTerm1st or 2nd termCompulsory requirementsnoneAssessmentexam 90 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	morataro	neucote Aunage,
- Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.Method(s) of instruction/ media being usedSeminar with case studiesLevel/ category2 (Bachelor=1, Master=2)Summer/ Wintersummer term or winter termTerm1st or 2nd termCompulsory requirementsnoneAssessmentexam 90 minAssessment modalitiesPL - exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Auflage.Method(s) of instruction/ media being usedSeminar with case studiesLevel/ category2 (Bachelor=1, Master=2)Summer/ Wintersummer term or winter termTerm1st or 2nd termCompulsory requirementsnoneAssessmentexam 90 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		- Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,
Method(s) of instruction/ media being usedSeminar with case studiesLevel/ category2 (Bachelor=1, Master=2)Summer/ Wintersummer term or winter termTerm1st or 2nd termCompulsory requirementsnoneAssessmentexam 90 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> </ul>
instruction/ media being used2(Bachelor=1, Master=2)Level/ category2(Bachelor=1, Master=2)Summer/ Wintersummer term or winter termTerm1st or 2nd termCompulsory requirementsnoneAssessmentexam 90 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste</li> </ul>
media being usedLevel/ category2 (Bachelor=1, Master=2)Summer/ Wintersummer term or winter termTerm1st or 2nd termCompulsory requirementsnoneAssessmentexam 90 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 		<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> </ul>
Level/ category2 (Bachelor=1, Master=2)Summer/ Wintersummer term or winter termTerm1st or 2nd termCompulsorynonerequirementsAssessmentexam 90 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Method(s) of	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> </ul>
Summer/Wintersummer term or winter termTerm1st or 2nd termCompulsorynonerequirements-Assessmentexam 90 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Method(s) of instruction/	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> </ul>
Term1st or 2nd termCompulsory requirementsnoneAssessmentexam 90 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Method(s) of instruction/ media being used	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> <li>Seminar with case studies</li> </ul>
Compulsory requirementsnoneAssessmentexam 90 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Method(s) of instruction/ media being used Level/ category	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> <li>Seminar with case studies</li> <li>2 (Bachelor=1, Master=2)</li> </ul>
requirementsexam 90 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Method(s) of instruction/ media being used Level/ category Summer/ Winter	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> <li>Seminar with case studies</li> <li>2 (Bachelor=1, Master=2) summer term or winter term</li> </ul>
Assessmentexam 90 minAssessment modalitiesPL – exam during audit period(graded)ECTS credits3Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Method(s) of instruction/ media being used Level/ category Summer/ Winter Term	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> <li>Seminar with case studies</li> <li>2 (Bachelor=1, Master=2) summer term or winter term</li> <li>1st or 2nd term</li> </ul>
Assessment modalities       PL – exam during audit period(graded)         ECTS credits       3         Workload       90h of total work load, thereof         30h of contact hours and       60h of self-study, consisting of:         40 h lecture (preparation and rework)       20 h exam preparation         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually	Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> <li>Seminar with case studies</li> <li>2 (Bachelor=1, Master=2) summer term or winter term</li> <li>1st or 2nd term</li> </ul>
ECTS credits       3         Workload       90h of total work load, thereof         30h of contact hours and       30h of contact hours and         60h of self-study, consisting of:       40 h lecture (preparation and rework)         20 h exam preparation         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually	Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> <li>Seminar with case studies</li> <li>2 (Bachelor=1, Master=2) summer term or winter term</li> <li>1st or 2nd term</li> <li>none</li> </ul>
Workload90h of total work load, thereof 30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Assessment	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> <li>Seminar with case studies</li> <li>2 (Bachelor=1, Master=2) summer term or winter term</li> <li>1st or 2nd term</li> <li>none</li> <li>exam 90 min</li> </ul>
30h of contact hours and 60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Assessment Assessment modalities	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> <li>Seminar with case studies</li> <li>2 (Bachelor=1, Master=2) summer term or winter term</li> <li>1st or 2nd term</li> <li>none</li> <li>exam 90 min</li> <li>PL – exam during audit period(graded)</li> </ul>
60h of self-study, consisting of: 40 h lecture (preparation and rework) 20 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Assessment Assessment modalities ECTS credits	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> <li>Seminar with case studies</li> <li>2 (Bachelor=1, Master=2) summer term or winter term</li> <li>1st or 2nd term</li> <li>none</li> <li>exam 90 min</li> <li>PL – exam during audit period(graded)</li> <li>3</li> </ul>
40 h lecture (preparation and rework)         20 h exam preparation         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually	Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Assessment Assessment modalities ECTS credits	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> <li>Seminar with case studies</li> <li>2 (Bachelor=1, Master=2) summer term or winter term</li> <li>1st or 2nd term</li> <li>none</li> <li>exam 90 min</li> <li>PL – exam during audit period(graded)</li> <li>3</li> <li>90h of total work load, thereof</li> </ul>
20 h exam preparation       Time     According time table       Duration of module     1 term       Place/ room     EAH Jena       Frequency of offer     Annually	Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Assessment Assessment modalities ECTS credits	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> <li>Seminar with case studies</li> <li>2 (Bachelor=1, Master=2) summer term or winter term</li> <li>1st or 2nd term</li> <li>none</li> <li>exam 90 min</li> <li>PL – exam during audit period(graded)</li> <li>3</li> <li>90h of total work load, thereof</li> <li>30h of contact hours and</li> </ul>
TimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Assessment Assessment modalities ECTS credits	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> <li>Seminar with case studies</li> <li>2 (Bachelor=1, Master=2)</li> <li>summer term or winter term</li> <li>1st or 2nd term</li> <li>none</li> <li>exam 90 min</li> <li>PL – exam during audit period(graded)</li> <li>3</li> <li>90h of total work load, thereof</li> <li>30h of contact hours and</li> <li>60h of self-study, consisting of:</li> </ul>
Duration of module     1 term       Place/ room     EAH Jena       Frequency of offer     Annually	Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Assessment Assessment modalities ECTS credits	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> <li>Seminar with case studies</li> <li>2 (Bachelor=1, Master=2)</li> <li>summer term or winter term</li> <li>1st or 2nd term</li> <li>none</li> <li>exam 90 min</li> <li>PL – exam during audit period(graded)</li> <li>3</li> <li>90h of total work load, thereof</li> <li>30h of contact hours and</li> <li>60h of self-study, consisting of:</li> <li>40 h lecture (preparation and rework)</li> </ul>
Place/ room     EAH Jena       Frequency of offer     Annually	Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Assessment Assessment Assessment Morkload	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> <li>Seminar with case studies</li> <li>2 (Bachelor=1, Master=2)</li> <li>summer term or winter term</li> <li>1st or 2nd term</li> <li>none</li> <li>exam 90 min</li> <li>PL – exam during audit period(graded)</li> <li>3</li> <li>90h of total work load, thereof</li> <li>30h of contact hours and</li> <li>60h of self-study, consisting of:</li> <li>40 h lecture (preparation and rework)</li> <li>20 h exam preparation</li> </ul>
Frequency of offer Annually	Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Assessment Assessment Assessment Morkload	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> <li>Seminar with case studies</li> <li>2 (Bachelor=1, Master=2)</li> <li>summer term or winter term</li> <li>1st or 2nd term</li> <li>none</li> <li>exam 90 min</li> <li>PL – exam during audit period(graded)</li> <li>3</li> <li>90h of total work load, thereof</li> <li>30h of contact hours and</li> <li>60h of self-study, consisting of:</li> <li>40 h lecture (preparation and rework)</li> <li>20 h exam preparation</li> </ul>
	Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Assessment Assessment Assessment Morkload	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> <li>Seminar with case studies</li> <li>2 (Bachelor=1, Master=2)</li> <li>summer term or winter term</li> <li>1st or 2nd term</li> <li>none</li> <li>exam 90 min</li> <li>PL – exam during audit period(graded)</li> <li>3</li> <li>90h of total work load, thereof</li> <li>30h of contact hours and</li> <li>60h of self-study, consisting of:</li> <li>40 h lecture (preparation and rework)</li> <li>20 h exam preparation</li> <li>According time table</li> <li>1 term</li> </ul>
	Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Assessment Assessment Assessment Modalities ECTS credits Workload	<ul> <li>Enders, T.: Produkteinführung und Gewerbliche Schutzrechte, in: Steckler,</li> <li>B./Pepels, W.: Handbuch für Rechtsfragen im Unternehmen, Berlin: neueste Auflage;</li> <li>Ensthaler, J.: Gewerblicher Rechtsschutz und Urheberrecht, neueste Auflage.</li> <li>Seminar with case studies</li> <li>2 (Bachelor=1, Master=2)</li> <li>summer term or winter term</li> <li>1st or 2nd term</li> <li>none</li> <li>exam 90 min</li> <li>PL – exam during audit period(graded)</li> <li>3</li> <li>90h of total work load, thereof</li> <li>30h of contact hours and</li> <li>60h of self-study, consisting of:</li> <li>40 h lecture (preparation and rework)</li> <li>20 h exam preparation</li> <li>According time table</li> <li>1 term</li> <li>EAH Jena</li> </ul>

Institution         English for Specific Purposes           Department         Electrical Engineering and Information Technology           Degree program         RFE (Ma), ET/I (Ma), ME (Ma)           Module coordinator         Herr Ulrich Schuhknecht           Compulsory/optional/ electiv         The students are enabled to participate actively in meetings and discussions on study and work-related topics. This involves giving information and explaining, expressing optinions and reacting appropriately.           Learning objectives         The students are enabled to participate actively in meetings and discussions on study and work-related topics. This involves giving information and explaining, expressing optinions and reacting appropriately.           They develop their writing stratast:         They acquire business-related vocabulary and language skills relevant for engineers.           They acquire business-related vocabulary and language skills relevant for engineers.         - Meetings and discussions on study and work-related topics, e.g. research projects           - Listening to lectures in English         - Negotiations         - Project work           - Scientific texts and articles taken from journals, books and the internet as input for writing tasks         - Buester           - Builess English for engineers, e.g. company structure, start-ups, financial matters, marketing         - Durm, M. et al. English for Scientists. CUP, 2013           - Bileth, D.: Technical Writing Today. Media Corporation, 2005         - Armer: Cambridge English for Scientists. CUP, 2013	Module number	ET.2.113
Department         Electrical Engineering and Information Technology           Degree program         RFE (Ma), ET/IT (Ma), ME (Ma)           Module coordinator         Herr Ulrich Schuhknecht           Compulsory/ optional/         optional           electiv         The students are enabled to participate actively in meetings and discussions on study and work-related topics. This involves giving information and explaining, expressing options and reacting appropriately. They develop their writing skills relating to study and work-related text types, e.g. summaries, reports and abstracts. They are able to listen to lectures for gist and detail and to use the information gathered in follow-up speaking and writing activities. They are guine business-related vocabulary and language skills relevant for engineers. The course is set at level C1 of the Common European Framework.           Module content         • Meetings and discussions on study and work-related topics, e.g. research projects           • Listening to lectures in English         • Negotations           • Project work         • Scientific texts and articles taken from journals, books and the internet as input for writing tasks.           • Business English for english for Electrical Engineering in Higher Education         Studies, Garnet Education, 2014           • Hughes, J.: Successful Meetings, OUP, 2013         • Billet, D.: Technical Writing Today. Media Corporation, 2005           • Armer: Cambridge English for Scientists. CUP, 2011         • Engine. Englisch for Scientists. CUP, 2013           Billet, D.: Technical Writing Today. Media Corporatio		
Degree program         RFE (Ma), ET/IT (Ma), ME (Ma)           Module coordinator         Herr Ulrich Schuhknecht           Compulsory/ optional/ electiv         optional           Learning objectives         The students are enabled to participate actively in meetings and discussions on study and work-related topics. This involves giving information and explaining, expressing options and reacting appropriately. They develop their writing skills relating to study and work-related text types, e.g., summaries, reports and abstracts.           The y are able to listen to lectures for gist and detail and to use the information gathered in follow-up speaking and writing activities.           The y are guire business-related vocabulary and language skills relevant for engineers.           Module content         - Meetings and discussions on study and work-related topics, e.g. research projects           - Listening to lectures in English           - Negotiations         - Project work           - Scientific texts and articles taken from journals, books and the internet as input for writing tasks           - Burnisk Material         Reader           Reader         - Oun, M. et al: English for Electrical Engineering in Higher Education itterature           Studies. Garnet Education, 2014         - Hughes, J.: Successful Meetings. OUP, 2013           - Ballet, D.: Technical Writing Today. Media Corporation, 2005         - Armer: Cambridge English for Scientistis. CUP, 2011           - Engrine. Englischfultingenerine. Week Businses Medien         <		
Module coordinator         Herr Ulrich Schuhknecht           Compulsory/ optional/ electiv         optional           Learning objectives         The students are enabled to participate actively in meetings and discussions on study and work-related topics. This involves giving information and explaining, expressing options and reacting appropriately. They develop their writing skills relating to study and work-related text types, e.g. summaries, reports and abstracts. They are able to listen to lectures for gist and detail and to use the information gathered in follow-up speaking and writing activities. They acquire business-related vocabulary and language skills relevant for engineers. The course is set at level C1 of the Common European Framework.           Module content         - Meetings and discussions on study and work-related topics, e.g. research projects - Listening to lectures in English - Negotiations - Project work - Scientific texts and articles taken from journals, books and the internet as input for writing task - Business English for engineers, e.g. company structure, start-ups, financial matters, marketing           Course type         0 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course)           Learning Material         Reader           Recommended         10 Junn, M. et al: English for Electrical Englineering in Higher Education Studies. Garnet Education, 2014 - Hughes, J: Successful Meeting. OUP, 2013 - Billet, D.: Technical Writing Today. Media Corporation, 2005 - Armer: Cambridge English inch by inch. Mathias Meier Verlag - Research EU. Results Magazine. EU publications - Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011           Method(s) of Instructor/ media being used         Intera		
Compulsory/ optional/ electiv         optional           Learning objectives         The students are enabled to participate actively in meetings and discussions on study and work-related topics. This involves giving information and explaining, expressing options and reacting appropriately. They develop their writing skills relating to study and work-related text types, e.g., summaries, reports and abstracts. They are able to listen to lectures for gist and detail and to use the information gathered in follow-up speaking and writing activities. They are able to listen to lectures for gist and detail and to use the information gathered in follow-up speaking and writing activities.           Module content         • Meetings and discussions on study and work-related topics, e.g. research projects           • Listening to lectures in English • Negotiations         • Project work • Scientific texts and articles taken from journals, books and the internet as input for writing tasks • Business English for englineers, e.g. company structure, start-ups, financial matters, marketing           Course type         0L - 3E - 0S - 0P         (Lecture, Exercise, Seminar, practical course)           Learning Material         Reader         • Dun, M. et al: English for Electrical Englineering in Higher Education Studies. Garnet Education, 2014           • Hughes, J: Successful Meetings. OUP, 2013         • Billet, D: Technical Writing Today. Media Corporation, 2005           • Armer: Cambridge English for Scientists. CUP, 2011         • Englischfüringersize, elearening platform           • Interactive, audio and video recordings, e-learning platform         • Level Log of the Common European Framework).		
electiv Learning objectives The students are enabled to participate actively in meetings and discussions on study and work-related topics. This involves giving information and explaining, expressing opinions and reacting appropriately. They develop their writing stills relating to study and work-related text types, e.g. summaries, reports and abstracts. They are able to listen to lectures for gist and detail and to use the information gathered in follow-up speaking and writing activities. They acquire business-related vocabulary and language skills relevant for engineers. The course is set at level C1 of the Common European Framework. Module content • Meetings and discussions on study and work-related topics, e.g. research projects • Listening to lectures in English • Negotiations • Project work • Scientific texts and articles taken from journals, books and the internet as input for writing tasks • Business English for englineers, e.g. company structure, start-ups, financial matters, marketing Course type OL - 3E • OS • OP (Lecture, Exercises, Seminar, practical course) Learning Material Reader • Dunn, M. et al: English for Electrical Engineering in Higher Education itterature studies, Garnet Education, 2014 • Hughes, J.: Successful Meetings. OUP, 2013 • Billet, D.: Technical Writing roday. Media Corporation, 2005 • Armer: Cambridge English for Scientists. CUP, 2011 • Engine. Englischüringenieure, Weka Business Medien • Inch. Technical English linch by inch. Matthias Meier Verlag • Research EU. Results Magazine. EU publications • Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011 Method(s) of Method(s)		
Learning objectives         The students are enabled to participate actively in meetings and discussions on study and work-related topics. This involves giving information and explaining, expressing opinions and reacting appropriately. They develop their writing skills relating to study and work-related text types, e.g. summaries, reports and abstracts. They are able to listen to lectures for gist and detail and to use the information gathered in follow-up speaking and writing activities. They are able to listen to lectures for gist and detail and to use the information gathered in follow-up speaking and writing activities. They acquire business-related vocabulary and language skills relevant for engineers.           Module content         - Meetings and discussions on study and work-related topics, e.g. research projects           - Listening to lectures in English - Negotiations         - Regotings           - Project work         - Scientific texts and articles taken from journals, books and the internet as input for writing tasks           - Business English for engineers, e.g. company structure, start-ups, financial matters, marketing           Course type         OL - 3E - 0S - 0P           Clearning Material         Reader           Recommended         - Dunn, M. et al: English for Electrical Engineering in Higher Education Studies. Garnet Education, 2014           - Hughes, J.: Successful Meetings. OUP, 2013         - Billet, D.: Technical Writing Today. Media Corporation, 2005           - Armer: Cambridge English for Scientisc. Longman, 2011         - English for Scientisc. Longman, 2011           - English Griftingenieure, Weka Business Medien<		optional
They develop their writing skills relating to study and work-related text types, e.g. summaries, reports and abstracts. They are able to listen to lectures for gist and detail and to use the information gathered in follow-up speaking and writing activities. They acquire business-related vocabulary and language skills relevant for engineers. The course is set at level C1 of the Common European Framework.           Module content         - Meetings and discussions on study and work-related topics, e.g. research projects           - Listening to lectures in English - Negotiations         - Project work           Scientific texts and articles taken from journals, books and the internet as input for writing tasks         - Business English for engineers, e.g. company structure, start-ups, financial matters, marketing           Course type         0L - 3E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Reader         Reader           Recommended         - Dunn, M. et al: English for Electrical Engineering in Higher Education Studies. Garnet Education, 2014         - Hughes, J.: Successful Meetings. OUP, 2013           - Billet, D: Technical Writing Today. Media Corporation, 2005         - Armer: Cambridge English for Scientists. CUP, 2011           - Engine. English for Electrical Engineering in Higher Education Studies. Garnet Education and video recordings, e-learning platform instructon/ media being used           Level/category         2         (Bachelor=1, Master=2)           Summer/Winter         summer term           Term <td< td=""><td></td><td>on study and work-related topics. This involves giving information and</td></td<>		on study and work-related topics. This involves giving information and
information gathered in follow-up speaking and writing activities. They acquire business-related vocabulary and language skills relevant for engineers. The course is set at level C1 of the Common European Framework.           Module content         Meetings and discussions on study and work-related topics, e.g. research projects - Listening to lectures in English - Negotiations - Project work           Scientific texts and articles taken from journals, books and the internet as input for writing tasks - Business English for engineers, e.g. company structure, start-ups, financial matters, marketing           Course type         0L - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course)           Learning Material         Reader           Recommended         - Dunn, M. et al: English for Electrical Engineering in Higher Education Studies. Garnet Education, 2014 - Hughes, J.: Successful Meetings. OUP, 2013 - Billet, D.: Technical Writing Today. Media Corporation, 2005 - Armer: Cambridge English for Scientiss. CUP, 2011 - Englischfürdingenieure, Weka Business Medien - Inch. Technical English for Scientiss. CUP, 2011 - Englischfürdingenieure, Weka Business Medien - Inch. Technical English inch by inch. Matthias Meier Verlag - Research EU. Results Magazine. EU publications - Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011           Method(s) of Instruction/ media being used Level/ category         2 (Bachelor=1, Master=2)           Summer /Winter         Summer term - Term           Recommended         Successful completion of the module "Technical English" or equivalent (Level B2 of the Common European Framework)           Assessment         oral exam, written test <td></td> <td>They develop their writing skills relating to study and work-related text types, e.g. summaries, reports and abstracts.</td>		They develop their writing skills relating to study and work-related text types, e.g. summaries, reports and abstracts.
The course is set at level C1 of the Common European Framework.           Module content         - Meetings and discussions on study and work-related topics, e.g. research projects           - Listening to lectures in English         - Negotiations           - Project work         - Scientific texts and articles taken from journals, books and the internet as input for writing tasks           - Business English for engineers, e.g. company structure, start-ups, financial matters, marketing         - 00 - 3E - 05 - 0P           Course type         0 L - 3E - 05 - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Reader         - Dunn, M. et al: English for Electrical Engineering in Higher Education Studies. Garnet Education, 2014           Recommended         - Dunn, M. et al: English for Scientists. CUP, 2013         - Billet, D.: Technical Writing Today. Media Corporation, 2005           - Armer: Cambridge English for Scientists. CUP, 2011         - Englischfüringenieure, Weka Business Medien           - Inch. Technical English inch by inch. Matthias Meier Verlag         - Research EU. Results Magazine. EU publications           - Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011         Interactive, audio and video recordings, e-learning platform           Method(s) of         Interactive, audio and video recordings, e-learning platform           EveV/ category         2 (Bachelor=1, Master=2)           Summer/ Winter         Successful completion of the m		information gathered in follow-up speaking and writing activities. They acquire business-related vocabulary and language skills relevant for
projects       - Listening to lectures in English         - Negotiations       - Project work         - Scientific texts and articles taken from journals, books and the internet as input for writing tasks         - Business English for engineers, e.g. company structure, start-ups, financial matters, marketing         Course type       0 3E - 0S - 0P         Learning Material       Reader         Recommended       - Dunn, M. et al: English for Electrical Engineering in Higher Education         Itierature       Studies. Garnet Education, 2014         - Hughes, J.: Successful Meetings. OUP, 2013         - Billet, D.: Technical Writing Today. Media Corporation, 2005         - Armer: Cambridge English for Scientists. CUP, 2011         - Engine. EnglischfürIngenieure, Weka Business Medien         - Inch. Technical English inch by inch. Matthias Meier Verlag         - Research EU. Results Magazine. EU publications         - Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011         Interactive, audio and video recordings, e-learning platform         instruction/         media being used         Level/ category       2         Summer term         Term       1st term         Recommended       cral exam, written test         Assessment       oral exam, written test         Assesssment <t< td=""><td>Module content</td><td>The course is set at level C1 of the Common European Framework.</td></t<>	Module content	The course is set at level C1 of the Common European Framework.
- Negotiations         - Project work         - Scientific texts and articles taken from journals, books and the internet as input for writing tasks         - Business English for engineers, e.g. company structure, start-ups, financial matters, marketing         Course type       0L - 3E - 0S - 0P         Learning Material       Reader         Recommended       - Dunn, M. et al: English for Electrical Engineering in Higher Education Studies. Garnet Education, 2014         - Hughes, J.: Successful Meetings. OUP, 2013       - Billet, D.: Technical Writing Today. Media Corporation, 2005         - Armer: Cambridge English for Scientists. CUP, 2011       - Engine. Englischfüringenieure, Weka Business Medien         - Inch. Technical English inch by inch. Matthias Meier Verlag       - Research EU. Results Magazine. EU publications         - Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011       Interactive, audio and video recordings, e-learning platform         Method(s) of instruction/       Interactive, audio and video recordings, e-learning platform         redia being used		projects
- Project work         - Scientific texts and articles taken from journals, books and the internet as input for writing tasks         - Business English for engineers, e.g. company structure, start-ups, financial matters, marketing         Course type       0L - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course)         Learning Material       Reader         Recommended       - Dunn, M. et al: English for Electrical Engineering in Higher Education Studies, Garnet Education, 2014         - Hughes, J.: Successful Meetings. OUP, 2013       - Billet, D.: Technical Writing Today. Media Corporation, 2005         - Armer: Cambridge English for Scientists. CUP, 2011       - Engline. EnglischfürIngenieure, Weka Business Medien         - Inch. Technical Englise nich by inch. Matthias Meeir Verlag       - Research EU. Results Magazine. EU publications         - Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011       Interactive, audio and video recordings, e-learning platform         Instruction/       media being used		
input for writing tasks         - Business English for engineers, e.g. company structure, start-ups, financial matters, marketing         Course type       0L - 3E - 0S - 0P       (Lecture, Exercises, Seminar, practical course)         Learning Material       Reader         Recommended       - Dunn, M. et al: English for Electrical Engineering in Higher Education Studies. Garnet Education, 2014         Iiterature       - Buinn, M. et al: English for Scientists. CUP, 2013         - Billet, D.: Technical Writing Today. Media Corporation, 2005         - Armer: Cambridge English for Scientists. CUP, 2011         - Engine. EnglischfürIngenieure, Weka Business Medien         - Inch. Technical English inch by inch. Matthias Meier Verlag         - Research EU. Results Magazine. EU publications         - Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011         Interactive, audio and video recordings, e-learning platform         instruction/         media being used         Level/ category       2 (Bachelor=1, Master=2)         Summer/ Winter       successful completion of the module "Technical English" or equivalent (Level B2 of the Common European Framework)         Assessment       oral exam, written test         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90h of total work lo		- Project work
- Business English for engineers, e.g. company structure, start-ups, financial matters, marketing         Course type       0L - 3E - 0S - 0P         Learning Material       Reader         Recommended       - Dunn, M. et al: English for Electrical Engineering in Higher Education Studies. Garnet Education, 2014         Iterature       - Hughes, J.: Successful Meetings. OUP, 2013         - Billet, D.: Technical Writing Today. Media Corporation, 2005         - Armer: Cambridge English for Scientists. CUP, 2011         - Englisch/fürlngenieure, Weka Business Medien         - Inch. Technical English inch by inch. Matthias Meier Verlag         - Research EU. Results Magazine. EU publications         - Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011         Method(s) of         Interactive summer term         Term         Term         Tat term         Recommended         Successful completion of the module "Technical English" or equivalent (Level B2 of the Common European Framework)         Assessment       oral exam, written test         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90h of total work load, thereof         45h of self-study, consisting of:       35 h lecture (preparation and rework)       0 h practical training (prepar		
matters, marketing           Course type         0L - 3E - 0S - 0P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Reader           Recommended         - Dunn, M. et al: English for Electrical Engineering in Higher Education           literature         - Dunn, M. et al: English for Electrical Engineering in Higher Education           Studies. Garnet Education, 2014         - Hughes, J.: Successful Meetings. OUP, 2013           - Billet, D.: Technical Writing Today. Media Corporation, 2005         - Armer: Cambridge English for Scientists. CUP, 2011           - Engine. EnglischfürIngenieure, Weka Business Medien         - Inch. Technical English inch by inch. Matthias Meier Verlag           - Research EU. Results Magazine. EU publications         - Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011           Method(s) of         Interactive, audio and video recordings, e-learning platform           instruction/         media being used           Level/ category         2           Summer/ Winter         summer term           Term         1st term           Recommented         Successful completion of the module "Technical English" or equivalent (Level B2 of the Common European Framework)           Assessment         oral exam, written test           Assessment modalities         APL – assessment during the semester period (graded)           ECTS c		
Learning Material         Reader           Recommended         - Dunn, M. et al: English for Electrical Engineering in Higher Education Studies. Garnet Education, 2014           Iiterature         - Hughes, J.: Successful Meetings. OUP, 2013           - Billet, D.: Technical Writing Today. Media Corporation, 2005           - Armer: Cambridge English for Scientists. CUP, 2011           - Engine. EnglischfürIngenieure, Weka Business Medien           - Inch. Technical English inch by inch. Matthias Meier Verlag           - Research EU. Results Magazine. EU publications           - Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011           Interactive, audio and video recordings, e-learning platform           instruction/           media being used           Level/ category         2 (Bachelor=1, Master=2)           Summert ferm           Term         1st term           Resessment         oral exam, written test           Assessment         oral exam, written test           Assessment modalities         APL – assessment during the semester period (graded)           ECTS credits         3           Workload         90h of total work load, thereof           45h of self-study, consisting of:         35 h lecture (preparation and rework)           0 h practical training (preparation and evaluation)         10 h exam preparation     <		matters, marketing
Recommended       - Dunn, M. et al: English for Electrical Engineering in Higher Education         literature       Studies. Garnet Education, 2014         - Hughes, J.: Successful Meetings. OUP, 2013         - Billet, D.: Technical Writing Today. Media Corporation, 2005         - Armer: Cambridge English for Scientists. CUP, 2011         - EnglischfürIngenieure, Weka Business Medien         - Inch. Technical English inch by inch. Matthias Meier Verlag         - Research EU. Results Magazine. EU publications         - Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011         Method(s) of       Interactive, audio and video recordings, e-learning platform         instruction/       summer term         Term       1st term         Recommended       Successful completion of the module "Technical English" or equivalent         (Level B2 of the Common European Framework)       Successment         Assessment       oral exam, written test         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90h of total work load, thereof         45h of self-study, consisting of:       35 h lecture (preparation and rework)         0 h practical training (preparation       10 h exam preparation         Usability of this module       All study programmes containing a C1 le	Course type	0L - 3E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
literature Studies. Garnet Education, 2014 - Hughes, J.: Successful Meetings. OUP, 2013 - Billet, D.: Technical Writing Today. Media Corporation, 2005 - Armer: Cambridge English for Scientists. CUP, 2011 - Engine. Englischfürlngenieure, Weka Business Medien - Inch. Technical English inch by inch. Matthias Meier Verlag - Research EU. Results Magazine. EU publications - Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011 Interactive, audio and video recordings, e-learning platform instruction/ media being used Level/ category 2 (Bachelor=1, Master=2) Summer/ Winter summer term Term 1st term Recommended Successful completion of the module "Technical English" or equivalent (Level B2 of the Common European Framework) Assessment oral exam, written test Assessment modalities APL – assessment during the semester period (graded) ECTS credits 3 Workload 90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 10 h exam preparation Usability of this module All study programmes containing a C1 level ESP module Time According time table Duration of module 1 term Frequency of offer Annually	Learning Material	Reader
<ul> <li>Hughes, J.: Successful Meetings. OUP, 2013</li> <li>Billet, D.: Technical Writing Today. Media Corporation, 2005</li> <li>Armer: Cambridge English for Scientists. CUP, 2011</li> <li>Engine. EnglischfürIngenieure, Weka Business Medien</li> <li>Inch. Technical English inch by inch. Matthias Meier Verlag</li> <li>Research EU. Results Magazine. EU publications</li> <li>Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011</li> <li>Interactive, audio and video recordings, e-learning platform</li> <li>instruction/</li> <li>media being used</li> <li>Level/ category</li> <li>(Bachelor=1, Master=2)</li> <li>Summer/ Winter</li> <li>summer term</li> <li>Term</li> <li>1st term</li> <li>Resesment</li> <li>oral exam, written test</li> <li>Assessment</li> <li>oral exam, written test</li> <li>Assessment modalities</li> <li>APL – assessment during the semester period (graded)</li> <li>ECTS credits</li> <li>Workload</li> <li>90h of total work load, thereof</li> <li>45h of self-study, consisting of:</li> <li>35 h lecture (preparation and rework)</li> <li>0 h practical training (preparation and evaluation)</li> <li>10 h exam preparation</li> <li>Usability of this module</li> <li>All study programmes containing a C1 level ESP module</li> <li>Time</li> <li>According time table</li> <li>Duration of module</li> <li>1 term</li> </ul>	Recommended	- Dunn, M. et al: English for Electrical Engineering in Higher Education
Billet, D.: Technical Writing Today. Media Corporation, 2005 - Armer: Cambridge English for Scientists. CUP, 2011 - Englis. EnglischfürIngenieure, Weka Business Medien - Inch. Technical English inch by inch. Matthias Meier Verlag - Research EU. Results Magazine. EU publications - Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011Method(s) of instruction/ media being usedInteractive, audio and video recordings, e-learning platformLevel/ category2(Bachelor=1, Master=2)Summer/ Winter requirementsSuccessful completion of the module "Technical English" or equivalent (Level B2 of the Common European Framework)Assessment Assessment modalitiesOral exam, written testAssessment modalities3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 0 h practical training (preparation and rework) 0 h practical training (preparation and evaluation) 10 h exam preparationUsability of this moduleAll study programmes containing a C1 level ESP moduleTime Place/ roomAccording time table Duration of moduleDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	literature	Studies. Garnet Education, 2014
<ul> <li>Billet, D.: Technical Writing Today. Media Corporation, 2005</li> <li>Armer: Cambridge English for Scientists. CUP, 2011</li> <li>Englis chfürlngenieure, Weka Business Medien</li> <li>Inch. Technical English inch by inch. Matthias Meier Verlag</li> <li>Research EU. Results Magazine. EU publications</li> <li>Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011</li> <li>Interactive, audio and video recordings, e-learning platform</li> <li>instruction/</li> <li>media being used</li> <li>Level/ category</li> <li>(Bachelor=1, Master=2)</li> <li>Summer/ Winter</li> <li>summer term</li> <li>Recommended</li> <li>Successful completion of the module "Technical English" or equivalent (Level B2 of the Common European Framework)</li> <li>Assessment</li> <li>oral exam, written test</li> <li>Assessment modalities</li> <li>APL – assessment during the semester period (graded)</li> <li>ECTS credits</li> <li>Workload</li> <li>90h of total work load, thereof</li> <li>45h of self-study, consisting of:</li> <li>35 h lecture (preparation and rework)</li> <li>0 h practical training (preparation and rework)</li> <li>0 h practical training (preparation and evaluation)</li> <li>10 h exam preparation</li> <li>Usability of this module</li> <li>All study programmes containing a C1 level ESP module</li> <li>Time</li> <li>According time table</li> <li>Duration of module</li> <li>1 term</li> <li>Place/ room</li> <li>EAH Jena</li> </ul>		- Hughes, J.: Successful Meetings. OUP, 2013
- Armer: Cambridge English for Scientists. CUP, 2011 - Engine. EnglischfürIngenieure, Weka Business Medien - Inch. Technical English inch by inch. Matthias Meier Verlag - Research EU. Results Magazine. EU publications - Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011Method(s) of instruction/ media being used Level/ categoryInteractive, audio and video recordings, e-learning platformLevel/ category2(Bachelor=1, Master=2)Summer/ Wintersummer termTerm1st termRecommended requirementsSuccessful completion of the module "Technical English" or equivalent (Level B2 of the Common European Framework)Assessment Morkloadoral exam, written testAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 10 h exam preparationUsability of this moduleAll study programmes containing a C1 level ESP moduleTime Place/ roomAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
- Engine. EnglischfürIngenieure, Weka Business Medien - Inch. Technical English inch by inch. Matthias Meier Verlag - Research EU. Results Magazine. EU publications - Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011Method(s) of instruction/ media being usedInteractive, audio and video recordings, e-learning platformLevel/ category2(Bachelor=1, Master=2)Summer/ Wintersummer termTerm1st termRecommended requirementsSuccessful completion of the module "Technical English" or equivalent (Level B2 of the Common European Framework)Assessmentoral exam, written testAssessmentoral exam, written testAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof 45h of self-study, consisting of: 35 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 10 h exam preparationUsability of this moduleAll study programmes containing a C1 level ESP moduleTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Inch. Technical English inch by inch. Matthias Meier Verlag - Research EU. Results Magazine. EU publications - Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011Method(s) of instruction/ media being usedInteractive, audio and video recordings, e-learning platformLevel/ category2 (Bachelor=1, Master=2)Summer/Wintersummer termTerm1st termRecommended requirementsCucessful completion of the module "Technical English" or equivalent (Level B2 of the Common European Framework)Assessmentoral exam, written testAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 10 h exam preparationUsability of this moduleAll study programmes containing a C1 level ESP moduleTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
- Research EU. Results Magazine. EU publications         - Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011         Method(s) of instruction/ media being used       Interactive, audio and video recordings, e-learning platform         Level/category       2 (Bachelor=1, Master=2)         Summer/Winter       summer term         Term       1st term         Recommended       Successful completion of the module "Technical English" or equivalent (Level B2 of the Common European Framework)         Assessment       oral exam, written test         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 10 h exam preparation         Usability of this module       All study programmes containing a C1 level ESP module         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
- Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011         Method(s) of instruction/ media being used       Interactive, audio and video recordings, e-learning platform         Level/category       2 (Bachelor=1, Master=2)         Summer/Winter       summer term         Term       1st term         Recommended       Successful completion of the module "Technical English" or equivalent (Level B2 of the Common European Framework)         Assessment       oral exam, written test         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90h of total work load, thereof         45h of self-study, consisting of: 35 h lecture (preparation and rework)       0 h practical training (preparation and evaluation)         10 h exam preparation       10 h exam preparation         Usability of this module       All study programmes containing a C1 level ESP module         Time       According time table         Duration of module       1 term         Place/room       EAH Jena         Frequency of offer       Annually		
Method(s) of instruction/ media being used       Interactive, audio and video recordings, e-learning platform         Level/ category       2 (Bachelor=1, Master=2)         Summer/ Winter       summer term         Term       1st term         Recommended       Successful completion of the module "Technical English" or equivalent (Level B2 of the Common European Framework)         Assessment       oral exam, written test         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 10 h exam preparation         Usability of this module       All study programmes containing a C1 level ESP module         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
instruction/ media being used2(Bachelor=1, Master=2)Level/ category2(Bachelor=1, Master=2)Summer/Wintersummer termTerm1st termRecommendedSuccessful completion of the module "Technical English" or equivalent (Level B2 of the Common European Framework)Assessmentoral exam, written testAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 10 h exam preparationUsability of this moduleAll study programmes containing a C1 level ESP moduleTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Method(s) of	
media being usedLevel/ category2 (Bachelor=1, Master=2)Summer/Wintersummer termTerm1st termRecommended requirementsSuccessful completion of the module "Technical English" or equivalent (Level B2 of the Common European Framework)Assessmentoral exam, written testAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 10 h exam preparationUsability of this moduleAll study programmes containing a C1 level ESP moduleTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Level/ category2(Bachelor=1, Master=2)Summer/ Wintersummer termTerm1st termRecommendedSuccessful completion of the module "Technical English" or equivalentrequirements(Level B2 of the Common European Framework)Assessmentoral exam, written testAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 10 h exam preparationUsability of this moduleAll study programmes containing a C1 level ESP moduleTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Summer/Winter       summer term         Term       1st term         Recommended       Successful completion of the module "Technical English" or equivalent (Level B2 of the Common European Framework)         Assessment       oral exam, written test         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 10 h exam preparation         Usability of this module       All study programmes containing a C1 level ESP module         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		2 (Bachelor-1 Master-2)
Term1st termRecommendedSuccessful completion of the module "Technical English" or equivalentrequirements(Level B2 of the Common European Framework)Assessmentoral exam, written testAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 10 h exam preparationUsability of this moduleAll study programmes containing a C1 level ESP moduleTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Recommended requirementsSuccessful completion of the module "Technical English" or equivalent (Level B2 of the Common European Framework)Assessmentoral exam, written testAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 10 h exam preparationUsability of this moduleAll study programmes containing a C1 level ESP moduleTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
requirements(Level B2 of the Common European Framework)Assessmentoral exam, written testAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 10 h exam preparationUsability of this moduleAll study programmes containing a C1 level ESP moduleTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Assessment       oral exam, written test         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90h of total work load, thereof         45h of contact hours and       45h of self-study, consisting of:         35 h lecture (preparation and rework)       0 h practical training (preparation and evaluation)         10 h exam preparation         Usability of this module       All study programmes containing a C1 level ESP module         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90h of total work load, thereof         45h of contact hours and       45h of self-study, consisting of:         35 h lecture (preparation and rework)       0 h practical training (preparation and evaluation)         10 h exam preparation         Usability of this module       All study programmes containing a C1 level ESP module         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually	•	
ECTS credits       3         Workload       90h of total work load, thereof         45h of contact hours and       45h of self-study, consisting of:         35 h lecture (preparation and rework)       0 h practical training (preparation and evaluation)         10 h exam preparation         Usability of this module       All study programmes containing a C1 level ESP module         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 10 h exam preparationUsability of this moduleAll study programmes containing a C1 level ESP moduleTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
45h of contact hours and 45h of self-study, consisting of: 35 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 10 h exam preparationUsability of this moduleAll study programmes containing a C1 level ESP moduleTimeAccording time tableDuration of module1 termPlace/roomEAH JenaFrequency of offerAnnually		
45h of self-study, consisting of: 35 h lecture (preparation and rework) 0 h practical training (preparation and evaluation) 10 h exam preparationUsability of this moduleAll study programmes containing a C1 level ESP moduleTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	vvorkioad	
35 h lecture (preparation and rework)         0 h practical training (preparation and evaluation)         10 h exam preparation         Usability of this module       All study programmes containing a C1 level ESP module         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
0 h practical training (preparation and evaluation)         10 h exam preparation         Usability of this module         All study programmes containing a C1 level ESP module         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
10 h exam preparation         Usability of this module       All study programmes containing a C1 level ESP module         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
Usability of this module       All study programmes containing a C1 level ESP module         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
Time     According time table       Duration of module     1 term       Place/ room     EAH Jena       Frequency of offer     Annually		
Duration of module     1 term       Place/ room     EAH Jena       Frequency of offer     Annually		
Place/ room     EAH Jena       Frequency of offer     Annually		
Frequency of offer Annually		
Language German/ English		
	Language	German/ English

Module number	ET.2.114
Module name	Business Administration for Master Engineers
Department	Business Administration
Degree program	RFE (Ma), ET/IT (Ma)
Module coordinator	Fachbereich Betriebswirtschaft,
	Department Business Administration
Compulsory/ optional/	optional
electiv	
Course type	2L - 0E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	1st term
Compulsory	none
requirements	
Assessment	written test
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

	FT 0.440 ME 0.440
Module number	ET.2.116, ME.2.110
Module name	thermal simulation
Department	Electrical Engineering and Information Technology
Degree program	Me (Ma)
Module coordinator	Prof. Dr. Detlef Redlich
Compulsory/ optional/	Compulsory
electiv	
Course type	01L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course)
Learning Material	script
Recommended literature	Sergent, J. E. et al.: Thermal Management Handbook: For Electronic Assemblies (Electronic Packaging and Interconnection Series). McGraw-Hill Education 1998 VDI-Wärmeatlas. Berlin: Springer Verlag 1997
	G. Müller: FEM für Praktiker, Bd. 1: Grundlagen; expert-Verlag U. Stelzmann: FEM für Praktiker, Bd. 2: Strukturdynamik; expert- Verlag
	C. Groth: FEM für Praktiker, Bd. 3: Temperaturfelder; expert-Verlag C.C. Spyrakos: Finite Element Modeling in Engineering Practice; Algor Publishing Division, Pittsburgh C.C. Spyrakos: Linear and nonlinear Finite Element Modeling; Algor Publishing Division, Pittsburgh
Method(s) of instruction/ media being used	Lecture and practical course
Level/ category	2 (Bachelor=1, Master=2)
Summer/ Winter	summer term
Term	2nd term
Compulsory requirements	none
Assessment	term paper
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Workload	90 h
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Madula numbar	ET 2 420
Module number	ET.2.120
Module name	Optimal control
Department	Electrical Engineering and Information Technology
Degree program	Me (Ma), RFE (Ma)
Specialization/ Profil	Prof. DrIng. habil. Klaus-Peter Döge
Module coordinator	Prof. DrIng. habil. Klaus-Peter Döge
Compulsory/ optional/ electiv	optional
Learning objectives	The students have a basic understanding of the optimal control of physical processes. The students are able to design simple optimal control systems.
Module content	<ul> <li>parameteroptimization and structure optimization</li> <li>quality criterions</li> <li>basic principle of the variational calculus</li> <li>Euler-Lagrange equation</li> <li>maximum principle of Pontryagin</li> </ul>
Course type	1L - 1E - 1S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	<ul> <li>graphical material of the lecture</li> <li>transformation table</li> <li>excercises</li> </ul>
Recommended	H. Gassmann, (1998) Theorie der Regelungstechnik, Verlag Harry Deutsch
literature	O. Föllinger (1994) Optimale Regelung und Steuerung, Oldenbourg Verlag
Method(s) of	lecture, excercise, blackboard and graphical material via data projector
instruction/	
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	1. term
Compulsory requirements	none
Recommended	- basics of control engineering and systems theory
requirements	- differential and integral calculus
	- state space representation
	- partial derivatives
Assessment	written university exam 90 min
Assessment modalities	PL – during period of exams (graded)
ECTS credits	6
Workload	180h of total work load, thereof
	45h of contact hours and
	135h of self-study, consisting of:
	115 h lecture (preparation and rework)
	20 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number         ET.2.121           Module name         Design of Spaceborne Electronics           Department         Electrical Engineering and Information Technology	
Lippartment I Electrical Engineering and Intermation Lechnology	
DepartmentElectrical Engineering and Information TechnologyDegree programRFE (Ma)	
Module coordinator Prof. DrIng. Burkart Voß	
Compulsory/ optional/ Compulsory	
electiv	
Learning objectives After successful completion of the module the students are abl	e to:
- understand a given requirement specification	0.10.
- develop electronics in consideration of the environmental con	ditions of
space applications	
- complete the required analyses	
- create the required documentation	
Module content         - Special requirements for electronic circuits targeted to space	application
- Selection of electronic components	application
- redundancy concepts	
- EMC- centric Design	
- Verification and test requirements	
- Special requirements for the design of electronic circuits targe	eted to space
application – required analyses	
- Radiation analysis	
- Risk and failure analysis	
- Derating analysis	
-Worst-Case analysis	
Course type 0L - 0E - 2S - 2P (Lecture, Exercises, Seminar, practical cou	urse)
Learning Material Lecture slides are provided via the Internet.	/
Recommended The Space Environment by Alan C. Tribble	
literature Electronics System Design Techniques for Safety Critical Appl	ications by
Luca Sterpone	,
Spacecraft Thermal Control Handbook by David G. Gilmore	
The Design of an Efficient, Elegant, and Cubic Pico-satellite El	lectronics
System by Christopher Alan Day	
Method(s) of Seminar	
instruction/	
media being used	
Level/ category 2 (Bachelor=1, Master=2)	
Summer/Winter summer term	
Term 1st term	
Compulsory Knowledge in analog and digital circuit design checked via the	admission
requirements process to the master course	
Assessment term paper	
Assessment modalities APL – assessment during the semester period (graded)	
Further Information The ability to systematically design an electronic circuit for use	in a space
application is shown with the documentation of a design project	
results have to get defended in a design review.	· ·
ECTS credits 6	
Workload 180 h of total work load, thereof	
60 h of contact hours and	
12 0h of self-study, consisting of:	
45 h lecture (preparation and rework)	
45 h practical training (preparation and evaluation)	
45 h practical training (preparation and evaluation) 30 h exam preparation	
45 h practical training (preparation and evaluation)30 h exam preparationTimeAccording time table	
45 h practical training (preparation and evaluation)       30 h exam preparation       Time     According time table       Duration of module     1 term	
45 h practical training (preparation and evaluation)30 h exam preparationTimeAccording time table	
45 h practical training (preparation and evaluation)       30 h exam preparation       Time     According time table       Duration of module     1 term	

Module number	ET.2.122
Module name	
	Space Travel Systems
Department	Electrical Engineering and Information Technology
Degree program	RFE (Ma)
Module coordinator	Prof. DrIng. Burkart Voß, Prof. DrIng. habil. Klaus-Peter Döge
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	use the terminology specific for space problems.
	Analysis and solution of problems to the position and location change of
	spacecraft
	understand the behaviour of satellites (orbits, fuel needs, etc.)
Module content	Orbital mechanics
	Environmental space conditions
	Introduction to remote sensing of the earth
	Mathematical modeling of orbit perturbations
	Coordinate systems
	Mathematical attitude description
	Sensors and actuators for attitude control
Course type	OL - OE - 3S - OP (Lecture, Exercises, Seminar, practical course)
Learning Material	Seminar slides (in English) are provided via the Internet.
Recommended	H. J. Kramer: "Observation of the Earth and Its Environment – Survey of
literature	Missions and Sensors" Springer 2002
	W. Steiner und M. Schagerl: "Raumflugmechanik – Dynamik und Steuerung
	von Raumfahrzeugen" Springer 2004
	W. Hallmann und W. Ley et al.: "Handbuch Raumfahrttechnik" Hanser 1999
	J. R. Wertz: "Spacecraft Attitude Determination and Control" Kluwer
	Academic Publishers
Method(s) of	Black board, data projector and simulation software
instruction/	
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	1st term
Compulsory	none
requirements	
Assessment	oral exam - 30 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	3
Workload	90h of total work load, thereof
	45h of contact hours and
	45h of self-study.
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Madula number	ET 0.000
Module number	ET.2.200
Module name	Numerical Mathematics/Optimization
Department	Electrical Engineering and Information Technology
Degree program	RFE (Ma), ET/IT (Ma), Me (Ma)
Module coordinator	Prof. Dr. Christopher Schneider
Compulsory/ optional/ electiv	Compulsory
Learning objectives	Mathematical techniques and methods which are important for solving linear and nonlinear optimization problems and problems of optimal control.
Module content	Linear programming, duality in linear programming,
	nonlinear optimization, Karush-Kuhn-Tucker-theory,
	case studies on optimal control, models,
	Hamilton function, maximum principle,
	numerical methods for solving optimization problems and problems of optimal control
Course type	3L - 1E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	Exercises with solutions, worksheets
Recommended	- Schwarz, H.R.;Köckler, N.(2011): Numerische Mathematik. 8. Aufl.,
literature	Springer Vieweg Verlag.
	- Alt, Walter(2011): Nichtlineare Optimierung. 2. Aufl., Vieweg Verlag.
	- Alt, Walter(2013): EAGLE-STARTHILFE, Optimale Steuerung, Theorie
	und
	numerische Verfahren, Edition am Gutenbergplatz Leipzig,1. Aufl.
	- Zimmermann, HJ.(2008) : Operations Research, 2. Aufl., Vieweg Verlag.
	- Unbehauen, H.(2011) : Regelungstechnik III, 7. Aufl., Identifikation,
	Adaption, Optimierung, Vieweg Verlag.
Method(s) of	Lecture and tutorial for deepening the material dealt with in the lecture and
instruction/	discussion on tasks given for individual work.
media being used	Solving tasks using MATLAB (Optimization Toolbox)
Level/ category	2 (Bachelor=1, Master=2)
Summer/ Winter	winter term
Term	2. term
Compulsory	none
requirements	
Recommended	Linear algebra, differential and integral calculus for functions of several
requirements	variables, differential equations, basic knowledge of MATLAB
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	6
Workload	180h of total work load, thereof
	75h of contact hours and
	105h of self-study, consisting of:
	60 h lecture (preparation and rework)
	25 h practical training (preparation and evaluation)
	20 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.2.201
Module name	Satellite communication
	Electrical Engineering and Information Technology
Department	RFE (Ma)
Degree program Module coordinator	
Compulsory/ optional/	Prof. Dr. Ludwig Niebel
electiv	Compulsory
Learning objectives	Upon completion of the module, students
Learning objectives	- understands special characteristics of telecommunication in case of
	satellite systems
	- are able to use relevant standards
	- understands the sections of information transmission
	- are able to use selected methodes for information transmission
	- are able to calculate radio links between earth and satellite
Module content	Special conditions for telecommunication between earth and space
	Relevant groups of standards
	Selected parts from the fields of communication networks, RF techniques
	and information and coding theory
Course type	0L - 0E - 2S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	Books, script, exercises and lab instruction sheets on the internet
Recommended	Ernst Messerschmid, Stefanos Fasoulas: Raumfahrtsysteme, Springer 2008
literature	Werner Mansfeld: Satellitenortung und Navigation, Vieweg+Teubner Verlag
	2003
	Bossert, M.: Einführung in die Nachrichtentechnik, Oldenbourg Verlag 2012
	Hermann Weidenfeller, Anton Vlcek: Digitale Modulationsverfahren mit
	Sinusträger, Springer 1996
Mathad(a) of	Rudolf Greif: Bodenantennen für Flugsysteme, Oldenbourg 1974
Method(s) of instruction/	seminar, demonstration, practical course, self-study
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/ Winter	winter term
Term	2nd term
Compulsory	none
requirements	
Assessment	written test
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	6
Workload	150h of total work load, thereof
	45h of contact hours and
	105h of self-study, consisting of:
	40 h seminar (preparation and rework)
	35 h practical training (preparation and evaluation)
	30 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.2.202
Module name	Design of Electronic Systems
Department	Electrical Engineering and Information Technology
Degree program	RFE (Ma), ET/IT (Ma), Me (Ma)
Module coordinator	Prof. Dr. Martin Hoffmann
Compulsory/ optional/	Compulsory
electiv	Compusory
Learning objectives	Advanced principles of construction for fail-safe electronic systems,
Learning objectives	detection and elimination of EMI-sources during the design process,
	application of learned methods and strategies for electronic system design
Module content	Characterization of interferences
	EMC-conform circuit design and layout
	Interaction of analog and digital units
	Optimization of shematics, criterias and strategies
	Power supply for analoge and digital units
	Connections and grounding design
	Simulation of complex electronic circuits
	Related regulatory standards
	Practical training
Course type	2L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course)
Learning Material	Literature, lab instruction sheets, handouts
Recommended	Recommended literature will be announced in the lecture.
literature	
Method(s) of	lecture, practical course, self-study
instruction/	
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	2. term
Compulsory	none
requirements	
Recommended	Digital Systems, Analog Circuit Design, Electronic Components, Circuit
requirements	Design, Digital Signal Processing
Assessment	exam 90 min
	exam 90 min, Laboratory internship certificate
Assessment modalities	PL - test performance (graded)
	APL - certificate (nongraded)
ECTS credits	6
Workload	180h of total work load, thereof
	60h of contact hours and
	120h of self-study, consisting of:
	35 h lecture (preparation and rework)
	35 h practical training (preparation and evaluation)
	50 h exam preparation
Usability of this module	Complex Lab Session
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German
Languago	Connan

Module name         Design of Electronic Components           Degree program         ET/TI (Ma), Me (Ma)           Module coordinator         Prof. Dr. Detlef Redlich           Compulsory/ optional/ electiv         Compulsory           Learning objectives         Basic knowledge on the design of electronic components are to be taught. Students can apply the aquired knowlege designing electronic components. They are familiar with the certification according to ISO9000.           Module content         design methodology of electronic components wire connections certification according to ISO9000 design of the external equipment configuration, degree of protection, protection class CE-identification, 19" boxes heat rejection section           Course type         11 - 0E - 0S - 2P         (Lecture, Exercises, Seminar, practical course)           Learning Material         script         Script           Recommended         1. Scheel, W.: "Baugruppentechnologie der Elektronik, Montage", Verlag Technik Berlin, bzw. Eugen G. Leuze Verlag, Saulgau, 1999           2. Remsburg, R: Advanced Thermal Design of Electronic Equipment. Kluwer Academic Publishers 1998         3. Sergent, J. E. et al: Thermal Management Handbook: For Electronic Assemblies (Electronic Packaging and Interconnection Series). McGraw-Hill Education 1998           4. VDI-Wärmeatlas. Berlin: Springer Verlag 1997         Lecture, practical course           Instruction/ media being used         APL – assessment during the semester period (graded)           ECTS credits         3	Module number	ET.2.203
Department         Electrical Engineering and Information Technology           Degree program         ET/IT (Ma), Me (Ma)           Module coordinator         Prof. Dr. Detlef Redlich           Compulsory/ optional/ electiv         Compulsory           Learning objectives         Basic knowledge on the design of electronic components are to be taught. Students can apply the aquired knowlege designing electronic components. They are familiar with the certification according to ISO9000.           Module content         design methodology of electronic components wire connections certification according to ISO9000 design of the external equipment configuration, degree of protection, protection class CE-identification, 19" boxes heat rejection section           Course type         1L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course)           Learning Material         Script           Recommended         1. Scheel, W.: "Baugruppentechnologie der Elektronik, Montage", Verlag Technik Berlin, bzw. Eugen G. Leuze Verlag, Saulgau, 1999           2. Remsburg, R.: Advanced Thermal Design of Electronic Equipment. Kluwer Academic Publishers 1998         S. Sergent, J. E. et al.: Thermal Management Handbook: For Electronic Assemblies (Electronic Packaging and Interconnection Series). McGraw-Hill Education 1998           4. vDI-Wärmeatlas. Berlin: Springer Verlag 1997         Lecture, practical course           Summer/ Winter         summer term           Term         1st term           Compulsory         none		
Degree program         ET/IT (Ma), Me (Ma)           Module coordinator         Prof. Dr. Detlef Redlich           Compulsory (optional/ electiv         Compulsory           Learning objectives         Basic knowledge on the design of electronic components are to be taught. Students can apply the aquired knowlege designing electronic components. They are familiar with the certification according to ISO9000.           Module content         design methodology of electronic components wire connections certification according to ISO9000 design of the external equipment configuration, degree of protection, protection class CE-identification, 19" boxes heat rejection section           Course type         1L - 0E - 0S - 2P         (Lecture, Exercises, Seminar, practical course)           Learning Material         script           Recommended         1. Scheel, W.: Baugruppentechnologie der Elektronik, Montage", Verlag Technik Berlin, bzw. Eugen G. Leuze Verlag, Saulgau, 1999           2. Remsburg, R.: Advanced Thermal Design of Electronic Equipment. Kluwer Academic Publishers 1998           3. Sergent, J. E. et al.: Thermal Management Handbook: For Electronic Assemblies (Electronic Packaging and Interconnection Series). McGraw-Hill Education 1998           4. VDI-Wärmeatlas. Berlin: Springer Verlag 1997           Leevel/ category         2           Summer/ Winter         summer term           Term         1st term           Compulsory         none           requirements         APL – ass		
Module coordinator         Prof. Dr. Detlef Rediich           Compulsory/ optional/ electiv         Compulsory           Learning objectives         Basic knowledge on the design of electronic components are to be taught. Students can apply the aquired knowlege designing electronic components. They are familiar with the certification according to ISO9000.           Module content         design methodology of electronic components wire connections certification according to ISO9000 design of the external equipment configuration, degree of protection, protection class CE-identification, 19" boxes heat rejection section           Course type         1L - 0E - 0S - 2P         (Lecture, Exercises, Seminar, practical course)         Learning Material           Recommended         1. Scheel, W.: "Baugruppentechnologie der Elektronik, Montage", Verlag Technik Berlin, bzw. Eugen G. Leuze Verlag, Saulgau, 1999         2. Remsburg, R:: Advanced Thermal Design of Electronic Equipment. Kluwer Academic Publishers 1998         3. Sergent, J. E. et al.: Thermal Management Handbook: For Electronic Assemblies (Electronic Packaging and Interconnection Series). McGraw-Hill Education 1998         4. VDI-Wärmeatlas. Berlin: Springer Verlag 1997           Method(s) of instruction/ media being used         Lecture, practical course         Assessment           Level/ category         2 (Bachelor=1, Master=2)         Summer term           Summer term         Sassessment         APL – assessment during the semester period (graded)           ECTS credits         3         Oh of total work load, thereof 45h of contact		
Compulsory/ optional/ electiv         Compulsory           Learning objectives         Basic knowledge on the design of electronic components are to be taught. Students can apply the aquired knowledge designing electronic components. They are familiar with the certification according to ISO9000.           Module content         design methodology of electronic components wire connections certification according to ISO9000 design of the external equipment configuration, degree of protection, protection section           Course type         1L - 0E - 0S - 2P         (Lecture, Exercises, Seminar, practical course)           Learning Material         script           Recommended         1. Scheel, W.: "Baugruppentechnologie der Elektronik, Montage", Verlag Technik Berlin, bzw. Eugen G. Leuze Verlag, Saulgau, 1999           2. Remsburg, R.: Advanced Thermal Design of Electronic Equipment. Kluwer Academic Publishers 1998           3. Sergent, J. E. et al.: Thermal Management Handbook: For Electronic Assemblies (Electronic Packaging and Interconnection Series). McGraw-Hill Education 1998           4. VDI-Wärmeattas. Berlin: Springer Verlag 1997           Level? category         2 (Bachelor=1, Master=2)           Summer term         Term           Term         1st term           Compulsory         none           requirements         APL – assessment during the semester period (graded)           ECTS credits         3           Workload         90h of total work load, thereof 45h of contact		
electiv         Hermitian           Learning objectives         Basic knowledge on the design of electronic components are to be taught. Students can apply the aquired knowlege designing electronic components. They are familiar with the certification according to ISO9000. design of the external equipment configuration, degree of protection, protection class CE-identification, 19° boxes heat rejection section           Course type         1L - 0E - 0S - 2P         (Lecture, Exercises, Seminar, practical course)           Learning Material         script         Scheel, W.: "Baugruppentechnologie der Elektronik, Montage", Verlag Technik Berlin, bzw. Eugen G. Leuze Verlag, Saulgau, 1999           Recommended         1. Scheel, W.: "Baugruppentechnologie der Elektronik, Montage", Verlag Technik Berlin, bzw. Eugen G. Leuze Verlag, Saulgau, 1999           2. Remsburg, R.: Advanced Thermal Design of Electronic Equipment. Kluwer Academic Publishers 1998         3. Sergent, J. E. et al.: Thermal Management Handbook: For Electronic Assemblies (Electronic Packaging and Interconnection Series). McGraw-Hill Education 1998           4. VDI-Wärmeatlas. Berlin: Springer Verlag 1997         Leetvel category           Method(s) of instruction/ media being used         Leeture, practical course           Level/ category         2 (Bachelor=1, Master=2)           Summer/ Winter         summer term           Assessment         APL – assessment during the semester period (graded)           ECTS credits         3           Workload         90h of total work load, thereof 4		
Students can apply the aquired knowlege designing electronic components. They are familiar with the certification according to ISO9000.           Module content         design methodology of electronic components wire connections certification according to ISO9000 design of the external equipment configuration, degree of protection, protection class CE-identification, 19" boxes heat rejection section           Course type         1L · 0E · 0S · 2P (Lecture, Exercises, Seminar, practical course)           Learning Material         script           Recommended         1. Scheel, W.: "Baugruppentechnologie der Elektronik, Montage", Verlag Technik Berlin, bzw. Eugen G. Leuze Verlag, Saulgau, 1999           2. Remsburg, R.: Advanced Thermal Design of Electronic Equipment. Kluwer Academic Publishers 1998           3. Sergent, J. E. et al.: Thermal Management Handbook: For Electronic Assemblies (Electronic Packaging and Interconnection Series). McGraw-Hill Education 1998           4. VDI-Wärmeatlas. Berlin: Springer Verlag 1997           Method(s) of Instruction/ media being used           Level/ category         2 (Bachelor=1, Master=2)           Summer/ Winter         summer term           Term         1st term           Compulsory         none           requirements         Assessment           Assessment         term paper           Assessment         APL – assessment during the semester period (graded)           ECTS credits         3           Worklo	electiv	
wire connections         certification according to ISO9000           design of the external equipment configuration, degree of protection, protection class CE-identification, 19" boxes           heat rejection section           Course type         1L - 0E - 0S - 2P           Learning Material         script           Recommended         1. Scheel, W.: "Baugruppentechnologie der Elektronik, Montage", Verlag Technik Berlin, bzw. Eugen G. Leuze Verlag, Saulgau, 1999           Literature         2. Remsburg, R.: Advanced Thermal Design of Electronic Equipment. Kluwer Academic Publishers 1998           S. Sergent, J. E. et al.: Thermal Management Handbook: For Electronic Assemblies (Electronic Packaging and Interconnection Series). McGraw-Hill Education 1998           Level/ category         2 (Bachelor=1, Master=2)           Summer/ Winter         summer term           Term         1st term           Compulsory         none           requirements         APL – assessment during the semester period (graded)           ECTS credits         3           Workload         90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 15 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 10 h exam preparation           Time         According time table           Duration of module         1 term           Place/ room         EAH Jena	Learning objectives	Students can apply the aquired knowlege designing electronic components.
Learning Material         script           Recommended         1. Scheel, W.: "Baugruppentechnologie der Elektronik, Montage", Verlag           literature         Technik Berlin, bzw. Eugen G. Leuze Verlag, Saulgau, 1999           2. Remsburg, R.: Advanced Thermal Design of Electronic Equipment.           Kluwer Academic Publishers 1998           3. Sergent, J. E. et al.: Thermal Management Handbook: For Electronic           Assemblies (Electronic Packaging and Interconnection Series). McGraw-Hill           Education 1998           4. VDI-Wärmeatlas. Berlin: Springer Verlag 1997           Method(s) of           Instruction/           media being used           Level/ category           2 (Bachelor=1, Master=2)           Summer/Winter           summer term           Term           1st term           Compulsory           none           requirements           Assessment           APL – assessment during the semester period (graded)           ECTS credits           3           Workload           90h of total work load, thereof           45h of self-study, consisting of:           15 h lecture (preparation and rework)           20 h practical training (preparation and evaluation)           10 h exam pr	Module content	wire connections certification according to ISO9000 design of the external equipment configuration, degree of protection, protection class CE-identification, 19" boxes heat rejection section
Recommended literature1. Scheel, W.: "Baugruppentechnologie der Elektronik, Montage", Verlag Technik Berlin, bzw. Eugen G. Leuze Verlag, Saulgau, 1999 2. Remsburg, R.: Advanced Thermal Design of Electronic Equipment. Kluwer Academic Publishers 1998 3. Sergent, J. E. et al.: Thermal Management Handbook: For Electronic Assemblies (Electronic Packaging and Interconnection Series). McGraw-Hill Education 1998 4. VDI-Wärmeatlas. Berlin: Springer Verlag 1997Method(s) of instruction/ media being usedLecture, practical courseLevel/ category2(Bachelor=1, Master=2)Summer/ Wintersummer termTerm1st termCompulsory requirementsnoneAssessmentterm paperAssessmentterm paperAssessment4.PL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 15 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 10 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Course type	1L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course)
Recommended literature1. Scheel, W.: "Baugruppentechnologie der Elektronik, Montage", Verlag Technik Berlin, bzw. Eugen G. Leuze Verlag, Saulgau, 1999 2. Remsburg, R.: Advanced Thermal Design of Electronic Equipment. Kluwer Academic Publishers 1998 3. Sergent, J. E. et al.: Thermal Management Handbook: For Electronic Assemblies (Electronic Packaging and Interconnection Series). McGraw-Hill Education 1998 4. VDI-Wärmeatlas. Berlin: Springer Verlag 1997Method(s) of instruction/ media being usedLecture, practical courseLevel/ category2(Bachelor=1, Master=2)Summer/ Wintersummer termTerm1st termCompulsory requirementsnoneAssessmentterm paperAssessmentterm paperAssessment4.PL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 15 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 10 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Method(s) of instruction/ media being usedLecture, practical courseLevel/ category2 (Bachelor=1, Master=2)Summer/ Wintersummer termTerm1st termCompulsory requirementsnoneAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 15 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 10 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Recommended	<ol> <li>Scheel, W.: "Baugruppentechnologie der Elektronik, Montage", Verlag Technik Berlin, bzw. Eugen G. Leuze Verlag, Saulgau, 1999</li> <li>Remsburg, R.: Advanced Thermal Design of Electronic Equipment. Kluwer Academic Publishers 1998</li> <li>Sergent, J. E. et al.: Thermal Management Handbook: For Electronic Assemblies (Electronic Packaging and Interconnection Series). McGraw-Hill Education 1998</li> </ol>
instruction/ media being used2(Bachelor=1, Master=2)Level/ category2(Bachelor=1, Master=2)Summer/ Wintersummer termTerm1st termCompulsory requirementsnoneAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 15 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 10 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Method(s) of	
media being usedLevel/ category2 (Bachelor=1, Master=2)Summer/Wintersummer termTerm1st termCompulsorynonerequirements		
Level/ category2 (Bachelor=1, Master=2)Summer/ Wintersummer termTerm1st termCompulsorynonerequirements-Assessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof45h of contact hours and 45h of self-study, consisting of: 15 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 10 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Summer/Winter       summer term         Term       1st term         Compulsory       none         requirements       -         Assessment       term paper         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90h of total work load, thereof         45h of contact hours and       45h of self-study, consisting of:         15 h lecture (preparation and rework)       20 h practical training (preparation and evaluation)         10 h exam preparation       10 h exam preparation         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		2 (Bachalor-1 Master-2)
Term1st termCompulsory requirementsnoneAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 15 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 10 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Compulsory requirementsnoneAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 15 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 10 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
requirementsAssessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 15 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 10 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Assessmentterm paperAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 15 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 10 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		none
Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       3         Workload       90h of total work load, thereof         45h of contact hours and       45h of self-study, consisting of:         15 h lecture (preparation and rework)       20 h practical training (preparation and evaluation)         10 h exam preparation         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually	· ·	term peper
ECTS credits       3         Workload       90h of total work load, thereof         45h of contact hours and       45h of self-study, consisting of:         15 h lecture (preparation and rework)         20 h practical training (preparation and evaluation)         10 h exam preparation         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually		
Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 15 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 10 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
45h of contact hours and 45h of self-study, consisting of: 15 h lecture (preparation and rework) 20 h practical training (preparation and evaluation) 10 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Duration of module     1 term       Place/ room     EAH Jena       Frequency of offer     Annually	Workload	<ul><li>45h of contact hours and</li><li>45h of self-study, consisting of:</li><li>15 h lecture (preparation and rework)</li><li>20 h practical training (preparation and evaluation)</li></ul>
Duration of module     1 term       Place/ room     EAH Jena       Frequency of offer     Annually	Time	
Place/ room         EAH Jena           Frequency of offer         Annually		
Frequency of offer Annually		
	Language	German

Module number	ET.2.208
Module name	Specialising module
Department	Electrical Engineering and Information Technology
Degree program	ME (Ma)
Compulsory/ optional/ electiv	Elective Compulsory
Module content	The Specialising modules with 24 ECTS-credits allows a selection from modulesME.2.206 Experimentelle Modalanalyse
	ET.2.104 - Zuverlässigkeitstheorie
	ET.2.220 - Optische und optoelektronische Sensorik
	ET.2.221 - Integration von Mixed-Signal-Schaltungen
	ET.2.224 - Intelligente Systeme
	ET.2.231 - Signalintegrität
	ET.2.232 - Augmented Reality/ Virtual Reality
	ET.2.212 - Embedded Systems
	ET.2.202 - Design elektronischer Systeme
Course type	(Lecture, Exercises, Seminar, practical course)
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	summer term or winter term
Term	1st or 2nd term
ECTS credits	24
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.2.209
Module name	Specialising module
Department	Electrical Engineering and Information Technology
Degree program	EE/IT (Ma)
Compulsory/ optional/	Elective Compulsory
electiv	
Module content	The Specialising modules with 36 ECTS-credits allows a selection from modules out of the following allocated specialisation profile according to your interests:
	Specialisation profile – Automation Specialisation module II – Communication and Media technology Specialisation module III – Technical Informatics
	You can find the concrete module content in the relevant module description.
	ET.2.224 - Intelligente Systeme (AT, TI)
	ET.2.211 - Komplexe Steuerungen (AT)
	ET.2.120 - Optimale Steuerung und Regelung (AT)
	ET.2.217 - Technische Optik (AT, KMT)
	ET.2.215 - Informationstheorie, Kodierung und Datensicherheit (KMT, TI) ET.2.232 - Augmented Reality/ Virtual Reality (KMT, TI) ET.2.102 - Softwareengineering (KMT, TI)
	ET.2.101 - Theoretische Informatik (TI)
	ET.2.230 - Prozessordesign (TI)
	ET.2.231 - Signalintegrität (KMT)
	ET.2.212 - Embedded Systems (AT, KMT, TI)
	ET.2.107 - Servoantriebstechnik (AT)
	ET.2.220 - Optische und optoelektronische Sensorik (AT)
	ET.2.218 - Optoelektronik 2 (AT)
	ET.2.221 - Integration von Mixed-Signal-Schaltungen (KMT)
	ET.2.104 - Zuverlässigkeitstheorie (AT, KMT, TI)
O a come a trans d	ET.2.105 - Anlogdesign (KMT)
Course type	(Lecture, Exercises, Seminar, practical course)
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	summer/winter term
Term	1./2. Semester
ECTS credits	36 According time toble
Time Duration of module	According time table
Place/ room	1 term EAH Jena
Frequency of offer	Annually
Language	German
Language	Johnan

Module number	ET.2.211
Module name	Advanced Control Systems
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ma)
Module coordinator	Prof. DrIng. Jörg Müller
Compulsory/ optional/ electiv	optional ET/IT (Ma)
	compulsory ME (Ma)
Learning objectives	After students have attended the course, they are able to - generalize parallel and concurrent processes,
	- calculate and predict their behavior,
	- transfer these processes to distributed systems,
	- plan with selected analysis and synthesis tools
Module content	- State description
Module content	- Petri-nets
	- Process sequence schedule
	- object-oriented programming (OOP) for process control
	- distributed systems
Course type	2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Recommended	Lunze, J.: Ereignisdiskrete Systeme; München, Wien: Oldenbourg
literature	von Aspern, J.: SPS-Steuerungsentwicklung mit Petri-Netzen; Berlin: VDE
	Lewis, R.: Modelling control systems using IEC 61499; London: The Inst. of
	Electrical Engineers
	Vyatkin, V.: IEC Function Blocks for Embedded and Distributet Control
	Systems Design; Research Triangle Park, NC: ISA-Instrumentation,
	Systems, and Automation Society
Method(s) of	2
instruction/	
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	2. term
Compulsory	none
requirements	
Assessment	Laboratory internship certificate, seminar paper
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Workload	90h of total work load, thereof
	45h of contact hours and
	45h of self-study, consisting of:
	25 h lecture (preparation and rework)
	10 h practical training (preparation and evaluation)
	10 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Place/ room Frequency of offer Language	EAH Jena Annually German

Module number	ET.2.212
Module name	Embedded Systems
Department	Electrical Engineering and Information Technology
Degree program	RFE (Ma), ET/IT (Ma), Me (Ma)
Module coordinator	Prof. DrIng. habil. Jürgen Kampe
Compulsory/ optional/ electiv	Compulsory
Learning objectives	At the end of the module students are able to create models of embedded
	systems with respect to the levels of abstraction of the Y-diagram of Gajski
	and Kuhn. The students understand the main concepts of modeling
	hardware based on the hardware description languages VHDL, Verilog, and SystemC including there specifics.
	The students remember the specifics of embedded systems as well as the
	general requirements, and they remember the design flow starting from a
	more abstract behavioural description down to the IC layout and they are
	able to apply the design flow based on Cadence Encounter design tools for
	simulation, verification, structural and layout synthesis.
	The students are able to evaluate the result of the design process and they are able to interfere into the automated design process.
Module content	- Embedded and real-time system specifics;
	- methodologies for the design of embedded systems;
	- concepts of hardware modeling and the design flow based on VHDL,
	Verilog, and SystemC including special concepts of behavioural modeling of
	concurrent systems; - high-level synthesis and modeling according to abstraction levels;
	- design tools for structural and layout synthesis; Cadence Encounter
	Design Flow;
	- adapted systems for embedded system and system-on-programmable-chip
	based applications;
	- verification, test benches, and design for test;
Course type	<ul> <li>- implementation of a microcontroller core in a CMOS technology.</li> <li>2L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course)</li> </ul>
Learning Material	Lecture notes, laboratory instructions, examples
Recommended	- P. Marwedel: Embedded System Design. Springer Verlag, 2011
literature	- D. Gajski et al: Specifications and Design of Embedded Systems.
	AddisonWesley, 1994
	- W.Wolf: Computers as Components - Principles of Embedded System
	Design. Morgan Kaufman Publ. 2012 - J. Teich: Digitale Hardware/Software Systeme. Springer 2007
	- N.Weste et al: Principles of CMOS VLSI Design. AddisonWesley
	Publishing Company
	- N. Sherwani: Algorithms for VLSI Physical Design Automation. Kluwer
	Academic Publishers
	- T. Kropf: Introduction to Formal Hardware Verification. Springer Verlag - G. Herrmann, D.Müller: ASIC Entwurf und Test. Fachbuchverlag Leipzig,
	- D. Gajski et al: High-Level-Synthesis: Introduction to Chip and System
	Design. Kluwer Academic Publishers, 1992
	- T. Kropf: VLSI-Entwurf. Vorgehen, Methoden, Automatisierung. Int.
	Thomson Publishing, 1995 - K. ten Hagen: Abstrakte Modellierung digitaler Schaltungen. Springer 1995
	- A. A. Jerraya et al: Behavioral Synthesis and Component Reuse with
	VHDL. Kluwer Academic Publisher
	- D. C. Black et al: SystemC: From the Ground Up. Springer, 2010
Matheod(=) =f	- R. Brück: Entwurfswerkzeuge für VLSI-Layout. Carl Hanser Verlag
Method(s) of instruction/	Talk, group work, hands-on training, case study
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	2. term
Compulsory	none
requirements Recommended	Digital Systems, Digital Design, Information Technology
requirements	
	1

Assessment	Laboratory internship report
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	6
Workload	180h of total work load, thereof
	60h of contact hours and
	120h of self-study, consisting of:
	35 h lecture (preparation and rework)
	85 h practical training (preparation and evaluation)
Usability of this module	Master thesis
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Madula number	ET 2 244
Module number	ET.2.214
Module name	Actuators
Department	Electrical Engineering and Information Technology
Degree program	RFE (Ma)
Module coordinator	Prof. DrIng. Matthias Förster
Compulsory/ optional/ electiv	elective
Learning objectives	The students get to know the basic knowledge of the physical principles to generate mechanical forces. Building on that knowledge they understand the technical realisation of actuators, their behaviour and their mathematical description. The main topics are electro-magnetic and piezoelectric actuators. After attending the event, students are able to select and project appropriate actuators for a technical applications.
Module content	The topics of the lecture are - Introduction with explanation of the principles of energy conversion and the generation of mechanical forces - Electromagnetic actuators with solenoids, stepping motors, linear motors and magnetostrictive actuators - Electrostatic actuators (Piezoelectric actuators) - Electrothermic actuators (shape memory actuators) In the practical course the students work with the following experiments: - Solenoid - Stepping motor - Piezoelectric and shape memory actuators
Course type	
Course type	
Learning Material	lecture papers and experiment instructions
Recommended literature	Janocha, H.: Aktoren Fatikow, S.: Mikroroboter und Mikromontage Jendritza, D.: Technischer Einsatz neuer Janocha, H.: Aktoren Fatikow, S.: Mikroroboter und Mikromontage Jendritza, D.: Technischer Einsatz neuer Aktoren
Method(s) of instruction/ media being used	lecture and experiment
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	Winter term
Term	2. term
Compulsory	none
requirements	
Recommended	Electrical drives and system design
requirements	
Assessment	exam 60 min
Assessment modalities	PL – during period of exams (graded)
ECTS credits	3
Workload	90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 20 h lecture (preparation and rework) 15 h practical training (preparation and evaluation) 10 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.2.215
Module name	Information Theory, Coding and Data Security
	Electrical Engineering and Information Technology
Department	0 0
Degree program	ET/IT (Ma)
Module coordinator	Prof. Dr. Ludwig Niebel
Compulsory/ optional/ electiv	optional
Learning objectives	Upon completion of the module, students
	- understands the major sections of information transmission in space and
	time
	- are able to applicate selected coding methodes
	- understands the impact of some methodes on data security
	- are able to use math methodes to rate these
	- are able to evaluate coding methodes
Module content	- Basics of linear algebra, theory of finite elements
	- Basics of Information theory, source description, source coding
	- cryptography
	- channel models, channel entropies
	- channel coding, block coding
	- convolution coding
O avera a terra a	- examples in simulation
Course type	2L - 2E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	books, script, exercises and lab instruction sheets on the internet
Recommended	Rohling, Müller: Einführung in die Informations- und Codierungstheorie,
literature	Teubner 1995
	Friedrichs: Kanalcodierung, Springer 1996
	Schneider-Obermann: Kanalkodierung, Vieweg 1998
	Bossert, M.: Kanalkodierung, Teubner 1998
	Kreß ,Irmer: Angewandte Systemtheorie, Verlag Technik 1989 Lipp, M.: VPN – virtuelle private Netzwerke, Pearson 2001 oder Addison-
	Wesley 2001
Method(s) of	Lecture, exercises, lab session, self study
instruction/	
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/ Winter	summer term
Term	1st term
Compulsory	none
requirements	
Recommended	Digital systems
requirements	
Assessment	exam 90 min, Laboratory internship certificate
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	6
Workload	180h of total work load, thereof
	h of contact hours and
	h of self-study, consisting of:
	h lecture (preparation and rework)
	h practical training (preparation and evaluation)
	h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German
00	l de la constante de

Madula number	ET 0.017
Module number	ET.2.217
Module name	Technical Optics
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ma)
Module coordinator	Prof. Dr. Alexander Richter
Compulsory/ optional/ electiv	optional module
Learning objectives	After successful participation of the module, the students are able to
	- describe optical radiation in the wave particle duality,
	- describe optical proberties of matter (optical index and absorption),
	- describe simple optical phenomena and to use for the design of
	optoelectronic systems,
	- elaborate concepts of optical systems with the help of ray optics
	- characterise lenses and lens systems, and
	to apply the basics of laser optics.
Module content	Wave particle duality
	photons
	optical index and absorption reflection and scattering
	wave properties wave equation, interference, diffraction
	Fourier optics
	ray optics and optical imaging, aberrations
	lenses, apertures, mirrors, prisms, fibers, micro optics, achromats
	measurements of lens systems
	optical instrumentation
	Properties of laser radiation, optical resonators, Gaussian beams
Course type	2L - 1E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Learning Material	script, lab instruction sheets
Recommended	Born, M.: Optik
literature	Schröder, G.: Technische Optik
	Pedrotti: Optik
	Kühlke, D: Optik
Method(s) of	Lecture, exercises, self study
instruction/	
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	1. term
Compulsory	none
requirements	Mathematica Dhusica
Recommended	Mathematics, Physics
requirements Assessment	
Assessment modalities	oral exam PL – exam during audit period(graded)
ECTS credits	6
Workload	90h of total work load, thereof
W UINIDAU	45h of contact hours and
	45h of self-study, consisting of:
	20 h lecture (preparation and rework)
	15 h exercise (preparation and evaluation)
	10 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.2.218
Module name	Optoelectronics 2
Department	Electrical Engineering and Information Technology
Degree program	RFE (Ma), ET/IT (Ma)
Module coordinator	Prof. Dr. Alexander Richter
Compulsory/ optional/	optional
electiv	optional
Learning objectives	After successful participation of the module, the students are able to - Know of the effect conditions of special optoelectronic components in recessed way; - create concepts of simple optoelectronic transmission systems under
	consideration of disturbance variables and the dynamic behaviour; - construct and test of simple optoelectronic systems
Module content	<ul> <li>use measurement techniques of fiber optics</li> <li>Mediation of the theoretical bases to photonics, dynamic events in semiconductor structures;</li> <li>Fiber optics</li> <li>Photonic transmission technology</li> </ul>
Course type	2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Recommended	Paul: "Optoelektronische Halbleiterbauelemente", Teubner-Verlag, 1992
literature	Jansen: "Optoelektronik", Vieweg, 1993
	Jones: "Optoelektronik", VCH, 1992
	Ramaswami, "Optical Networks", Morgan Kaufmann Publishers, 1998
Method(s) of	2L - 0E - 0S - 1P
instruction/	
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/ Winter	winter term
Term	2. term
Compulsory	none
requirements	
Assessment	oral exam
Assessment modalities	PL – exam during audit period(graded)
Further Information	In the exsam, students create solutions for selected optoelectronic questions, and calculate various technically relevant variables and parameters based on given practical examples.
ECTS credits	6
Workload	<ul> <li>90h of total work load, thereof</li> <li>45h of contact hours and</li> <li>45h of self-study, consisting of:</li> <li>20 h lecture (preparation and rework)</li> <li>15 h practical training (preparation and evaluation)</li> <li>10 h exam preparation</li> </ul>
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.2.219
Module name	Laser Techniques
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ma)
Module coordinator	Prof. Dr. Alexander Richter
Compulsory/ optional/	optional
electiv	
Learning objectives	- knowledge of the effect conditions of laser
	- knowledge of the laser kinds and her operating conditions
	- ability of the laser use decision
Module content	- theoretical bases of laser
	- laser kinds and explanation forms
	- application of laser
Course type	2L – 0E – 0S – 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	- lecture script
	- lab instruction sheets
Recommended	- Bauer, H.: Lasertechnik
literature	- Eichler: Laser
	- Meschede: Optik, Licht und Laser
	- Treiber: Der Laser in der industriellen Technik
Method(s) of	Collection of transparencies, lecture, self- study, discussion at the laboratory
instruction/	
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	2nd term
Compulsory	none
requirements	
Recommended	Physics, Optics
requirements	
Assessment	oral examination
Assessment modalities	PL – exam during audit period(graded)
ECTS credits	6
Workload	90 h of total work load, therefrom
	45 h of presence at university
	45 h of self-study
Usability of this module	- Optoelectronics
	- Optical and Optoelectronical Sensors
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Modulo pumbor	ET.2.220
Module number Module name	
	Optical and Optoelectronical Sensors
Department	Electrical Engineering and Information Technology
Degree program	RFE (Ma), ET/IT (Ma)
Specialization/ Profil	AT
Module coordinator	Prof. Dr. Alexander Richter
Compulsory/ optional/	optional
electiv	
Learning objectives	After successful participation of the module, the sudents are able to
	- use modern optical sensor technologies (micro-optics, fibre optics,
	integrated optics)
	- select components (optoelectronic light sources/detectors
	- define properties, topologies, classification
	- select working principles (intensity modulation, spectral encoding,
	interferometry, and other)
	- use signal processing concepts, multiplexing (sensor systems and
	networks)
	- define practial applications
Module content	- Modern optical sensor technologies (micro-optics, fibre optics, integrated
	optics)
	- Components (optoelectronic light sources/detectors
	- Properties, topologies, classification
	- Working principles (intensity modulation, spectral encoding, interferometry,
	and other)
	- Signal processing concepts, multiplexing (sensor systems and networks)
	- Applications
Course type	2L - OE - OS - 1P (Lecture, Exercises, Seminar, practical course)
Recommended	HR. Tränkler, E. Obermeier (Herausg.) "Sensortechnik" Handbuch für
literature	Praxis und Wissenschaft, Springer, 1998
	W. Heiwang (Herausg.) "Sensorik", Reihe: Halbleiter-Elektronik Bd. 17,
	Springer 1993
	P. Hauptmann "Sensoren: Prinzipien und Anwendungen" C. Hanser, 1990
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	2nd term
Compulsory	none
requirements	
Assessment	oral exam
Assessment modalities	PL – exam during audit period(graded)
Further Information	In the exsam, students create solutions for selected optoelectronic
	questions, and calculate various technically relevant variables and
	parameters based on given practical examples.
ECTS credits	6
Workload	90h of total work load, thereof
	45h of contact hours and
	45h of self-study, consisting of:
1	20 h lecture (preparation and rework)
	15 h practical training (preparation and evaluation)
	10 h exam preparation
Time	According time table
Duration of module	
	1 term
Place/ room	EAH Jena

Induction         Integration of mixed-signal circuits           Department         Electrical Engineering and Information Technology           Degree program         RFE (Ma), ET/IT (Ma), ET/IT (Ma)           Module coordinator         Prof. DrIng, habil. Jürgen Kampe           Compulsory         The student will be introduced to circuit design, to the automated design of complex integrated CMOS circuits and to related design tools. Sizing as well as alyout synthesis will be emphasized.           At the end of the module students are able to recognize the main basic and elementary circuit configurations for integrated CMOS circuits and to resultate them on the base of there characteristics. The students are able to remember complex analog CMOS circuit configurations, used for signal conditioning and converting purposes in the interface region of integrated systems on chip.           The student will be introduced to size them with respect to a given application.           The student will be introduced to circuit system and to synthesize, to varify and to rate layouts by the use of design tools.           Module content         - CMOS technology:           The student will be systematic circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA Converters);           Sign tools for integrated circuits (system level to layout, pre- and post-layout synthesize) to complex integrated circuits (system level to layout, pre- and post-layout synthesize).           Course type         ZL - OE - 1S · 1P           Course type         ZL - OE - 1S · 1P           Course	Module number	ET.2.221
Department         Electrical Engineering and Information Technology           Degree program         RFE (Ma), ET/11 (Ma), Et/11 (Ma)           Module coordinator         Prof. DrIng, habil. Jürgen Kampe           Compulsory/ optional/         Compulsory           electiv         The student will be introduced to circuit design, to the automated design of complex integrated CMOS circuits and to related design tools. Sizing as well as layout synthesis will be emphasized.           At the end of the module students are able to freecognize the main basic and elementary circuit configurations for integrated CMOS circuits and to evaluate them on the base of there characteristics. The students are able to tremember complex analog CMOS circuit configurations, used for signal conditioning and converting purposes in the interface regino of new circuit configurations and to size them with respect to a given application. The students are able to infer and CMOS layouts and to synthesize, to verify and to rate layouts by the use of design tools.           Module content         - CMOS technology;           - toring traitors, used of rate analy circuit configurations of integrated CMOS design (i.e. current sources and mirors, cascade, transfer switches, differential amplifier, output and bias stages);           - complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA converts);           - systematic design methodology for analog integrated circuits;           - functional analysis of complex circuits and simulation.           Material         Allen, P. E., Holberg, D. R: CMOS analog circuit design.		
Degree program         RFE (Ma), ET/IT (Ma), ET/IT (Ma)           Module coordinator         Prof. DrIng, habil. Jürgen Kampe           Compulsory/ optional/ electiv         Compulsory           Learning objectives         The student will be introduced to circuit design, to the automated design of complex integrated CMOS circuits and to related design tools. Sizing as well as layout synthesis will be emphasized. At the end of the module students are able to recognize the main basic and elementary circuit configurations for integrated CMOS circuit configurations, used for signal conditioning and converting purposes in the interface region of integrated systems on chip.           The students are able to indo ut the principle of operation of new circuit configurations are able to indo ut the principle of operation of new circuit configurations are able to understand CMOS layouts and to synthesize, to verify and to rate layouts by the use of design tools.           Module content         - CMOS technology; - Cl layout, layout design and verification; - basic and elementary circuit configurations of integrated CMOS design (i.e. current sources and mirrors, cascade, transfer switches, differential amplifier, output and bias stages); - complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA convertens); - systematic design methodology for analog integrated circuits; - functional analysis of complex circuits, system level to layout, pre- and post- layout simulation and layout verification).           Course type         2L - 0E - 15 - 17           Course type         2L - 0E - 15 - 17           Literature, lecture notes, labo instruction sheets <t< td=""><td></td><td></td></t<>		
Module coordinator         Prof. Dr. Ing., habit. Jürgen Kampe           Compulsory         Compulsory           Jearning objectives         The student will be introduced to circuit design, to the automated design of complex integrated CMOS circuits and to related design tools. Sizing as well as layout synthesis will be emphasized.           At the end of the module students are able to recognize the main basic and elementary circuit configurations for integrated CMOS circuits are able to remember complex analog CMOS circuit configurations, used for signal conditioning and converting purposes in the interface region of integrated systems on chip.           The students are able to find out the principle of operation of new circuit configurations and to size them with respect to a given application. The students are able to understand CMOS layouts and to synthesize, to verify and to rate layouts by the use of design tools.           Module content         - CMOS technology;           - Io Layout, layout design and verification;         - basic and elementary circuit configurations of integrated CMOS design (i.e. current sources and mirrors, cascade, transfer switches, differential amplifier, output and bias stages);           - complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparetors, VCO, AD and DA converters);           - systematic design methodology for analog integrated circuits;           - systematic design on layout verification.           - basign tools for integrated circuits (system level to layout, pre- and posl-layout sinulation and layout verification).           Course type         21 - 0E - 15 - 1P (Lecture,		
Compulsory/optional/ electiv         Compulsory           Learning objectives         The student will be introduced to circuit design, to the automated design of complex integrated CMOS circuits and to related design tools. Sizing as well as layout synthesis will be emphasized. At the end of the module students are able to recognize the main basic and elementary circuit configurations for integrated CMOS circuits and to evaluate them on the base of there characteristics. The students are able to remember complex analog CMOS circuit configurations, used for signal conditioning and converting purposes in the interface region of integrated systems on chip. The students are able to ind out the principle of operation of new circuit configurations and to size them with respect to a given application. The students are able to understand CMOS layouts and to synthesize, to verify and to rate layouts by the use of design tools.           Module content         - CMOS technology: - CMOS technology: - CMOS technology: - CMOS technology: - CMOS technology.           Module content         - CMOS technology: - CMOS technology: - complex integrated circuits (system levels to layout, pre- and post- layout simulation and layout verification; - systematic design methodology for analog integrated circuits; - functional analysis of complex circuits, system level to layout, pre- and post- layout simulation and layout verification).           Course type         2L - 0E - 15 - 1P (Lecture, Exercises, Seminar, practical course)           Learning Material         Literature, lecture notes, lab instruction sheets           Recommended         Allen, P. E, Holberg, D. R.: CMOS analog circuit design. Baker, R. J.: CMOS circuit design, layout, and simulation. Maloberti, F.: Analog design coreturits,		
Learning objectives         The student will be introduced to circuit design, to the automated design of complex integrated CMOS circuits and to related design tools. Sizing as well as layout synthesis will be emphasized. At the end of the module students are able to recognize the main basic and elementary circuit configurations for integrated CMOS circuits and to evaluate them on the base of there characteristics. The students are able to remember complex analog CMOS circuit configurations, used for signal conditioning and converting purposes in the interface region of integrated systems on chip.           The students are able to find out the principle of operation of new circuit configurations and to size them with respect to a given application. The students are able to understand CMOS layouts and to synthesize, to verify and to rate layouts by the use of design tools.           Module content         - CNOS technology: - CONOS technology: - CONOS technology: - Complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA converters); - systematic design methodology for analog integrated circuits; - systematic design methodology for analog integrated circuits; - systematic design methodology for analog integrated circuits; - design tools for integrated circuits (system level to layout, pre- and post- layout simulation and layout verification).           Learning Material Literature, lecture notes, lab instruction sheets         Allen, P. E., Hoberg, D. R: CMOS substructies, symbolic and simulation. Matoberti, F.: Analog design for CMOS VLSI systems Fischer, W. J., Schuffyr, R.: MOS-VLSI-Technik: Eine Einführung in Technologie, Entwurf, CAD System, Schalturgen           Method(s) of instruction/ study         Talk, peer instruction, hands-on training, individual work, case study, self- study media being us		
complex integrated CMOS circuits and to related design tools. Sizing as well as layout synthesis will be emphasized. At the end of the module students are able to recognize the main basis: and elementary circuit configurations for integrated CMOS circuits and to evaluate them on the base of there characteristics. The students are able to remember complex analog CMOS circuit configurations, used for signed configurations and to size them with respect to a given application. The students are able to indout the principle of operation of integrated systems on chip.           Module content         - CMOS technology; - CMOS technology; - CMOS technology; - CMOS technology; - CMOS technology; - Camplex integrated circuits (i.e. current sources and mirrors, cascade, transfer switches, differential amplifier, output and bias stages); - complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA converters); - systematic design methodology for analog integrated circuits; - functional analysis of complex circuits, symbolic analysis, sizing, design space centering, trade-off curvelfication sheets Recommended           Allen, P. E., Holberg, D. R.: CMOS analog circuit design. Matchert, P. E., Holberg, D. R.: CMOS analog circuit design. Matchert, P. J.: Schüffny, R.: MOS-VLSI-Technik: Eine Einführung in Technologie, Entwurt, CAD-Systems, Schalturges           Method(s) of instruction/ metal baberi, F.: Analog design for CMOS VLSI-Systems Fischer, WJ., Schüffny, R.: MOS-VLSI-Technik: Eine Einführung in Technologie, Entwurt, CAD-Systems, Schalturgen           Method(s) of instruction/ metal being used         Tak, peer instructon, hands-on training, individual work, case study, self- study           Method(s) of instruction/ metal being used         Analog design for tequirements         Analog		
as layout synthesis will be emphasized.           At the end of the module students are able to recognize the main basic and elementary circuit configurations for integrated CMOS circuits and to evaluate them on the base of there characteristics. The students are able to remember complex analog CMOS circuit configurations, used for signal conditioning and converting purposes in the interface region of integrated systems on chip.           The students are able to find out the principle of operation of new circuit configurations and to size them with respect to a given application. The students are able to understand CMOS layouts and to synthesize, to verify and to rate layouts by the use of design tools.           Module content         - CMOS technology; - CMOS technology; - CMOS technology; - CMOS technology; - Complex integrated circuits configurations of integrated CMOS design (i.e. current sources and mirrors, cascade, transfer switches, differential amplifer, output and bias stages); - complex integrated circuits (system these), differential amplifer, output and bias stages); - complex integrated circuits (system level to layout, pre- and post- layout simulation and layout verification), - basic and elementary circuits (system level to layout, pre- and post- layout simulation and layout verification), - design tools for integrated circuits (system level to layout, pre- and post- layout simulation and layout verification), - design clobel for integrated circuits (system level to layout, pre- and post- layout simulation and layout verification, - design, floxed, cMOS; circuit design, layout, and simulation. Maloberti, F:: Analog design for CMOS VLSI systems Fischer, WJ., Schüftyr, R:: MOS-VLSI-Technik: Eine Einfuhrung in Technologie, Entwurf, CAD-Systeme, Schaltkreise Gleien, G: Symbolic Analysis for Automated Design of Analog Integrated Circuitis. Gräb, H. E:: Analog design centering and sizna- L	Learning objectives	
At the end of the module students are able to recognize the main basic and elementary circuit configurations for integrated CMOS circuits and to evaluate them on the base of there characteristics. The students are able to remember complex analog CMOS circuit configurations, used for signal conditioning and converting purposes in the interface region of integrated systems on chip. The students are able to find out the principle of operation of new circuit configurations and to size them with respect to a given application. The students are able to indeverstand CMOS layouts and to synthesize, to verify and to rate layouts by the use of design tools.           Module content         - CMOS technology. - IC layout, tayout design and verification; - basic and elementary circuit configurations of integrated CMOS design (i.e. current sources and mirrors, cascade, transfer switches, differential amplifer, output and bias stages); - complex integrated circuits (is: efference sources, OTA, optical receivers, comparators, VCO, AD and DA converters); - systematic design methodology for analog integrated circuits; - functional analysis of complex circuits, symbolic analysis, sizing, design space centering, trade-off curves and Pareto optimality; - design tools for integrated circuits; symbolic analysis, sizing, design space centering, trade-off curves and Pareto optimality; - design tools for integrated circuits; - functional analysis of CMOS vicil design. Bayout simulation and layout verification).           Course type         21. 0 E · 15 - 1P (Lecture, Exercises, Seminar, practical course)           Learning Material         Literature, lecture notes, lab instruction sheets           Recommended         Allen, P. E., Holberg, D. R.: CMOS vicil design of Analog Integrated Circuits. Gräb, H. E.: Analog design for CMOS VLSI systems Fischer, W. J.; Schüffny, R: MO		
elementary circuit configurations for integrated CMOS circuits and to evaluate them on the base of there characteristics. The students are able to remember complex analog CMOS circuit configurations, used for signal conditioning and converting purposes in the interface region of integrated systems on chip.           The students are able to find out the principle of operation of new circuit configurations and to size them with respect to a given application. The students are able to understand CMOS layouts and to synthesize, to verify and to rate layouts by the use of design tools.           Module content         - CMOS technology; - IC layout, layout design and verification: - basic and elementary circuit configurations of integrated CMOS design (i.e. current sources atages); - complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA converters); - systematic design methodology for analog integrated circuits; - functional analysis of complex circuits, symbolic analysis, sizin, design space centering, trade-off curves and Pareto optimality; - design tools for integrated circuits (system level to layout, pre- and post- layout simulation and layout verification).           Course type         2L - 0E - 15 - 1P (Lecture, Exercises, Seminar, practical course)           Learning Material         Literature, IccMOS analog circuit design.           Hierature         Baker, R. J.: CMOS: circuit design in alyout, and simulation. Matoberit, F.: Analog design for CMOS VLSI systems Fischer, WJ., Schuffty, R.: MOS-VLSI - Schattkreise Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits. Grab, H. E.: Analog design centering and sizing. Lienig. J.: Layoutsynthese elektronischer Schaltungen           Method(s) of Instruction/ metab being		
evaluate them on the base of there characteristics. The students are able to remember complex analog CMOS circuit configurations, used for signal conditioning and converting purposes in the interface region of integrated systems on chip.           The students are able to inderstand CMOS layouts and to synthesize, to verify and to rate layouts by the use of design tools.           Module content         - CMOS technology: - IC layout, layout design and verification; - basic and elementary circuit configurations of integrated CMOS design (i.e. current sources and mirrors, cascade, transfer switches, differential amplifier, output and bias stages); - complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA converters); - systematic design methodology for analog integrated circuits; - functional analysis of complex circuits, symbolic analysis, sizing, design space centering, trade-off curves and Pareto optimality: - design tools for integrated circuits (system level to layout, pre- and post- layout simulation and layout verification).           Course type         2L - 0E - 15 - 112 (Lecture, Exercises, Seminar, practical course)           Learning Material         Literature, lecture notes, lab instruction sheets           Recommended         Allen, P. E., Holberg, D. R.: MOS VLSI-Technik: Eine Einführung in Technologie, Entwurf, CAD-Systems, Schaltkreise Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits.           Gräb, H. E.: Analog design centering and sizing Lienig, J: Layoutsynthese elektronischer Schaltungen           Technologie, Entwurf, CAD-Systems, Schaltkreise           Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits. <td></td> <td></td>		
remember complex analog CMOS circuit configurations, used for signal conditioning and converting purposes in the interface region of integrated systems on chip.           The students are able to find out the principle of operation of new circuit configurations and to size them with respect to a given application. The students are able to understand CMOS layouts and to synthesize, to verify and to rate layouts by the use of design tools.           Module content         - CMOS technology; - IC layout, layout design and verification; - basic and elementary circuit configurations of integrated CMOS design (i.e. current sources and mirrors, cascade, transfer switches, differential amplifier, output and bias stages); - complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA converters); - systematic design methodology for analog integrated circuits; - functional analysis of complex circuits (system level to layout, pre- and post- layout simulation and layout verification).           Course type         2L - 0E - 15 - 1P (Lecture, Exercises, Seminar, practical course)           Learning Material         Literature, lecture notes, lab instruction sheets           Recommended         Allen, P. E., Holberg, D. R.: CMOS analog circuit design.           Baker, R. J.: CMOS: circuit design, layout, and simulation. Maloberti, F.: Analog design centering and sizing. Liering, J.: Layoutsynthese elektronischer Schalturgen           Method(s) of instruction/ media being used         Tak, peer instruction, hands-on training, individual work, case study, self- study           Level category         2 (Bachelor=1, Master=2)           Summer/Winter         Analog design		
conditioning and converting purposes in the interface region of integrated systems on chip. The students are able to find out the principle of operation of new circuit configurations and to size them with respect to a given application. The students are able to understand CMOS layouts and to synthesize, to verify and to rate layouts by the use of design tools.           Module content         - CMOS technology; - IC layout, layout design and verification; - basic and elementary circuit configurations of integrated CMOS design (i.e. current sources and mirrors, cascade, transfer switches, differential amplifier, output and bias stages); - complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA converters); - systematic design methodology for analog integrated circuits; - functional analysis of complex circuits, symbolic analysis, sizing, design space centering, trade-off curves and Pareto optimality; - design tools for integrated circuits (system level to layout, pre- and post- layout simulation and layout verification).           Course type         2L - OE - 1S - 1P         (Lecture, Exercises, Seminar, practical course)         Learning Material           Literature, IccUMOS: circuit design, layout, and simulation. Maloberti, F.: Analog design for CMOS VLSI systems Fischer, WJ., Schüffny, R.: MOS-VLSI-Technik: Eine Einführung in Technologie, Eintwurf, CAD-Systeme, Schailtreise Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits. Gräb, H. E: Analog design centering and sizing Lienig, J:: Layoutsynthese elektronischer Schaltungen           Method(s) of instruction/ media being used         Taik, peer instruction, hands-on training, individual work, case study, self- study           Lewevel category         2         Bach		
systems on chip.         The students are able to find out the principle of operation of new circuit configurations and to size them with respect to a given application.           Module content         - CMOS technology;           - IC layout, layout design and verification;         - basic and elementary circuit configurations of integrated CMOS design (i.e. current sources and mirrors, cascade, transfer switches, differential amplifier, output and bias stages);           - compartants, VCO, AD and DA converters);         - systematic design methodology for analog integrated circuits;           - functional analysis of complex circuits (symbolic analysis, sizing, design space centering, trade-off curves and Pareto optimality;         - design tools for integrated circuits; (symbolic analysis, sizing, design space centering, trade-off curves and Pareto optimality;           - design tools for integrated circuits (system level to layout, pre- and post-layout switches, differential           Learning Material         Literature, learner one, bab instruction sheets           Recommended         Allen, P. E., Holberg, D. R.: CMOS analog circuit design.           Baker, R. J.: CMOS: circuit design, layout, and simulation.           Maloberti, F.: Analog design for CMOS-VLSI-Technik: Eine Einführung in Technologic. Entwurf, CAD-Systeme, Schaltkreise           Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits.           Grab, H. E: Analog design centering and sizing.           Lienig. J.: Layoutsynthese elektronischer Schalturgen           Technologic. Entwurf, CAD-Syste		
configurations and to size them with respect to a given application. The students are able to understand CMOS layouts and to synthesize, to verify and to rate layouts by the use of design tools.           Module content         - CMOS technology; - Clayout, layout design and verification; - basic and elementary circuit configurations of integrated CMOS design (i.e. current sources and mirrors, cascade, transfer switches, differential amplifier, output and bias stages); - complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA converters); - systematic design methodology for analog integrated circuits; - functional analysis of complex circuits, synthesize, alsign, design space centering, trade-off curves and Pareto optimality; - design tools for integrated circuits (system level to layout, pre- and post- layout simulation and layout verification).           Course type         2L - 0E - 1S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Literature, lecture notes, lab instruction sheets           Recommended         Allen, P. E., Holberg, D. R.: CMOS analog circuit design.           Baker, R. J.: CMOS: circuit design, layout, and simulation. Maloberti, F.: Analog design for CMOS VLSI systems Fischer, WJ., Schuffny, R.: MOS-VLSI-Technik: Eine Einführung in Technologie, Entwurf, CAD-Systeme, Schaltkreise Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits. Gräb, H. E.: Analog design centering and sizing. Lienig. J.: Layoutsynthese elektronischer Schaltungen           Method(s) of instruction/ media being used         2         (Bachelor=1, Master=2)           Summer/ Winter         Analogdesign requirements		
The students are able to understand CMOS layouts and to synthesize, to verify and to rate layouts by the use of design tools.           Module content         - CMOS technology;           I C layout, layout design and verification;         - basic and elementary circuit configurations of integrated CMOS design (i.e. current sources and mirrors, cascade, transfer switches, differential amplifier, output and bias stages);           - complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA converters);         - systematic design methodology for analog integrated circuits;           - functional analysis of complex circuits, symbolic analysis, sizing, design space centering, trade-off curves and Pareto optimality;         - design tools for integrated circuits (system level to layout, pre- and post- layout simulation and layout verification).           Course type         21 - 0E - 15 - 1P (Lecture, Exercises, Seminar, practical course)           Learning Material         Literature, lecture notes, lab instruction sheets           Recommended         Allen, P. E., Holberg, D. R.: MCSV-LIS-Technik: Eine Einführung in Technologie, Entwurf, CAD-Systeme, Schattkreise           Grielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits.         Gräb, H. E:: Analog design centering and sizing.           Level/ category         2 (Bachelor=1, Master=2)         Summer/ Winter           Summer/ Winter         winter term, summer term           Term         2nd term           Compulsory         Analogdesign <td></td> <td></td>		
Verify and to rate layouts by the use of design tools.           Module content         - CMOS technology;           IC layout, layout design and verification;         - basic and elementary circuit configurations of integrated CMOS design (i.e. current sources and mirrors, cascade, transfer switches, differential amplifier, output and bias stages);           - complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA converters);         - systematic design methodology for analog integrated circuits;           - functional analysis of complex circuits, symbolic analysis, sizing, design space centering, trade-off curves and Pareto optimality;         - design tools for integrated circuits (system level to layout, pre- and post-layout simulation and layout verification).           Course type         2L - 0E - 1S + 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Literature, lecture notes, lab instruction sheets           Recommended         Allen, P. E., Holberg, D. R.: CMOS analog circuit design.           Baker, R. J.: CMOS: circuit design, layout, and simulation.         Maloberti, F: Analog design for CMOS VLSI systems           Fischer, WJ., Schüffny, R.: MOS-VLSI-Technik: Eine Einführung in Technologie, Entwurf, CAD-Systeme, Schaltkreise         Girab, H. E.: Analog design for CMOS VLSI systems           Iterature         Baker, J.: Layoutsynthese elektronischer Schaltkreise         Girab, H. E.: Analog design for CMOS VLSI systems           Fischer, WJ., Schüffny, R.: MOS-VLSI systems <t< td=""><td></td><td></td></t<>		
Module content         - CMOS technology;           - IC layout, layout design and verification;         - basic and elementary circuit configurations of integrated CMOS design (i.e. current sources and mirrors, cascade, transfer switches, differential amplifier, output and bias stages);           - complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA converters);         - systematic design methodology for analog integrated circuits;           - functional analysis of complex circuits (system level to layout, pre- and post-layout simulation and layout verification).         - Course type           Course type         2L - 0E - 1S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Literature, lecture notes, lab instruction sheets           Recommended         Allen, P. E., Holberg, D. R.: CMOS snalog circuit design.           Baker, R. J.: CMOS: circuit design, layout, and simulation.         Maloberti, F.: Analog design for CMOS VLSI systems           Fischer, WJ., Schüffny, R.: MOS-VLSI-Technik: Eine Einführung in Technologie, Entwurf, CAD-Systeme, Schaltkreise         Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits.           Gräb, H. E.: Analog design centering and sizing.         Lienig, J.: Layoutsynthese elektronischer Schaltungen           Hethod(s) of instruction/ method         Talk, peer instruction, hands-on training, individual work, case study, self-study           Summer/ Winter         Winter term, summer term           Z		
- IC layout, layout design and verification;         - basic and elementary circuit configurations of integrated CMOS design (i.e. current sources and mirrors, cascade, transfer switches, differential amplifier, output and bias stages);         - complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA converters);         - systematic design methodology for analog integrated circuits;         - functional analysis of complex circuits, symbolic analysis, sizing, design space centering, trade-off curves and Pareto optimality;         - design tools for integrated circuits (system level to layout, pre- and post-layout simulation and layout verification).         Course type       2L - 0E - 1S - 1P (Lecture, Exercises, Seminar, practical course)         Learning Material       Literature, lecture notes, lab instruction sheets         Recommended       Allen, P. E., Holberg, D. R.: CMOS analog circuit design.         Baker, R. J.: CMOS: circuit design, layout, and simulation.       Maloberti, F.: Analog design centering and sizing.         Literature       Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits.         Grab, H. E.: Analog design centering and sizing.       Lienig, J.: Layoutsynthese elektronischer Schaltungen         Method(s) of instruction, hands-on training, individual work, case study, self-study       Analog Circuit Design, Signals and Systems, Integrated Circuits         Recommended       Analog Circuit Design, Signals and Systems, Integrated Circuits         re	Madula seriest	
- basic and elementary circuit configurations of integrated CMOS design (i.e. current sources and mirrors, cascade, transfer switches, differential amplifier, output and bias stages);           - complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA converters);           - systematic design methodology for analog integrated circuits;           - functional analysis of complex circuits, symbolic analysis, sizing, design space centering, trade-off curves and Pareto optimality;           - design tools for integrated circuits (system level to layout, pre- and post-layout simulation and layout verification).           Course type         2L - 0E - 1S - 1P           Learning Material         Literature, lecture notes, lab instruction sheets           Recommended         Allen, P. E., Holberg, D. R.: CMOS analog circuit design.           Iterature         Baker, R. J.: CMOS: circuit design, layout, and simulation.           Matoperial         Circuits.           Grab, H. E.: Analog design for CMOS VLSI systems           Fischer, WJ., Schüffny, R.: MOS-VLSI systems           Fischer, WJ., Schüffny, R.: MOS-VLSI systems           Grab, H. E.: Analog design centering and sizing.           Lienig, J.: Layoutsynthese elektronischer Schaltungen           Method(s) of         Talk, peer instruction, hands-on training, individual work, case study, self-study           media being used         Level / category         2 (Bachelor=1, Master=2)	ivioaule content	
current sources and mirrors, cascade, transfer switches, differential amplifier, output and bias stages);         - complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA converters);           - systematic design methodology for analog integrated circuits;         - systematic design methodology for analog integrated circuits;           - functional analysis of complex circuits, symbolic analysis, sizing, design space centering, trade-off curves and Pareto optimality;         - design tools for integrated circuits (system level to layout, pre- and post- layout simulation and layout verification).           Course type         2L - 0E - 1S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Literature, lecture notes, lab instruction sheets           Recommended         Allen, P. E., Holberg, D. R.: CMOS analog circuit design.           literature         Baker, R. J.: CMOS: circuit design, layout, and simulation.           Maloberti, F.: Analog design for CMOS VLSI systems         Fischer, WJ., Schüffny, R.: MOS-VLSI-Technik: Eine Einführung in Technologie, Entwurf, CAD-Systeme, Schaltkreise           Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits.         Gräb, H. E.: Analog design centering and sizing.           Lienig, J.: Layoutsynthese elektronischer Schaltungen         Talk, peer instruction, hands-on training, individual work, case study, self- study           weetwork (category         2.         (Bachelor=1, Master=2)           Summer/ Winter		
amplifier, output and bias stages);       - complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA converters);         - systematic design methodology for analog integrated circuits;       - functional analysis of complex circuits, symbolic analysis, sizing, design space centering, trade-off curves and Pareto optimality;         - design tools for integrated circuits (system level to layout, pre- and post-layout simulation and layout verification).         Course type       2L - 0E - 1S - 1P       (Lecture, Exercises, Seminar, practical course)         Learning Material       Literature, lecture notes, lab instruction sheets         Recommended       Allen, P. E., Holberg, D. R.: CMOS analog circuit design.         Baker, R. J.: CMOS: circuit design, layout, and simulation.         Maloberti, F.: Analog design for CMOS VLSI systems         Fischer, WJ., Schüffny, R.: MOS-VLSI-Technik: Eine Einführung in Technologie, Entwurf, CAD-Systems, Schaltkreise         Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits.         Grab, H. E.: Analog design centering and sizing.         Lienig, J.: Layoutsynthese elektronischer Schaltungen         Method(s) of instruction/ study         media being used         Level/ category       2 (Bachelor=1, Master=2)         Summer/ Winter       2nd term         Compulsory       Analog design         requirements       Analog Circuit Design, Signals a		
- complex integrated circuits (i.e. reference sources, OTA, optical receivers, comparators, VCO, AD and DA converters);           - systematic design methodology for analog integrated circuits;           - functional analysis of complex circuits, symbolic analysis, sizing, design space centering, trade-off curves and Pareto optimality;           - design tools for integrated circuits (system level to layout, pre- and post- layout simulation and layout verification).           Course type         2L - 0E - 1S - 1P (Lecture, Exercises, Seminar, practical course)           Learning Material         Literature, lecture notes, lab instruction sheets           Recommended         Allen, P. E., Holberg, D. R.: CMOS analog circuit design.           Baker, R. J.: CMOS: circuit design, layout, and simulation.           Maloberti, F.: Analog design for CMOS VLSI systems           Fischer, WJ., Schüffny, R.: MOS-VLSI-technik: Eine Einführung in Technologie, Entwurf, CAD-Systeme, Schaltkreise           Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits.           Grab, H. E.: Analog design centering and sizing.           Lienig, J.: Layoutsynthese elektronischer Schaltungen           Method(s) of instruction/ media being used           Level/ category         2 (Bachelor=1, Master=2)           Summer/ Winter         Winter term, summer term           Term         2.nd term           Analog Circuit Design, Signals and Systems, Integrated Circuits           re		
- systematic design methodology for analog integrated circuits;         - functional analysis of complex circuits, symbolic analysis, sizing, design space centering, trade-off curves and Pareto optimality;         - design tools for integrated circuits (system level to layout, pre- and post-layout simulation and layout verification).         Course type       2L - 0E - 1S - 1P         Learning Material       Literature, lecture notes, lab instruction sheets         Recommended       Allen, P. E., Holberg, D. R.: CMOS analog circuit design.         literature       Baker, R. J.: CMOS: circuit design, layout, and simulation.         Maloberti, F.: Analog design for CMOS VLSI systems         Fischer, WJ., Schüffny, R.: MOS-VLSI-Stechnik: Eine Einführung in Technologie, Entwurf, CAD-Systeme, Schaltkreise         Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits.         Gräb, H. E.: Analog design centering and sizing.         Lienig, J.: Layoutsynthese elektronischer Schalturgen         Method(s) of instruction, hands-on training, individual work, case study, self-study         study         media being used         Level/ category       2 (Bachelor=1, Master=2)         Summer/ Winter       winter term, summer term         Term       2nd term         Compulsory       Analog Gircuit Design, Signals and Systems, Integrated Circuits         equirements       Analog design		
- functional analysis of complex circuits, symbolic analysis, sizing, design space centering, trade-off curves and Pareto optimality;         - design tools for integrated circuits (system level to layout, pre- and post-layout simulation and layout verification).         Course type       2L - 0E - 1S - 1P       (Lecture, Exercises, Seminar, practical course)         Learning Material       Literature, lecture notes, lab instruction sheets         Recommended       Allen, P. E., Holberg, D. R.: CMOS analog circuit design.         Maker, R. J.: CMOS: circuit design, layout, and simulation.         Maloberti, F.: Analog design for CMOS VLSI systems         Fischer, WJ., Schüffny, R.: MOS-VLSI-Technik: Eine Einführung in Technologie, Entwurf, CAD-Systeme, Schaltkreise         Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits.         Gräb, H. E.: Analog design for Automated Design of Analog Integrated Circuits.         Gräb, H. E.: Analog design centering and sizing.         Lienig, J.: Layoutsynthese elektronischer Schaltungen         Method(s) of instruction, hands-on training, individual work, case study, self-study         media being used         Level/ category       2         Summer/ Winter       winter term, summer term         Term       2nd term         Compulsory       Analog design report         Assessment       Laboratory internship report         Assessment		
space centering, trade-off curves and Pareto optimality; - design tools for integrated circuits (system level to layout, pre- and post- layout simulation and layout verification).           Course type         2L - 0E - 1S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Literature, lecture notes, lab instruction sheets           Recommended         Allen, P. E., Holberg, D. R.: CMOS analog circuit design.           Baker, R. J.: CMOS: circuit design, layout, and simulation.           Maloberti, F.: Analog design for CMOS VLSI systems           Fischer, WJ., Schüffny, R.: MOS-VLSI-Technik: Eine Einführung in Technologie, Entwurf, CAD-Systeme, Schaltkreise           Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits.           Gräb, H. E.: Analog design centering and sizing.           Lienig, J.: Layoutsynthese elektronischer Schaltungen           Method(s) of         Talk, peer instruction, hands-on training, individual work, case study, self- study           study         vinter term, summer term           Term         2nd term           Compulsory         Analog design           requirements         Analog Circuit Design, Signals and Systems, Integrated Circuits           Assessment         Laboratory internship report           Assessment         Laboratory internship report           Assessment modalities         APL – assessment during the semester period (graded) </td <td></td> <td></td>		
- design tools for integrated circuits (system level to layout, pre- and post- layout simulation and layout verification).         Course type       2L - 0E - 1S - 1P       (Lecture, Exercises, Seminar, practical course)         Learning Material       Literature, lecture notes, lab instruction sheets         Recommended       Allen, P. E., Holberg, D. R.: CMOS analog circuit design.         Baker, R. J.: CMOS: circuit design, layout, and simulation.         Maloberti, F.: Analog design for CMOS VLSI systems         Fischer, WJ., Schüffny, R.: MOS-VLSI-Technik: Eine Einführung in Technologie, Entwurf, CAD-Systeme, Schaltkreise         Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits.         Gräb, H. E.: Analog design centering and sizing.         Lienig, J.: Layoutsynthese elektronischer Schaltungen         Method(s) of instruction/ media being used         Level/ category       2 (Bachelor=1, Master=2)         Summer/ Winter       winter term, summer term         Term       2nd term         Compulsory       Analog Gircuit Design, Signals and Systems, Integrated Circuits         requirements       APL – assessment during the semester period (graded)         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       6         Workload       180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 35		
Iayout simulation and Iayout verification).           Course type         2L - 0E - 1S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Literature, lecture notes, lab instruction sheets           Recommended         Allen, P. E., Holberg, D. R.: CMOS analog circuit design.           Baker, R. J.: CMOS: circuit design, layout, and simulation.           Maloberti, F.: Analog design for CMOS VLSI systems           Fischer, WJ., Schüffny, R.: MOS-USL-Technik: Eine Einführung in           Technologie, Entwurf, CAD-Systeme, Schaltkreise           Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated           Circuits.           Gräb, H. E.: Analog design centering and sizing.           Lienig, J.: Layoutsynthese elektronischer Schaltungen           Method(s) of         Talk, peer instruction, hands-on training, individual work, case study, self-study           media being used         Z           Level/ category         2         (Bachelor=1, Master=2)           Summer/ Winter         winter term, summer term           Term         Znd term           Compulsory         Analog circuit Design, Signals and Systems, Integrated Circuits           Recommended         Analog Circuit Design, Signals and Systems, Integrated Circuits           Resessment         Laboratory internship report           Assessment		
Course type         2L - 0E - 1S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Literature, lecture notes, lab instruction sheets           Recommended         Allen, P. E., Holberg, D. R.: CMOS analog circuit design.           Baker, R. J.: CMOS: circuit design, layout, and simulation.           Maloberti, F.: Analog design for CMOS VLSI systems           Fischer, WJ., Schüffny, R.: MOS-VLSI-Technik: Eine Einführung in Technologie, Entwurf, CAD-Systeme, Schaltkreise           Gräb, H. E.: Analog design centering and sizing.           Lienig, J.: Layoutsynthese elektronischer Schaltungen           Method(s) of instruction/           media being used           Level/ category         2           Summer/ Winter           winter term, summer term           Term         2nd term           Compulsory           Analogdesign           requirements           Recommended           requirements           Assessment           Laboratory internship report           Assessment modalities           APL – assessment during the semester period (graded)           ECTS credits           6           Workload           180h of total work load, thereof           60h of contact hours and		
Learning Material         Literature, lecture notes, lab instruction sheets           Recommended         Allen, P. E., Holberg, D. R.: CMOS analog circuit design.           Baker, R. J.: CMOS: circuit design, layout, and simulation.         Maloberti, F.: Analog design for CMOS VLSI systems           Fischer, WJ., Schüffny, R.: MOS-VLSI-Technik: Eine Einführung in Technologie, Entwurf, CAD-Systeme, Schaltkreise         Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits.           Method(s) of instruction/ media being used         Talk, peer instruction, hands-on training, individual work, case study, self- study           Summer/ Winter         2 (Bachelor=1, Master=2)           Summer/ Winter         2nd term           Compulsory         Analog Circuit Design, Signals and Systems, Integrated Circuits           Recommended         Analog Circuit Design, Signals and Systems, Integrated Circuits           Resommended         Analog Circuit Design, Signals and Systems, Integrated Circuits           Compulsory         Analog Circuit Design, Signals and Systems, Integrated Circuits           Cortact hours and 120h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 35h lecture (preparation and rework) 35h seminar (preparation and rework) 35h seminar (preparation and rework) 35h seminar (preparation and rework) 35h lecture (preparation and rework) 35h seminar (preparation and rework)	Course type	
Recommended       Allen, P. E., Holberg, D. R.: CMOS analog circuit design.         Baker, R. J.: CMOS: circuit design, layout, and simulation.       Maloberti, F.: Analog design for CMOS VLSI systems         Fischer, WJ., Schüffny, R.: MOS-VLSI-Technik: Eine Einführung in Technologie, Entwurf, CAD-Systeme, Schaltkreise       Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits.         Gräb, H. E.: Analog design centering and sizing.       Lienig, J.: Layoutsynthese elektronischer Schaltungen         Method(s) of instruction/       Talk, peer instruction, hands-on training, individual work, case study, self-study         Summer/ Winter       winter term, summer term         Term       2nd term         Compulsory       Analogdesign         requirements       Analog Circuit Design, Signals and Systems, Integrated Circuits         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       6         Workload       180h of total work load, thereof         60h of contact hours and       120h of self-study, consisting of:         35h seminar (preparation and rework)       35h seminar (preparation and rework)         50 h practical training (preparation and rework)       50 h practical training (preparation and evaluation)		
Maloberti, F.: Analog design for ČMOŠ VLSI systems         Fischer, WJ., Schüffny, R.: MOS-VLSI-Technik: Eine Einführung in         Technologie, Entwurf, CAD-Systeme, Schaltkreise         Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated         Circuits.         Gräb, H. E.: Analog design centering and sizing.         Lienig, J.: Layoutsynthese elektronischer Schaltungen         Method(s) of         instruction/         media being used         Level/ category         2       (Bachelor=1, Master=2)         Summer/ Winter       winter term, summer term         Term       2nd term         Compulsory       Analogdesign         requirements       Analog Circuit Design, Signals and Systems, Integrated Circuits         Assessment       Laboratory internship report         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       6         Workload       180h of total work load, thereof         60h of self-study, consisting of:       35 h lecture (preparation and rework)         35h seminar (preparation and rework)       35h seminar (preparation and rework)         50 h practical training (preparation and evaluation)       50 h practical training (preparation and evaluation)	v	
Fischer, WJ., Schüffny, R.: MOS-VLSI-Technik: Eine Einführung in Technologie, Entwurf, CAD-Systeme, Schaltkreise Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits. Gräb, H. E.: Analog design centering and sizing. Lienig, J.: Layoutsynthese elektronischer SchaltungenMethod(s) of instruction/ media being used Level/categoryTalk, peer instruction, hands-on training, individual work, case study, self- studySummer/Winterwinter term, summer termTerm2nd termCompulsory requirementsAnalog Circuit Design, Signals and Systems, Integrated CircuitsAssessmentLaboratory internship reportAssessmentLaboratory internship reportAssessment180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 35 h lecture (preparation and rework) 35h seminar (preparation and rework) 35h seminar (preparation and rework) 35h seminar (preparation and rework) 35h seminar (preparation and rework) 30 h practical training (preparation and evaluation)TimeAccording time tableDuration of module1 term	literature	
Technologie, Entwurf, ČAD-Systeme, Schaltkreise Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits. Gräb, H. E.: Analog design centering and sizing. Lienig, J.: Layoutsynthese elektronischer SchaltungenMethod(s) of instruction/ media being usedTalk, peer instruction, hands-on training, individual work, case study, self- studyLevel/ category2(Bachelor=1, Master=2)Summer/ Winterwinter term, summer termTerm2nd termCompulsory requirementsAnalogdesignRecommended requirementsAnalog Circuit Design, Signals and Systems, Integrated CircuitsBCTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 35 h lecture (preparation and rework) 35h semiar (preparation and rework) 35h semiar (preparation and rework) 35h semiar (preparation and evaluation)TimeAccording time tableDuration of module1 term		
Gielen, G.: Symbolic Analysis for Automated Design of Analog Integrated Circuits. Gräb, H. E.: Analog design centering and sizing. Lienig, J.: Layoutsynthese elektronischer SchaltungenMethod(s) of instruction/ media being usedTalk, peer instruction, hands-on training, individual work, case study, self- studyLevel/ category2 (Bachelor=1, Master=2)Summer/ Winterwinter term, summer termTerm2nd termCompulsory requirementsAnalog Circuit Design, Signals and Systems, Integrated CircuitsAssessmentLaboratory internship reportAssessment modalitiesAPL – assesment during the semester period (graded)ECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 35 h lecture (preparation and rework) 35h seminar (preparation and rework) 35h hereical training (preparation and evaluation)TimeAccording time tableDuration of module1 term		
Circuits.       Gräb, H. E.: Analog design centering and sizing.         Lienig, J.: Layoutsynthese elektronischer Schaltungen         Method(s) of       Talk, peer instruction, hands-on training, individual work, case study, self-         instruction/       study         media being used       Level/category         Level/category       2 (Bachelor=1, Master=2)         Summer/Winter       winter term, summer term         Term       2nd term         Compulsory       Analogdesign         requirements       Analog Circuit Design, Signals and Systems, Integrated Circuits         Recommended       Analog Circuit Design, Signals and Systems, Integrated Circuits         requirements       APL – assessment during the semester period (graded)         ECTS credits       6         Workload       180h of total work load, thereof         60h of contact hours and       120h of self-study, consisting of:         35 h lecture (preparation and rework)       35h seminar (preparation and rework)         35h h seminar (preparation and rework)       50 h practical training (preparation and evaluation)         Time       According time table		
Gräb, H. E.: Analog design centering and sizing. Lienig, J.: Layoutsynthese elektronischer SchaltungenMethod(s) of instruction/ media being usedTalk, peer instruction, hands-on training, individual work, case study, self- studyLevel/ category2 (Bachelor=1, Master=2)Summer/ Winterwinter term, summer termTerm2nd termCompulsory requirementsAnalogdesignRecommended requirementsAnalog Circuit Design, Signals and Systems, Integrated CircuitsAssessmentLaboratory internship reportAssessmentLaboratory internship reportAssessment6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 35 h lecture (preparation and rework) 35h seminar (preparation and rework) 35h seminar (preparation and rework) 30 h practical training (preparation and evaluation)TimeAccording time tableDuration of module1 term		
Lienig, J.: Layoutsynthese elektronischer SchaltungenMethod(s) of instruction/ media being usedTalk, peer instruction, hands-on training, individual work, case study, self- studyLevel/ category2 (Bachelor=1, Master=2)Summer/ Winterwinter term, summer termTerm2nd termCompulsory requirementsAnalogdesignRecommended requirementsAnalog Circuit Design, Signals and Systems, Integrated CircuitsAssessmentLaboratory internship reportAssessmentLaboratory internship reportAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 35 h lecture (preparation and rework) 35h seminar (preparation and rework) 50 h practical training (preparation and evaluation)TimeAccording time tableDuration of module1 term		
Method(s) of instruction/ media being usedTalk, peer instruction, hands-on training, individual work, case study, self- studyLevel/ category2 (Bachelor=1, Master=2)Summer/ Winterwinter term, summer termTerm2nd termCompulsory requirementsAnalogdesignRecommended requirementsAnalog Circuit Design, Signals and Systems, Integrated CircuitsAssessmentLaboratory internship reportAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 35 h lecture (preparation and rework) 35h seminar (preparation and rework) 50 h practical training (preparation and evaluation)TimeAccording time tableDuration of module1 term		
instruction/ media being usedstudyLevel/ category2(Bachelor=1, Master=2)Summer/ Winterwinter term, summer termTerm2nd termCompulsory requirementsAnalogdesignRecommended requirementsAnalog Circuit Design, Signals and Systems, Integrated CircuitsAssessmentLaboratory internship reportAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 35 h lecture (preparation and rework) 35h seminar (preparation and rework) 50 h practical training (preparation and evaluation)TimeAccording time tableDuration of module1 term	Method(s) of	
Level/ category2 (Bachelor=1, Master=2)Summer/ Winterwinter term, summer termTerm2nd termCompulsory requirementsAnalogdesignRecommended requirementsAnalog Circuit Design, Signals and Systems, Integrated CircuitsAssessmentLaboratory internship reportAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 35 h lecture (preparation and rework) 35h seminar (preparation and rework) 50 h practical training (preparation and evaluation)TimeAccording time tableDuration of module1 term	instruction/	study
Summer/Winterwinter term, summer termTerm2nd termCompulsory requirementsAnalogdesignRecommended requirementsAnalog Circuit Design, Signals and Systems, Integrated CircuitsAssessmentLaboratory internship reportAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 35 h lecture (preparation and rework) 35h seminar (preparation and rework) 50 h practical training (preparation and evaluation)TimeAccording time tableDuration of module1 term		
Term2nd termCompulsory requirementsAnalogdesignRecommended requirementsAnalog Circuit Design, Signals and Systems, Integrated CircuitsAssessmentLaboratory internship reportAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 35 h lecture (preparation and rework) 35h seminar (preparation and rework) 50 h practical training (preparation and evaluation)TimeAccording time tableDuration of module1 term		
Compulsory requirementsAnalogdesignRecommended requirementsAnalog Circuit Design, Signals and Systems, Integrated CircuitsAssessmentLaboratory internship reportAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 35 h lecture (preparation and rework) 35h seminar (preparation and rework) 50 h practical training (preparation and evaluation)TimeAccording time tableDuration of module1 term		
requirementsAnalog Circuit Design, Signals and Systems, Integrated CircuitsRecommended requirementsAnalog Circuit Design, Signals and Systems, Integrated CircuitsAssessmentLaboratory internship reportAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 35 h lecture (preparation and rework) 35h seminar (preparation and rework) 50 h practical training (preparation and evaluation)TimeAccording time tableDuration of module1 term		
Recommended requirementsAnalog Circuit Design, Signals and Systems, Integrated CircuitsAssessmentLaboratory internship reportAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 35 h lecture (preparation and rework) 35h seminar (preparation and rework) 50 h practical training (preparation and evaluation)TimeAccording time tableDuration of module1 term		
requirementsLaboratory internship reportAssessment modalitiesAPL – assessment during the semester period (graded)ECTS credits6Workload180h of total work load, thereof 60h of contact hours and 120h of self-study, consisting of: 35 h lecture (preparation and rework) 35h seminar (preparation and rework) 50 h practical training (preparation and evaluation)TimeAccording time tableDuration of module1 term		Analog Circuit Design, Signals and Systems, Integrated Circuits
Assessment       Laboratory internship report         Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       6         Workload       180h of total work load, thereof         60h of contact hours and       120h of self-study, consisting of:         35 h lecture (preparation and rework)       35h seminar (preparation and rework)         50 h practical training (preparation and evaluation)       Time         According time table       1 term		
Assessment modalities       APL – assessment during the semester period (graded)         ECTS credits       6         Workload       180h of total work load, thereof         60h of contact hours and       60h of contact hours and         120h of self-study, consisting of:       35 h lecture (preparation and rework)         35h seminar (preparation and rework)       50 h practical training (preparation and evaluation)         Time       According time table         Duration of module       1 term	Assessment	Laboratory internship report
Workload       180h of total work load, thereof         60h of contact hours and       120h of self-study, consisting of:         35 h lecture (preparation and rework)       35h seminar (preparation and rework)         50 h practical training (preparation and evaluation)         Time       According time table         Duration of module       1 term		
60h of contact hours and         120h of self-study, consisting of:         35 h lecture (preparation and rework)         35h seminar (preparation and rework)         50 h practical training (preparation and evaluation)         Time       According time table         Duration of module       1 term		
120h of self-study, consisting of:         35 h lecture (preparation and rework)         35h seminar (preparation and rework)         50 h practical training (preparation and evaluation)         Time       According time table         Duration of module       1 term	Workload	
35 h lecture (preparation and rework)         35h seminar (preparation and rework)         50 h practical training (preparation and evaluation)         Time       According time table         Duration of module       1 term		
35h seminar (preparation and rework)       50 h practical training (preparation and evaluation)       Time     According time table       Duration of module     1 term		
50 h practical training (preparation and evaluation)         Time       According time table         Duration of module       1 term		
Time     According time table       Duration of module     1 term		
Duration of module 1 term	Time	
	Place/ room	EAH Jena

Frequency of offer	Annually
Language	German

Module number         E11.224           Module number         Intelligent Systems           Department         Electrical Engineering and Information Technology           Degree program         RFE (Ma), ET/IT (Ma)           Module coordinator         Prof. DrIng. habil. Klaus-Peter Döge           Compulsory/ optional/ electiv         optional           Learning objectives         The students master the basics of strategies and algorithms of artificial intelligence. They are able to applicate these algorithms for concrete technical systems.           Module content         - Design of Fuzzy-Systems (control systems and data mining)           - Artificial Neural Networks (Topologie, Training, Simulation and Design Tools)         - Neuro Fuzzy Systems           - Evolutionary Algorithms: Strategies, Optimization for Fuzzy and Neural Network Systems.         - Evolutionary Algorithms: Strategies, Optimization for Fuzzy and Neural Network Systems.           Course type         2L - 0E - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture script         - Recommended           Recommended         Keller, H.B.: Maschinelles Lernen, Oldenbourg- Verlag, München 2008           Artabisadan 2009         Alpaydin, E.: Maschinelles Lernen, Oldenbourg- Verlag, München 2008           Method(s) of         CAE-Tools (MATLAB/Simulink)           instruction/ media being used         2         (Bache	Module number	ET.2.224
Department         Electrical Engineering and Information Technology           Degree program         RFE (Ma), ET/IT (Ma)           Module coordinator         Prof. DrIng, habil. Klaus-Peter Döge           Compulsory/ optional/ electiv         optional           Learning objectives         The students master the basics of strategies and algorithms of artifical intelligence. They are able to applicate these algorithms for concrete technical systems.           Module content         - Design of Fuzzy-Systems (control systems and data mining)           - Artificial Neural Networks (Topologie, Training, Simulation and Design Tools)           - Neuro Fuzzy Systems           - Evolutionary Algorithms: Strategies, Optimization for Fuzzy and Neural Network Systems.           Course type         2L - 0E - 0S - 1P           Learning Material         Lecture script           Recommended         Keller, H.B.: Maschinelle Intelligenz, F.Vieweg-Verlag, Braunschweig/Wiesbaden 2000           Ertel, W.: Grundkurs Künstliche Intelligenz, Vieweg und Teubner, Wiesbaden 2009           Alpaydin, E.: Maschinelles Lernen, Oldenbourg- Verlag, München 2008           Method(s) of instruction/ media being used           Level / category         2 (Bachelor=1, Master=2)           Summer/ Winter         winter term           Recommended         Automatic Control, Digital Control Systems           requirements         Automatic Control, Digi		
Degree program         RFE (Ma), ET/IT (Ma)           Module coordinator         Prof. DrIng. habil. Klaus-Peter Döge           Compulsory/ optional/ electiv         optional           Learning objectives         The students master the basics of strategies and algorithms of artifical intelligence. They are able to applicate these algorithms for concrete technical systems.           Module content         - Design of Fuzzy-Systems (control systems and data mining)           - Artificial Neural Networks (Topologie, Training, Simulation and Design Tools)         - Neuro Fuzzy Systems           - Evolutionary Algorithms: Strategies, Optimization for Fuzzy and Neural Network Systems.         - Evolutionary Algorithms: Strategies, Optimization for Fuzzy and Neural Network Systems.           Course type         2.L - 0E - 0S + 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture script         Recommended           Retrautre         Braunschweig/Wiesbaden 2000         Entel. W.: Grundkurs Künstliche Intelligenz, F.Vieweg-Verlag, Braunschweig/Wiesbaden 2009           Alpaydin, E:: Maschinelles Lernen, Oldenbourg- Verlag, München 2008         CAE-Tools (MATLAB/Simulink)           instruction/ media being used         CAE-Tools (MATLAB/Simulink)           Level/ category         2         (Bachelor=1, Master=2)           Summer/ Winter         winter term           Recommended         Automatic Control, Digital Control Sy		
Module coordinator         Prof. DrIng. habil. Klaus-Peter Döge           Compulsory/ optional/ electiv         optional/ intelligence. They are able to applicate these algorithms of artifical intelligence. They are able to applicate these algorithms for concrete technical systems.           Module content         - Design of Fuzzy-Systems (control systems and data mining) - Artificial Neural Networks (Topologie, Training, Simulation and Design Tools) - Neuro Fuzzy Systems           Course type         2L - OE - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture script         Evolutionary Algorithms: Strategies, Optimization for Fuzzy and Neural Network Systems.           Course type         2L - OE - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture script         Braunschweig/Wiesbaden 2000           Recommended         Keller, H.B.: Maschinelle Intelligenz, F.Vieweg-Verlag, Braunschweig/Wiesbaden 2009           Alpagvin, E.: Maschinelles Lemen, Oldenbourg- Verlag, München 2008         CAE-Tools (MATLAB/Simulink)           Instruction/ media being used         CAE-Tools (MATLAB/Simulink)           Level/ category         2         (Bachelor=1, Master=2)           Summer/ Winter         winter term           Recommended         Automatic Control, Digital Control Systems           requirements         Assessment           Assessment <t< td=""><td></td><td></td></t<>		
Compulsory/ optional/ electiv         optional/ optional         optional           Learning objectives         The students master the basics of strategies and algorithms of artifical intelligence. They are able to applicate these algorithms for concrete technical systems.           Module content         - Design of Fuzzy-Systems (control systems and data mining) - Artificial Neural Networks (Topologie, Training, Simulation and Design Tools) - Neuro Fuzzy Systems           Course type         2L - 05 - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture script           Recommended         Keller, H.B.: Maschinelle Intelligenz, F.Vieweg-Verlag, Braunschweig/Wiesbaden 2000           Etrature         Wiesbaden 2000           Alpaydin, E.: Maschinelles Lernen, Oldenbourg- Verlag, München 2008           Method(s) of instruction/ media being used         CAE-Tools (MATLAB/Simulink)           Level/ category         2           2. term         Compulsory none           Recommended         Automatic Control, Digital Control Systems           Recommended         Automatic Control, Digital Control Systems           Resesment         exam 90 min           Assessment         exam 90 min           Assessment         90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 20 h lecture (preparation and rework) 10 h practical training (preparation and rework) 10 h practical training (		
electiv         Image: constraint of the second		
Intelligence. They are able to applicate these algorithms for concrete technical systems.           Module content         - Design of Fuzzy-Systems (control systems and data mining) - Artificial Neural Networks (Topologie, Training, Simulation and Design Tools) - Neuro Fuzzy Systems - Evolutionary Algorithms: Strategies, Optimization for Fuzzy and Neural Network Systems.           Course type         2L - 0E - 0S - 1P         (Lecture, Exercises, Seminar, practical course)           Learning Material         Lecture script         Recommended           Recommended         Keller, H.B.: Maschinelle Intelligenz, F. Vieweg-Verlag, Braunschweig/Wiesbaden 2000         Braunschweig/Wiesbaden 2000           Lertel, W.: Grundkurs Künstliche Intelligenz, Vieweg und Teubner, Wiesbaden 2009         Alpaydin, E.: Maschinelles Lernen, Oldenbourg- Verlag, München 2008           Method(s) of instruction/ media being used         CAE-Tools (MATLAB/Simulink)         CAE-Tools (MATLAB/Simulink)           Term         2. term         Compulsory none         Nutomatic Control, Digital Control Systems           Recommended         PL - university written exam during period of lectures (graded)         ECTS credits           Stasessment         exam 90 min         Assessment         Asto of self-study, consisting 0f: 20 h lecture (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparation         16 h exam preparation           Time         According time table         Duratiton of module         1 term	electiv	
<ul> <li>Artificial Neural Networks (Topologie, Training, Simulation and Design Tools)         <ul> <li>Neuro Fuzzy Systems</li> <li>Evolutionary Algorithms: Strategies, Optimization for Fuzzy and Neural Network Systems.</li> </ul> </li> <li>Course type 2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)         <ul> <li>Learning Material</li> <li>Lecture script</li> </ul> </li> <li>Recommended Iterature Braunschweig/Wiesbaden 2000             <ul> <li>Ertel, W.: Grundkurs Künstliche Intelligenz, F.Vieweg-Verlag, Braunschweig/Wiesbaden 2000</li> <li>Ertel, W.: Grundkurs Künstliche Intelligenz, Vieweg und Teubner, Wiesbaden 2009             <ul> <li>Alpaydin, E.: Maschinelles Lernen, Oldenbourg- Verlag, München 2008</li> <li>CAE-Tools (MATLAB/Simulink)</li> <li>Method(s) of CAE-Tools (MATLAB/Simulink)</li> <li>Caertel, W.: Grundkurs Künstliche Intelligenz, Vieweg und Teubner, Wiesbaden 2009</li> <li>Alpaydin, E.: Maschinelles Lernen, Oldenbourg- Verlag, München 2008</li> <li>CAE-Tools (MATLAB/Simulink)</li> <li>Caertel, Waster=2)</li> <li>Summer/ Winter</li> <li>winter term</li> <li>Term</li> <li>term</li> <li>none</li> <li>requirements</li> <li>Recommended</li> <li>Automatic Control, Digital Control Systems</li> <li>requirements</li> <li>Assessment modalities</li> <li>PL – university written exam during period of lectures (graded)</li> <li>ECTS credits</li> <li>3</li> </ul> <ul> <li>Workload</li> <li>90 h of total work load, thereof</li> <li>45 h of self-study, consisting of:</li> <li>20 h lecture (preparation and rework)</li> <li>10 h practical training (preparation and evaluation</li></ul></li></ul></li></ul>		intelligence. They are able to applicate these algorithms for concrete technical systems.
Learning Material         Lecture script           Recommended         Keller, H.B.: Maschinelle Intelligenz, F.Vieweg-Verlag, Braunschweig/Wiesbaden 2000           Ertel, W.: Grundkurs Künstliche Intelligenz, Vieweg und Teubner, Wiesbaden 2009           Alpaydin, E.: Maschinelles Lernen, Oldenbourg- Verlag, München 2008           Method(s) of instruction/ media being used         CAE-Tools (MATLAB/Simulink)           Level/ category         2 (Bachelor=1, Master=2)           Summer/ Winter         winter term           Term         2. term           Compulsory         none           requirements         Automatic Control, Digital Control Systems           Recommended         Automatic Control, Digital Control Systems           requirements         90 min           Assessment         exam 90 min           Assessment modalities         PL – university written exam during period of lectures (graded)           ECTS credits         3           Workload         90h of total work load, thereof           45h of self-study, consisting of:         20 h lecture (preparation and rework)           10 h practical training (preparation and evaluation)         15 h exam preparation           15 h exam preparation         14 term           Place/ room         EAH Jena           Frequency of offer         Annually <td>Module content</td> <td><ul> <li>Artificial Neural Networks (Topologie, Training, Simulation and Design Tools)</li> <li>Neuro Fuzzy Systems</li> <li>Evolutionary Algorithms: Strategies, Optimization for Fuzzy and Neural Network Systems.</li> </ul></td>	Module content	<ul> <li>Artificial Neural Networks (Topologie, Training, Simulation and Design Tools)</li> <li>Neuro Fuzzy Systems</li> <li>Evolutionary Algorithms: Strategies, Optimization for Fuzzy and Neural Network Systems.</li> </ul>
Recommended literatureKeller, H.B.: Maschinelle Intelligenz, F.Vieweg-Verlag, Braunschweig/Wiesbaden 2000 Ertel, W.: Grundkurs Künstliche Intelligenz, Vieweg und Teubner, Wiesbaden 2009 Alpaydin, E.: Maschinelles Lernen, Oldenbourg- Verlag, München 2008Method(s) of instruction/ media being usedCAE-Tools (MATLAB/Simulink)Level/ category2 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm2. termCompulsory requirementsnoneRecommended requirementsAutomatic Control, Digital Control SystemsZCTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 20 h lecture (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Course type	2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
literatureBraunschweig/Wiesbaden 2000Ertel, W.: Grundkurs Künstliche Intelligenz, Vieweg und Teubner, Wiesbaden 2009 Alpaydin, E.: Maschinelles Lernen, Oldenbourg- Verlag, München 2008Method(s) of instruction/ media being usedCAE-Tools (MATLAB/Simulink)Level/ category2Summer/ Winterwinter termTerm2. termCompulsory requirementsnoneAssessmentexam 90 minAssessmentexam 90 minAssessment90 h of total work load, thereof 45h of self-study, consisting of: 20 h lecture (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparationTimeAccording time tableDuration of module1 termPlace/roomEAH JenaFrequency of offerAnnually	Learning Material	
Ertel, W.: Grundkurs Künstliche Intelligenz, Vieweg und Teubner, Wiesbaden 2009 Alpaydin, E.: Maschinelles Lernen, Oldenbourg- Verlag, München 2008Method(s) of instruction/ media being usedCAE-Tools (MATLAB/Simulink)Level/ category2 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm2. termCompulsory requirementsnoneRecommended requirementsAutomatic Control, Digital Control SystemsAssessmentexam 90 minAssessmentexam 90 minAssessment90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 20 h lecture (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Recommended	
Method(s) of instruction/ media being usedCAE-Tools (MATLAB/Simulink)Level/ category2 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm2. termCompulsory requirementsnoneRecommended requirementsAutomatic Control, Digital Control SystemsAssessmentexam 90 minAssessment modalitiesPL – university written exam during period of lectures (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 20 h lecture (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	literature	Ertel, W.: Grundkurs Künstliche Intelligenz, Vieweg und Teubner, Wiesbaden 2009
media being usedLevel/ category2 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm2. termCompulsory requirementsnoneRecommended requirementsAutomatic Control, Digital Control SystemsAssessmentexam 90 minAssessment modalitiesPL – university written exam during period of lectures (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 20 h lecture (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Method(s) of	CAE-Tools (MATLAB/Simulink)
Level/ category2 (Bachelor=1, Master=2)Summer/ Winterwinter termTerm2. termCompulsory requirementsnoneRecommended requirementsAutomatic Control, Digital Control SystemsAssessmentexam 90 minAssessment modalitiesPL – university written exam during period of lectures (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 20 h lecture (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparationTimeAccording time tableDuration of module1 termPlace/roomEAH JenaFrequency of offerAnnually	instruction/	
Summer/Winter       winter term         Term       2. term         Compulsory       none         requirements       Automatic Control, Digital Control Systems         Recommended       Automatic Control, Digital Control Systems         requirements       exam 90 min         Assessment       exam 90 min         Assessment modalities       PL – university written exam during period of lectures (graded)         ECTS credits       3         Workload       90h of total work load, thereof         45h of contact hours and       45h of self-study, consisting of:         20 h lecture (preparation and rework)       10 h practical training (preparation and evaluation)         15 h exam preparation       15 h exam preparation         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually	media being used	
Term2. termCompulsory requirementsnoneRecommended requirementsAutomatic Control, Digital Control SystemsAssessmentexam 90 minAssessment modalitiesPL – university written exam during period of lectures (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 20 h lecture (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Level/ category	2 (Bachelor=1, Master=2)
Compulsory requirementsnoneRecommended requirementsAutomatic Control, Digital Control SystemsAssessmentexam 90 minAssessment modalitiesPL – university written exam during period of lectures (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 20 h lecture (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Summer/ Winter	winter term
requirementsAutomatic Control, Digital Control SystemsRecommended requirementsAutomatic Control, Digital Control SystemsAssessmentexam 90 minAssessment modalitiesPL – university written exam during period of lectures (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 20 h lecture (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Term	2. term
Recommended requirementsAutomatic Control, Digital Control SystemsAssessmentexam 90 minAssessment modalitiesPL – university written exam during period of lectures (graded)ECTS credits3Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 20 h lecture (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		none
Assessment modalities       PL – university written exam during period of lectures (graded)         ECTS credits       3         Workload       90h of total work load, thereof         45h of contact hours and       45h of self-study, consisting of:         20 h lecture (preparation and rework)       10 h practical training (preparation and evaluation)         15 h exam preparation         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually	Recommended	Automatic Control, Digital Control Systems
ECTS credits       3         Workload       90h of total work load, thereof         45h of contact hours and       45h of self-study, consisting of:         20 h lecture (preparation and rework)         10 h practical training (preparation and evaluation)         15 h exam preparation         Time       According time table         Duration of module       1 term         Place/ room       EAH Jena         Frequency of offer       Annually	Assessment	exam 90 min
Workload90h of total work load, thereof 45h of contact hours and 45h of self-study, consisting of: 20 h lecture (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually	Assessment modalities	
45h of contact hours and 45h of self-study, consisting of: 20 h lecture (preparation and rework) 10 h practical training (preparation and evaluation) 15 h exam preparationTimeAccording time tableDuration of module1 termPlace/ roomEAH JenaFrequency of offerAnnually		
Duration of module     1 term       Place/ room     EAH Jena       Frequency of offer     Annually	Workload	<ul><li>45h of contact hours and</li><li>45h of self-study, consisting of:</li><li>20 h lecture (preparation and rework)</li><li>10 h practical training (preparation and evaluation)</li></ul>
Duration of module     1 term       Place/ room     EAH Jena       Frequency of offer     Annually	Time	
Place/ room         EAH Jena           Frequency of offer         Annually		
Frequency of offer Annually		

Module number	ET.2.230
Module name	
	Processor Design
Department	Electrical Engineering and Information Technology
Degree program	RFE (Ma), ET/IT (Ma)
Specialization/ Profil	
Module coordinator	Prof. DrIng. Burkart Voß
Compulsory/ optional/	optional
electiv	
Learning objectives	After successfully completing the module students are able to:
	- understand the functional principle and possible applications of
	microcontrollers.
	- derive principles of assembler programming.
	- understand the interaction between hardware and software.
	- derive the consequences of design decisions.
	- systematically plan and design a digital processor.
Module content	Within the scope of this module the fundamental functional principle of a
	digital processor is covered in detail. Based on the knowledge acquired in
	the courses "Digital Circuit Design" and "Microprocessor Technology" a
	RISC processor with a given instruction set is designed by the students and
	implemented on a FPGA. Programs to run on this self-developed processor
	can be assembled with a provided Assembler tool. If the instruction set is
	extended by the students, they can adapt the Assembler accordingly. Based
	on the knowledge gained in this project processor architecture alternatives
	are introduced, e.g. VLIW and multi core processors.
Course type	1L - 0E - 0S - 3P (Lecture, Exercises, Seminar, practical course)
Learning Material	Lecture slides (in English) are provided via the Internet
Method(s) of	Lecture with practical course
instruction/	
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	2nd term
Compulsory	none
requirements	
Recommended	Programming skills and knowledge of digital circuit design, VHDL
requirements	
Assessment	term paper, seminar paper, project work
Assessment modalities	APL – assessment during the semester period (graded)
Further Information	The deep understanding of basic processor principles and the ability to
	systematically design a processor and program the designed processor are
	demonstrated with the design and documentation of a functional processor
	followed by a project review.
ECTS credits	6
Workload	180h of total work load, thereof
	60h of contact hours and
	120h of self-study, consisting of:
	110h design and test of Processor in VHDL
	10h documentation of design
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.2.231
Module name	Signal Integrity
Department	Electrical Engineering and Information Technology
Degree program	RFE (Ma), ET/IT (Ma)
Specialization/ Profil	KMT
Module coordinator	Prof. Dr. Ludwig Niebel
Compulsory/ optional/	Optional required module
electiv	
Learning objectives	Upon completion of the module, students
	- understands the impact of lines on fast signals
	- are able to create models for simulation of these impact
	- are able to identify relevant parameters of lines
	<ul> <li>are able to verify simulation results by measuring</li> </ul>
	- are able to use the knowledge while designing electronic modules
Module content	Model of matched lines
	Modelling of circuit parts and circuits in microwave frequency range
	Wave propagation on TEM lines
	Transmission line parameters in time domaine and frequency domain
	Dispersion
	Transmission line simulation in Spice Coupled lines, crosstalk
	Spice simulation of coupled lines, example: directional coupler
	Simulation usinf field solver (Microwave Studio from CST Darmstadt)
	Network analysis
	High-speed data communication via transmission lines
	Reflection and refraction of data words at impedance discontinuities
	Time domain reflectometry and transmission (TDR, TDT)
	Software-controlled TDR measurement system
	TDR-based Modelling of measurements results
	Design Methodology
Course type	2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	books, script and lab instruction sheets on the internet
Recommended	Unger, HG.: Elektromagnetische Wellen auf Leitungen. Heidelberg: Hüthig
literature	1991
	1991 Dokumentation zu Microwave Studio von CST Darmstadt
literature	1991 Dokumentation zu Microwave Studio von CST Darmstadt Schmidt, M.: Signalintegrität, Vogel 2013
literature Method(s) of	1991 Dokumentation zu Microwave Studio von CST Darmstadt
literature Method(s) of instruction/	1991 Dokumentation zu Microwave Studio von CST Darmstadt Schmidt, M.: Signalintegrität, Vogel 2013
literature Method(s) of instruction/ media being used	1991 Dokumentation zu Microwave Studio von CST Darmstadt Schmidt, M.: Signalintegrität, Vogel 2013 Lecture, practical training, self study
literature Method(s) of instruction/ media being used Level/ category	1991 Dokumentation zu Microwave Studio von CST Darmstadt Schmidt, M.: Signalintegrität, Vogel 2013 Lecture, practical training, self study 2 (Bachelor=1, Master=2)
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter	1991         Dokumentation zu Microwave Studio von CST Darmstadt         Schmidt, M.: Signalintegrität, Vogel 2013         Lecture, practical training, self study         2       (Bachelor=1, Master=2)         winter term
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term	1991 Dokumentation zu Microwave Studio von CST Darmstadt Schmidt, M.: Signalintegrität, Vogel 2013 Lecture, practical training, self study 2 (Bachelor=1, Master=2)
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter	1991         Dokumentation zu Microwave Studio von CST Darmstadt         Schmidt, M.: Signalintegrität, Vogel 2013         Lecture, practical training, self study         2       (Bachelor=1, Master=2)         winter term         2nd term
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory	1991         Dokumentation zu Microwave Studio von CST Darmstadt         Schmidt, M.: Signalintegrität, Vogel 2013         Lecture, practical training, self study         2       (Bachelor=1, Master=2)         winter term         2nd term
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements	1991         Dokumentation zu Microwave Studio von CST Darmstadt         Schmidt, M.: Signalintegrität, Vogel 2013         Lecture, practical training, self study         2       (Bachelor=1, Master=2)         winter term         2nd term         none
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Recommended	1991         Dokumentation zu Microwave Studio von CST Darmstadt         Schmidt, M.: Signalintegrität, Vogel 2013         Lecture, practical training, self study         2       (Bachelor=1, Master=2)         winter term         2nd term         none
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Recommended requirements	1991         Dokumentation zu Microwave Studio von CST Darmstadt         Schmidt, M.: Signalintegrität, Vogel 2013         Lecture, practical training, self study         2       (Bachelor=1, Master=2)         winter term         2nd term         none         Measurement Techniques
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Recommended requirements Assessment Assessment modalities ECTS credits	1991         Dokumentation zu Microwave Studio von CST Darmstadt         Schmidt, M.: Signalintegrität, Vogel 2013         Lecture, practical training, self study         2       (Bachelor=1, Master=2)         winter term         2nd term         none         Measurement Techniques         term paper
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Recommended requirements Assessment Assessment modalities	1991         Dokumentation zu Microwave Studio von CST Darmstadt         Schmidt, M.: Signalintegrität, Vogel 2013         Lecture, practical training, self study         2       (Bachelor=1, Master=2)         winter term         2nd term         none         Measurement Techniques         term paper         APL – assessment during the semester period (graded)         3         90h of total work load, thereof
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Recommended requirements Assessment Assessment modalities ECTS credits	1991         Dokumentation zu Microwave Studio von CST Darmstadt         Schmidt, M.: Signalintegrität, Vogel 2013         Lecture, practical training, self study         2       (Bachelor=1, Master=2)         winter term         2nd term         none         Measurement Techniques         term paper         APL – assessment during the semester period (graded)         3         90h of total work load, thereof         45h of contact hours and
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Recommended requirements Assessment Assessment modalities ECTS credits	1991       Dokumentation zu Microwave Studio von CST Darmstadt         Schmidt, M.: Signalintegrität, Vogel 2013         Lecture, practical training, self study         2       (Bachelor=1, Master=2)         winter term         2nd term         none         Measurement Techniques         term paper         APL – assessment during the semester period (graded)         3         90h of total work load, thereof         45h of self-study, consisting of:
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Recommended requirements Assessment Assessment modalities ECTS credits	1991       Dokumentation zu Microwave Studio von CST Darmstadt         Schmidt, M.: Signalintegrität, Vogel 2013         Lecture, practical training, self study         2       (Bachelor=1, Master=2)         winter term         2nd term         none         Measurement Techniques         term paper         APL – assessment during the semester period (graded)         3         90h of total work load, thereof         45h of contact hours and         45h of self-study, consisting of:         25 h lecture (preparation and rework)
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Recommended requirements Assessment Assessment modalities ECTS credits	1991         Dokumentation zu Microwave Studio von CST Darmstadt         Schmidt, M.: Signalintegrität, Vogel 2013         Lecture, practical training, self study         2       (Bachelor=1, Master=2)         winter term         2nd term         none         Measurement Techniques         term paper         APL – assessment during the semester period (graded)         3         90h of total work load, thereof         45h of self-study, consisting of:         25 h lecture (preparation and rework)         10 h practical training (preparation and evaluation)
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Recommended requirements Assessment Assessment Assessment Morkload	1991       Dokumentation zu Microwave Studio von CST Darmstadt         Schmidt, M.: Signalintegrität, Vogel 2013         Lecture, practical training, self study         2       (Bachelor=1, Master=2)         winter term         2nd term         none         Measurement Techniques         term paper         APL – assessment during the semester period (graded)         3         90h of total work load, thereof         45h of self-study, consisting of:         25 h lecture (preparation and rework)         10 h practical training (preparation and evaluation)         10 h exam preparation
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Recommended requirements Assessment Assessment Assessment Modalities ECTS credits Workload	1991       Dokumentation zu Microwave Studio von CST Darmstadt         Schmidt, M.: Signalintegrität, Vogel 2013         Lecture, practical training, self study         2       (Bachelor=1, Master=2)         winter term         2nd term         none         Measurement Techniques         term paper         APL – assessment during the semester period (graded)         3         90h of total work load, thereof         45h of self-study, consisting of:         25 h lecture (preparation and rework)         10 h practical training (preparation and evaluation)         10 h exam preparation
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Recommended requirements Assessment Assessment Assessment Assessment Morkload	1991       Dokumentation zu Microwave Studio von CST Darmstadt         Schmidt, M.: Signalintegrität, Vogel 2013         Lecture, practical training, self study         2       (Bachelor=1, Master=2)         winter term         2nd term         none         Measurement Techniques         term paper         APL – assessment during the semester period (graded)         3         90h of total work load, thereof         45h of contact hours and         45h of self-study, consisting of:         25 h lecture (preparation and rework)         10 h practical training (preparation and evaluation)         10 h exam preparation         According time table         1 term
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Recommended requirements Assessment Assessment Assessment Morkload	1991       Dokumentation zu Microwave Studio von CST Darmstadt         Schmidt, M.: Signalintegrität, Vogel 2013         Lecture, practical training, self study         2       (Bachelor=1, Master=2)         winter term         2nd term         none         Measurement Techniques         term paper         APL – assessment during the semester period (graded)         3         90h of total work load, thereof         45h of contact hours and         45h of self-study, consisting of:         25 h lecture (preparation and rework)         10 h practical training (preparation and evaluation)         10 h exam preparation         According time table         1 term         EAH Jena
literature Method(s) of instruction/ media being used Level/ category Summer/ Winter Term Compulsory requirements Recommended requirements Assessment Assessment Assessment Morkload	1991       Dokumentation zu Microwave Studio von CST Darmstadt         Schmidt, M.: Signalintegrität, Vogel 2013         Lecture, practical training, self study         2       (Bachelor=1, Master=2)         winter term         2nd term         none         Measurement Techniques         term paper         APL – assessment during the semester period (graded)         3         90h of total work load, thereof         45h of contact hours and         45h of self-study, consisting of:         25 h lecture (preparation and rework)         10 h practical training (preparation and evaluation)         10 h exam preparation         According time table         1 term

Module number	ET.2.232
Module name	Augmented Reality / Virtual Reality
Department	Electrical Engineering and Information Technology
	ET/IT(Ma), RFE (Ma)
Degree program Module coordinator	Prof. DrIng. Sebastian Knorr
Compulsory/ optional/	Electiv
electiv	
Learning objectives	At the end of the module students are able:
	- to distinguish between Virtual, Mixed und Augmented Reality
	<ul> <li>to digitalise information and present it user-friendly in VR, augment reality</li> <li>to recognise application domains of this technology and implment it</li> </ul>
	pototypicaly
	- to implement and apply interfaces
	- to assess limitations and requirements of AR / VR
Module content	Tracking-Systems, Head-Mounted Didplays, Mobile Computing, Digital
	Image Processing, Assistence Systems 2L – 0E – 0S – 2P (Lecture, Exercises, Seminar, practical course)
Course type	
Learning Material Recommended	Literature recommendation specific to the seminar sessions
literature	- Dörner, R., Broll, W., Grimm, P., Jung, B. (Hrsg.): Virtual und Augmented Reality (VR / AR), Springer Verlag, 2013
literature	- Marcus Tönnis: Augmented Reality: Einblicke in die Erweiterte Realität,
	Springer Verlag, 2010
Method(s) of	Seminar, Exercisises
instruction/	
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	2. term
Compulsory	none
requirements	
Recommended	Computer science basic knowledge, programming skills in at least one
requirements	common programming language, basic knowledge in digital image
	processing
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
Workload	180h of total work load, thereof
	45h of contact hours and
	135h of self-study, consisting of:
	100 h lecture (preparation and rework)
	35 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ET.2.280
Module name	Project "Conception and execution of autonomous missions"
Department	Electrical Engineering and Information Technology
Degree program	ET/IT (Ma), Me (Ma)
Module coordinator	Prof. Voß (ET/IT), Prof. Dienerowitz (SciTec)
Compulsory/ optional/	optional
electiv	
Course type	(Lecture, Exercises, Seminar, practical course)
Level/ category	2 (Bachelor=1, Master=2)
Summer/ Winter	winter term
Term	2. term
Compulsory	none
requirements	
Assessment	project
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Madula number	ET 2 200
Module number Module name	ET.2.300
	Complex Lab Session
Department	Electrical Engineering and Information Technology RFE (Ma), ET/IT (Ma)
Degree program	
Specialization/ Profil	EAT, TI, KMT
Module coordinator	Prof. DrIng. Frank Giesecke, Prof. DrIng. Burkart Voß
Compulsory/ optional/ electiv	Compulsory
Learning objectives	After successful conclusion of this module the students will be able to: - study technical literature and do review and evaluation for a given topic. - analyze a given problem with scientific methods, develop and evaluate proposals for solutions, document and implement selected solutions as well as present and interpret of the achieved result in a written form. - visualize and accurate present technical issues. - develop and formulate consistent and logically coherent thoughts.
Module content	Within the context of an ongoing research or development project at the university a subtask has to be solved. After a short introduction, an overview of the international standard of the topic has to be provided. An experimental setup has to be developed and used. Using scientific skills, chosen research problems have to be solved. Results have to be displayed and explained. Acquired knowledge and skills are a necessary prerequisite for the Master thesis.
Course type	0L - 0E - 0S - 4P (Lecture, Exercises, Seminar, practical course)
Learning Material	Technical literature, special application software, technical manufacturer information
Recommended	A general bibliographical reference cannot be given because it depends
literature	on the topic.
Method(s) of	Independent scientific work
instruction/	
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	summer term, winter term
Term	2nd and 3th term
Compulsory	none
requirements	
Assessment	term paper
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	6
Workload	180 h
Usability of this module	Masterarbeit
-	Masterarbeit
Time	According time table
Time Duration of module	According time table 1 term
	According time table
Duration of module	According time table 1 term

Module number	ET.2.301
Module name	Master thesis
Department	Electrical Engineering and Information Technology
Degree program	RFE (Ma), Me (Ma), ETIT(Ma)
Specialization/ Profil	EAT, TI, KMT
Module coordinator	Prof. DrIng. Burkart Voß,
	Prof. DrIng. Jörg Müller,
	Prof. DrIng. Frank Giesecke
Compulsory/ optional/ electiv	Compulsory
Learning objectives	After successful conclusion of this module the students will be able to:
	- arrange and structure a scientific work.
	- study technical literature and do a review and an evaluation for a given
	topic.
	- analyze a given problem statement with scientific methods, develop and
	evaluate proposals for solutions, document and implement selected
	solutions as well as present and interpret of the achieved result in a written form.
	- visualize and accurately present technical issues.
	- develop and formulate consistent and logically coherent thoughts.
	- generate well-grounded scientific findings, which will be an engineering
	progress in this relevant field.
	- write orthographically and grammatically accurate text, which satisfies
	formal restrictions.
Module content	The topic of the master thesis has to deal with the design and evaluation of
	electronic systems, with information technology or with mechatronic
	systems. The thesis work can be done in the context of research and/or
	development tasks in universities as well as companies and research establishments in Germany or abroad.
	After an orientation phase the international state of the art in this specialized
	topic has to be discussed. With scientific methods the subject at hand has to
	get analyzed and proposals for solutions will need to be formulated.
	Experimental, design and/or theoretical work will have to be done to meet
	the goal. Furthermore a presentation and an interpretation of the results are
	required.
Course type	(Lecture, Exercises, Seminar, practical course)
Learning Material	Technical literature, patents, special application software, technical
Decommonded	manufacturer information Grieb: Schreibtipps für Diplomanden und Doktoranden. Berlin: VDE-Verlag,
Recommended literature	1993
IIIeralure	Scholz: Diplomarbeiten normgerecht verfassen – Schreibtipps zur
	Gestaltung von Studien-, Diplom- und Doktorarbeiten. Würzburg: Vogel,
	2001
	Nicol: Wissenschaftliche Arbeiten schreiben mit Word – formvollendete und
	normgerechte Examens-, Diplom- und Doktorarbeiten (für Word 97, 2000,
	2002). München: Addison-Wesley, 2002
Method(s) of	Independent scientific work
instruction/	
media being used	2 (Bachelor=1, Master=2)
Level/ category Summer/ Winter	summertermn
Term	3th term
Compulsory	Successful completion of all compulsory modules and selected optional
requirements	required modules, written registration of the topic of the master thesis
Assessment	Scientific work
Assessment modalities	final examination
Further Information	Hand over of master thesis just in time and tutor's report
ECTS credits	24
Workload	720 h
Usability of this module	Completion of second academic degree
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer Language	each term
	German

Module number	ET.2.302
Module name	Colloquium
Department	Electrical Engineering and Information Technology
Degree program	RFE (Ma), Me (Ma), ET/IT (Ma)
Specialization/ Profil	EAT, TI, KMT
Module coordinator	Prof. DrIng. Burkart Voß,
	Prof. DrIng. Jörg Müller,
	Prof. DrIng. Frank Giesecke
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	Presentation and defense of the results in the context of a colloquium.
Module content	The master thesis is presented in a colloquium. The candidate provides the
	goal, the most important results and conclusions in a presentation of 20
	minutes (maximum). Subsequently the topics will be discussed. The total
	time the colloquium takes amounts to 60 minutes (or shorter).
Course type	Presentation, Colloquium (Lecture, Exercises, Seminar, practical course)
Learning Material	Technical literature, patents, special application software, technical
Ũ	manufacturer information
Recommended	Leopold-Wildburger; Schütze: Verfassen und Vortragen - wissenschaftliche
literature	Arbeiten und Vorträge leicht gemacht. Berlin: Springer, 2002
	Franck: Rhetorik für Wissenschaftler - selbstbewusst auftreten, selbstsicher
	reden. München : Vahlen, 2001
	Huth: Duden - Reden gut und richtig halten! -Ratgeber für wirkungsvolles
	und modernes Reden. Mannheim: Dudenverlag, 2000
	Lucas: Überzeugend reden - mehr Erfolg durch richtige Rhetorik.
	Düsseldorf: Econ-Taschenbuch-Verlag, 1999
Method(s) of	Independent scientific work
instruction/	
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	3th term
Compulsory	Successful completion of all compulsory modules and selected elective
requirements	modules of the course, timely submission of the thesis and supervisor
	reports
Assessment	presentation, colloquium
Assessment modalities	final examination
ECTS credits	3
Workload	90 h workloadCompletion of the second academic degree
Usability of this module	full time
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	each term
Language	German/ English

Module number	ME.2.102
Module name	Mechatronics
Department	Mechanical Engineering
Degree program	Me (Ma)
Module coordinator	Prof. DrIng. habil Jörg Grabow
Compulsory/ optional/ electiv	Compulsory
Course type	2L - 2E - 0S - 0P (Lecture, Exercises, Seminar, practical course)
Recommended	Heimann, Gerth, Popp: Mechatronik.
literature	Isermann: Identifikation dynamischer Systeme I, II.
	Isermann: Mechatronische Systemeat.
	Roddeck: Einführung in die Mechatronik.
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	1. term
Compulsory	none
requirements	
Assessment	exam 90 min
Assessment modalities	PL – exam during audit period(graded)
Workload	180 h of total work load, thereof 60 h of contact hours and 120 h of self-
	study,
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ME.2.105
Module name	pattern recognition
Department	Electrical Engineering and Information Technology
Degree program	ME (Ma)
Module coordinator	Prof. DrIng. Sebastian Knorr
Compulsory/ optional/	Compulsory
electiv	Compusory
Learning objectives	- Hough transformation: detection of lines and circles
	- Detection of interest points
	- Transformations
	- Pattern recognition and machine learning, Bayes classifier, neural
	networks, support vector machines
	- Face detection and face recognition
	- object recognition
Course type	2L - 0E - 0S - 1P (Lecture, Exercises, Seminar, practical course)
Learning Material	books, script and lab instruction sheets on the internet
Recommended	- Burger, Wilhelm und Burge, Mark J.: Digitale Bildverarbeitung: Eine
literature	algorithmische Einführung mit Java, Springer Vieweg, 3. Auflage, 2015.
	- Burger, Wilhelm und Burge, Mark J.: Principles of Digital Image
	Processing, Vol. 3, Springer-Verlag, 2009, 2013.
	- Tilo Strutz: Bilddatenkompression, Vieweg + Teubner, 4. Auflage (2009).
	- Nischwitz, Alfred, Fischer, Max, Haberäcker, Peter, Socher, Gudrun:
	Computergrafik und Bildverarbeitung, Band 2: Bildverarbeitung, Vieweg und
	Teubner, 3. Auflage, 2011.
	- Weitere Literaturangaben in der Vorlesung
Method(s) of	nteractive lecture, practical course, self study
instruction/	
media being used	
Level/ category	1 (Bachelor=1, Master=2)
Summer/Winter	summer term
Term	1st term
Compulsory	none
requirements	
Assessment	Laboratory internship report, Programming project
Assessment modalities	APL – assessment during the semester period (graded)
ECTS credits	3
Workload	90h of total work load, thereof
	45h of contact hours and
	45h of self-study, consisting of:
	20 h lecture (preparation and rework)
	10 h exercise (preparation and rework)
	15 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ME.2.108
Module name	Technical elective module
Department	Electrical Engineering and Information Technology
Degree program	Me (Ma)
Module coordinator	Prof. DrIng. habil Jörg Grabow
Compulsory/ optional/ electiv	optional
Learning objectives	VM1 and VM2
Course type	(Lecture, Exercises, Seminar, practical course)
Level/ category	(Bachelor=1, Master=2)
Summer/Winter	summer term, winter term
Term	1. and 2. term
Compulsory	none
requirements	
Assessment	see module describtion
Assessment modalities	see module describtion
ECTS credits	12
Workload	360 h
Time	According time table
Duration of module	2 terms
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

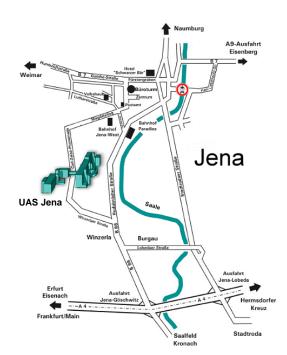
Module number	ME.2.109
Module name	Mechatronics Project
Department	Mechanical Engineering
Degree program	Me (Ma)
Module coordinator	Prof. DrIng. habil Jörg Grabow
Compulsory/ optional/ electiv	Compulsory
Course type	0L - 0E - 0S - 2P (2. term)
	0L - 0E - 0S - 2P (3. term) (Lecture, Exercises, Seminar, practical course)
Learning Material	Folien der Vorlesung und Literaturhinweise
Recommended	Madauss, Bernd J.: Projektmanagement, 3. Auflage, Stuttgart 1990
literature	Boy, J., u.a.: Projektmanagement; Bremen, 1994
	Reschke, H.; Schelle, R.; Schnopp (Hrsg.): Handbuch Projektmanagement,
	2 Bände, Köln, 1989
	Wermter, M.: Strategisches Projektmanagement, Zürich und Köln, 1992
	Wischnewski, E.: Modernes Projektmanagement, 4. Auflage, Braunschweig
	1993
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	winter term, summer term
Term	2. and 3. term
Compulsory	none
requirements	
Assessment	Project
Assessment modalities	APL - during term(graded)
ECTS credits	6
Workload	180 h
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ME.2.203
Module name	Actuators and Simulation of electromechanical Systems
Department	Electrical Engineering and Information Technology
Degree program	Me (Ma)
Module coordinator	Prof. DrIng. Matthias Förster
Compulsory/ optional/	Compulsory
electiv	
Learning objectives	Building on the physical principles used to convert controlled electrical energy into mechanical energy, an overview of the technically realized actuators and their laws is to be provided. The actuators should be selected for technical applications, simulated and projected in connection with control and coupled multi-mass systems. The focus is on electro-magnetic actuators and piezo actuators. After successfully participating in this course,
	students are able to analyze and mathematically describe the treated actuators with or without a coupled mechanical system, as well as to determine and simulate the system behavior.
Module content	The topics of the lecture actuators are: - Introduction with explanation of the principles of energy conversion and the generation of mechanical forces
	<ul> <li>Electromagnetic actuators with solenoids, stepping motors, linear motors and magnetostrictive actuators</li> <li>calculation of magnetic fields</li> </ul>
	<ul> <li>Electrostatic actuators (Piezoelectric actuators)</li> <li>Electrothermic actuators (shape memory actuators)</li> </ul>
	In the practical course the students work with the following experiments: - Solenoid
	- Stepping motor
	<ul> <li>Piezoelectric and shape memory actuators</li> <li>magnetic field calculation and simulation</li> </ul>
	In the lecture on the simulation of electromechanical systems, based on the knowledge of the module actuators mechatronics, the specifics of the simulation of such systems are presented. In the internship, selected systems are simulated and examined experimentally at the same time: -state size representation of a coil drive
	-Network simulation of a piezo actuator
	-Simulation and behaviour of a regulated positioning drive
Course type	3L - 0E - 0S - 3P (Lecture, Exercises, Seminar, practical course)
Learning Material	lecture papers and experiment instructions
Recommended literature	Grabow, J: Verallgemeinerte Netzwerke in der Mechatronik Stölting, H.; Kallenbach, E.; Amrhein, W.: Handbuch Elektrische Kleinantriebe
	Kallenbach, E.; Eick, R.; Ströhla, T.; Feindt, K.; Kallenbach, M.; Radler, O.: Elektromagnete Heimann,B.; Albert,A.; Ortmaier, T.; Rissing, L.: Mechatronik
Method(s) of	lecture and experiment
instruction/	
media being used	
Level/ category	2 (Bachelor=1, Master=2)
Summer/Winter	winter term
Term	2. term
Compulsory	none
requirements	maghatraniaa
Recommended	mechatronics
requirements Assessment	Actuators: exam 90min
799699116111	Simulation of electromechanical Systems: term paper
Assessment modalities	Actuators: PL-exam during audit period(graded) Simulation of electromechanical Systems: APL – during term(graded)
ECTS credits	6
Workload	180h of total work load, thereof 90h of contact hours and 90h of self-study, consisting of:
	30 h lecture (preparation and rework)

	40 h practical training (preparation and evaluation)
	20 h exam preparation
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

Module number	ME.2.206
Module name	Experimental modal analysis
Department	Mechanical Engineering
Degree program	Me (Ma)
Module coordinator	Prof. DrIng. habil Jörg Grabow
Course type	2L - 0E - 0S - 2P (Lecture, Exercises, Seminar, practical course)
Recommended	Waller, H.; Reinhard, S.: Schwingungslehre für Ingenieure
literature	Inman, D.: Engineering Vibration
	Natke, H.G.: Experimentelle Modalanalyse
	Verlag Technik Berlin
Level/ category	2 (Bachelor=1, Master=2)
Assessment	term paper
Assessment modalities	APL - during term(graded)
ECTS credits	6
Time	According time table
Duration of module	1 term
Place/ room	EAH Jena
Frequency of offer	Annually
Language	German

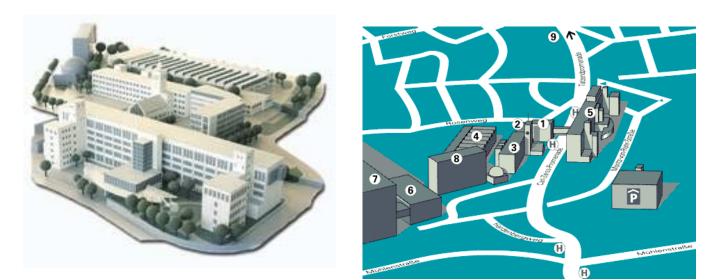
Map of UAS Jena campus



University of Applied Sciences Jena Carl-Zeiss-Promenade 2 D – 07745 Jena Phone: +49 (0)3641-205-0

Postal address: Postfach 10 03 14 07703 Jena Germany

E-Mail: info@eah-jena.de



Published by:Rector of the University of Applied Sciences JenaEditors:Hartmann/Guddei/Geller-Urban/ThomasGoing to press:11/2010, editorial revised: 01/2019

All status and function designations used in this ECTS information brochure refer to both genders. The information contained in this brochure was compiled on the basis of the previous "Guidelines for foreign students and prospective students" and on the basis of the current "Study guide to the UAS Jena" and may be subject to amendment at a later date. No legally valid claims may be derived from this brochure.