Ernst-Abbe-Hochschule Jena
University of Applied Sciences

ECTS – Information Brochure of Master Degree Programme

Scientific Instrumentation








Thank you for your interest in studying at the Ernst-Abbe-University of Applied Sciences Jena (EAH Jena). You will probably have a whole range of questions about our programmes and all the formalities. This brochure is intended to help answer your questions.
Of course there are also numerous people that you can contact in order to get answers to your questions. The addresses are listed under: I.2.8 Important addresses. Please check our website and the information boards next to each office for opening hours.

CONTENTS

Part I: General Information on the City of Jena and the University of Applied Sciences Jena

I.1. The city of Jena

I.1.1. Jena = high-tech + student life

Jena is steadily gaining in nationwide importance as a location of study and research.

Jena is characterised by industrial enterprises, which operate globally (Carl Zeiss Jena GmbH, JENOPTIK AG, SCHOTT JENAer Glas GmbH, Jenapharm GmbH & Co. KG, INTERSHOP Communications AG) and renowned institutions of scientific research (Max Planck and Leibniz Institutes, Fraunhofer Institute for Applied Optics and Precision Engineering). The location in the centre of Germany, the well-developed infrastructure and two high-performing universities have made Jena an attractive place for innovative technology. A total of 26.000 students are enrolled at both, Thuringia's largest university, the Friedrich Schiller University of Jena (FSU), and Thuringia's largest University of Applied Sciences, the UAS Jena.

Progressive thinking as well as the scenic Saale valley always attracted famous personages to the town. Jena is not only a center of the literary movements of German Classicism and Romanticism as well as philosophy (with several buildings reminiscent of Goethe, Schiller and others), but also the birthplace of the modern optical and precision engineering industry and, not to forget, the site of one of Napoleon's victorious battles.

Today, Jena is characterised by a high standard of living and a colourful cultural scene, the highlights of which are the progressive theatre, the Jena Philharmonic orchestra, the Thuringian Jazz festival (“Jazzmeile”), and the "Kulturarena", an annual series of open-air events with international stars. Other attractions popular amongst inhabitants and visitors include the Zeiss Planetarium, the Botanical Garden and the several museums.

Recommendable day-trip destinations are the nearby city of Weimar (European capital of culture in 1999), Thuringia's state capital Erfurt, the Saale-Unstrut wine-growing area, and the thermal baths in Bad Sulza and Bad Klosterlausnitz. Jena is well connected to the motorways A 4 (Dresden – Frankfurt/Main) und A 9 (Berlin – Munich) and is a stop on the Berlin-Munich intercity express railway line. Leipzig-Halle airport is only 90 km from Jena.

I.1.2. Jena in figures

First mentioned	◆ 9th century
Altitude	◆ 144 - 400 m above sea level
Population	◆ over 100,000
Students	◆ over 25,000

I.1.3. Distances

Weimar:	27 km
Gera:	46 km
Erfurt:	56 km
Dresden:	175 km
Berlin:	265 km
Frankfurt/Main:	330 km
Munich:	375 km
Hamburg:	465 km
Cologne:	545 km

I.1.4. A short history of the city of Jena

1236	The village of Jena receives the town charter; main economic activities are wine growing and agriculture.
14th C.	Jena develops into an important trade centre.
1523/24	Jena is one of the centres of the Reformation.
1558	The University of Jena is founded. Jena develops into an intellectual and cultural centre.
16th/17th C.	Jena is one of the most important centres of German book printing.
17th/18th C.	The University of Jena is now the largest university in Germany and has the largest German university library. Around 1800 Jena and its university are a hub of intellectual and cultural life: Goethe, Schiller, Fichte, Hegel, Feuerbach, Schelling, Hufeland, Döbereiner, Tieck, the Schlegel brothers, all work here.
1806	Battle of Jena and Auerstedt, Napoleon's troops defeat the Prussian army.
1846	Carl Zeiss establishes a precision mechanical and optical workshop. Later he enlists the scientist Ernst Abbe.
19th C.	Jena develops into an industrial city.
1969/70	The new university tower building is constructed after parts of the old city centre were torn down.
1975	Jena recovers from the losses and damages of the 2nd World War and now has a population of

100,000. The Zeiss company is one of the largest employers in the GDR.

1990 German reunification.

1991 The University of Applied Sciences Jena is established.

1996 On the grounds of what was once Zeiss' main plant, the "Goethe Galerie" shopping arcade is built, along with the Friedrich Schiller University's new campus. Some metal sculptures by Frank Stella are arranged at the Ernst- Abbe- Place.

2005 Over 80 institutes, hospitals und companies present itself in more than 300 events at the first "Long Night of Sciences".

2006 Jena celebrates the „Day of Thuringia" at the German- French- Year and commemorates the battle near Jena and Auerstedt 200 years ago.

2008 The university celebrates its 450th anniversary. The highlight of the year of celebrations is the ceremony on 15 May attended by numerous heads of traditional European universities (Coimbra Group). Under the maxim "Knowledge and growth – made in Jena" the city achieves the title "Science City" in 2008.

2011 Anniversary year „20 Years University of Applied Sciences Jena".

I.2. The Ernst-Abbe-University of Applied Sciences Jena

I.2.1. German university landscape

Everyone, who wants to study in Germany, has a choice of different types of higher education institutions: universities, technical universities, universities of applied sciences, art or music schools (colleges). At present there are 409 universities in Germany and just more than 2.1 million students. The decision which is the right type of higher education institution depends on the student's aims. Information material is available for all types of higher education establishments (for example on the homepages of the Deutsche Akademische Austauschdienst (DAAD) (German Academic Exchange Service) and the Hochschulkompass (Higher Education Compass).

Internet: www.daad.de
www.hochschulkompass.de

Universities of Applied Sciences (UAS) are specific to German education and have a relatively young history. They were first founded in the late 1960s. These universities primarily offer courses in engineering, economics and social sciences. Universities of applied sciences have short study periods, a tight syllabus and high practical relevance. Final degrees of German Universities of Applied Sciences are at present Bachelor and Master Degrees.

I.2.2. Studying at the Ernst-Abbe-University of Applied Sciences Jena

The University of Applied Sciences Jena (UAS) was founded on 1st October 1991 as one of the first educational institutions of its kind in the new German "Länder" (federal states). Meanwhile it has evolved to become a key component of higher education in Thuringia and beyond. In March 2012 it was renamed in „Ernst-Abbe-Fachhochschule Jena"and in October 2014 in "Ernst-Abbe-Hochschule Jena".

There are many reasons why prospective students choose to study at the Ernst-Abbe-University of Applied Sciences Jena (EA-UAS Jena).

One reason is the city itself, with its student life and high-tech, and its attractive location in the Saale valley.

The other reason is that the EA-UAS Jena has a modern campus, excellently equipped lecture and seminar rooms and laboratories, an academic library with a patent information office, a climate observation station, a campus theatre, a gymnasium and fitness rooms.

The EA-UAS Jena attaches great importance to scientifically founded, yet practice-related education in attractive degree programmes covering the fields of engineering, natural, business and social sciences.

With regard to the exchange of students and academic staff, joint research efforts, internship placements and degree theses, the EA-UAS Jena cooperates with universities and companies in the region and worldwide (e.g., IBM, Bosch, Carl Zeiss Jena GmbH). It is linked with various branch-specific networks and competence centres such as BioRegio e.V., OptoNet e.V., the Jena Bioinformatics Centre and the Thuringian Business Startup Initiative.

For a change from their everyday work, the students and staff of the Ernst-Abbe-University of Applied Sciences Jena have access to many attractive recreation and sports facilities. It is noteworthy that the EA-UAS Jena was designated **„Partner University of Top-Rank Sports"** in 2005. As a result, top-rank sportspersons among the students enjoy conditions that help them reconcile the diverse demands made on their time by their studies and by training and contests.

The EA-UAS Sports Meeting in June, the Matriculation Ceremony in October and the Christmas Party in December are the highlights of the university's social life. Throughout the year, students can participate in various committees

and projects, such as the Student Council, the department councils, the students' advertising agency „The Golden Twenties“ (“Die Goldenen Zwanziger”), the campus radio station, and production of the UAS magazine „facetten“, or in mentoring and helping foreign students.

Internet: www.fh-jena.de

I.2.3. The departments

- Business Administration
- Electrical and Information Engineering
- Health and Care
- Fundamental Science (This department does not offer study programmes on its own.)
- Mechanical Engineering
- Medical Engineering and Biotechnology
- SciTec (Precision - Optics - Materials - Environment)
- Social Work
- Industrial Engineering

I.2.4. Current range of programmes (winter semester 2014/2015)

Bachelor study courses:	**Master study courses:**
Automation Engineering/ Information Engineering International Biotechnology Business Administration Business Administration & Engineering (Industry) Business Administration & Engineering (Information Technology) Communication and Media Technology Computer Engineering E-Commerce Electrical Engineering/ Automation Engineering Laser- and Optotechnologies Materials Engineering Mechanical Engineering Mechatronics Medical Engineering Optometry (extra-occupational) Optometry/ Ophthalmic Optics Photovoltaic and Semiconductor Technology Physics Engineering Precision Engineering Social Work	Business Administration & Engineering General Management Laser- and Optotechnologies Materials Engineering Mechanical Engineering Mechatronics Medical Engineering Miniaturised Biotechnology Optometry/ Vision Science Pharmaceutical Biotechnology Production Engineering/ Production Management Scientific Instrumentation Social Work Space Electronics System Design
Distance study courses:	**Dual study courses:**
Business Administration (Master) Health Care Management (Master) Nursing Science/ Nursing Administration (Master) Nursing/ Nursing Management (Bachelor) Production Engineering/ Production Management (Master)	Business Administration & Engineering (Bachelor) Laser- and Optotechnologies (Bachelor) Mechanical Engineering (Bachelor) Mechatronics (Bachelor) Midwifery (Bachelor) Nursing (Bachelor)

Note:
The standard period of study is 6-7 semesters for Bachelor degree courses and 3-4 semesters for Master degree courses.

The present Diploma courses at the UAS Jena were converted into Bachelor and Master Courses. Since then the following academic degrees are awarded:

- Bachelor/ Master of Arts (B.A., M.A.)
- Bachelor/ Master of Engineering (B.Eng., M.Eng.)
- Bachelor/ Master of Science (B.Sc., M.Sc.)

For information about the requirements for admission to a particular course of study, please contact the EA-UAS' Admission and Registrar's Office (Studentensekretariat) or the central Student Advisory Service (Zentrale Studienberatung) - see: Important contacts.

I.2.5. Jena Academy for Lifelong Learning (JenALL)

Alongside the study programmes listed above, the UAS Jena also offers practice and problem oriented further education in the form of seminars, workshops, specialist lectures and courses. For this reason, the EA-UAS Jena and the Friedrich Schiller University of Jena run a joint further education institution - the Jena Academy for Lifelong Learning (JenALL).

Internet: www.jenall.de

I.2.6. Partner universities at home and abroad

The University of Applied Sciences Jena currently maintains close relations to 80 universities worldwide.
Some of these contacts are listed below:

Brazil:	Centro Estandual de Educação Tecnológica Paula Souza (CEETEPS), São Paulo
China:	Beijing Institute of Machinery, Beijing
France:	Université d'Orléans, Orléans
Hungary:	St. Istvan Universität SZIE, Gyöngyös
Lithuania:	Universität Vilnius, Vilnius
Namibia:	Polytechnic of Namibia, Windhoek
Netherlands:	Hanzehogeschool, Hogeschool van Groningen, Groningen
Switzerland:	University of Applied Sciences Westschweiz, Hochschule Wallis/Sion
USA:	University of Clemson, Clemson
Vietnam:	TU Hanoi, Hanoi

In 1999, the three universities of applied sciences in Jena, Leipzig and Zwickau signed a contract on cooperation in the fields of teaching and research.

I.2.7. 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 EA-UAS Jena website.

Winter semester (September to February):

Lecture period:	October to January
Examination period:	February
Semester break:	March

Summer semester (March to August**):**

Lecture period:	March to June
Examination period:	July
Semester break:	August and September

Holidays:

Christmas holidays:	two weeks at end of December (including Christmas Eve and New Year's Eve)
Easter:	Good Friday and Easter Monday
German Labour Day:	1st May
Ascension Day:	Thursday
Pentecost:	Whit Monday
German Unity Day :	3rd October
Reformation Day:	31st October

Orientation for people interested in studying at the EA-UAS Jena:

University Information Day:	March/ April of every year
Trial study days:	March/ April of every year
Girl's Day:	April of every year
Introductory days for first semester students:	one week before beginning of winter semester
Orientation for school classes:	By appointment with the Study Counselling Centre (see: Important addresses)

I.2.8. Important addresses

Note: For current office hours, see the EA-UAS Jena website (Internet: www.fh-jena.de), the current EA-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 (BW):	Phone +49 (0)3641 205-550, Betriebswirtschaft@fh-jena.de
Electrical and Information Engineering (ET/IT):	Phone +49 (0)3641 205-700, Elektrotechnik@fh-jena.de
Health and Care (GP):	Phone +49 (0)3641 205-850, gp@fh-jena.de
Fundamental Sciences (GW):	Phone +49 (0)3641 205-500, Grundlagenwissenschaften@fh-jena.de
Industrial Engineering (WI):	Phone +49 (0)3641 205-900, Wirtschaftsingenieurwesen@fh-jena.de
Mechanical Engineering (MB):	Phone +49 (0)3641 205-300, Maschinenbau@fh-jena.de
Medical Engineering and Biotechnology (MT/BT):	Phone +49 (0)3641 205-600, Medizintechnik@fh-jena.de
SciTec (Precision-Optics-Materials-Environment):	Phone +49 (0)3641 205-350, SciTec@fh-jena.de
Social Work (SW):	Phone +49 (0)3641 205-800, Sozialwesen@fh-jena.de

Study Counselling Centre:
(in German: Zentrale Studienberatung)
Petra Jauk, Anja Jansen
building 1, ground floor, room 13 (01.00.13)
Phone +49 (0)3641 205-122
Fax +49 (0)3641 205-121
E-Mail: studienberatung@fh-jena.de

Student Information Centre:
(in German: Service Zentrum Studentische Angelegenheiten)
Uwe Scharlock
building 1, ground floor, room 15 (01.00.15)
Phone +49 (0)3641 205-230
Fax +49 (0)3641 205-231
E-Mail: uwe.scharlock@fh-jena.de

Admission and Registrar's Office:
(in German: Studentensekretariat)
Beate Thieme, Andrea Hendrich
building 1, ground floor, room 10 (01.00.11)
Phone +49 (0)3641 205-233 -232
Fax +49 (0)3641 205-231
E-Mail: studentensekretariat@fh-jena.de

International Office:
(in German: Akademisches Auslandsamt)
Angelika Förster
building 1, ground floor, room 12 (01.00.12)
Phone +49 (0)3641 205-135
Fax +49 (0)3641 205-136
E-Mail: auslandsamt@fh-jena.de

Master's Studies Service Centre:
(in German: Servicestelle Masterstudium)
Elvira Hädicke
building 5, ground floor, room 29/2 (05.00.29/2)
Phone +49 (0)3641 205-148
Fax +49 (0)3641 205-837
E-Mail: master@fh-jena.de

Career Service:
Dr. Katja Zitzmann
building 5, ground floor, room 29/2 (05.00.29/2)
Phone +49 (0)3641 205-787
E-Mail: career-service@fh-jena.de

THOSKA-Office:

Sabine Schubert
building 1, ground floor, room 17 (01.00.17)
Phone +49 (0)3641 205-266
Fax +49 (0)3641 205-231
E-Mail: thoska@fh-jena.de

Examination Offices of the departments *(in German: Prüfungsamt)***:**

Departments BW und MB:

Marion Zipfel
Phone +49 (0)3641 205-580
E-Mail: PA-I@fh-jena.de

Department SW:

Birgit Engmann
Phone +49 (0)3641 205-808
E-Mail: PA-II@fh-jena.de

Departments ET/ IT, MT/ BT, SciTec:

Gudrun Maetzig,
Gabriele Heller, Kirsten Trillhaase
Phone +49 (0)3641 205-236
Fax +49 (0)3641 205-235
E-Mail: PA-III@fh-jena.de

Department WI:

Kristina Sommerwerk, Katrin Heinicke
Phone +49 (0)3641 205-921
E-Mail: PA-IV@fh-jena.de

Trainee's Offices of the departments *(in German: Praktikantenamt)***:**

Departments ET/IT,
MB, MT/BT, SciTec:

Dr. Sabine Karthe
Phone +49 (0)3641 205-485
Fax +49 (0)3641 205-485
E-Mail: sabine.karthe@fh-jena.de

Department SW:

Martina Neubauer
Phone +49 (0)3641 205-805
E-Mail: martina.neubauer@fh-jena.de

Department BW:

Gabriele Bliedtner
Phone +49 (0)3641 205-566
Fax +49 (0)3641 205-567
E-Mail: gabriele.bliedtner@bw.fh-jena.de

Department WI:

Kristina Sommerwerk, Katrin Heinicke
Phone +49 (0)3641 205-921
E-Mail: veronika.jaeger@fh-jena.de

Academic Sports Office:
(in German: Hochschulsport)

Michael Rothe
building 3, ground floor, room 11 (03.00.11)
Phone +49 (0)3641 205-254
Fax +49 (0)3641 205-255
E-Mail: hochschulsport@fh-jena.de

Library *(in German: Hochschulbibliothek)***:**

lending service, enquiries, information:

building 5, ground floor, room 47 (05.00.47)
Phone +49 (0)3641 205-280/-290
E-Mail: bibliothek@fh-jena.de
Internet: http://www.fh-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 first Tuesday of every month in the EA-UAS Jena library. For appointments, please call: +49 (0)3641 205-270.

Part II: Information on Study Programmes at the Ernst-Abbe-University of Applied Sciences Jena

II.1. Information on Bachelor and Master Degree programmes

II.1.1. What is ECTS?

In Bologna in 1999, 29 European countries signed what is known as the „Bologna Declaration“. The aim was the creation of a "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, and,
- 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).

II.1.2. ECTS-Coordinator

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.

II.1.3. 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 3 to 4 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.

II.1.4. Master

Master degree programmes are based on a previously completed course of study (e.g., Bachelor). They usually take 1 to 2 years and broaden and deepen the knowledge acquired in a Bachelor degree course. Master degree courses can be either “research-oriented” or “application-oriented”. 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 (1 to 5 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.

II.1.5. 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 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 exercise sessions 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.

II.1.6. 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 h 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 a 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

This grading scale represents a ranking of academic achievements from one student in comparison with a special cohort (e.g. all students from one year), but don't replace the grade of the local university. The students can gain in the context of this grading scale the following **ECTS-grades**:

A – the best 10%
B – the next 25%
C – the next 30%
D – the next 25%
E – the next 10%

II.1.7. Diploma Supplement

Starting in 2005, all graduates from the EA-UAS Jena receive a Diploma Supplement (DS) free of charge. This is a supplement to the transcript of grades, 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.

II.1.8. 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.

II.2. The field of study at the Department of SciTec

II.2.1. The Department of SciTec

With a total of 25 professors, 25 academic and technical collaborators, as well as more than one thousand students enrolled in seven study programmes, the Department of SciTec is the largest of its kind at this university. The name **SciTec** stands for the link between **science** and **technology**. The subtitle "Precision, Optics, Materials" names the focal points in its teaching and research. The Department of SciTec was founded in 2005 from the former Precision Engineering, Physics Engineering and Materials Engineering Departments. This merger has produced a new engineering science entity with a wide-ranging spectrum of scientific and technical expertise and well equipped modern laboratories. The working fields of the department are: teaching, research and further education.

Teaching:
The Department of SciTec offers the following degree programmes:

Bachelor degree programmes

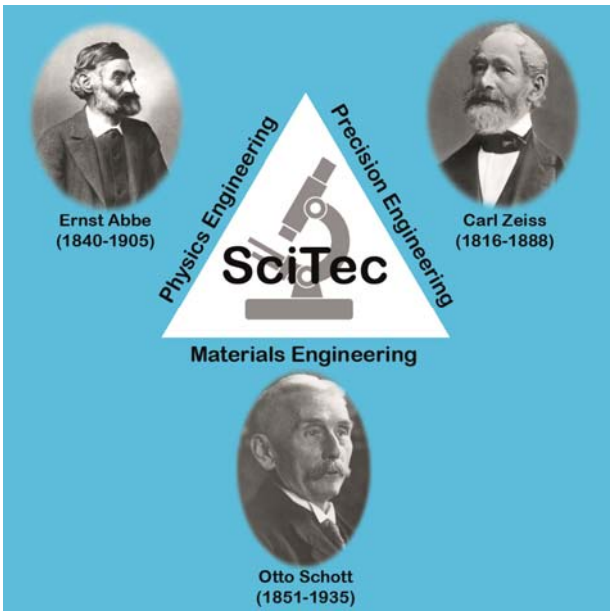
- Laser- and Optotechnologies
- Materials Engineering
- Optometry/ Ophthalmic Optics
- Photovoltaic and Semiconductor Technology
- Physics Engineering
- Precision Engineering

Master degree programmes

- Laser- and Optotechnologies
- Materials Engineering
- Optometry/ Vision Science
- Scientific Instrumentation

Research:
The focal points of research projects operated at the Department of SciTec can be described with the following key words:

- laser technique and optics
- materials science
- optometry
- precision and micro technologies



Further education:
The Department of SciTec offers further education in special fields for industrial establishments.

International contacts:
The Department of SciTec maintains contacts to universities all over the world. Numerous students use this chance to complete a part of study abroad (U.S.A., France, Japan, China, Australia etc.).

II.2.2. The Master degree programme Scientific Instrumentation

The international Master's degree programme of Scientific Instrumentation taught in English language is designed for graduates in science and engineering disciplines and provides advanced qualification for employment in the research and development branches of various fields. Building on the competence acquired during the Bachelor's degree programme, the course of study enables students to independently design and develop scientific instruments and manage development and research projects.

Scientific instruments are highly specialized devices for measuring physical or chemical quantities, carrying out special processes or creating defined test conditions. These instruments are used in fields that include research in physics and sciences, advanced technology, biomedical engineering, and aeronautics.

students at optics laboratory

Jena's reputation as a centre of technology specializing in optics and scientific instrument manufacturing dates back over a hundred years. Industrial firms and research institutes are engaged in the fields of applied physics, technologies in the field of physics, optics, high-precision mechanics, metrology, sensors, microengineering and nanotechnology, as well as biomedical engineering. The development of hightech processes, of innovative measuring techniques and instruments is crucial for this sector to remain globally competitive.

II.2.3. Employment opportunities

The Master's degree in Scientific Instrumentation qualifies its holders for the employment in industry, research institutes and engineering firms. Holders of the Master's degree mediate between pure science and engineering disciplines and consequently apply scientific knowledge to find appropriate, effective solutions to engineering problems. Typical examples of employment opportunities in industry and research institutes can be found in the research and development of new instrumentation, in monitoring high-tech processes, as well as in solving metrological problems and problems relating to the technical aspects of instruments arising in interdisciplinary research projects, such as biomedical engineering, geotechnics, environmental engineering and the aerospace industries.

II.2.4. Entrance requirements

The entrance requirement for the Master's degree programme is a university degree with competent final degree grades in physics, science or a scientific engineering discipline whose curriculum covers the subject entry requirements (e.g. physics, physics engineering, precision engineering, electrical engineering/electronics, mechatronics, biomedical engineering). English proficiency is also mandatory.

The acceptance is decided in an approval test. Graduates of other Bachelor courses than Physics Engineering or Precision Engineering need comprehensive knowledge in Engineering Design, Materials Science and Instrumentation. If such knowledge is not fully existent the admission panel will issue the obligation to take and successfully pass all the postgradual basis modules (Solid State Physics, Microsystems Engineering, Design of Precision Devices und Introduction to FEM).

II.2.5. Application

Basic requirement for working on an application is that all needed documents are in time.

- Deadline summer semester: 15.01.
- Deadline winter semester: 15.07.

The criterion is the postmark. Later received applications will not be considered. Application forms can be requested from EA-UAS Jena or downloaded from the web page of EA-UAS Jena.
The Ernst-Abbe-University of Applied Sciences Jena offers an ONLINE- enrolment since summer semester 2008.

Important: For various reasons, the Ernst-Abbe-University of Jena doesn't enrol in every semester in all study programmes or study forms. Information for it are published in the newspapers or rather given from EA-UAS Jena (Study Counselling Centre, Admission and Registrar's Office or web page).

The following documents have to be attached to an application:

- application form with passport photograph
- officially certified copy of University Entrance Qualification
- officially certified copy of Skilled Worker Certificate or employer certificate of pre-study industrial placement
- personal data sheet/ curriculum vitae (optional)
- additional for numerus clausus university places: proof of medical certificates, periods of service, reasonable hardship claims, etc. as a copy
- addressed and post-paid postcard (for arrival notice of application)
- addressed and post-paid C5- envelope (for sending der matriculation documents)

Application documents of not accepted or not appeared applicants are destroyed after a period of two years. The return of application documents only occurs, if this is explicitly wished and it exist an addressed and post-paid envelope.

II.2.6. Matriculation

The applicants will need to attend personally with the document of admission to study, proof of health insurance, an account statement as proof of paid semester fee and a valid identification card (normally a passport with visa) at the Admission and Registrar's Office *(in German: Studentensekretariat)* for enrolment.

At enrolment you will receive the certificate of matriculation and the student ID card. With the student card you can use busses and trams in Jena und of special trains (RE, RB, SE) of German Railways for free. The student ID card is classified as ticket only with a valid identification card with passport photograph. The routes of local public transport are good developed, so that you will arrive in Jena the Ernst-Abbe-University of Applied Sciences and the residential homes without problems and don't need a car.

Every Year in October there will be ceremonial enrolment of first-semesters.

Instrumental accompaniment

Matriculation ceremony at “Volkshaus”

II.2.7. Programme overview

The programme has been designed to equip students with both the technical and interdisciplinary qualifications necessary for the successful pursuit of their future careers. Apart from contents of the course in physics and engineering science, this also includes the so-called key qualifications. In the first semester in addition to the compulsory modules a selection of postgradual basis modules in the fields of applied physics or precision engineering is offered to bring students from different disciplines up to the same level. In the second semester, students select three fields of specialization from a choice of five:

- micro and nanotechnologies
- smart materials and sensors
- scientific computing
- metrology and analysis
- design

The language of instruction is English. In a research internship in semester three the students are introduced into scientific research work. Students are supposed to write their Master’s thesis in the fourth semester. The thesis will focus on specific aspects of fundamental research or development in the field of technology and is written at our University of Applied Sciences, at a foreign partner university, at a research institute or in the R&D department of an industrial firm. A thesis is written under the joint scientific supervision of the relevant institution and the University of Applied Sciences Jena.

The Master’s programme is presented in modular form. Under the European Credit Transfer and Accumulation System (ECTS), students receive a fixed number of credits for every successfully completed teaching module. This system facilitates the recognition of students’ coursework, should they change universities in their home country or abroad. A special curriculum with 6 semester length is provided for part-time students. Hereby the further qualification as a Master of Science is possible also for employed persons.

II.2.8. Graduation

The internationally recognized academic degree of Master of Science (M.Sc.) will be conferred on students by the Ernst Abbe University of Applied Sciences Jena, upon successful completion of the programme.

II.2.9. Professional perspectives

In the actual scenario of the increasing shortage of highly qualified personnel in technical and scientific sectors, there are excellent career prospects for graduates of the Master’s degree programme in scientific instrumentation both nationally and internationally.
The industries and research institutes in the region of Jena provide excellent employment opportunities for graduates in the particular specializations which they have opted for. Many companies are engaged into the fields of metrology and sensors, optics, analytical techniques, micro engineering and medical engineering. The close contacts that the teaching staff possesses with the industrial firms and research institutes ensure that the training is practically oriented and is up-to-date with the course contents. Looking at the current scenario for interns and graduates of the scientific engineering courses, the demand is greater than the supply. The Master’s degree in Scientific Instrumentation also qualifies its holder to pursue a PhD.

II.2.10. Contact person

For any specific question on the Master degree programme Scientific Instrumentation please contact Mr Prof. Dr. Ploss (Study programme advisor):

Prof. Dr. Bernd Ploss
Phone: +49 (0)3641 205 353
Fax: +49 (0)3641 205 401
E-Mail: scientific-instrumentation@fh-jena.de
Internet: www.scitec.fh-jena.de/

II.2.11. Module descriptions

In this chapter you will find all module descriptions of Master study programme Scientific Instrumentation in chronological order of curriculum.

Following module table gives an overview of curriculum according to Study and Examination Regulations from 13.10.2011 and 11.12.2012 (EP-version 31):

date: 24.04.2015	module 1	module 2	module 3	module 4	module 5	SWS
1st semester	Embedded Digital Systems	Optical Instruments	Physical Materials Diagnostics	Postgradual Basics Modules*	Non-technical Module I**	
	ET.2.903 SP 90, SL	SciTec.2.042 SP 90, SL	SciTec.2.111 SP 90, SL			
	2 0 0 2	2 0 0 2	2 0 0 2	7,5	3	22,5
	SI	SI	SI			
	Wagner (ET/IT)	Brunner	Teichert			
2nd semester	Mesomodule 1***	Mesomodule 2***		Mesomodule 3***	Non-technical Module 2**	
	7	8		9	3	27
3rd semester	Research Internship				Soft Skills	
	SciTec.2.618	AP			ST.2.501 AP	
					0 2 0 0	2
	SI				LOT, SI, WT	
	lecturers of programme SI, 18 weeks				div. lecturers	
4th semester	Master Thesis				Colloquium	
	SciTec.2.705	AP			ST.2.801 AP	
						0
	SI				SI, WT	
	lecturers of programme SI, 18 weeks					

*classified by study course consultant

Module group	Module	Module-no.	PL	L	S	E	P	Participating study programmes	Lecturer	CP
Postgradual Basics Modules*	Solid State Physics	SciTec.2.088	SP 90	3	0	1	0	SI, WT	Ploss	7
	Microsystems Engineering	ST.2.032	SP 90	2	0	1	0	SI, WT	Rüb	
	for graduates in e.g. Precision Engineering*									
	Design of Precision Devices	SciTec.2.007	AP	2	0	0	3	SI	Pfaff	8
	Introduction to FEM	ST.2.017	AP, SL	2	0	0	1	(LOT), SI, WT	Dienerowitz	
	for graduates in e.g. Physics Engineering or Photovoltaic and Semiconductor Technology*									
Non-technical Module 1**	German as Foreign Language I	GW.2.110	AP	0	0	4	0	SI	Berndt	7
	English for Specific Purposes I	GW.2.112	AP	0	0	3	0	SI, WT	Schuhknecht	
	Further Foreign Languages	GW.2.109	AP	0	0	3	0	LOT, SI, WT	SLZ	
	Intercultural Communication	BW.2.906	AP	0	2	0	0	SI, WT	Dozent BW	
	Business Administration Compulsory Optional Module	BW.2.907	AP	0	2	0	0	SI, WT	Dozent BW	
Non-technical Module 2**	German as Foreign Language II	GW.2.111	AP	0	0	4	0	SI	Berndt	7
	English for Specific Purposes II	GW.2.113	AP	0	0	3	0	SI, WT	Schuhknecht	
	Further Foreign Languages	GW.2.109	AP	0	0	3	0	LOT, SI, WT	SLZ	
	Intercultural Communication	BW.2.906	AP	0	2	0	0	SI, WT	Dozent BW	
	Business Administration Compulsory Optional Module	BW.2.907	AP	0	2	0	0	SI, WT	Dozent BW	

**students without appropriate knowledge of German Language have to attend the compulsory optional modules „German as Foreign Language". For all other students are these modules not available as compulsory optional modules.

***Choice 3 mesomodules of 5 offered mesomodules.

Mesomodule	Module	Module-no.	PL	L	S	E	P	Participating study programmes	Lecturer	CP
Mesomodule Micro- and Nano-technology	Micro- and Nanostructures	SciTec.2.031	SP 90, SL	3	0	0	2	SI, WT	Rüb	8
	Thin Films	ST.2.113	SP90,SL	2	0	0	1	SI, WT	Konovalov	
Mesomodule Smart Materials and Sensors	Materials for Sensors and Electronics	SciTec.2.029	SP 90, SL	4	0	0	1	(LOT), SI, WT	Ploss, Töpfer	7
	Selected Topics of Sensor Technology	ST.2.061	SP 90	2	0	0	0	SI, WT	Ploss et al.	
Mesomodule Scientific Computing	Scientific Computing	GW.2.402	SP 120, SL	4	0	0	3	SI, WT	Wilde, Schütze (GW)	7
Mesomodule Metrology and Analytics	Gas Sensing and Aerosol Measurement	SciTec.2.014	SP 90, SL	3	0	0	2	SI, WT	Schleicher	8
	Instrumental Chemical Analytics	MT.2.902	SP90,SL	2	0	0	1	SI, WT	Feller (MT)	
Mesomodule Design	Advanced 3D-Design	ST.2.114	AP ,SL	1	0	0	2	SI, WT	Pfaff	8
	FEM and Simulation	ST.2.115	AP ,SL	1	0	0	2	SI, WT	Dienerowitz	
	Precision Instrumentation	ST.2.116	AP:ST	2	0	0	0	SI, WT	Schröck	

Following legend explains the module table and makes the reading of it easier:

legend:

whole module (6 cp):

module name			
module-no.		PL	
L	S	E	P
participating study programmes			
lecturer			

half module (3 cp):

module name			
module-no.		PL	
L	S	E	P
part. stud. prog.			
lecturer			

Course type:

L	-	lecture
S	-	seminar
E	-	exercises
P	-	practical course

Assessment (PL):

SP	written examination
MP	oral examination
AP	alternative examination

colour code of departments:

BW
ET/ IT
GW
MB
MT/BT
SciTec
SW
WI
external of university

Following table of contents makes the searching of module descriptions easier:

Department	SciTec
Degree programme	SI
Module name	**Embedded Digital Systems**
Module number	**ET.2.903**
Compulsory/ compulsory optional/ optional module	Compulsory module
Module coordinator	teaching assignment: Prof. Herbert Wagner
Module content	▪ Fundamental terms/ trends; ▪ Microcontroller architectures; ▪ User-specific periphery (operation and control); ▪ Hard- and software design (in-circuit); ▪ Evaluation software/ debugging
Learning objectives	▪ Review of main hard- and software design principles of system-integrated microcontrollers; ▪ Overview of typical architectures; ▪ Application-oriented hard- and software design
Course type (lecture, seminar, exercises, practical course)	2 L – 0 S – 0 E – 2 P
Recommended literature	▪ Balarin, Felice: Hardware-software co-design of embedded systems: the POLIS Approach, 0-7923-9936-6, 4. print., Boston: Kluwer, 2002. ▪ A.S. Berger: Embedded Systems Design. 1-57820-073-3, CMP-Books, 2001. ▪ Chakrabarty, Krishnendu: SOC (System-on-a-Chip) testing for plug and play test automation. 6., Boston, MA. : Kluwer Ac. Publishers, 2002.
Learning materials	Lecture slides; data sheets; circuit designs; bibliography; design software (evaluation version)
Method(s) of instruction/ media being used	Interactive lecture, exercise, practical course
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	winter term
Which semester during the programme	1
Requirements for attendance	Digital Circuit Technology; Microprocessor Technology (fundamentals); Programming (C++)
Assessment (written/ oral test, paper, etc.)	Written examination (90 minutes), certificate for practical course
ECTS credits	6
Work load in:	▪ 180 h of total work load, therefrom ▪ 60 h of presence at university ▪ 120 h of self-study
Usability of this module	-
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Department	SciTec
Degree programme	SI
Module name	**Optical Instruments**
Module number	**SciTec.2.042**
Compulsory/ optional/ elective module	Compulsory module
Module coordinator	Prof. Dr. Robert Brunner
Module content	Fundamentals in ray-optics as a basis for the understanding of the working principle of optical instruments: ▪ Fresnel-Principle (principle of least time) ▪ imaging-equation, optical properties of a lens-makers formula ▪ aperture and field stop, pupils and windows ▪ aberrations (chromatic, spherical, coma, astigmatism, distortion, field curvature) → correction of aberrations Wave optics: ▪ Huygens-Principle, grating equation, Abbe-theory ▪ Maxwell-Equations, Fourier-Optics, Fraunhofer-Diffraction, Rayleigh-Criterion, DOF Introduction into the structure and working principles of optical instruments: ▪ Eye and visual perception, microscopy (bright-field – dark-field, phase-contrast, Fluorescence-Microscope) ▪ optical Lithography (deep-UV – EUV, illumination systems phase masks) ▪ spectral sensors (Czerny-Turner, imaging spectrometer) special modern optical elements: ▪ diffractive optical elements ▪ switchable elements
Learning objectives	The students are getting an overview of the basic working principles of basic optical instruments.
Course type (lecture, seminar, exercises, practical course)	2 L – 0 S – 0 E – 2 P
Recommended literature	▪ Pedrotti: Introduction to Optics. Addison-Wesley; 3rd edition, 2006 ▪ Hecht: Optics. Addison-Wesley; 4th edition, 2001 ▪ Born, Wolf: Principles of Optics; Cambridge University Press; 7th edition, 1999 ▪ Goodman: Introduction to Fourier Optics; McGraw-Hill, 1996
Learning materials	self-provided manuscript/ CD with lecture transparencies
Method(s) of instruction/ media being used	lecture and practical course
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	winter term
Which semester during the programme	1
Requirements for attendance	Basic courses in Physics and Mathematics
Assessment (written/ oral test, paper, etc.)	Written examination (90 minutes), course achievement: practical course
ECTS credits	6
Work load in:	▪ 180 h of total work load, therefrom ▪ 60 h of presence at university ▪ 120 h of self-study
Usability of this module	-
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Department	SciTec
Degree programme	SI
Module name	**Physical Materials Diagnostics**
Module number	**SciTec.2.111**
Compulsory/ compulsory optional/ optional module	Compulsory module
Module coordinator	Prof. Dr. Steffen Teichert
Module content	Overview on typical methods of physical materials analysis with special emphasis on tool setups; Selection of methods: SEM, TEM, XRD, SPM, MS, ES, synchrotron experiments, TA
Learning objectives	The students acquire knowledge on the most important methods of physical materials analysis. They understand the physical background of the methods as well as the technical basics of the corresponding tools. The students have an overview on the application field of physical materials analysis methods. Furthermore, they also have knowledge on the technical and physical limitations of the methods.
Course type (lecture, seminar, exercises, practical course)	2 L – 0 S – 0 E – 2 P
Recommended literature	▪ Surface Analysis: The Principle Techniques J. C. Vickerman, Wiley –VCH ▪ Microstructural Characterization of Materials, D. Brandon, W.D. Kaplan, Wiley-VCH ▪ Introduction to Diffraction in Materials Science and Engineering, A.D. Krawitz, John Wiley & Sons
Learning materials	lecture notes
Method(s) of instruction/ media being used	lecture and practical course
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	winter term
Which semester during the programme	1
Requirements for attendance	experimental physics, basics of materials science
Assessment (written/ oral test, paper, etc.)	Written examination (90 minutes), certificate for practical course
ECTS credits	6
Work load in:	▪ 180 h of total work load, therefrom ▪ 60 h of presence at university ▪ 120 h of self-study
Usability of this module	The module is closely connected to solid state physics, materials science and measurement engineering.
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Department	SciTec
Degree programme	SI, WT
Module name	**Solid State Physics**
Module number	**SciTec.2.088**
Compulsory/ compulsory optional/ optional module	compulsory optional module
Module coordinator	Prof. Dr. Bernd Ploss
Module content	Bindings in solid materials, crystalline structure and crystallographic systems, diffraction and reciprocal lattice, Brillouin-zone, lattice vibrations, thermal properties, electron gas and band structure, semiconductors, superconductivity, dielectric properties of materials, ferroelectricity, magnetic properties.
Learning objectives	Understanding the: ▪ structure of solid materials and the resulting macroscopic properties, ▪ physical effects in solid materials and their applications
Course type (lecture, seminar, exercises, practical course)	3 L – 0 S – 1 E – 0 P
Recommended literature	▪ C. Kittel: Introduction to Solid State Physics (John Wiley & Sons, 2004) ▪ H. Ibach, H. Lüth: Solid-State Physics: An Introduction to Principles of Materials Science, (Springer-Verlag, 2003). ▪ H.P. Myers: Introductory Solid State Physics (Taylor & Francis 2009)
Learning materials	Handouts, revision notes.
Method(s) of instruction/ media being used	Lecture and tutorial.
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	Winter term
Which semester during the programme	1
Requirements for attendance	Mathematics and Physics at the level BSc or BEng
Assessment (written/ oral test, paper, etc.)	Written examination (90 minutes)
ECTS credits	6
Work load in:	▪ 180 h of total work load, therefrom ▪ 60 h of presence at university ▪ 120 h of self-study
Usability of this module	-
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Department	SciTec
Degree programme	SI, WT
Module name	**Microsystems Engineering**
Module number	**SciTec.2.032**
Compulsory/ compulsory optional/ optional module	SI: compulsory optional module WT: compulsory module
Module coordinator	Prof. Dr. Michael Rüb
Module content	Microsystems Engineering, Materials, Thin Film Technology, Basics of Lithography, Surface Micromachining, Cleanroom and Yield, Bulk Micromachining, LIGA-Technique, Assembling Technology, Examples **Lecture** Definition of Microsystems Engineering, latest state of the art and future developments. Process based presentation of the Microsystems Engineering topic: Materials of Microsystem Engineering: Manufacturing and properties of silicon wafers, ideal and real materials, silicon compounds Thin Film Technology: Thermal deposition, CVD, sputtering Basics of Lithography: Process based generic presentation of important lithography techniques Surface Micromachining: Sacrificial layer technology, silicon foundries, SOI technology Clean Rooms and Yield: Properties of clean rooms, effect of defects on volume yield, root causes of defects, removal of defects Volume Micromachining: 3-dim patterning by anisotropic wet chemical etching LIGA: x-ray lithography, galvanic deposition, moulding, examples Assembly Technology: Wafer sawing, mounting techniques, reliability, bonding techniques Examples of micromechanical devices: DLP chip, Acceleration and rate sensors **Seminar** **Option 1:** Student presentations on current topics in microsystems engineering **Option 2:** Exercises on lecture topics
Learning objectives	Knowledge on important components of microsystems; Knowledge on manufacturing techniques
Course type (lecture, seminar, exercises, practical course)	2 L – 0 S – 1 E – 0 P
Recommended literature	▪ Büttgenbach; Mikromechanik; Teubner-Verlag 1991 ▪ Madou; Fundamentals of Microfabrication; CRC Press 1997 ▪ Menz, Mohr; Mikrosystemtechnik für Ingenieure; VCH-Verlag 1997 ▪ Völklein, Zetterer; Einführung in die Mikrosystemtechnik; Vieweg 2000
Learning materials	Lecture slides
Method(s) of instruction/ media being used	Lecture and seminar
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	Winter term
Which semester during the programme	1
Requirements for attendance	Basic knowledge on physics, optics, vacuum and thin film technology
Assessment (written/ oral test, paper, etc.)	70%: written examination (90 minutes), 30%: alternative examination (presentation)
ECTS credits	3
Work load in:	▪ 90 h of total work load, therefrom ▪ 45 h of presence at university ▪ 45 h of self-study
Usability of this module	-

Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Department	SciTec
Degree programme	LOT, SI, WT
Module name	**Introduction to FEM**
Module number	**SciTec.2.017**
Compulsory/ compulsory optional/ optional module	LOT: optional module SI: compulsory optional module WT: compulsory module
Module coordinator	Prof. Dr.-Ing. Frank Dienerowitz
Module content	▪ Introduction to FEM ▪ FEM procedure ▪ modelling structural mechanics problems ▪ overview on types of elements ▪ discretisation of the model (meshing) ▪ application of boundary conditions ▪ solving and post-processing
Learning objectives	The student is: ▪ able to develop and set-up FEM-model for structural mechanics problems (statics) using computer-based tool. ▪ knowledgeable about particular aspects of FEM: model simplifications, stress singularities, mesh convergence, verification, limitations of FEM. ▪ able to evaluate results with regards to loads, stress (safety factor) and deformation.
Course type (lecture, seminar, exercises, practical course)	2 L – 0 S – 0 E – 1 P
Recommended literature	▪ Gebhardt, C., Praxisbuch FEM mit ANSYS Workbench: Einführung in die lineare und nichtlineare Mechanik, Carl Hanser Verlag, 2014 ▪ Lee, H.-H., Finite Element Simulations with ANSYS Workbench 14, SDC Publications, 2012 ▪ Mac Donald, B. J., Practical Stress Analysis with Finite Elements, GLASNEVIN Publishing, 2011
Learning materials	hand-outs supporting lecture and tutorial contents
Method(s) of instruction/ media being used	Lecture, practical course (tutorial)
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	Winter term
Which semester during the programme	LOT: 3 SI, WT: 1
Requirements for attendance	statics, mechanics of materials
Assessment (written/ oral test, paper, etc.)	alternative examination, course achievement: successful attendance of practical course
ECTS credits	3
Work load in:	▪ 90 h of total work load, therefrom ▪ 45 h of presence at university ▪ 45 h of self-study
Usability of this module	FEM and Simulation, 3D-Design of Precision Devices
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Department	SciTec
Degree programme	SI
Module name	**German as Foreign Language I**
Module number	**GW.2.110**
Compulsory/ compulsory optional/ optional module	compulsory optional module
Module coordinator	Michael Düring
Module content	Main topics: ▪ Information/ talk about people ▪ Describe daily routines, studies, leisure time activities ▪ Manage daily routines (post office, bank, phone calls, visit the doctor) Statements and discussions on distinctive cultural features of different countries including Germany
Learning objectives	Students learn to understand and use the German language in everyday situations. They obtain the ability to pronounce the German words in the right way, in order to make themselves understood in everyday life. They can use basic grammar structures. They are able to write short texts in German.
Course type (lecture, seminar, exercises, practical course)	0 L – 0 S – 4 E – 0 P
Recommended literature	▪ Hueber - Verlag : Dreyer/Schmidt „Lehr – und Übungsbuch der deutschen Grammatik“ , ISBN 3-19-007255-8 ▪ Fabouda - Verlag: Lodevik „DHS & Studienvorbereitung (Deutsch als Fremdsprache für Studentinnen und Studenten)“ ISBN 3-930861-40-2 ▪ Klett - Verlag: „Pons - Großwörterbuch - Deutsch als Fremdsprache„ ISBN 3-12-517043-5
Learning materials	Langenscheidt - Verlag: „Optimal A1 – Ein Lehrwerk für Deutsch als Fremdsprache“ ISBN – Lehrbuch: 3- 468-47001- 0 ISBN – Arbeitsbuch: 3-468-47005-3
Method(s) of instruction/ media being used	Teacher-centred teaching and group work, work with audio-visual media, work (partially self-studies) in the media-pool (language department)
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	Winter term
Which semester during the programme	1
Requirements for attendance	none
Assessment (written/ oral test, paper, etc.)	alternative examination
ECTS credits	3
Work load in:	90 h of total work load, therefrom ▪ 60 h of presence at university ▪ 30 h of self-study
Usability of this module	Everyday life during the stay for studying Scientific Instrumentation.
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	German

Department	SciTec
Degree programme	SI, WT
Module name	**English for Specific Purposes I**
Module number	**GW.2.112**
Compulsory/ compulsory optional/ optional module	compulsory optional module
Module coordinator	Ulrich Schuhknecht
Module content	▪ Aspects of Materials Technology and Nanotechnology ▪ Scientific texts and articles taken from journals, books and the internet ▪ Complex listening texts on academic and scientific topics
Learning objectives	The students extend their ESP knowledge (vocabulary in particular) and skills (in particular reading and speaking) and use them in study and work-related situations. They acquire strategies to deal effectively with listening tasks taking the form of longer talks and lectures and develop their note-taking skills. The course is set at level C1 of the Common European Framework.
Course type (lecture, seminar, exercises, practical course)	0 L – 0 S – 3 E – 0 P
Recommended literature	▪ Ibbotson, M.: Cambridge English for Engineering. CUP, 2008 ▪ Campbell, C. et al: English for Academic Study: Listening. Garnet Education, 2009 ▪ Ashby, M.: Materials Selection in Mechanical Design. Elsevier, 2007
Learning materials	Reader
Method(s) of instruction/ media being used	Interactive, audio and video recordings, e-learning platform
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	Winter term
Which semester during the programme	1
Requirements for attendance	Successful completion of the module “Technical English” or equivalent (Level B2 of the Common European Framework)
Assessment (written/ oral test, paper, etc.)	Alternative examination
ECTS credits	3
Work load in:	▪ 90 h of total work load, therefrom ▪ 45 h of presence at university ▪ 45 h of self-study
Usability of this module	All study programmes containing a C1 level ESP module
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Department	SciTec
Degree programme	LOT, SI, WT
Module name	**Further Foreign Languages**
Module number	**GW.2.109**
Compulsory/ compulsory optional/ optional module	compulsory optional module
Module coordinator	Appropriate language teacher
Module content	Students become familiar with the French, Russian or Spanish language and acquire basic vocabulary and grammar.
Learning objectives	▪ every day language ▪ leisure ▪ studying ▪ general professional situations
Course type (lecture, seminar, exercises, practical course)	0 L – 0 S – 3 E – 0 P
Recommended literature	▪ Libre Echange 1, Courtillon et al, Hatier/Didier, 1991 ; ▪ Studio 60 Niveau 1, Lavenne et al, Didier, 2001 ; ▪ Studio 100 Niveau 1 ▪ Taxi 1, Capelle et al, Hachette/Langenscheidt, 2004 ▪ „Projekty“ Hueber-Verlag ▪ „Kljutschi“ Hueber-Verlag ▪ „Mosty“ Klett-Verlag ▪ „Mirada“ Hueber-Verlag
Learning materials	French: Le Nouvel Espaces 1 Russian: Workbook, scripts, handouts, dictioonary Spanish: Work book, handouts, dictionary
Method(s) of instruction/ media being used	Multimedia, Video, Audio
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	Winter or summer term
Which semester during the programme	▪ LOT: 1 (referred to study and examination regulations of 02.08.2010) ▪ LOT: 3 (referred to study and examination regulations of 13.10.2011) ▪ SI, WT: 1 or 2
Requirements for attendance	None or basic knowledge
Assessment (written/ oral test, paper, etc.)	Alternative examination
ECTS credits	3
Work load in:	▪ 90 h of total work load, therefrom ▪ 45 h of presence at university ▪ 45 h of self-study
Usability of this module	-
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	French, Russian or Spanish

Department	SciTec
Degree programme	SI, WT
Module name	**Intercultural Communication**
Module number	**BW.2.906**
Compulsory/ compulsory optional/ optional module	compulsory optional module
Module coordinator	Prof. Dr. Heiko Haase
Module content	The course "Intercultural Communication" is arranged decided interdisciplinary. The course covers besides cultural and communication-theoretical plus socio-scientific questions of intercultural action as well as aspects of international management and marketing. structure: 1. definition and models of communication 2. definition and models of culture 3. stereotype 4. culture-specific form of thought 5. verbal communication 6. non-verbal communication 7. culture-comparative studies 8. process of cultural assimilation
Learning objectives	The students understand essential culture-specific aspects of thinking, action and communication. The students are able to apply this knowledge in an intercultural context. They can analyse and evaluate culture-specific attitudes with a view to business communication and etiquette. As a result participants have the necessary intercultural skills to successfully build up business relationships in different economic regions of the world.
Course type (lecture, seminar, exercises, practical course)	0 L – 2 S – 0 E – 0 P
Recommended literature	▪ Schugk, Michael: Interkulturelle Kommunikation - Kulturbedingte Unterschiede in Verkauf und Werbung, Verlag Vahlen 2004. ▪ Bolten, Jürgen: Einführung in die Interkulturelle Wirtschaftskommunikation, UTB Verlag 2007. ▪ Heringer, Hans Jürgen: Interkulturelle Kommunikation: Grundlagen und Konzepte, UTB Verlag, 3. Auflage, 2010. ▪ Acuff, F.L.: How to negotiate anything with anyone anywhere around the world, AMACOM, 3rd ed., 2008. ▪ Morrison, T.; Conaway, W.A..: Kiss, bow, or shake hands: The bestselling guide to doing business in more than 60 countries, Adams Media, 2nd ed., 2006.
Learning materials	A script with exercises and control questions as e-learning-material is the basis for this course. Additional literature is recommended to the students.
Method(s) of instruction/ media being used	self-study with the help of the script and presence seminars
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	winter term/ summer term
Which semester during the programme	1/ 2/ 3
Requirements for attendance	none
Assessment (written/ oral test, paper, etc.)	alternative examination
ECTS credits	3
Work load in:	▪ 90 h of total work load, therefrom ▪ 30 h of presence at university ▪ 60 h of self-study
Usability of this module	-
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Department	SciTec
Degree programme	SI, WT
Module name	**Business Administration Compulsory Optional Module**
Module number	**BW.2.907**
Compulsory/ compulsory optional/ optional module	compulsory optional module
Module coordinator	Professor of the Department of Business Administration or lecturers. The choice of the lecturer is in accordance with available capacities in the Department of Business Administration.
Module content	The teaching offer covers all business contents: investment and finance, marketing, accounting and controlling, taxes and auditing, personnel management and organisation, business informatics and economic law. This range is supplemented by special events such as founder seminars, corporate strategic planning simulations, international business, European integration, logistics, and innovation management.
Learning objectives	The students should be given the opportunity to broaden their business knowledge according to their personal interests. Every student has specific ideas of his later professional activity. It is therefore not appropriate to prescribe a concrete business module for students in the context of a specialisation. While one student sees its future in the founding of a company, the other intends to operate international as an employee in a large company. The training needs of students varies accordingly. The introduction of this "Business Administration Compulsory Optional Module" allows the students to choose a business module that best meets its needs.
Course type (lecture, seminar, exercises, practical course)	0 L – 2 S – 0 E – 0 P
Recommended literature	▪ Topic oriented.
Learning materials	Lecture script, exercise papers
Method(s) of instruction/ media being used	Lecture with in-depth case studies and exercises
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	winter term/ summer term
Which semester during the programme	1/ 2/ 3
Requirements for attendance	Commercial basic knowledge that can be acquired through professional practice or the module "Business Administration". In particular, special knowledge may be required (e.g. for the module "International Tax Law").
Assessment (written/ oral test, paper, etc.)	alternative examination
ECTS credits	3
Work load in:	▪ 90 h of total work load, therefrom ▪ 30 h of presence at university ▪ 60 h of self-study
Usability of this module	-
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	German

Department	SciTec
Degree programme	SI, WT
Module name	**Micro- and Nanostructures**
Module number	**SciTec.2.031**
Compulsory/ compulsory optional/ optional module	compulsory optional module
Module coordinator	Prof. Dr. Michael Rüb
Module content	Micro-Nanotechnology, Optical Lithography Electron Beam Lithography, Next Generation Lithography, Pattern Transfer, Device Physics and Technology, Device Scaling, Nanotechnology **Lecture:** Micro- Nanotechnology: Moore´s Law, ITRS Roadmap, Top down and bottom up approach Optical Lithography: Lithography techniques, maximum pattern resolution, resist chemistry- and kinetics, resolution enhancement techniques (Immersion lithography, OPC, Phase Shift Masks, etc.) Electron Beam Lithography: Imaging process with electrons; proximity effects, limitations Next Generation Lithography: Comparison of techniques discussed in latest ITRS Roadmap, e.g. nanoimprint, EUV lithography. Device Physics, Technology and Scaling: Basic device physics, like p-n junction, MOS capacitor; scaling of MOS transistors; Link to ITRS roadmap, post-CMOS devices. Nanotechnology: Fundamental principles of nanotechnology, self-organisation, nanowires, nanotubes, outlook to nanodevices **Laboratory course:** ▪ Process sequence pattern transfer (e.g. image reversal resist and lift-off) in clean room (I+II) ▪ Simulation (Device, Technology or Lithography (I+II) ▪ (Electron Beam Lithography)
Learning objectives	In-depth knowledge about latest pattern generation and transfer techniques applied in research and industrial production. Also, overview about current developments and trends in research. Introduction into the emerging “bottom-up” nanotechnology.
Course type (lecture, seminar, exercises, practical course)	3 L – 0 S – 0 E – 2 P
Recommended literature	▪ Bushan; Handbook of Nanotechnology, Springer 2007 ▪ Madou; Fundamentals of Microfabrication; CRC Press 1997 ▪ Mack; Fundamental Principles of Optical Lithography, Wiley 2007 ▪ S.M. Sze; Semiconductor Devices – Physics and Technology, Wiley Interscience 1985 ▪ Zeng Cui; Micro- Nanofabrication, Technologies and Applications, Springer
Learning materials	Lectures slides, laboratory instructions
Method(s) of instruction/ media being used	Lecture and small group laboratory experiments
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	summer term
Which semester during the programme	2
Requirements for attendance	Basic knowledge on microsystems engineering, physics, optics and vacuum technology
Assessment (written/ oral test, paper, etc.)	written examination (90 minutes) Successful participation in laboratory course
ECTS credits	6
Work load in:	▪ 180 h of total work load, therefrom ▪ 75 h of presence at university ▪ 105 h of self-study
Usability of this module	-
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Department	SciTec
Degree programme	SI, WT
Module name	**Thin Films**
Module number	**SciTec.2.113**
Compulsory/ compulsory optional/ optional module	compulsory optional module
Module coordinator	Prof. Dr. Igor Konovalov
Module content	**Lecture** Fabrication of thin films by conversion, special vacuum-based deposition techniques, models of layer formation, substrate preparation, physical properties of thin films, methods of their analysis Fabrication of thin films by conversion: Diffusion, Ion implantation, Oxidation of Silicon Special vacuum-based deposition techniques: thermal evaporation, sputtering, chemical vapour deposition – deep insight aspects Epitaxial techniques: MOCVD, ALD, MBE, ECALE Chemical deposition of thin films: CVD, CBD, electrochemical deposition and electroplating Thin film characterization: optical methods, electrical methods, surface and interface characterization **Laboratory** ▪ Chemical Bath Deposition ▪ Electrochemical deposition of semiconductor films ▪ Anodization of Al ▪ RF Sputtering of ZnO:Al
Learning objectives	Details on the main methods and relations for production of functional films with well-defined properties. Extra focus on the relation to the contemporary subjects in the Industry development and scientific research at universities and institutes.
Course type (lecture, seminar, exercises, practical course)	2 L – 0 S – 0 E – 1 P
Recommended literature	▪ C. Eisenmenger-Sittner, „Technologie Dünner Schichten“ und „Physik Dünner Schichten“, Skript und Vorlesung TU Wien, 2008 ▪ J.E. Mahan, „Physical Vapor Deposition of Thin Films“, 2000, Wiley Interscience, ISBN 0-4781-33001-9 ▪ S. Sivaram „Chemical Vapor Deposition“, 1994, International Thomson Publishing, ISBN 0-442-01079-6 ▪ B. Chapman „Glow Discharge Processes“, 1980, Wiley Interscience, ISBN 0-471-07828-X ▪ Semiconductor Devices, Physics and Technology, 1985, Wiley and Sons, ISBN 0-471-87424-8
Learning materials	script of lecture, instructions for practical course
Method(s) of instruction/ media being used	lecture, practical course in little groups of 2 students
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	summer term
Which semester during the programme	2
Requirements for attendance	Basic knowledge of physics and vacuum technology
Assessment (written/ oral test, paper, etc.)	written examination (90 minutes) course achievement: successful attendance of practical course
ECTS credits	3
Work load in:	▪ 90 h of total work load, therefrom ▪ 45 h of presence at university ▪ 45 h of self-study
Usability of this module	-
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Department	SciTec
Degree programme	LOT, SI, WT
Module name	**Materials for Sensors and Electronics**
Module number	**SciTec.2.029**
Compulsory/ compulsory optional/ optional module	LOT: optional module SI, WT: optional compulsory module
Module coordinator	Prof. Dr. Bernd Ploss, Prof. Dr. Jörg Töpfer
Module content	Dielectrics, pyro-, piezo- und ferroelectrics and applications, inhomogeneous materials and composites, smart materials, charge transport in solid state materials and applications, magnetic properties of dia-, para-, ferro- und ferrimagnetic materials, remanent magnets, soft magnets, magnetic recording media, XMR technologies.
Learning objectives	Communication of concepts, physics and applications of new electronic, dielectric and magnetic materials, introduction into the current research in the area of new materials for electronics and sensors.
Course type (lecture, seminar, exercises, practical course)	4 L – 0 S – 0 E – 1 P
Recommended literature	▪ M.E. Lines, A.M. Glass, Principles and Applications of Ferroelectrics (Oxford University Press, 2001) ▪ N. Spaldin, Magnetic Materials (Cambridge University Press, 2003) ▪ R. O'Handley, Modern Magnetic Materials (J. Wiley, 2000) ▪ actual publications (are provided).
Learning materials	Hand-outs, publications, lab instructions.
Method(s) of instruction/ media being used	Lecture and laboratory.
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	Summer term
Which semester during the programme	2
Requirements for attendance	Solid State Physics
Assessment (written/ oral test, paper, etc.)	written examination (90 minutes) coursework: laboratory.
ECTS credits	6
Work load in:	▪ 180 h of total work load, therefrom ▪ 75 h of presence at university ▪ 105 h of self-study
Usability of this module	-
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Department	SciTec
Degree programme	SI, WT
Module name	**Selected Topics of Sensor Technology**
Module number	**SciTec.2.061**
Compulsory/ compulsory optional/ optional module	compulsory optional module
Module coordinator	Prof. Dr. Bernd Ploss u.a.
Module content	Lecture series by experts from science and industry on sensor technology. Topics include: fibre optical sensors (Prof. Dr. W. Ecke, IPHT Jena), integrated optical sensors (Dr. Ruske, Guided Color Technologies Jena), biosensors (Bio-FET) (Prof. Dr. K.-H. Feller, FH Jena), magneto resistive sensors (Dr. R. Mattheis, IPHT Jena), acceleration sensors and their application in early damage diagnostics (U. Oertel, Bachmann Monitoring GmbH Rudolstadt), et al.
Learning objectives	Communication of the state of the art in selected topics on sensor technology.
Course type (lecture, seminar, exercises, practical course)	2 L – 0 S – 0 E – 0 P
Recommended literature	Books and publications (as specified in the lectures).
Learning materials	Handouts, publications.
Method(s) of instruction/ media being used	Lecture
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	Summer term
Which semester during the programme	2
Requirements for attendance	Solid state physics
Assessment (written/ oral test, paper, etc.)	written examination (90 minutes)
ECTS credits	3
Work load in:	▪ 90 h of total work load, therefrom ▪ 30 h of presence at university ▪ 60 h of self-study
Usability of this module	-
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Department	SciTec
Degree programme	SI
Module name	**Scientific Computing**
Module number	**GW.2.402**
Compulsory/ compulsory optional/ optional module	compulsory optional module
Module coordinator	Prof. Dr. Juliane Schütze, Prof. Dr. Peter Wilde
Module content	▪ Mathematical modelling ▪ Fundamental concepts from functional analysis ▪ Inverse and ill-posed problems ▪ Regularization methods for ill-posed problems ▪ Regularization by discretization ▪ Numerical methods to solve ill-posed problems ▪ Parameter identification. ▪ Applied multivariate data analysis, estimating and testing in linear models, exploring and analysing data using SPSS/ MATLAB
Learning objectives	▪ To impart advanced mathematical concepts and numerical methods necessary for understanding and solving problems in applied sciences and in particular for inverse and ill-posed problems. ▪ Basic concepts in data analysis, descriptive statistics, graphing relationships. ▪ Linear regression models, comparing means, ANOVA. ▪ using data analysis software ▪ Professional competence: 40 %, Competence of methods: 55 %, Soft skills: 5 % (Presentation competence and teamwork through self-organisation of work groups).
Course type (lecture, seminar, exercises, practical course)	4 L – 0 S – 0 E – 3 P
Recommended literature	▪ Field, A.: Discovering Statistics using SPSS, SAGA Publ. 2009. ▪ Gander, W.; Hrebicek, J.: Solving Problems in Scientific Computing Using Maple and Matlab. Springer 1995. ▪ Gomez, C.: Engineering and Scientific Computing with Scilab. Birkhäuser 1999. ▪ Kirsch, A.: An Introduction to the Mathematical Theory of Inverse Problems, Springer 1996. ▪ Quarteroni, A., et al: Scientific Computing with Matlab and Octave, Springer 2010.
Learning materials	Compendium of the lecture.
Method(s) of instruction/ media being used	Interactive lecture, tutorial and laboratory for deepening the material dealt with in the lecture and discussion on tasks and exercises given for individual work.
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	summer term
Which semester during the programme	2
Requirements for attendance	Knowledge of mathematics and informatics at a bachelor-course level.
Assessment (written/ oral test, paper, etc.)	Written test of 120 minutes. course achievement: successful attendance of practical course
ECTS credits	9
Work load in:	▪ 270 h of total work load, therefrom ▪ 105 h of presence at university ▪ 165 h of self-study
Usability of this module	Finite Elements
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Department	SciTec
Degree programme	SI, WT
Module name	**Gas Sensing and Aerosol Measurement**
Module number	**SciTec.2.014**
Compulsory/ compulsory optional/ optional module	compulsory optional module
Module coordinator	Prof. Dr. Andreas Schleicher
Module content	1. Introduction: Conditions, requirements and strategies of gas and particulate measurement in Ambient Air and Emission Monitoring, Occupational Health and Safety Monitoring and Process Measurement 2. Principles and Instrumentation for Gas Sensing ▪ Spectroscopic Methods o Fundamentals of IR and UV/ Vis-Spectroscopy o Absorption Photometry o Fluorescence and Chemoluminescence o Electrochemical Methods o Semiconductor Gas Sensor o Thermal Gas Sensors o Paramagnetic Gas Sensor o Flame Ionisation Detector 3. Principles and Instrumentation for Aerosol Measurement ▪ Fundamental Properties of Aerosols ▪ Measurement of Mass Concentrations ▪ Particle Counting ▪ Particle Size Measurement ▪ Chemical Characterisation of Aerosol Particles ▪ Sampling of Aerosols 4. Temperature, Pressure and Flow measurement 5. Applications ▪ Ambient Air Measurement ▪ Continuous Emission Monitoring ▪ Remote Sensing of Atmospheric Pollutants ▪ Vehicle Emission Measurement
Learning objectives	The student knows and understands the most common methods, the instrumentation and the underlying principles of gas and aerosol measurement used in ambient air, occupational health, safety and emission monitoring and process metrology. He is able to assess the strengths and weaknesses of different methods, to select the best suited instrumentation and to identify options for improvement.
Course type (lecture, seminar, exercises, practical course)	3 L – 0 S – 0 E – 2 P
Recommended literature	▪ Siegrist, M.W.: Air Monitoring by Spectroscopic Techniques; Wiley 1993 ▪ Willeke, K; Baron, A. (Hrsg): Aerosol Measurement; Principles, Techniques and Applications; Van Nostrand Reinhold, 1992 ▪ Friedlander: Smoke, Dust, and Haze; Fundamentals of Aero-sol Dynamics, Oxford Univ. Press, 2000 ▪ Staab, J.: Industrielle Gasanalyse Oldenbourg Verlag 1994 ▪ Douglas O.J. de Sá: Instrumentation Fundamentals for Process Control, Taylor and Francis London 2001 ▪ VDI, DIN-und ISO Normen der unterschiedlichen Messverfahren
Learning materials	Power point presentation and literature references as download
Method(s) of instruction/ media being used	Interactive lecture and practical course at laboratory
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	summer term
Which semester during the programme	2
Requirements for attendance	Basics of Physics and Optics
Assessment (written/ oral test, paper, etc.)	written examination (90 minutes) course achievement: successful attendance of practical course
ECTS credits	6
Work load in:	180 h of total work load, therefrom ▪ 75 h of presence at university ▪ 105 h of self-study

Usability of this module	-
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Department	SciTec
Degree programme	SI, WT
Module name	**Instrumental Chemical Analytics**
Module number	**MT.2.902**
Compulsory/ compulsory optional/ optional module	SI: compulsory optional module WT: compulsory module
Module coordinator	Prof. Dr. Karl-Heinz Feller
Module content	Performance of analytical apparatuses, figure of merit, analysis techniques, chromatography, elements of optical spectroscopy, UV-Vis- and IR molecular spectroscopy, mass spectrometry Lab: UV-Vis absorption spectrometry, fluorescence spectrometry, HPLC, gas chromatography
Learning objectives	Acquisition of basic principles in instrumental analysis and significance of modern approaches in analysis and process measurement technology. The main educational objective is the characterisation and application of these modern approaches to analyse complex media. An advanced educational objective is the evaluation of modern analytical approaches in terms of capabilities and efficiency.
Course type (lecture, seminar, exercises, practical course)	2 L – 0 S – 0 E – 1 P
Recommended literature	▪ Analytikum, Doerffel u. a. Deutscher Verlag für Grundstoffindustrie, Leipzig 1994, ▪ Instrumental Analysis, Skoog, Leary, Wiley, 1996 ▪ Undergraduate Instrumental Analysis, 7th Edition, James W. Robinson, CRC Press, 2014
Learning materials	script, lab instructions
Method(s) of instruction/ media being used	Lecture in combination with practical course (lab classes)
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	Summer term
Which semester during the programme	2
Requirements for attendance	Basic knowledge of physics, chemistry, metrology
Assessment (written/ oral test, paper, etc.)	written examination (90 minutes) course achievement: successful attendance of practical course
ECTS credits	3
Work load in:	▪ 90 h of total work load, therefrom ▪ 45 h of presence at university ▪ 45 h of self-study
Usability of this module	-
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Advanced 3D-Design

Department	SciTec
Degree programme	SI, WT
Module name	**FEM and Simulation**
Module number	**SciTec.2.115**
Compulsory/ compulsory optional/ optional module	compulsory optional module
Module coordinator	Prof. Dr. Frank Dienerowitz
Module content	FEM-analysis for the following structural mechanics problems: ▪ buckling (linear and non-linear) ▪ contact mechanics ▪ modal analysis ▪ harmonic analysis introduction to optimisation: ▪ parameterisation of problems ▪ sensitivity analysis (design of experiments, evaluation of results, deriving meta model) ▪ optimisation (design space, objective function, optimisation methods, robust optimisation)
Learning objectives	The students are able to: ▪ investigate problems of "buckling", "contact mechanics", "modal analysis" and "harmonic analysis" using computer-based tool; knowledgeable about key limitations and challenges for these problems ▪ set-up and evaluate optimisation problems (mathematical model is given, up to around 10 parameters) using computer-based tool, performing sensitivity analysis and optimisation
Course type (lecture, seminar, exercises, practical course)	1 L – 0 S – 0 E – 2 P
Recommended literature	▪ Gebhardt, C., Praxisbuch FEM mit ANSYS Workbench: Einführung in die lineare und nichtlineare Mechanik, Carl Hanser Verlag, 2014 ▪ Lee, H.-H., Finite Element Simulations with ANSYS Workbench 14, SDC Publications, 2012 ▪ Mac Donald, B. J., Practical Stress Analysis with Finite Elements, GLASNEVIN Publishing, 2011
Learning materials	hand-outs supporting lecture and tutorial contents
Method(s) of instruction/ media being used	Lecture and practical course (tutorials)
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	Summer term
Which semester during the programme	2
Requirements for attendance	Introduction into Finite-Elements-Method
Assessment (written/ oral test, paper, etc.)	alternative examination course achievement: successful attendance of practical course
ECTS credits	3
Work load in:	▪ 90 h of total work load, therefrom ▪ 45 h of presence at university ▪ 45 h of self-study
Usability of this module	Advanced 3D-Design
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Department	SciTec
Degree programme	SI, WT
Module name	**Precision Instrumentation**
Module number	**SciTec.2.116**
Compulsory/ compulsory optional/ optional module	compulsory optional module
Module coordinator	Prof. Dr. Martin Schröck
Module content	Introduction, classification with respect to other technological fields, function and structure of instruments, design development process, design principles, i.e.: functional separation, functional integration; accuracy enhancement by error minimisation, innocence principle, invariance principle, error compensation, adjustment; DOF in joints, degree of mobility, over determinacy and its effects; special bearings and guideways for precision instruments, drive units for precision devices, positioning systems, reliability of precision instruments
Learning objectives	Impart knowledge in the fundamental principles for the design of precision instruments, in rules to facilitate the accuracy of precision devices as well as in aspects of the practical application of these rules. Getting acquainted with up-to-date elements and modules of precision instruments. Getting to know possibilities to improve the reliability of precision devices.
Course type (lecture, seminar, exercises, practical course)	2 L – 0 S – 0 E – 0 P
Recommended literature	▪ Blackburn, J. A.: Modern instrumentation for scientists and engineers, New York, Springer, 2001 ▪ Krause, W.: Konstruktionselemente der Feinmechanik, Hanser, 2004 ▪ Krause, W.: Gerätekonstruktion, Verlag Technik Berlin, 1986 ▪ Ringhardt, H.: Feinwerkelemente, Hanser, 1992
Learning materials	Lecture script, additional worksheets
Method(s) of instruction/ media being used	Lecture and applied project work
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	Summer term
Which semester during the programme	2
Requirements for attendance	Basic knowledge in design, engineering mechanics and mechanical components
Assessment (written/ oral test, paper, etc.)	alternative examination: written test (60 minutes)
ECTS credits	3
Work load in:	90 h of total work load, therefrom ▪ 30 h of presence at university ▪ 60 h of self-study
Usability of this module	-
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Department	SciTec
Degree programme	SI
Module name	**German as Foreign Language II**
Module number	**GW.2.111**
Compulsory/ compulsory optional/ optional module	compulsory optional module
Module coordinator	Michael Düring
Module content	Main topics: ▪ Information/ talk about people ▪ Describe daily routines, studies, leisure time activities ▪ Manage daily routines (post office, bank, phone calls, visit the doctor) Statements and discussions on distinctive cultural features of different countries including Germany
Learning objectives	Students learn to understand and use the German language in everyday situations. They obtain the ability to pronounce the German words in the right way, in order to make themselves understood in everyday life. They can use basic grammar structures. They are able to write short texts in German.
Course type (lecture, seminar, exercises, practical course)	0 L – 0 S – 4 E – 0 P
Recommended literature	▪ Hueber - Verlag : Dreyer/Schmidt „Lehr – und Übungsbuch der deutschen Grammatik“ , ISBN 3-19-007255-8 ▪ Fabouda - Verlag: Lodevik „DHS & Studienvorbereitung (Deutsch als Fremdsprache für Studentinnen und Studenten)“ ISBN 3-930861-40-2 ▪ Klett - Verlag: „Pons - Großwörterbuch - Deutsch als Fremdsprache„ ISBN 3-12-517043-5
Learning materials	Langenscheidt - Verlag: „Optimal A1 – Ein Lehrwerk für Deutsch als Fremdsprache“ ISBN – Lehrbuch: 3- 468-47001- 0 ISBN – Arbeitsbuch: 3-468-47005-3
Method(s) of instruction/ media being used	Teacher-centred teaching and group work, work with audio-visual media, work (partially self-studies) in the media-pool (language department)
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	summer term
Which semester during the programme	2
Requirements for attendance	none
Assessment (written/ oral test, paper, etc.)	alternative examination
ECTS credits	3
Work load in:	90 h of total work load, therefrom ▪ 60 h of presence at university ▪ 30 h of self-study
Usability of this module	Everyday life during the stay for studying Scientific Instrumentation.
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	German

Department	SciTec
Degree programme	SI, WT
Module name	**English for Specific Purposes II**
Module number	**GW.2.113**
Compulsory/ compulsory optional/ optional module	compulsory optional module
Module coordinator	Ulrich Schuhknecht
Module content	▪ Meetings and discussions on study and work-related topics, e.g. research projects ▪ 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
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 acquire business-related vocabulary and language skills relevant for engineers. The course is set at level C1 of the Common European Framework.
Course type (lecture, seminar, exercises, practical course)	0 L – 0 S – 3 E – 0 P
Recommended literature	▪ Dunn, M. et al: English for Mechanical Engineering in Higher Education Studies. Garnet Education, 2010 ▪ Comfort, J.: Effective Meetings. OUP, 2005 ▪ Billet, D.: Technical Writing Today. Media Corporation, 2005 ▪ Cotton, D. et al: Market Leader Upper Intermediate. Longman, 2011
Learning materials	Reader
Method(s) of instruction/ media being used	Interactive, audio and video recordings, e-learning platform
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	Summer term
Which semester during the programme	2
Requirements for attendance	Successful completion of the module “Technical English” or equivalent (Level B2 of the Common European Framework)
Assessment (written/ oral test, paper, etc.)	Alternative examination
ECTS credits	3
Work load in:	▪ 90 h of total work load, therefrom ▪ 45 h of presence at university ▪ 45 h of self-study
Usability of this module	All study programmes containing a C1 level ESP module
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English

Department	SciTec
Degree programme	SI
Module name	**Research Internship**
Module number	**SciTec.2.618**
Compulsory/ compulsory optional/ optional module	compulsory module
Module coordinator	The respective academic supervisor and the internal mentor.
Module content	The student shall solve a particular task in a running research or development project in the fields of “Micro- and Nanotechnology”, “Smart Materials and Sensors”, “Scientific Computing”, “Metrology and Analytics” or “Industrial Design”. After a short introduction an overview of the state of the art has to be achieved and the student shall be familiar with the experimental equipment. Using scientific skills, the research problems have to be discussed and provided with possible solutions. The results have to be presented and explained in a scientific way.
Learning objectives	Application of skills and knowledge acquired in the Master programme to the independent processing of a clearly defined scientific problem. Application of scientific skills to the presentation of the results. This presentation shall comply with the requirements of a scientific publication.
Course type (lecture, seminar, exercises, practical course)	18 weeks Students may participate in the lab course “Advanced Laboratory” (2 SWS) and the “Research Seminar” (1 SWS) optionally.
Recommended literature	Topic oriented.
Learning materials	Topic oriented.
Method(s) of instruction/ media being used	Individual research work.
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	Winter term
Which semester during the programme	3
Requirements for attendance	Pass of all respective modules according to the examination order. Scientific principles for the topic from the relevant mesomodules (semester 2).
Assessment (written/ oral test, paper, etc.)	alternative examination
ECTS credits	27
Work load in:	▪ 810 h of total work load, therefrom ▪ 0 h of presence at university ▪ 810 h of self-study
Usability of this module	The acquired ability and knowledge can be used in the Master’s thesis as well as in the professional life.
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena, a research institute or an R+D department in industry.
Time	According to schedule
Language(s)	English/ German

Department	SciTec
Degree programme	LOT, SI, WT
Module name	**Soft Skills**
Module number	**SciTec.2.501**
Compulsory/ compulsory optional/ optional module	Compulsory module
Module coordinator	coordination by a professor of SciTec Department, lecturer with relevant professional experience
Module content	Often block course with seminars or workshops with following topics: ▪ project management ▪ rhetoric ▪ presentation techniques ▪ How to hold a conversation. ▪ How to effect negotiations. ▪ corporate strategic planning simulations
Learning objectives	impart knowledge of relevant professional key skills in the field of: ▪ social competences especially ability to communicate ▪ interdisciplinary method competence
Course type (lecture, seminar, exercises, practical course)	0 L – 2 S – 0 E – 0 P
Recommended literature	Belongs to the topic
Learning materials	Belongs to the topic
Method(s) of instruction/ media being used	Different instruction methods
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	LOT: summer term SI: winter term WT: summer term
Which semester during the programme	LOT: 2 SI: 3 WT: 4
Requirements for attendance	none
Assessment (written/ oral test, paper, etc.)	Alternative examination: paper or presentation (it belongs to the topic)
ECTS credits	3
Work load in:	▪ 90 h of total work load, therefrom ▪ 30 h of presence at university ▪ 60 h of self-study
Usability of this module	The students can use the acquired abilities and knowledge for the master thesis and for their professional career.
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst-Abbe-University of Applied Sciences Jena
Time	According to schedule
Language(s)	German/ English

Department	SciTec
Degree programme	SI
Module name	**Master Thesis**
Module number	**SciTec.2.705**
Compulsory/ compulsory optional/ optional module	compulsory module
Module coordinator	The respective academic supervisor and the internal mentor.
Module content	The student shall process a subject-specific scientific task independently. Appropriate topics are from the fields of “Micro- and Nanotechnology”, “Smart Materials and Sensors”, “Scientific Computing”, “Metrology and Analytics” and “Industrial Design”. The student will be supported by the respective academic supervisor and the internal mentor. The work will include the investigation and presentation of the state of science, compilation of the theoretical principles, problem oriented approaches and suggestions to solve the problem, independent development of alternative solutions, presentation and interpretation of the results of the work as well as their assessment and contextual evaluation. The Master’s Thesis shall comply with the directives according to the following DIN standards: DIN 1301, DIN 1338, DIN 1421, DIN 1422, DIN 1505, DIN 5478.
Learning objectives	Introduction into the work as a scientist or engineer by scientific participation in research institutes or in industry.
Course type (lecture, seminar, exercises, practical course)	18 weeks Students may participate in the lab course “Advanced Laboratory” (2 SWS) and the “Research Seminar” (1 SWS) optionally.
Recommended literature	▪ Kate L. Turabian: A Manual for Writers of Research Papers, University of Chicago Press 2007 ▪ Wayne C. Booth, Gregory G. Colomb, Joseph M. Williams: The Craft of Research, University of Chicago Press 2008 ▪ Margaret Cargill, Patrick O'Connor: Writing Scientific Research Articles, Wiley-Blackwell 2013
Learning materials	Instructions for the Master’s thesis, scientific literature, company notes.
Method(s) of instruction/ media being used	Individual research work on an assigned task with scientific methods.
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	Summer term
Which semester during the programme	4
Requirements for attendance	Pass of all modules of semesters 1 to 3 according to the examination order. Scientific principles for the topic from the Research Internship and the relevant mesomodules (semester 2).
Assessment (written/ oral test, paper, etc.)	Master Thesis (alternative examination)
ECTS credits	27
Work load in:	▪ 810 h of total work load, therefrom ▪ 0 h of presence at university ▪ 810 h of self-study
Usability of this module	The acquired competence and knowledge can be used in the professional career and they are the base for further qualification in research.
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	University of Applied Sciences Jena, a research institute or an R+D department in industry.
Time	According to schedule
Language(s)	English, German

Department	SciTec
Degree programme	SI, WT
Module name	**Colloquium**
Module number	**SciTec.2.801**
Compulsory/ compulsory optional/ optional module	compulsory module
Module coordinator	The respective academic supervisor and the internal mentor.
Module content	In the colloquium the student shall present the results of his or her Master's thesis by giving a lecture and defending it against expert criticism. To prepare the colloquium the student will practise the following topics: ▪ Presentation techniques ▪ Job application training ▪ Rhetoric ▪ Scientific discussion ▪ Design of a lecture ▪ Precise and conceptional presentation of a topic A poster presentation is also required.
Learning objectives	The student shall be able to give a presentation of acquired knowledge and results.
Course type (lecture, seminar, exercises, practical course)	2 weeks
Recommended literature	▪ Michael Alley: The Craft of Scientific Presentations: Critical Steps to Succeed and Critical Errors to Avoid, Springer Science+Business Media 2013 ▪ Rossig, W.E./ Prätsch, J.: Wissenschaftliche Arbeiten; Verlag Weyhe ▪ Krämer. K.L.: Paper, Poster und Projekte, Novartis Pharma GmbH 1998 ▪ Nicol: Wissenschaftliche Arbeiten schreiben mit Word – formvollendete normgerechte Examens-, Diplom- und Doktorarbeiten (für Word 97, 2000, 2002). München: Addison-Wesley, 2002
Learning materials	Topic oriented.
Method(s) of instruction/ media being used	Independent elaboration and presentation of the results of the Master's thesis with scientific methods and scientific discussion.
Level/ category (Ba=1, Ma=2)	2
Which semester (winter/ summer term)	Summer term
Which semester during the programme	4
Requirements for attendance	Pass of all modules.
Assessment (written/ oral test, paper, etc.)	Colloquium: presentation, discussion, poster
ECTS credits	3
Work load in:	▪ 90 h of total work load, therefrom ▪ 0 h of presence at university ▪ 90 h of self-study
Usability of this module	The colloquium will complete the Master's thesis and the course of study.
Frequency of offer	Annually
Duration of module	1 semester
Place/ room	Ernst Abbe University of Applied Sciences Jena
Time	According to schedule
Language(s)	English/ German

Part III: General Information for Students

III.1. Before starting your studies

III.1.1. Entry requirements to Germany

If you are not a European Union citizen, please contact the consular department of the German Embassy in your home country to find out whether you need to apply for a visa in advance. Information is also available on the Internet (www.auswaertiges-amt.de) under "*Reise & Sicherheit*" (journey & safety), subitem: *Auslandsvertretungen* (agency abroad).

Immediately after you have entered the country you must register with the Registration Office (*Einwohnermeldeamt*) and the Aliens Registration Authority (*Ausländerbehörde*) in Jena. German students must register with the Registration Office (*Einwohnermeldeamt*) in Jena if they are moving their main or second domicile to Jena.

	Citizen Service City	**Aliens Registration Authority**
required documents	▪ passport ▪ rental agreement	▪ passport ▪ biometry-suitable passport photograph ▪ rental agreement of residential home ▪ student ID card ▪ certification regarding duration of study ▪ health insurance documents ▪ copy of the registration form from the Registration Office ▪ proof of financing your studies
opening hours	Monday: 9.00 - 19.00 Tuesday: 9.00 - 15.00 Wednesday: 9.00 - 15.00 Thursday: 9.00 - 19.00 Friday: 9.00 - 15.00 Saturday: 9.00 - 12.30	Monday: 9.00 - 12.00 Tuesday: 9.00 - 12.00, 14.00 - 18.00 Wednesday: closed Thursday: 9.00 - 12.00, 14.00 - 16.00 Friday: 9.00 - 12.00 Saturday: closed
postal address	Löbdergraben 12 07743 Jena	Richard-Sorge-Straße 4 07747 Jena (Lobeda-Ost)
telephone	phone +49 (0)3641 49 37 11 or phone +49 (0)3641 49 37 12	phone +49 (0)3641 49 37 60 or phone +49 (0)3641 49 37 61
mail	buergerservice@jena.de	auslaenderbehoerde@jena.de

III.1.2. Arrival

See the back page of this brochure for an approach map of the Ernst-Abbe-University of Applied Sciences Jena and a map of its campus.
To get to the EA-UAS Jena from the city centre, use city buses of lines 10, 11, 12 and 13; get off at the station marked „*Fachhochschule*“. It is preferable to use public transport rather than your own car, as parking space on the EA-UAS premises is scarce. For railway connections to Jena, consult www.bahn.de.

III.2. During your studies

III.2.1. Cost of living in Germany

On average a student will need between 550 EUR and 700 EUR a month, including rent, depending on lifestyle.

At the beginning of your studies you will need to have enough cash with you. You will usually need to pay for the following:

- first rent instalment (from 150 to 300 EUR)
- a deposit for your accommodation (usually one or two months "cold" rent, i.e. without utility charges)
- semester fee
- possibly one month's contribution for your health insurance
- travelling costs
- spending money for the first few days (food, drinks, cinema, etc.)

We recommend that you open a bank account – if you don’t already have one – at a local bank. The *Sparkasse* and other banks offer students a free bank account. You will receive an EC card, which is accepted for payment in many shops and which you use to withdraw money from your bank account at cash machines.

You will need the following documents to open a bank account:

- passport and/ or resident's permit in the case of NON-EU citizens and
- your student ID card if you wish to open a free "young person's account" (up to 25 years of age).

EC cards or credit cards from other cities and countries can generally be used at cash machines. Please note, however, that withdrawing money from anywhere other than your own bank is subject to high bank charges.

Shopping

It is definitely worth shopping around to compare food prices. The cheapest are discounters such as ALDI, LIDL, PLUS, REWE. For more exclusive, and also more expensive, tastes there is "*Tegut*" in the *Goethe-Galerie*, for example. The market on Jena's market square offers fresh produce from the local region several times a week. The two shopping centres "*Goethe-Galerie*" and "*Neue Mitte*" are worth a visit for shopping trips.

III.2.2. Accommodation in Jena

Student halls of residences

There is a new student residence on the campus of the Ernst-Abbe-University of Applied Sciences Jena, but most of the student residences are in Jena-Lobeda, approx. 5 km from the EA-UAS. It takes around 20 minutes to reach them by public transport. Depending on the size and standard of the accommodation, rents are between 95 EUR and 300 EUR. The halls of residence are usually fully furnished and have their own laundry room, telephone in every unit, television room and a covered area for bicycles. Some residences even have their own sports room, Internet connections or student club. With few exceptions, showers, W.C. and kitchen are located within each accommodation unit.

Detailed information on student accommodation (application documents, entitlement, rents, overview of all halls of residence plus maps) must be requested from the Student Accommodation Department of Student Services (*Studentenwerk Thüringen*). This is located at Philosophenweg 22. For information and appointments, phone +49 (0) 3641-93 06 60/ 3 or contact the INFOtake.

Special rules apply to **students from foreign partner universities (exchange students)**. An application for a place in a student residence is submitted by the International Office (*Akademisches Auslandsamt*).

Private accommodation

It is extremely difficult to find a private room, flat or a room in a shared flat in Jena. We recommend that you first arrange a place in a hall of residence before looking for private accommodation locally. The INFOtake's private accommodation service may be able to help.

It is also worth looking at the accommodation offers on notice boards throughout the EA-UAS Jena and Jena's Friedrich Schiller University, on the Internet (www.wg-gesucht.de) or in local newspapers (e.g. TLZ und OTZ). However, the best tips often come from other students, so don't be afraid to ask around.

III.2.3. Student Services

The *Studentenwerk Thüringen* (a student services association) gives economic, cultural and social support to all students of the Thuringian universities. In addition to running the student halls of residence, student restaurants and cafeterias, they also offer a range of advisory and other services. These include general social advisory service, disabled students advisory service, psycho-social advisory service, childcare, insurance advice, allocating hardship loans, legal advice by a lawyer, issuing international student ID cards, promoting cultural activities and organizing a student house (WAGNER at Wagnergasse 26 in Jena) and a sport and study home.

STUDENT SERVICES THURINGIA (*STUDENTENWERK THÜRINGEN*)

INFOtake (drop-in centre for private accommodation)
Ernst-Abbe-Platz 5
Phone +49 (0)3641 93 05 06
Office hours:
Mon, Wed, Do: 9.00 - 16.00
Tue: 9.00 - 17.00, Fri: 9.00 - 14.00
E-Mail: infotake-jena@stw-thueringen.de

Accommodation Department (halls of residence)
Philosophenweg 20
Phone +49 (0)3641 93 06 60
Office hours: by appointment
E-Mail: wj@stw-thueringen.de

Service Office for Financial Support/ BAföG
Am Planetarium 4
Phone +49 (0)3641 93 05 70
Office hours:
Mon-Thu: 9.00 - 16.00
Fri: 9.00 - 14.00

Office for State Educational Grants
Am Planetarium 4
Phone +49 (0)3641 93 05 60
Office hours:
Tue: 13.00 - 16.30
Thu: 9.00 - 12.30

Psychosocial Counselling
Carl-Zeiss-Promenade 6, *Mensa*, basement floor
Phone +49 (0)3641 93 06 67
Office hours:
Thu: 12.30 - 14.00
E-Mail: psb-jena@stw-thueringen.de

Legal Counselling for Students
Wagnergasse 26, 1st floor
Phone +49 (0)3641 82 08 77 (in urgent cases)
Office hours: only in lecture period
Thu: 17.00 - 19.00

Internet: www.studentenwerk-thueringen.de

Note:
The Student Services Thuringia offers a service package for foreign students. Among other things the package encompassed: a furnished single room or flat in a student hall of residence with internet and a bed-package (pillow, blanket, bed-linen), tokens with a total value of 280 Euro for the lunch in a student restaurant, support and consulting at the place of study, semester contribution including a ticket for local public transport in Jena and a rail ticket. Application deadlines are 31 July for the winter semester and 31 January for the summer semester. Please address all enquiries directly to the Student Services Office.

Meals

There are three student restaurants (*Mensa*) in Jena:
- *Mensa* Philosophenweg
- *Mensa* Ernst-Abbe-Place
- *Mensa* Ernst-Abbe-University of Applied Sciences Jena (run jointly with Carl Zeiss Jena GmbH)

Those student restaurants offer a choice of two or more main dishes and at least one vegetarian dish. In addition to the student restaurants, the 5 cafeterias offer a variety of hot and cold food, drinks and cakes.

- cafeteria Ernst-Abbe-University of Applied Sciences Jena
- cafeteria Friedrich-Schiller-University - main building
- cafeteria Carl-Zeiss-Str. 3
- cafeteria library (ThULB)
- Pasta Basta

Jena also has many pubs, cafés and restaurants. Here is just a small selection:

Alt Jena - Markt 9
Excellent for good and reasonably priced pizza. Also offers local cooking at affordable prices.

Café Immergrün - Fürstengraben
An alternative café. Good assortment of teas, newspapers and board games, terrace

Café Stilbruch – Wagnergasse 2
One of the most popular cafés in Jena, and therefore always crowded. Cosy atmosphere on three levels.

Haus zur Rosen - Johannisstraße 13
Discounts are available on various meals with presentation of student ID card.

Irish Pub - Bachstrasse
Typical pub atmosphere, good Whiskey, solid food and live folk music.

Rosenkeller - Johannisstraße 13
A popular meeting place for students, particularly on Tuesdays and Saturdays.

Zum Roten Hirsch - Holzmarkt 10
Traditional and comfortable, well situated beer garden in summer. Local cuisine.

Zur Noll – Oberlauengasse 19
Comfortable bar/ restaurant for more sophisticated tastes, with piano. Large, roofed-over beer garden.

The area around Jena also has a variety of pubs and restaurants which can be reached on foot, e.g. *Fuchsturm*, *Jenzighaus* and *Lobdeburg*.

III.2.4. Medical services

The addresses of doctors can be found in the Jena Yellow Pages (*Gelbe Seiten*) (online under www.gelbeseiten.de or in print). Medical emergencies will also be handled by Jena's university hospital complex.

III.2.5. Insurances

Health insurance

Students must have health insurance for the duration of their stay at the EA-UAS Jena. The monthly contribution is currently around 60.00 EUR.

The following applies to all foreign students: please check in your home country whether your local health insurance is valid in Germany or can be extended to cover your stay in Germany. Students from European Union member states must obtain an E 109/ E 111/E 128 form, with notes, from their local health insurance provider. It is also possible to take out health insurance in Germany, which is often the easier option.

We recommend the following health insurance companies (*Krankenkassen*), e.g.:

AOK Plus	**BARMER Ersatzkasse**	**DAK**	**Techniker Krankenkasse**
Ludwig-Weimar-Gasse 4 07743 Jena Tel. +49 (0)3641 58 50	Goethestraße 3b 07743 Jena Tel. +49 (0)3641 596 1270	Löbderstr. 7 07743 Jena Tel.: +49 (0)3641 53 17 60	Steinweg 24 07743 Jena Tel. +49 (0)3641 62 32 20

It is advisable to find a general practitioner (*Hausarzt*) whom you can consult for all illnesses. The GP will then refer you to a specialist if necessary.

Statutory accident insurance

Students are covered by statutory accident insurance with the *Unfallkasse Thüringen*. The insurance covers all activities in connection (time, local or cause) with studying, such as participation in courses (including breaks), using the library, excursions, student self-administration, all journeys to and from the university and to the student's own bank. It is important that all accidents are reported to Student Services Thuringia (*Studentenwerk Thüringen*).

Accident insurance during leisure time

Student Services Thuringia (*Studentenwerk Thüringen*) has a group accident insurance for all accidents occurring outside of study times. However, this only insures students in cases which are not covered by other insurers. The insurance covers accidents anywhere in the world and includes invalidity payments, the costs of recovery and cosmetic operations.

Household insurance

Student Services Thuringia (*Studentenwerk Thüringen*) does not provide general household insurance cover. All students should therefore check whether their parents have household insurance that also covers accommodation in a student hall of residence.

Personal liability insurance

Personal liability insurance must be contracted privately.

III.2.6. Financial support for students

German universities generally do not award grants themselves. However, there are various partisan, non-partisan and church foundations to which students can apply for support. For more detailed information please visit www.stiftungsindex.de

It is also advisable to apply for **BAföG**. The Student Services Thuringia is responsible for processing applications for state higher education grants (**BAföG**). The grants department of the Student Services Thuringia usually recommends that students make an application for a state grant to clarify whether they are eligible or not. To save time, students should complete the relevant form carefully and take it along to their first appointment. The forms are available for collection from the outer office of the grants department and the INFOtake at Ernst-Abbe-Place. Alternatively, students can collect a form from the registrar's office at the EA-UAS Jena (Room 01.00.01) or download it from the Student Services Thuringia website (www.stw-thueringen.de).

For **foreign students** in Germany and German students who are interested in studying abroad, the following counts: the ***Deutsche Akademische Austauschdienst*** **(DAAD)** offers the most comprehensive financial assistance programme. This institution awards scholarships to students and graduates for different periods of time; it does not finance a full course of study either in Germany or abroad. Specialist qualification, personal aptitude and reports by the university lecturers are the most important selection criteria for DAAD scholarships. Information should be obtained as early as possible, as the application process can take a very long time. For further

information abroad please contact the German Embassy in your country and in Germany contact the DAAD direct or the international offices of the universities.

III.2.7. Leisure and sporting activities

The Ernst-Abbe-University of Applied Sciences Jena, the Friedrich Schiller University of Jena and the city of Jena offer students a great number of attractive and low-priced cultural, recreation, sports and further training facilities.

Various jollifications and activities run by the EA-UAS Jena are mentioned in Chapter I.2.2 Studying at the Ernst-Abbe-University of Applied Sciences Jena.

In addition, the EA-UAS Jena offers its students “food for the mind” in extra-curricular events such as excursions, public lectures, workshops, conferences, company contact meetings, etc. The following activities are specially worth mentioning:

- Special excursions by the EA-UAS departments (including visits to companies and trade fairs);
- Public lectures at the EA-UAS Jena, organised every semester by various UAS departments);
- Public lectures at the Friedrich Schiller University (UAS students are welcome);
- Diverse thematic workshops;
- symposia or conferences;
- Annual „Company Contact Meeting", where students can get into contact with companies operating on a regional or national level and apply for diploma theses, practical placements and jobs
- Annual „Day of Research“, on which EA-UAS students, doctoral students and lecturers report about their research work in scientific papers, a poster exhibition and short films.

Other cultural facilities offered by the University of Applied Sciences Jena:

Irrespective of the UAS Jena's emphasis on engineering, social and economic sciences, art is not neglected. Building 5 of the UAS regularly sees photography and art exhibitions, including vernissage. Under the title of „*BEGEGNUNGEN Kultur-Technik-Wirtschaft*“ (Meetings: Culture-Technology-Business), the EA-UAS and Jenoptik AG jointly hold workshops on a variety of themes (e.g., quality management). For information on these workshops, see our website or ask Mrs Sigrid Neef, Public Relations Officer of the EA-UAS Jena, phone +49 (0)3641 205-130.

Last but not least, the Friedrich Schiller University Jena offers in collaboration with the EA-UAS Jena a varied programme of movies every semester. Run by students for students, the programme is entitled „*Hörsaalkino*“ (lecture hall cinema), as the movies are shown in lecture halls of both institutions (Internet: www.hoersaalkino.de).

Academic sport

Collaborating with the EA-UAS, Jena's Friedrich Schiller University publishes an academic sports brochure twice every year (Internet: www.usvjena.de), which lists a broad selection of individual and team sports (from A for Alpine Leisure Skiing to Y for Yoga) accessible to the students and staff of both institutions.

Leisure facilities of the city of Jena

- Jena boasts several internationally renowned museums and other facilities (among others, the Phyletic Museum (illustrating the evolution of species), the Optical Museum, the Romantic poets' house, Schiller's house, the Schott Glass Museum, the Zeiss Planetarium and a Botanical Garden);
- Jena has one commercial cinema (*CineStar*) and a special programme cinema (*Schillerhof*);
- Jena has a lot of cosy pubs, elegant cafés and restaurants;
- Jena has a noted theatre and a philharmonic of nationwide fame, and stages several annual top-flight festivals such as the *Kulturarena* (Arena of Culture) and the Thuringian Jazz Mile. Well-known festivals out of town but within easy reach are the Dance and Folk Festival in Rudolstadt and the *Kunstfest* (Festival of Arts) in Weimar;
- Jena is situated in a charming landscape with many hiking trails. You can go canoeing on the Saale or follow the river along the Saale cycling trail;
- Jena lies close to a lot of interesting places: Weimar (Europe‘s Culture Capital of 1999), Erfurt, Halle, Naumburg and Leipzig can be reached by car or railway within a short time;
- Jena and other places in the vicinity have many attractive shopping centres (e.g., the *Goethe Galerie* and *Neue Mitte* shopping malls or a chinaware factory outlet in Kahla);
- East Thuringia has quite a few thermal baths and water parks (e.g., the „*GalaxSea*“ in Jena and the „*Toskana-Therme*“ in Bad Sulza);
- Jena is situated in an old area of agriculture, forestry and viniculture. A day trip to the vineyards of the Saale-Unstrut region is a worthwhile undertaking, not least because the local winegrowers sell pretty good stuff on the premises.

For leisure and sports facilities and events offered by the city (cinemas, swimming pools, parks, concerts, dancing lessons, etc.), inquire at Jena's Tourist Information office (Johannisstrasse 23), or consult the internet at www.jena.de.

III.2.8. Language courses

The Language Learning Centre at the EA-UAS (department of Fundamental Science) offers English, French, Russian and Spanish as foreign language courses. Foreign students can also take courses in German as a foreign language. The language teachers give more information.

Further information:
http://www.gw.fh-jena.de → *Fachgruppen* → *Sprachen*

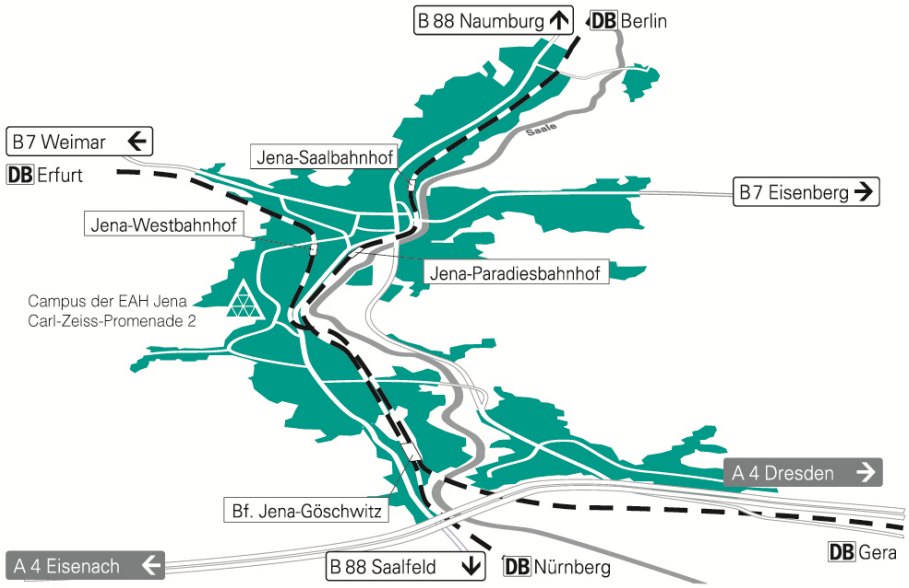
For foreign students: Mr. Düring, teacher at the Language Learning Centre, is responsible for courses in German as a foreign language (phone +49 (0) 36 41 – 205 510 or +49 (0) 36 41 – 205 511.

Memo

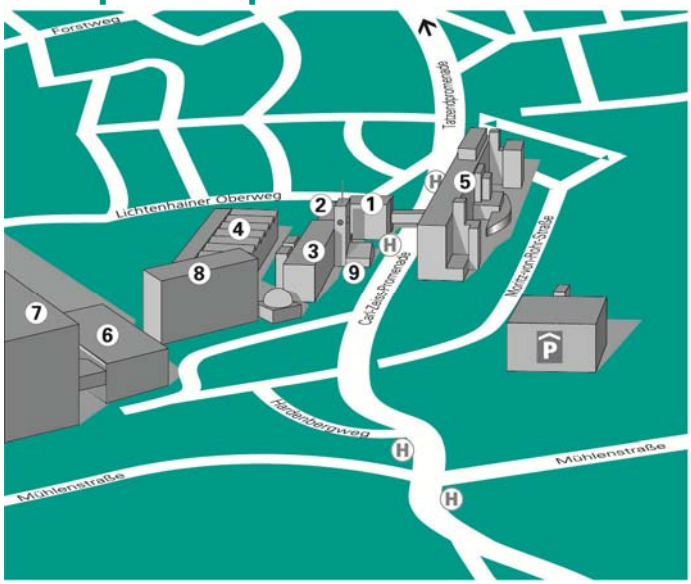
Ernst-Abbe-Hochschule Jena
University of Applied Sciences

Carl-Zeiss-Promenade 2, 07745 Jena, Germany
Postal address: post office box 10 03 14, 07703 Jena, Germany
E-Mail: info@fh-jena.de
Tel.: +49(0)3641-205-0

Driving map



Campus map



Legende:

1 Haus 1
2 Haus 2
3 Haus 3
4 Haus 4
5 Haus 5
6 Mensa
7 Carl Zeiss Jena GmbH
8 Studentenwohnheim
9 Hochschulsportzentrum
P Parkhaus

Imprint:
Publisher: Rector of Ernst-Abbe-University of Applied Sciences Jena
Editorial staff: Guddei, von Nordheim (Hartmann, Geller-Urban)
Editorial deadline: 07/ 2015

All status and function designations used in this ECTS information brochure refer to both genders. The information contained in this brochure was compiled on basis of the previous "Guidelines for foreign students and prospective students" and on basis of the current "Study guide of UAS Jena“. All information might be subject to additional modification. This brochure confers no legally binding requirements.