Department
Engineering and Management

Module Guide

Study Programme

Industrial Engineering and Management - International (B.Sc.)

valid from winter semester 2018/19

in accordance with the study and examination regulations for the Bachelor's programme "Industrial Engineering and Management - International" in force since 1st August 2018

Module specification Mathematics

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B. Sc.) Industrial Engineering and Management - International (B. Sc.)
Module name	Mathematics
Module code	WI-B.101
Module type	Core module
Module coordinator	Dipl.-Math. Stephan Peter (Department of Fundamental Sciences)
Learning objectives	Acquisition and consolidation of basic mathematical knowledge and methods which are necessary for the study and later profession and which enable the application of mathematical knowledge in the economic and engineering disciplines.
Content	• Mathematical Basics • Functions of one Variable • Differential calculus for functions of one variable
Teaching formats **L**ecture, **T**utorial, **S**eminar, **Lab** Work **(SWS)**	3 SWS **L**, 2 SWS **T**
Literature references	/1/ Papula, L.: Mathematik für Ingenieure, Band 1, 2, Aufgabensammlung, Formelsammlung, 10. Auflage, Braunschweig 2001 /2/ Schwarze, J.: Mathematik für Wirtschaftswissenschaftler; Elementare Grundlagen für Studienanfänger, Band 1 und 2, 7. Auflage, Herne 2003
Learning formats	Script, Blackboard
Learning materials	Materials online
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	1st
Prerequisites	
Prerequisites for awarding credit points	Exam 120 minutes
Module usage	Industrial Engineering and Management (B. Sc.) Industrial Engineering and Management - International (B. Sc.)
ECTS credits	6
Workload	Hours in class: 5 SWS => 75 h Self-study: 105 h

Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Statics and Strength Theory

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module name	Statics and Strength Theory
Module code	WI-B.102
Module type	Core module
Module coordinator	Prof. Dr.-Ing. habil. Peter Pawliska
Learning objectives	The students should determine the load-bearing capacity of new and existing constructions in practice under static load. They are able to determine the support and intermediate reactions of structures. In addition, they can determine the endangered cross-sections and provide the strength verification there. They can assess and evaluate the failure modes cracking, buckling, fracture by bending.
Content	• Statics • Strength Theory
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	2 SWS **L**, 3 SWS **T**
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	1st
Prerequisites	-
Prerequisites for awarding credit points	Tests
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
ECTS credits	6
Workload	Hours in class: 5 SWS => 75 h Self-study: 105 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Submodule specification Statics

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module name	Statics
Module code	WI-B.102.1
Module category	Statics and Strength Theory
Module type	Core module
Submodule manager	Prof. Dr.-Ing. habil. Peter Pawliska
Learning objectives	The students should determine the load-bearing capacity of new and existing constructions in practice under static load. They are able to determine the support and intermediate reactions of structures. In addition, they can determine the endangered cross-sections with the help of the internal force method.
Content	Statics, forces, moments, internal forces
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	2 SWS **L**, 3 SWS **T (1st half of semester)**
Literature references	/1/ Gross, Hauger, Schnell: Technische Mechanik, Bd. 1 (Statik) und 2, (Festigkeitslehre), Springer-Verlag, Berlin /2/ Gloistehn: Lehr- und Übungsbuch der Technischen Mechanik, Band 1 (Stereostatik) und Band 2 (Festigkeitslehre), Vieweg Verlag, Braunschweig /3/ Holzmann, Meyer, Schumpich: Technische Mechanik, Teil 1 (Statik) und Teil 3, (Festigkeitslehre), Teubner-Verlag, Stuttgart
Learning materials	Script, formula collection, textbooks, blackboard, overhead transparencies
Learning formats	Seminar
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	1st
Prerequisites	Mathematical knowledge according to qualifying school-leaving certificate
Prerequisites for awarding credit points	see main module
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)

ECTS credits	3
Workload	Hours in class: 5 SWS => 45 h (1st semester half) Self-study: 45 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Submodule specification of Strength Theory

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module name	Strength Theory
Module code	WI-B.102.2
Module category	Statics and Strength Theory
Module type	Core module
Submodule manager	Prof. Dr.-Ing. habil. Peter Pawliska
Learning objectives	The students should determine the load-bearing capacity of new and existing constructions in practice under static load. With the knowledge from the structural analysis module, they are able to make statements about the load-bearing behaviour of structures by means of the support and intermediate reactions. You can select materials and define cross-section dimensions.
Content	Strength theory; forces, moments, internal forces, stresses, strains, load-bearing behaviour, bending, buckling
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	2 SWS **L**, 3 SWS **T (2nd half of semester)**
Literature references	/1/ Gross, Hauger, Schnell: Technische Mechanik, Bd. 1 (Statik) und 2, (Festigkeitslehre), Springer-Verlag, Berlin /2/ Gloistehn: Lehr- und Übungsbuch der Technischen Mechanik, Band 1 (Stereostatik) und Band 2 (Festigkeitslehre), Vieweg Verlag, Braunschweig /3/ Holzmann, Meyer, Schumpich: Technische Mechanik, Teil 1 (Statik) und Teil 3, (Festigkeitslehre), Teubner-Verlag, Stuttgart
Learning materials	Script, formula collection, textbooks, blackboard, overhead transparencies

Learning formats	Seminar
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	1st
Prerequisites	Mathematical knowledge according to the qualifying school-leaving certificate as well as partial module statics
Prerequisites for awarding credit points	see main module
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
ECTS credits	3
Workload	Hours in class: 5 SWS => 45 h (2. Semester half) Self-study: 45 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Construction and Manufacturing

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.)
	Industrial Engineering and Management - International (B.Sc.)
Module name	Construction and Manufacturing
Module number	WI-B.105
Module type	Core module
Module coordinator	Prof. Dr.-Ing. habil. Frank Engelmann
Learning objectives	Students are proficient in the basics of technical representation. They are able to generate a technical drawing, in accordance with standards, since this is an engineer's language and can be understood worldwide.
	Students can represent individual components and assemblies and produce a full set of drawings from a technical system in accordance with the valid standards and with all necessary information (surface specification, tolerance specification, fit, etc.).
	The student acquires the following skills after attending courses and completing internships in the area of manufacturing technology. The student:
	• understands the procedure sequence of the respective manufacturing procedure
	• and understands the connections between individual process parameters and the final result
	• knows the specific advantages and disadvantages of the respective procedures.
	• can technically/economically assess and select a manufacturing procedure in relation to a specific application
	• can analyse the manufacturability of a product with the required manufacturing procedure
Content	• Construction and Materials
	• Manufacturing Engineering I
	• Manufacturing Engineering II
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	1st Semester 4 SWS **S**
	2nd Semester 2 SWS **S**, 1 SWS **Lab**
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	1st and 2nd
Prerequisites for awarding credit points	The three partial modules must be passed

Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
ECTS credits	9
Module duration	2 semesters
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Submodule specification Construction and Materials

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module name	Construction and Materials
Module code	WI-B.105.1
Module category	Construction and Manufacturing
Module type	Core module
Submodule manager	Prof. Dr.-Ing. habil. Frank Engelmann
Learning objectives	Students are proficient in the basics of technical representation. They are able to generate a technical drawing, in accordance with standards, since this is an engineer's language and can be understood worldwide. Students can represent individual components and assemblies and produce a full set of drawings from a technical system in accordance with the valid standards and with all necessary information (surface specification, tolerance specification, fit, etc.). The knowledge imparted in the area of materials technology permits students, in conjunction with the "Static and Strength of Materials" module and the "Manufacturing Technology" partial module, to select appropriate materials for specific applications, or assess these, in terms of stress and manufacturing requirements. Students also acquire the necessary skills to check and asses the most technologically important material properties.

Content	• Technical representation tasks
	• Basics for (detailed) technical representation
	• Organisational basics (means of representation) such as lines, scales, page formats, etc.
	• Projection-appropriate representation
	• Standardised machine drawing (technical drawing)
	• Recording scale
	• Design deviations (fit, form and position tolerance, etc.)
	• Material specifications
	• Heat treatment information
	• Product division and drawing sets
	• Simplified, symbolic and emblematic drawing
	• Representation of technical functions
	• Overview of various types of materials
	• Material structure
	• Mechanical properties
	• Metal materials
	• Iron materials
	• Non-ferrous metals
	• Ceramic materials
	• Plastic materials
	• Test procedures
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	2 SWS **S** (Construction) 2 SWS **S** to SW 7 (Materials)
Literature references	/1/ Arnold, B.: Werkstofftechnik für Wirtschaftsingenieure, Berlin: Springer Vieweg Verlag, 2. Auflage, 2017 (ISBN 9783662545478) /2/ Böttcher, P.; Forberg, R.: Technisches Zeichnen, Stuttgart: Vieweg &Teubner Verlag; 25. Auflage, 2011. (ISBN 9783834809735) /3/ Hintzen, H.; Laufenberg, H.; Kurz, U.: Konstruieren, Gestalten, Entwerfen, Ein Lehr- und Arbeitsbuch für das Studium der Konstruktionstechnik Wiesbaden: Vieweg & Teubner, 4. überarb. Auflage, 2009. (ISBN 3834802190) /4/ Hoischen, H.: Technisches Zeichnen, Grundlagen, Normen, Beispiele, Darstellende Geometrie. Düsseldorf: Cornelsen Verlag, 35. überarb. und erw. Auflage, 2016. (ISBN 9783061510404) /5/ Seidel, W.: Werkstofftechnik. Werkstoffe - Eigenschaften - Prüfung – Anwendung, München: Carl Hanser Verlag, 7. Auflage, 2006. (ISBN 9783446407893) /6/ Steinhilper, W.; Sauer, B.: Maschinen- und Konstruktionselemente, Band II, Verbindungselemente.

	Berlin: Springer-Verlag, 7. Auflage , 2012. (ISBN 9783642243028)
	/7/ Valid standards and guidelines for technical drawing and technical product documentation
Learning materials	Teaching materials (scripts), models
Learning formats	e.g. disassembly and assembly of technical structures (drives, motor)
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	1st
Prerequisites	-
Prerequisites for awarding credit points	Written exam 120 minutes
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
ECTS credits	4.5
Workload	Hours in class: 3 SWS => 45 h Self-study: 90 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Submodule specification Manufacturing Engineering I

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module name	Manufacturing Engineering I
Module code	WI-B.105.2
Module category	Construction and Manufacturing
Module type	Core module
Submodule manager	Prof. Dr.-Ing. Tobias Pfeifroth
Learning objectives	Students acquire the following skills after attending the courses. The student: • understands the process flow of the respective manufacturing processes

	• and understands the relationships between individual process parameters and the final result. • knows the specific advantages and disadvantages of the respective processes • can technically / economically evaluate and select the manufacturing processes for a specific application • can analyse the manufacturability of a product with the necessary manufacturing processes
Content	Overview of the industrial production technology and deepening of the process principles as well as the technical / economic application characteristics of the most common processes of metalworking. The following manufacturing processes are described in detail: 1) Primary shaping processes such as casting and sintering 2) Forming processes such as bulk and sheet forming Further manufacturing processes are dealt with in detail in the submodule "Manufacturing engineering II".
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	1th semester: 2 SWS **S**, (from SW8)
Literature references	/1/ Behmel/Berger u.a.: Industrielle Fertigung, Europa-Lehrmittel Verlag, 7. Auflage, 2016. (ISBN 9783808553596) /2/ Fritz/Schulze: Fertigungstechnik, Berlin: Springer-Verlag, 10. Auflage, 2012. (ISBN 9783642297854) /3/ Koether/Sauer: Fertigungstechnik für Wirtschaftsingenieure, München: Carl Hanser Verlag, 5. Auflage, 2017. (ISBN 9783446448315) /4/ König/Klocke: Fertigungsverfahren, Bd. 1-5, Springer-Verlag 2005-2017. (ISBN 9783540-358343 u.a.)
Learning materials	Presentation, script, demonstrators
Learning formats	Seminar
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	1th semester (from SW 8)
Prerequisites	
Prerequisites for awarding credit points	Tests
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
ECTS credits	1,5
Workload	Hours in class: 1 SWS => 15 h Self-study: 30 h

Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Submodule specification Manufacturing Engineering II

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module name	Manufacturing Engineering II
Module code	WI-B.105.3
Module category	Construction and Manufacturing
Module type	Core module
Submodule manager	Prof. Dr.-Ing. Tobias Pfeifroth
Learning objectives	Students acquire the following skills after attending courses and internships. The student: • understands the process flow of the respective manufacturing processes • and understands the relationships between individual process parameters and the final result. • knows the specific advantages and disadvantages of the respective processes • can technically / economically evaluate and select the manufacturing processes for a specific application • can analyse the manufacturability of a product with the necessary manufacturing processes
Content	Overview of the industrial production technology and deepening of the process principles as well as the technical / economic application characteristics of the most common processes of metalworking. The following manufacturing processes are described in detail: 2) Machining processes such as cutting, laser and water jet processing Further manufacturing processes, in particular the joining and assembly processes, are dealt with in depth in the "Manufacturing" module.
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	2nd semester: 2 SWS **S**, 1 SWS **Lab**
Literature references	/1/ Behmel/Berger u.a.: Industrielle Fertigung, Europa-Lehrmittel Verlag, 7. Auflage, 2016. (ISBN 9783808553596)

	/2/ Fritz/Schulze: Fertigungstechnik, Berlin: Springer-Verlag, 10. Auflage, 2012. (ISBN 9783642297854)
	/3/ Koether/Sauer: Fertigungstechnik für Wirtschaftsingenieure, München: Carl Hanser Verlag, 5. Auflage, 2017. (ISBN 9783446448315)
	/4/ König/Klocke: Fertigungsverfahren, Bd. 1-5, Springer-Verlag 2005-2017. (ISBN 9783540-358343 u.a.)
Learning materials	Presentation, script, demonstrators
Learning formats	Seminar, practical course
Programme level	Bachelor
Start of programme (WS/SS)	WS und SS
Study semester	2nd semester
Prerequisites	
Prerequisites for awarding credit points	Test and successful participation in practical courses
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
ECTS credits	3
Workload	Hours in class: 3 SWS => 45 h Self-study: 45 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Basics of industrial technology

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module name	Basics of industrial technology
Module code	WI-B.107
Module type	Core module
Module coordinator	Prof. Dr.-Ing. Frank-Joachim Möller
Learning objectives	**Introduction to automation technology:** • The students know the technical possibilities and limits of automation technology. • The students can analyse facts from the field of automation and evaluate them with regard to technically and economically sensible aspects. **Introduction to the process industry:** • The students know the process industry and can present and describe important techniques. **Working and learning techniques:** • The students can solve complex problems using the PBL method. • The students can work in groups and demonstrate their social skills. • The students are able to scientifically research/write and evaluate/structure the results. • The students arouse enthusiasm with the short presentation of a factual situation • The students are able to organize their own work processes under time-economic aspects.
Content	• Working and learning techniques • Introduction to industrial production
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	2 SWS **L**, 1 SWS **S**, 1, 3 SWS **PBL** (Problem-based Learning)
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	1st
Prerequisites	see submodules
Prerequisites for awarding credit points	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
ECTS credits	6

Workload	Hours in class: 4 SWS => 60 h Self-study: 120 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Submodule specification Working and learning techniques

Not available in English

Submodule specification Introduction to industrial production

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
Module name	Introduction to industrial production
Module code	WI-B.107.2
Module category	Basics of industrial technology
Module type	Core module
Submodule manager	Prof. Dr.-Ing. Tobias Pfeifroth
Learning objectives	The students understand the interrelationships of industrial production. **Introduction to automation technology:** • The students know the technical possibilities and limits of automation technology. • The students can analyse facts from the field of automation and evaluate them with regard to technically and economically sensible aspects. **Introduction to process industry:** • The students know areas of the process industry and can present and describe important techniques.
Content	**Introduction to automation technology** • Goals, limits, concepts of automation • Components of an automation system • Logistics systems • Manufacturing systems (NC machines) • Assembly systems - Packaging systems

	Introduction to process industry
	• Mineral oil and plastics industry, food, paper, glass, iron and steel production;
	• Energy sector
	• Environmental processes
Teaching formats **L**ecture**,** **T**utorial**,** **S**eminar**,** **Lab** Work **(SWS)**	2 SWS **L,** 1 SWS **S**
Literature references	/1/ Heimbold, T.: Einführung in die Automatisierungstechnik, München: Carl Hanser Verlag, 2012 /2/ Baur, J., Kaufmann, H. u.a.: Automatisierungstechnik, Europa-Lehrmittel Verlag, 11. Auflage, 2015
Learning materials	Presentation
Learning formats	
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	1st
Prerequisites	
Prerequisites for awarding credit points	Test 60 minutes
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
ECTS credits	3
Workload	Hours in class: 3 SWS => 45 h Self-study: 45 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification General Introduction into Economics

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module name	General Introduction into Economics
Module code	WI-B.108
Module type	Core module
Module coordinator	Prof. Dr. rer. pol. Wolfgang Eibner
Learning objectives	Ability to understand complex economic relationships in their mutual national and international dependencies. On the basis of an overview on economic theory and business administration the students should be able to understand macroeconomic dependencies and business management framework condition. The students' social competence is strengthened in critical discussions on current economic policy issues of daily economic matters. Students in the Economics section will: • learn how our economic system micro- and macro-economically is organized and networked; • be able to understand the business section of daily or weekly newspapers and to give well-founded opinions on current business-related issues; • recognize, which economic policy measures, programmes, and problem-solving concepts propagated by politicians, the media, employers, and employees is based on economic expertise and logical thinking; • understand the significance and manifold effects of changes in economic, monetary, financial policy, and law for the economic framework; • know how these changes in framework conditions – whether caused exogenous or by government action – can be taken into account in individual company decisions or even anticipated in business management. In the part General Business Administration the students will be able to • gain a basic understanding of the function of companies and, building on this, of the challenges and factors of success in operational management; • be able to conceptually grasp fundamental business interrelationships and understand the essence of operational problems; • recognize, which constitutive operational decision facts exist

	from the foundation of an enterprise and under application of which procedures and criteria decisions can be met; as well as • discuss ethical aspects of business critically.
Content	**Part General Economics:** **A) Fundamentals of Micoeconomics:** • Fundamentals of demand theory; • Fundamentals of business theory; • Fundamentals of market forms and price theory. **B) Fundamentals of Macroeconomics:** • Subject of economics; • National income and balance of payments: definitions and interpretation, qualitative vs. quantitative growth; determinants of exchange rate formation and its analysis; • Economic system, order and constitution; • Causes of World Economic Crises –like Great Depression 1929, US Financial Crisis 2008/9, Euro Crisis 2010/??; • Classic and Neoclassic economic theory, Keynesianism, Monetarism, Liberalism, Ordoliberalism, Economy of the German Social Market Theory; • Ethical aspects of economic activity: market ethics; • Money supply and demand; gold standard, balance of payments mechanisms, European Central Bank, monetary policy instruments, European Economic and Currency UNion: problems and opportunities; • Current issues of economic development. **Part: General Business Administration:** • Fundamentals of economics and economic sciences, enterprises as a focal point of the economic cycle; • Typologisation of enterprises; • Functions and processes in companies (corporate objectives, operational value chain, management functions and systems); • Measures of economic activity, production and cost functions; • Constitutive corporate decisions (legal form, organisational forms, choice of location); • Operational planning and control (basics of income statement, basic accounting concepts); • Ethical aspects of business: business ethics.
Teaching formats **L**ecture**,** **T**utorial**,** **S**eminar**,** **Lab** Work **(SWS)**	4 SWS **L**, 1 SWS **T**
Literature references	1/ Baumol, W. J./ Blinder, A. St.: Economics, Principles and Policy, 8. Auflage, New York u. a. 2000 2/ Gräfin Dönhoff, M.: Zivilisiert den Kapitalismus – Grenzen der Freiheit, Stuttgart 1997

	3/ Eibner, W.:Skript VWL, 6. Auflage, Jena 2018 oder neuer
	4/ Hoyer, W./ Eibner, W.: Grundlagen der mikroökono-mischen Theorie, 4. Auflage, München 2011
	5/ Issing, O. (Hrsg.): Geschichte der Nationalökonomie, Vahlen Verlag, München 1984
	6/ Pepels, W. (Hrsg.): ABWL – Eine praxisorientierte Einführung in die moderne Betriebswirtschaftslehre, 4. Aufl., Köln 2010
	7/ Samuelson, P. A./ Nordhaus, W. D.: Volkswirtschaftslehre, 6. Auflage, Stuttgart 2016
	8/ Steinmann, H./ Schreyögg, G.: Management, 7. Auflage, Wiesbaden 2013.
	9/ Stützel, W. (Hrsg.): Grundtexte zur Sozialen Marktwirtschaft, Stuttgart u. a. 1981
	10/ Thommen, J.P./ Achleitner, A.K.: Allgemeine Betriebswirtschaftslehre: Umfassende Einführung aus managementorientierter Sicht, 8. Aufl., Wiesbaden 2016.
	11/ Tilly, R. (Hrsg.): Geschichte der Wirtschaftspolitik. Vom Merkantilismus zur Sozialen Marktwirtschaft, München 1993
	12/ Wöhe, G./ Döring, U.: Einführung in die allgemeine Betriebswirtschaftslehre, 25. Aufl., München 2013
	13/ Wöhe, G./ Kaiser, H./ Döring, U.: Übungsbuch zur Einführung in die Allgemeine Betriebswirtschaftslehre, 15. Aufl., München 2016
Learning materials	Blackboard work, overhead transparencies, instructional videos, power-point presentations, whiteboard, case studies and exercises
Learning formats	Lectures, seminars, presentations, videos, self-study, exercises. In general, the entirety of multimedia knowledge transfer is offered.
Programme level	Bachelor
Start of programme (WS/SS)	Each semester
Study semester	1st
Prerequisites	None
Prerequisites for awarding credit points	Exam 120 minutes
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)

ECTS credits	6
Workload	Hours in class: 5 SWS => 75 h, Self-study: 75 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Mathematics and Operations Research

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
Module name	Mathematics and Operations Research
Module code	WI-B.201
Module type	Core module
Module coordinator	Prof. Dr. Doris Planer (Department of Fundamental Sciences)
Learning objectives	Learn the basic mathematical methods needed to understand and solve problems in engineering and economics. Modelling of decision problems of economic practice, Practising basic concepts and algorithms, starting from the geometric view, Evaluating model assumptions and solutions for their practical significance
Content	Mathematics • Integral calculus • Ordinary differential equations • Linear Algebra • Functions with two or more independent variables Operations research • Basic problems of linear programming • Modelling of application examples • Graphical solution • Simplex algorithm • Sensitivity analysis • Duality • Transport optimization
Teaching formats **L**ecture**,** **T**utorial**,** **S**eminar**,** **Lab** Work **(SWS)**	3 SWS **S**, 3 SWS **T**
Literature references	/1/ Papula, L.: Mathematik für Ingenieure, Band 1-3, Aufgabensammlung, Formelsammlung, Braunschweig 2014 /2/ Schwarze, J.: Mathematik für Wirtschaftswissenschaftler, Band 2 und 3, 13. Auflage, Herne 2011

	/3/ Schwarze, J.: Mathematik für Wirtschaftswissenschaftler – Aufgabensammlung, 7. Auflage, Herne 2015
	/4/ Bartsch, H.-J.: Taschenbuch Mathematischer Formeln, 23. Auflage, Leipzig 2014
	/5/ Stingl, P.: Operations Research – Linearoptimierung, München 2002
	/6/ Stöcker, H. (Hrsg.): Lineare Algebra, Optimierung (Band 3), Frankfurt 1999
Learning materials	Task collection (with results), script
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	2nd
Prerequisites	Mathematics 1 (WI-B.101)
Prerequisites for awarding credit points	Exam 120 minutes
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
ECTS credits	6
Workload	Hours in class: 6 SWS => 90h Self-study: 90 h
Module duration	1 Semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Dynamics

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module name	Dynamics
Module code	WI-B.202
Module type	Core module
Module coordinator	Prof. Dr.-Ing. habil. Peter Pawliska
Learning objectives	After completing the module, the students are able to record the dynamic behavior of components. As a result, they can determine kinematic parameters such as location, speed and acceleration as well as the forces and moments acting at a given state of motion. This enables the design of moving components such as shafts or entire constructions such as automatic production machines. In addition, students can analyze the impact problems that occur in practice, such as those to be solved in a vehicle crash. Furthermore, optimizations of dynamically stressed systems such as elevators can be carried out with regard to their cycle times, taking into account the load-bearing behavior of the components used.
Content	• Questions of Dynamics • Movement of mass points, mass point systems • and rigid bodies • NEWTON's Basic Laws in Different Coordinate Systems • Moment rate • Principle of angular momentum • Law of energy • Principle of work • Shock laws • Introduction to vibration theory
Teaching formats **L**ecture, **T**utorial, **S**eminar, **Lab** Work **(SWS)**	2 SWS **L**, 1 SWS **T**
Literature references	/1/ H. A. RICHARD, M. SANDER: Technische Mechanik Dynamik, Viewegs Fachbücher der Technik, Wiesbaden /2/ D. GROSS, W. HAUGER, W. SCHNELL: Technische Mechanik, Bd. 3, Springer-Verlag, Berlin /3/ GLOISTEHN: Lehr- und Übungsbuch der Technischen Mechanik, Band 3 , Vieweg Verlag, Braunschweig /4/ HOLZMANN, MEYER, SCHUMPICH: Technische Mechanik, Teil 2 (Dynamik), Teubner-Verlag, Stuttgart

Learning materials	Table and overhead transparencies. Script and task sheets as PDF files are available to students on the Industrial Engineering intranet.
Learning formats	
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	2nd
Prerequisites	Module statics and strength theory
Prerequisites for awarding credit points	Tests (can be changed according to examination regulations)
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
ECTS credits	3
Workload	Hours in class: 3 SWS => 45 h Self-study: 45 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Electrical engineering

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
Module name	Electrical engineering
Module code	WI-B.204
Module type	Core module
Module coordinator	Dipl. Ing. Oliver Reimer (FB ET/IT)
Learning objectives	After attending the course, the students are able to ... • ... to apply the basic equations of electrical engineering. • ... to calculate currents and voltages at linear and non-linear one ports. • ... to calculate linear networks with network analysis methods (Equivalent circuits, superposition). • ... describe electric and magnetic fields. • ... to evaluate characteristic values in alternating current circuits. • ... to solve electrotechnical problems in advanced courses.
Content	1. Basic terms: charge, current, voltage, resistors, energy and power. 2. Direct current circuits: Ohm's law, Kirchhoff's voltage and current law, Series and parallel circuits, current and voltage measurement, linear and nonlinear one-ports, superposition theorem, star-delta transformation, analysis of linear networks, equivalent circuits. 3. Electric and magnetic fields: capacitor and coil as well as transformer and electric motor. 4. Alternating current circuits: time-dependent currents and voltages, sinusoidal steady-state analysis of linear RLC circuits.
Teaching formats **L**ecture**,** **T**utorial**,** **S**eminar**,** **Lab** Work **(SWS)**	2 SWS **L**, 2 SWS **T**
Literature references	/1/ Ose, Rainer: Elektrotechnik für Ingenieure, Carl Hanser Verlag, 5. Auflage, 2013 /2/ Zastrow, Dieter: Elektrotechnik – Ein Grundlagenlehrbuch, Springer Vieweg, 19. Auflage, 2014

	/3/ Weißgerber, Wilfried: Elektrotechnik für Ingenieure 1 + 2, Springer Vieweg, 10. Auflage, 2015
	/4/ Linder; Brauer; Lehmann: Taschenbuch der Elektrotechnik und Elektronik, Carl Hanser Verlag, 9. Auflage, 2008
Learning materials	Lecture notes, exercises, homework, Moodle
Learning formats	Lecture: interactive lecture; Exercise: solution of tasks, discussion of results in consideration of the application, homework via the learning platform Moodle, consultations for exam preparation
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	2nd
Prerequisites	Basic mathematics and physics courses of A-levels
Prerequisites for awarding credit points	Exam 90 min.
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
ECTS credits	6
Workload	Hours in class: 4 SWS => 60 h Self-study: 120 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Business and Technical English

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module name	Business and Technical English
Module code	WI-B.205
Module type	Core module
Module coordinator	Dr. Berndt (Department of Fundamental Sciences)
Learning objectives	Students are enabled to use the English language productively and receptively in a variety of relevant professional and study-related situations. They acquire an insight into basic business and technical vocabulary. And apply it in oral and written form in solving various tasks. The level corresponds to level B2-C1 of the Common European Framework of Reference for Languages.
Content	**Studies (Campus):** Campus, EAH, Facilities, Student Life **Business English:** Company structure/ legal status/ departments **Business English (business letters/ emails)** Examples/ typical phrases **Language of maths and measurement:** Units of measurement; measurements and measuring instruments, equations, geometrical shapes, Describing graphs and trends **Devices/ Tools/ Engineering devices/ instruments/** Functionality, Application
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	2 SWS **T**
Literature references	/1/ Ibbotson, Cambridge English for Engineering, Cambridge, 2008 /2/ Büchel/Carey/Schäfer, Technical Milestones, Stuttgart, 2007 /3/ Glendinning, Oxford English for Electrical and Mechanical Engineering, Oxford /4/ Rembold/Nnaji/Storr, Computer Integrated Manufacturing /5/ Business English, Oxford University Press /6/ Technical English 3 und 4, Pearson-Longman 2010 /7/ Fachartikel aus Fachzeitschriften, Internetforen
Learning materials	Handouts, video sequences, listening exercises
Learning formats	Individual and group work, multimedia E-learning (Moodle)

Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	2nd
Prerequisites	at least B1.2/ B2 (CEF)
Prerequisites for awarding credit points	Records of performance accompanying the lecture (can be changed according to the examination regulations)
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
ECTS credits	3
Workload	Hours in class: 2 SWS => 30 h Self-study: 60 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	English

Module specification Production/ Investment and Marketing

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
Module name	Production, Investment, Marketing
Module code	WI-B.206
Module type	Core module
Module coordinator	Prof. Dr. rer. oec. Kathrin Reger-Wagner
Learning objectives	Students should be able to learn about and apply instruments of operational analysis based on market conditions and the processes in the goods and finance industries in the company. The interdisciplinary knowledge of the marketing, materials management and production areas enables the students to make decisions for manufacturing and the design of marketing. On the basis of key business figures, they can assess which investment decisions are most advantageous from the company's point of view.
Content	• Production and Investment • Marketing
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	4 SWS **L**, 1 SWS **T**, 1 SWS **Lab**
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	2nd
Prerequisites	Introduction to business administration (1st semester)
Prerequisites for awarding credit points	See submodules
ECTS credits	6
Workload	Hours in class: 6SWS => 90 h Self-study: 90 h

Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Submodule specification Production and Investment

Not available in English

Submodule specification Marketing

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
Module name	Marketing
Module code	WI-B.206.2
Module category	Production, Investment, Marketing
Module type	Core module
Submodule manager	Prof. Dr. rer. oec. Kathrin Reger-Wagner
Learning objectives	This course helps students understand marketing, the process through which organizations analyse, plan, implement, and control programs to develop and maintain beneficial exchanges with customers. This course will provide students with a systematic and objective approach to the search for and analysis of information relevant to the identification and solution of marketing problems. Students gain an understanding of how target buyers make decisions and which strategic and operational marketing measures are suitable for maintaining competitive advantage.
Content	1. Role and importance of marketing 2. Understanding buyer behaviour 3. Tools for analysing target buyers and markets 4. Methods of market research

	5. Marketing objectives
	6. Marketing strategy using segmentation and brand positioning
	7. Marketing-Mix-Instruments: price, promotion, product, place
	8. Basis of marketing controlling
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	2 SWS **L**, 1 SWS **T**
Literature references	/1/ Meffert, H./ Burmann, Ch./ Kirchgeorg, M.: Marketing. Grundlagen marktorientierter Unternehmensführung, neuestes Aufl., Wiesbaden. /2/ Backhaus, K./ Voeth, M: Industriegütermarketing, neuestes Aufl., München. /3/ Kroeber-Riel, W./ Gröppel-Klein, A.: Konsumentenverhalten, neueste Aufl., München. As well as current articles from professional journals
Learning materials	case studies, videos
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	2nd
Prerequisites	
Prerequisites for awarding credit points	90 min exam (additional points for exam for active participation in exercises, if necessary)
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
ECTS credits	3
Workload	Hours in class: 3 SWS => 45 h Self-study: 45 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German or English

Module specification Accounting

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
Module name	Accounting
Module code	WI-B.207
Module type	Core module
Module coordinator	Prof. Dr. rer. soc. oec. Hubert Ostermaier
Learning objectives	The students understand the importance of accounting as a fundamental instrument of decision-making. The students are familiar with essential methods and instruments in the field of accounting and balancing as well as cost accounting.
Content	• Accounting and Balancing • Cost Performance Accounting
Teaching formats **L**ecture**,** **T**utorial**,** **S**eminar**, Lab** Work **(SWS)**	2 SWS **L**, 1 SWS **T**, 2 SWS **S**, 1 SWS **Lab**
Programme level	Bachelor
Start of programme (WS/SS))	WS and SS
Study semester	2nd and 3rd
Prerequisites	
Prerequisites for awarding credit points	See submodules
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
ECTS credits	6
Workload	Hours in class: 6 SWS => 90 h Self-study: 90 h
Module duration	2 semesters
Location	EAH Jena
Course time	According to timetable

Language(s) of instruction	German/English

Submodule specification Accounting and Balancing

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
Module name	Accounting and Balancing
Module code	WI-B.207.1
Module category	Accounting
Module type	Core module
Submodule manager	Prof. Dr. rer. soc. oec. Hubert Ostermaier
Learning objectives	Students know and can manage particular Accounting tasks linked to the preparation of Financial Statements. They know how to keep bookkeeping records and to prepare financial statements. They have the knowledge to gather information in a professional Accounting environment required for these tasks. Students have basic knowledges of IFRS financial statements.
Content	1. Basic knowledge in Bookkeeping 2. Good Knowledge in preparing financial statements according to German HGB 3. Basic knowledge of International Accounting Standards
Teaching formats **L**ecture**,** **T**utorial**,** **S**eminar**,** **Lab** Work **(SWS)**	2 SWS **L,** 1 SWS **T**
Literature references	/1/ Weber, Jürgen.; Weißenberger, Barbara.: Einführung in das Rechnngswesen: Bilanzierung und Kostenrechnung, 9. Auflage, Stuttgart 2015. /2/ Coenenberg, Adolf G.; Haller Axel; Schultze, Wolfgang: Jahresabschluss und Jahresabschlussanalyse, 24. Auflage, Stuttgart 2016.
Learning materials	Script, technical literature, case studies
Learning formats	

Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	2nd
Prerequisites	
Prerequisites for awarding credit points	(AP) Performance record accompanying the lecture
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
ECTS credits	3
Workload	Hours in class: 3 SWS => 45 h Self-study: 45 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German/English

Submodule specification Cost Performance Accounting

Not available in English

Module specification Physics

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module name	Physics
Module code	WI-B.301
Module type	Core module
Module coordinator	Prof. Dr. Stefan Sienz
Learning objectives	After taking part in the module lessons, the students have extended their basic knowledge of physics to further areas of physics. They can apply physical methods to new areas. With the completion of the basic physics lab sessions the students are able to plan and conduct physical measurements and to evaluate and assess the results.
Content	**Thermodynamics:** Temperature, heat energy, heat capacity, phase transformations, heat transfer, ideal gases, laws of thermodynamics, thermodynamic processes **Fluid mechanics:** Properties of fluids, fluid statics, flow equations **Optics**: Geometric optics, wave optics, lasers **Lab sessions:** Selected experiments out of the subareas of Physics mentioned above
Teaching formats **L**ecture**,** **T**utorial**,** **S**eminar**,** **Lab** Work **(SWS)**	2 SWS **L**, 1 SWS **T**, 1 SWS **Lab**
Learning formats	Exercises, e-learning, practical instructions
Literature references	1. D. C. Giancoli: Physik Lehr- und Übungsbuch, Pearson 2010 2. D. Halliday, R. Resnick, J. Walker, Physik, Bachelor Edition, Wiley-VCH, Weinheim 2007 3. P. A. Tipler, G. Mosca, Physik für Wissenschaftler und Ingenieure, Elsevier 2004
Programme level	Bachelor
Start of programme (WS/SS)	WS
Study semester	3rd
Prerequisites	Mathematics

Prerequisites for awarding credit points	Successful participation in seminars and, if applicable, e-learning, Exam 120 minutes
ECTS credits	6
Workload	Hours in class: 4 SWS => 60 h Self-study: 120 h
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Business Informatics

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
Module name	Business informatics
Module code	WI-B.302
Module type	Core module
Module coordinator	Prof. Dr. Andrej Werner
Learning objectives	The students • know basic concepts from computer science and know how to use them to solve problems in their field. • understand the working method of a computer program. • analyse technical problems, design solution algorithms and implement these algorithms. • know objectives, developments and methods in business informatics, can identify opportunities and risks of the use of current ICT in companies and in an information society, classify them and transfer them to economic fields of application. • understand the central role of ICT in the support and optimisation of internal and external processes as well as the computerisation of the (everyday) world and apply selected methods in practical training.
Content	• Computer Science Basics • Business Information Systems
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	4 SWS **L**, 2 SWS **Lab**
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	1st or 3rd
Prerequisites	
Prerequisites for awarding credit points	Tests (can be changed according to examination regulations)
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
ECTS credits	6

Workload	Hours in class: 6 SWS => 90 h Self-study: 90 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Submodule specification Computer Science Basics

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
Module name	Computer Science Basics
Module code	WI-B.302.1
Module category	Business informatics
Module type	Core module
Submodule manager	Prof. Dr. Christian Erfurth
Learning objectives	The students are able to use computer science to solve the problems of their subject area. • Students will understand how a computer program works. • They analyse technical problems, design solution algorithms and implement these algorithms. • The students know the process of software development within a software project.
Content	Introduction to the basics of computer science and to procedural programming using the programming language C as an example. • Basics in algorithms and programming (basic concepts, control structures, algorithms, program design techniques, programming languages) Structuring of programs (extended data types, functions, parameter transfer) • Design and operation of a computer (switching elements, introduction to switching algebra and statement logic, Von-Neumann architecture) • Information, data and coding (basic coding, number systems, number representation, coding of texts and other information) • Basics of operating systems

Teaching formats **L**ecture**, T**utorial**, S**eminar**, **Lab** Work **(SWS)**	2 SWS **L**, 1 SWS **Lab**
Literature references	/1/ Gumm; Sommer (2016): Grundlagen der Informatik, Band 1: Programmierung, Algorithmen und Datenstrukturen. De Gruyter Studium. /2/ Gumm; Sommer (2017): Grundlagen der Informatik, Band 2: Rechnerarchitektur, Betriebssysteme, Rechnernetze. De Gruyter Studium. /3/ Herold; Lurz; Wohlrab; Hopf (2017): Grundlagen der Informatik. Pearson. /4/ Die Programmiersprache C, RRZN Hannover. HERDT-Verlag. /5/ Wikibook C-Programmierung, https://de.wikibooks.org/wiki/C-Programmierung /6/ Veranstaltungsbegleitende Literaturempfehlungen
Learning materials	PowerPoint, Whiteboard, Videos, Development Environment, Internship Tasks
Learning formats	
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	1st or 3rd
Prerequisites	
Prerequisites for awarding credit points	see main module
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
ECTS credits	3
Workload	Hours in class: 3 SWS => 45 h Self-study: 45 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Submodule specification Business Information Systems

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
Module name	Business Information Systems
Module code	WI-B.302.2
Module category	Business informatics
Module type	Core module
Submodule manager	Prof. Dr. Andrej Werner
Learning objectives	The students • know objectives, developments and methods in business informatics, can identify, classify and transfer opportunities and risks of the use of current ICT in companies and in an information society to economic fields of application. • apply concepts from business informatics to solve the problems of their field, assess the opportunities and risks of using ICT in companies and make efficient deployment decisions. • understand the central role of information systems in supporting and optimising internal and external processes and apply data, information or process management methods in case studies. • understand the developments towards the computerisation of the (everyday) world (Internet of Things) and can apply these in simple prototypes.
Content	I. Networked business world and information processing • Introduction and Methods of Business Informatics • information society • Information systems and IT-supported value creation • Information, data and process management • Internal and external information processing TWO. Information and communication infrastructures • Communication Systems and Internet • Hardware and software platforms and IT trends • Internet of Things
Teaching formats **L**ecture**,** **T**utorial**,** **S**eminar**,** **Lab** Work **(SWS)**	2 SWS **L**, 1 SWS **Lab**

Literature references	/1/ Laudon; Laudon; Schoder (2015): Wirtschaftsinformatik. Pearson.
	/2/ Schwarzer; Kracmar (2014): Wirtschaftsinformatik. Schäfer
	/3/ Helmut Krcmar (2009): Informationsmanagement.
	/4/ http://www.enzyklopaedie-der-wirtschaftsinformatik.de
	/5/ Veranstaltungsbegleitende Literaturempfehlungen
Learning materials	PowerPoint, whiteboard, videos, case studies, technical articles, practical tasks, application systems, IoT kits
Learning formats	
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	1st or 3rd
Prerequisites	
Prerequisites for awarding credit points	see main module
Module usage	Industrial Engineering and Management (B.Sc.)
	Industrial Engineering and Management - International (B.Sc.)
	Industrial Engineering and Management - Digital Economy (B.Sc.)
	E-Commerce (B.Sc.)
ECTS credits	3
Workload	Hours in class: 3 SWS => 45 h
	Self-study: 45 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Statistics

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
Module name	Statistics
Module code	WI-B.303
Module type	Core module
Module coordinator	Prof. Dr. Doris Planer (Department of Fundamental Sciences)
Learning objectives	Preparation, presentation and characterization of empirical data material, recognition of correlations; checking for dependencies, Describing random phenomena with models of probability theory
Content	Descriptive statistics: statistical measures, regression, time series, basic concepts of probability, selected types of probability distributions, applications of normal distribution
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	2 SWS **L**, 1 SWS **Lab**
Literature references	/1/ Beichelt, F.: Stochastik für Ingenieure, 1. Auflage, Stuttgart 1995 /2/ Bleymüller, J./Weißbach, R.: Statistik für Wirtschaftswissenschaftler, 17. Auflage, München 2015 /3/ Schwarze, J.: Grundlagen der Statistik, Band 1, 12. Auflage, Herne 2014 /4/ Schwarze, J.: Grundlagen der Statistik, Band 2, 10. Auflage, Herne 2013 /5/ Schwarze, J.: Aufgabensammlung zur Statistik, 7. Auflage, Herne 2013 /6/ Voß, W. (Hrsg.): Taschenbuch der Statistik, 2. Auflage, München 2004
Learning materials	Script, task collection (with results)
Learning formats	
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	3rd

Prerequisites	Mathematics, especially integral calculus (WI-B.201)
Prerequisites for awarding credit points	Exam 90 minutes
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
ECTS credits	3
Workload	Hours in class: 3 SWS => 45 h Self-study: 45 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Business Law

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
Module name	Business law
Module code	WI-B.304
Module type	Core module
Module coordinator	
Learning objectives	• Students are able to find legal information, understand legal texts, argue legally and make legally valid decisions. • Students are familiar with legal standard instruments used in procurement and sales as well as able to apply them. • Students understand how commercial and technical risks are dealt with through contracts. • Students are able to determine whether a contract has come into effect and is still existing. • Students understand the methodology of handling legal cases and can apply it to a simple set of facts.
Content	• The legal system and its operation • Conclusion and invalidity of the contract • Contract drafting and contract content • Contract fulfilment, in particular transfer of ownership • Default • Tort and product liability • Contract management
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	5 SWS **S**
Literature references	/1/ Eichhorn et. al., Internetrecht im E-Commerce, 2016 /2/ Flitsch, M., Verträge und Vertragsmanagement im Unternehmen, 2010 /3/ Frenz/Müggenborg, Recht für Ingenieure, 2. Aufl. 2016 /4/ Führich, E., Wirtschaftsprivatrecht, 13. Aufl. 2017 /5/ Steckler, B., Kompendium Wirtschaftsrecht, 8. Aufl., 2016
Learning materials	Script, case studies, judgments
Learning formats	Seminar, case-oriented learning
Programme level	Bachelor

Start of programme (WS/SS)	WS and SS
Study semester	3rd
Prerequisites	
Prerequisites for awarding credit points	Exam 120 minutes
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
ECTS credits	6
Workload	Hours in class: 5 SWS = 75 h Self-study: 105 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Project and Human Resource Management

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy
Module name	Project and Human Resource Management
Module code	WI-B.305
Module type	Core module
Module coordinator	Prof. Dr. rer. soc. oec. Hubert Ostermaier
Learning objectives	1. The students know the interrelationships of project management as well as the contents of the four project phases: Project definition, planning, implementation and completion. They know the essential methods and can thus lead practical projects. 2. The students understand the behavior of individuals and groups in organizations and can apply essential methods of motivation and leadership.
Content	• Project management basics • Human Resource Management
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	2 SWS **L**, 1 SWS **S**, 2 SWS **T**, 1 SWS **Lab**
Programme level	Bachelor
Study semester	3rd or 4th
Start of programme (WS/SS)	WS and SS
Prerequisites	
Prerequisites for awarding credit points	See submodules
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
ECTS credits	6
Workload	Hours in class: 6 SWS => 90 h Self-study: 90 h
Module duration	1 semester
Location	EAH Jena

Course time	According to timetable

Submodule specification Project management basics

Not available in English

Submodule specification Human Resource Management

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy
Module name	Human Resource Management
Module code	WI-B.305.2
Module category	Project and Human Resource Management
Module type	Core module
Submodule manager	Prof. Dr. rer. soc. oec. Hubert Ostermaier
Learning objectives	The students know the organizational psychological basics to analyse the behavior of individuals and groups and to shape it within the framework of organization and personnel deployment. Students understand the effects of leadership styles and reflect their own behavior in leadership models. The students master the basic rules of communication. They can apply these in case-study-like leadership situations to improve their understanding of the behavior of individuals as well as to understand group-dynamic processes. They have competences in mindful leadership.
Content	1. Main features of personnel management 2. Motivation theories 3. Leadership and communication 4. Team developement
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	1 SWS **S**, 2 SWS **T**

Literature references	/1/ Amberg, Martina: Führungskompetenz Achtsamkeit, Wiesbaden 2016.
	/2/ Berthel, Jürgen; Becker, Fred. G.: Personalmanagement, 11. Auflage, Stuttgart 2017.
	/3/ Rosenstiel von, Lutz.: Grundlagen der Organisationspsychologie, 9. Auflage, Stuttgart 2015.
	/4/ Scholz, Christian: Personalmanagement, 6. Auflage, München 2013.
Learning materials	Script, technical literature, case studies
Learning formats	Seminar, group work, presentations
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	3rd or 4th
Prerequisites	
Prerequisites for awarding credit points	Test and/or presentation
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
ECTS credits	3
Workload	Hours in class: 3 SWS => 45 h Self-study: 45 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Production Engineering

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Specialization Production Industrial Engineering and Management - International (B.Sc.)
Module name	Production Engineering
Module code	WI-B.401
Module type	Core module
Module coordinator	Prof. Dr.-Ing. Tobias Pfeifroth
Learning objectives	The students • understand the basics of assembly systems • and can evaluate both manual and automatic assembly systems technically / economically • can design and construct complete assembly systems from planning to commissioning as part of a team. • know the most common joining processes and can analyse their field of application technically / economically. • understand the basics of plastics technology • and can evaluate the production processes for plastics and fibre-reinforced plastics • understand the additive manufacturing processes with their fields of application and limits
Content	• Basics of assembly technology • Design of manual and automatic assembly systems • Processes of industrial joining technology • Fundamentals of plastics technology with the most common processes for the production of plastics and fibre-reinforced plastics • Principles of additive manufacturing
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	4 SWS **S**, 2 SWS **Lab**
Literature references	/1/ Lotter, B.; Wiendahl, H.-P.: Montage in der industriellen Produktion – Ein Handbuch für die Praxis, Berlin 2006 /2/ Bullinger, H.-J.(Hrsg.): Systematische Montageplanung - Handbuch für die Praxis, 1. Auflage, München/Wien 1986 /3/ Reisgen, U.; Stein, L.: Grundlagen der Fügetechnik, DVS-Fachbücher, Band 161, 2015 /4/ Bonnet, M.: Kunststofftechnik, Wiesbaden: Springer Vieweg Verlag, 2. Auflage 2014

	/5/ AVK: Handbuch Faserverbundkunststoffe/Composites, Wiesbaden: Springer Vieweg Verlag, 4. Auflage 2013
	/6/ Gebhardt, A.: Generative Fertigungsverfahren, München: Carl Hanser Verlag, 4. Auflage 2013
Learning materials	Presentation, script, demonstrators
Learning formats	Seminar, practical course
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	4th
Prerequisites	
Prerequisites for awarding credit points	Exam 120 min.
Module usage	Industrial Engineering and Management (B.Sc.) Specialization Production Industrial Engineering and Management - International (B.Sc.)
ECTS credits	6
Workload	Hours in class: 6 SWS => 90 h, Self-study: 90 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German or English

Module specification Construction Technology and Machine Elements

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Specialization Production Industrial Engineering and Management - International (B.Sc.)
Module name	Construction Technology and Machine Elements
Module code	WI-B.403
Module type	Core module
Module coordinator	Prof. Dr.-Ing. habil. Frak Engelmann
Learning objectives	Students understand and are proficient in basic technical matters concerning significant machine elements, and have consolidated knowledge of construction and product development. The module enables students to develop and draft technical solutions and structures and present the result. Through this, students acquire the skills to be able to correctly assess or make professional decisions in the area of construction and product development, while considering technical and economical aspects, in their future careers.
Content	**Construction and development:** • Representation of the technical design and development process • Design approach, in particular with the following work steps: • Clarifying and specifying tasks • Conceptualisation, including methods for finding solutions and assessment procedures • Drafting • Basic rules for technical design • Design principles (for example appropriate design in relation to original prototypes and joining) **Typical machine elements** in devices, systems and machines in industry/production • Dimensioning basics/Calculation basics • Connecting elements, particularly screws • Hub-shaft connections (friction or form fit connections) • Axles and shafts • Plain and roller bearings • Seals • Couplings and drives

Teaching formats Lecture, Tutorial, Seminar, Lab Work (SWS)	4 SWS L, 2 SWS T
Literature references	/1/ Pahl, G.; Beitz, W.; Feldhusen, J.; Grote, K.H. (Herausg.): Pahl/Beitz, Konstruktionslehre, Grundlagen erfolgreicher Produktentwicklung, Methoden und Anwendungen, Berlin: Springer-Verlag, 8. Auflage, 2013 (ISBN 9783642295683) /2/ Ehrlenspiel, K.; Kiewert, A.; Lindemann, U.: Kostengünstig Entwickeln und Konstruieren. Berlin: Springer- Verlag, 7. Auflage, 2013 (ISBN 9783642419584) /3/ Roth, K.: Konstruieren mit Konstruktionskatalogen, Band 2: Kataloge. Berlin: Springer-Verlag, 3. Auflage, 2012 (ISBN 9783642621000) /4/ Warnecke, H. J.; Bullinger, H.-J.; Hichert, R.; Voegele, A.: Kostenrechnung für Ingenieure München: Springer Vieweg Verlag, 5. Auflage, 1996 (ISBN 3446186956) /5/ Steinhilper, W.; Sauer, B.: Konstruktionselemente des Maschinenbaus, Band 1. Berlin: Springer-Verlag, 8 Auflage, 2012. (ISBN 9783642243004) /6/ Decker, K.-H.; Kabus, K.: Maschinenelemente. München: Hanser-Verlag, 17. neubearb. u. erw. Auflage, 2009. (ISBN: 3446417591) /7/ Walter, W.: Festigkeitsberechnungen im Apparate- und Rohrleitungsbau. Vogel Verlag, 8. Auflage, 2012. (ISBN 9783834332721) /8/ Valid standards and guidelines
Learning materials	
Learning formats	
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	4th
Prerequisites	
Prerequisites for awarding credit points	120 min written exam + homework + lecture
Module usage	Industrial Engineering and Management (B.Sc.) Specialization Production Industrial Engineering and Management - International (B.Sc.)
ECTS credits	6
Module duration	1 semester
Workload	Hours in class: 6 SWS => 90 h Self-study: 45 h; exam preparation 45 h
Location	EAH Jena

Course time	According to timetable
Language(s) of instruction	German

Module specification Labour Law

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Specialization Production Industrial Engineering and Management - International (B.Sc.)
Module name	Labour law
Module code	WI-B.404
Module type	Core module
Module coordinator	
Learning objectives	• The students are aware of the impact of the law on personnel-related issues. • Students are able to assess issues of workforce deployment from a legal point of view and to develop solutions for such issues in a rational and systematic manner. • Students know and understand their rights and duties as employees and can exercise them properly. • Students are able to manage employees in conformity with the law. • The students know how to organise and manage the company or a structural unit in compliance with the requirements of labour law.
Content	• Introduction to labour law • Sources of labour law • Contractual duties and obligations • Right of direction and transfer • Default • Contract termination
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	3 SWS **S**
Literature references	/1/ Fitting/Kaiser/Heiter/Engels/Schmidt, Betriebsverfassungsrecht /2/ Hanau/Adomeit, Arbeitsrecht /3/ Junker, Abbo, Grundkurs Arbeitsrecht /4/ Löwisch, Arbeitsrecht /5/ Löwisch/Rieble, Tarifvertragsgesetz /6/ Thüsing, Gregor, Arbeitnehmerüberlassungsgesetz
Learning materials	Script, case studies, verdicts
Learning formats	Seminar, case-oriented learning

Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	4th
Prerequisites	None
Prerequisites for awarding credit points	Exam 90 minutes
Module usage	Industrial Engineering and Management (B.Sc.) Specialization Production Industrial Engineering and Management - International (B.Sc.)
ECTS credits	3
Workload	Hours in class: 3 SWS = 45 h Self-study: 45 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Production Logistics

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module name	Production logistics
Module code	WI-B.408
Module type	Core module
Module coordinator	Prof. Dr.-Ing. Burkhard Schmager
Learning objectives	Students achieve knowledge about basics and interrelations in operational production logistics. They are able to implement methods and procedures in materials management, know their basics and can evaluate and apply disposition methods. They will be able to select and apply procedures for production planning and control. They have knowledge of the instruments of production data gathering and processing. They are familiar with the current procedures of requirements and procurement planning. Graduates will be able to work effectively and constructively with other people in different planning situations and in an interdisciplinary internal environment. They can work individually as well as in groups on the topic of PPS, effectively organize and implement projects and grow into a corresponding management responsibility.
Content	1. **Basics of Production Planning** 　1.1 Terms and systematics 　1.2 Operating conditions Classification of production planning 　1.3 Work planning **2. Scheduling and Capacity Planning** 2.1 Tasks and time system of scheduling and capacity planning 2.2 Scheduling procedure 2.3 Determination of capacity requirements 2.4 Determination of available capacity 2.5.Capacity coordination **3. Detailed Planning & Scheduling** 3.1 Tasks of detailed planning/ scheduling 3.2 Tools for detailed planning 3.3 Load-oriented order planning 3.4 Work distribution/control station concept **4. Production Control and Production Data Processing** 4.1 Tasks of the production control system

	4.2 Concepts of Shop Floor Control (Kanban, Cumulative Quantities) 4.3 Systematics of operating data 4.4 Methods of production data acquisition 4.5.Operating data processing systems **5. Data processing Systems for PPS/ERP and MES** 5.1 Fundamentals of PPS (ERP) and BDEV systems 5.2 Definition of requirements for PPS/ERP system. 5.3 Selection and implementation strategies 5.4 Evaluation of PPS-(ERP-)&BDEV-SW-Systems 5.5 PPS/ERP and MES as integration modules for industry 4.0 **6. Economic Aspects of PPS** **7. Systematics & Objectivs of Materials Management** 7.1 Elements, tasks and objectives of materials management 7.2 Typological classification of enterprises: organisational forms and types of production **8. Informational Basics:** 8.1 Product structures 8.2 Bill of materials 8.3 Types of material requirements **9. Methods of Materials Management** 9.1 Demand planning: 9.1.1 Static and dynamic deterministic material requirements planning 9.1.2 Stochastic material requirements planning 9.1.3 Inventory valuation and procurement strategies 9.1.4 Determination of lot size 9.2 Procurement planning: 9.2.1. order policies 9.2.2. procurement tools
Teaching formats **L**ecture**,** **T**utorial**,** **S**eminar**,** **Lab** Work **(SWS)**	2 SWS **L**, 2 SWS **S**, 1 SWS **Lab**
Literature references	/1/ Blohm; Beer; Seidenberg; Silber: Produktionswirtschaft, 5. Aufl., nwb studium Verlag, Hamm 2016 /2/ Harald Ehrmann: Logistik, 9. Aufl., Kiehl Verlag, 2017 /3/ Harald Ehrmann: Kompakt-Training Logistik, Kiehl Verlag, 2013 /4/ Otto-Ernst Heiserich; Klaus Helbig; Werner Ullmann: Logistik, Aufl., Gabler Verlag, Wiesbaden 2011 /5/ Kiener; Maier-Scheubeck; Obermaier; Weiß: Produktions-Management, 11. Aufl., Oldenbourg Verlag 2017 /6/ H. Schneider: Produktionsmanagement in KMU, Schäffer-Poeschl Verlag, Stuttgart 2010

	/7/ H.-P. Wiendahl: Betriebsorganisation für Ingenieure, 8.überarb. Aufl., Carl Hanser Verlag, München 2014
Learning materials	Script / Case Studies
Learning formats	Seminar, lab work, PBL method
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	4th
Prerequisites	Basic knowledge of business administration
Prerequisites for awarding credit points	Exam 120 minutes active participation in the PBL meetings and in the PPS computer lab
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
ECTS credits	6
Workload	Hours in class: 5 SWS => 75 h Self-study: 105 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German / English

Module specification Industrial control system

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) _Specialization Production Industrial Engineering and Management - International (B.Sc.)
Module name	Industrial control system
Module code	WI-B.444
Module type	Core module
Module coordinator	Prof. Dr.-Ing. Jörg Müller (Department of Electrical Engineering and Information Technology)
Learning objectives	• Students have knowledge of the structure and operation of industrial controls. • You are familiar with the basic description tools as well as analysis and development methods.
Content	• Control and regulation technology • Electronics
Teaching formats **L**ecture**,** **T**utorial**,** **S**eminar**,** **Lab** Work **(SWS)**	4 SWS **L**, 1 SWS **T**, 1 SWS **Lab**
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	4th
Prerequisites for awarding credit points	see submodules
Module usage	Industrial Engineering and Management (B.Sc.) _Specialization Production Industrial Engineering and Management - International (B.Sc.)
ECTS credits	6
Workload	Hours in class: 6 SWS => 90 h Self-study: 90 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Submodule specification control and regulation technology

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) _Specialization Production Industrial Engineering and Management - International (B.Sc.)
Module name	Control and regulation technology
Module code	WI-B.444.1
Module category	Industrial control system
Module type	Core module
Submodule manager	Prof. Dr.-Ing. Jörg Müller (Department of Electrical Engineering and Information Technology)
Learning objectives	Acquisition of basic knowledge in the field of control engineering for the evaluation and solution of simple tasks. The students know the description means and solution tools and can use them.
Content	• Introduction to control and regulation technology • Description forms of control tasks • Programmed logic controllers, implemented according to IEC 61131-3 • Structure and representation of a control loop • Behaviour of the elementary transmission elements in the time domain
Teaching formats **L**ecture**,** **T**utorial**,** **S**eminar**,** **Lab** Work **(SWS)**	2 SWS **L**, 1 SWS **Lab**
Literature references	/1/ Seitz, M.: Speicherprogrammierbare Steuerungen für die Fabrik- und Prozessautomation; Leipzig: Fachbuchverlag /2/ F. Tröster: Steuerungs- und Regelungstechnik für Ingenieure, Oldenbourg Verlag, München/Wien
Learning materials	Script, Textbooks
Learning formats	Group work
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	4th
Prerequisites	
Prerequisites for awarding credit points	90 minutes exam and certificate for successful completion of all practical exercises

Module usage	Industrial Engineering and Management (B.Sc.) _Specialization Production Industrial Engineering and Management - International (B.Sc.)
ECTS credits	3
Workload	Hours in class: 3 SWS => 45 h Self-study: 45 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Submodule specification Electronics

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) _Specialization Production Industrial Engineering and Management - International (B.Sc.)
Module name	Electronics
Module code	WI-B.444.2
Module category	Industrial control system
Module type	Core module
Submodule manager	Prof. Dr.-Ing. Martin Hoffmann
Learning objectives	Acquisition of knowledge in the field of electronics as a basis for understanding the structure and mode of operation of industrial controls and the underlying computer technology: - The students understand the structure and function of selected semiconductor components (HL-BE) and are able to interpret characteristic curves, parameters and data sheets. - You are capable of analysing analogue circuit diagrams, determining the mode of action and performing operating point calculations. - They are able to implement basic logic functions using contact circuits as well as discrete HL-BE and to interpret corresponding circuits. - Students master the analysis, design and optimization of simple digital circuits.
Content	- Structure and mode of operation of selected HL-BE - Basics of analogue circuit technology - Operational Amplifiers - Characteristics and Application

	• Basics of digital technology • Switching networks and switching devices - Digital basic circuits • Digital circuit design process • Selected applications of digital circuits
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	2 SWS **L,** 1 SWS **T**
Literature references	/1/ Stiny, S.: Aktive elektronische Bauelemente, Vieweg, 2015 /2/ Wöstenkühler, G.: Grundlagen der Digitaltechnik, Hanser, 2016
Learning materials	Textbooks, formula collection, handouts
Learning formats	Seminar
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	4th
Prerequisites	basics electrical engineering
Prerequisites for awarding credit points	Exam 90 min
Module usage	Industrial Engineering and Management (B.Sc.) _Specialization Production Industrial Engineering and Management - International (B.Sc.)
ECTS credits	3
Workload	Hours in class: 3 SWS => 45 h Self-study: 45 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Controlling

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module name	Controlling
Module code	WI-B.601
Module type	Core module
Module coordinator	Prof. Dr. rer. pol. Rüdiger Mottl
Learning objectives	The students master essential instruments and methods of controlling. They know important controlling variables of companies and are able to influence them operationally and strategically in a success-oriented way. They develop the ability to analyse and depict the concrete cost and competitive situation of the company and to carry out suitable planning and control calculations. The aim is to improve the adaptability of companies to external and internal changes. The students can support the management in the definition and pursuit of objectives and continuously accompany the realisation process by selecting suitable means.
Content	• Controlling I • Controlling II
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	4 SWS **S**, 1 SWS **T**
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	6th
Prerequisites	None
Prerequisites for awarding credit points	see submodules
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
ECTS credits	6
Workload	Hours in class: 5 SWS => 75 h Self-study: 105 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable

Language(s) of instruction	German

Submodule specification Controlling I

Not available in English

Submodule specification Controlling II

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module name	Controlling II
Module code	WI-B.601.2
Module category	Controlling
Module type	Core module
Submodule manager	Prof. Dr. rer. soc. oec. Hubert Ostermaier
Learning objectives	The students are familiar with the significance and objectives of controlling and its integration into the management system. They master essential approaches, methods and tools and can apply them to practice-relevant tasks. They are able to design the planning and control system in companies. They know the characteristics of performance measurement systems. They are aware of the advantages and disadvantages of budgeting. The students master the use of Key Performance Indicators
Content	1. Controlling and Management 2. Coordination-based Controlling 3. Balanced Scorecard 4. Budgeting System 5. Coordination of the information supply system 6. Key Performance Indicators 7. Strategic Cost Management
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	2 SWS **S**
Literature references	/1/ Horváth, Peter; Gleich, Ronald; Seiter, Mischa: Controlling, 13. Aufl., München 2015. /2/ Weber, Jürgen.: Einführung in das Controlling, 15. Auflage, Stuttgart 2015 /3/ Bokranz, Rainer; Kurt Landau: Produktivitätsmanagement von Arbeitssystemen – MTM Handbuch, Stuttgart 2006

Learning materials	Script, technical literature, case studies
Learning formats	Seminar, group work
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	6th
Prerequisites	
Prerequisites for awarding credit points	(AP) tests
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
ECTS credits	3
Workload	Hours in class: 2 SWS => 30 h, Self-study: 60 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Innovation and Quality

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Specialization Production Industrial Engineering and Management - International (B.Sc.)
Module name	Innovation and Quality
Module code	WI-B.607
Module type	Core module
Module coordinator	Prof. Dr.-Ing. Burkhard Schmager
Learning objectives	The students understand the processes of innovation processes in industrial companies and are able to evaluate them. In addition they know the essential methods and instruments for generating and evaluating ideas and can apply them in practice. The students get to know the basic concepts and systematics of quality management and can use them in tasks of operational practice. Furthermore, they know the essential methods of quality management and are able to assess, select and apply them in practise.
Content	• Design of innovation processes • Quality management
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	3 SWS **S**, 2 SWS **T**
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	6th / 7th
Prerequisites	Production and Investment, Project Management
Prerequisites for awarding credit points	see submodules
Module usage	Industrial Engineering and Management (B.Sc.) Specialization Production Industrial Engineering and Management - International (B.Sc.)
ECTS credits	6
Workload	Hours in class: 5 SWS => 75h Self-study: 105 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable

Language(s) of instruction	German

Submodule specification Design of innovation processes

Not available in English

Submodule specification Quality Management

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Specialization Production Industrial Engineering and Management - International (B.Sc.)
Module name	Quality management
Module code	WI-B.607.2
Module category	Innovation and Quality
Module type	Core module
Submodule manager	Prof. Dr.-Ing. Burkhard Schmager
Learning objectives	The students get to know the basic concepts and systematics of quality management and can use them in tasks of operational practice. Furthermore, they know the essential methods and tools of quality management and can assess, select and apply them to practical tasks.

Content	• Systematics of Quality Management
	  - QM structures and processes
	  - Fields of application
	• QM Systems
	  -System elements
	  -QM Policy and Goals
	  -QM key figures
	  -QM-Certification
	• QM methods
	  -Quality circle
	  -Improvement process scheme
	  -CIP
	  -Management of complaints
	• QM -Tools
	  -7 Management tools
	  -QFD
	  -Design review
	  -FMEA
	  -FTA
	  -SPC
	  -Control charts

Teaching formats **L**ecture**,** **T**utorial**,** **S**eminar**,** **Lab** Work **(SWS)**	1 SWS **S**, 1 SWS **T**
Literature references	/1/ Brunner, Franz J.; Wagner, Karl. W.: Qualitätsmanagement, 6. Aufl. Carl Hanser Verlag, München Wien 2016 /2/ Herrmann, J. /Fritz, H. : Qualitätsmanagement – Lehrbuch für Studium und Praxis, Hanser Fachbuchverlag 2016 /3/ Linß, Gerhard: Qualitätsmanagement für Ingenieure, 4. Aufl. Fachbuchverlag Leipzig 2018 /4/ Masing, W.: Handbuch Qualitätsmanagement, 6. Aufl., Carl Hanser Verlag, München Wien 2014 /5/ Schmager, B.: Leitfaden Arbeitsschutz-Management-system, Carl Hanser Verlag, München Wien 1999 /6/ Schmager, B.; Spanner-Ulmer, B.; Sprenger, K.; Li, Z.: Qualitätssicherungsmaßnahmen bei der Gestaltung technischer Arbeitsmittel, Schriftenreihe der Bundesanstalt für Arbeitsschutz und Arbeitsmedizin - Fb 786, Bremerhaven 1997
Learning materials	Script, case studies
Learning formats	Lecture, group work
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	6th/ 7th
Prerequisites	None
Prerequisites for awarding credit points	Tests (can be changed according to examination regulations)
Module usage	Industrial Engineering and Management (B.Sc.) Specialization Production Industrial Engineering and Management - International (B.Sc.)
ECTS credits	3
Workload	Hours in class: 2 SWS => 30 h Self-study: 60 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German / English

Module specification Technical Sales and Foreign Trade

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
Module name	Technical sales and foreign trade
Module code	WI-B.608
Module type	Core module
Module coordinator	Prof. Dr. rer. oec. Kathrin Reger-Wagner
Learning objectives	The students shall • be able to make recommendations for foreign trade business types and distribution channels on the basis of analytical methods. • perform customer evaluations and derive implications for CRM. • assess what information is needed to prepare and conduct sales calls. • gain an overview of determinants of foreign trade-related pricing and calculate quoted prices based on this information. • use key figures to evaluate the success of sales activities.
Content	**Technical Sales** **1. importance and object of sales:** relevance for the success of the company and current general conditions **2. determinants of the sales system:** sales channel decisions, customer evaluation as the starting point of CRM **3. organisational and behavioural fundamentals of decision-making processes** **4. preparation, conduct and follow-up of sales talks** **5. sales support instruments:** e.g. trade fairs, social media **6. sales controlling:** performance measurement using key figures **Foreign Trade** **1. subject matter and thematic relevance:** importance of foreign trade for companies **2. regulatory framework for foreign trade:** e.g. foreign trade policy **3. manifestations and types of business in foreign trade** **4. foreign trade marketing**: including international market research, strategic decision-making, cultural understanding, international product, price and communication policy

	5. purchase contracts and terms of delivery in foreign trade **6. transport and documentation in foreign trade** **7. foreign trade financing** **8. ethicsal issues in international trade relations**
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	2 SWS **S**, 2 SWS **T**
Literature references	**Technical sales** /1/ Albers, S./ Krafft, M: Vertriebsmanagement: Organisation - Planung – Controlling, aktl. Aufl., Wiesbaden. /2/ Hofbauer, G./ Hellwig, C.: Professionelles Vertriebsmanagement. Der prozessorientierte Ansatz aus Anbieter- und Beschaffersicht, aktl. Aufl., Erlangen. /3/ Rentzsch, H.-P.: Kundenorientiert verkaufen im technischen Vertrieb: erfolgreiches Beziehungsmanagement im Business-to-Business, aktl. Aufl., Wiesbaden. /4/ Ingram, T. N. et al.: Sales Management: Analysis and Decision Making, aktl. Aufl, NY und London. **Foreign trade** /1/ Büter, C.: Außenhandel: Grundlagen internationaler Handelsbeziehungen, aktl. Aufl., Wiesbaden. /2/ Kehr, H./ Jahrmann, F.-U.: Außenhandel, aktl. Aufl., Herne. /3/ Brenner, H./ Misu, C. (Hrsg.): Internationales Business Development, aktl. Aufl., Wiesbaden. /4/ Peng, M.W.: Global Business, aktl. Aufl., Boston. as well as current articles from professional journals
Learning materials	PowerPoint presentations, overhead transparencies, whiteboard, instructional videos, (multimedia) case studies, inclusion of guest speakers
Learning formats	Case studies, role plays
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	6.
Prerequisites	
Prerequisites for awarding credit points	Performance record accompanying the seminar (can be changed according to examination regulations)

Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
ECTS credits	6
Workload	Hours in class: 4 SWS => 60 h Self-study: 120 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German or English

Module specification Design of Work and Factory Systems

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Specialization Production Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
Module name	Design of Work and Factory systems
Module code	WI-B.609
Module type	Core module
Module coordinator	Prof. Dr.-Ing. Burkhard Schmager
Learning objectives	Students have knowledge of the basics and interrelations in the design of work and factory systems. They will acquire the ability to implement methods and procedures in work analysis and work system planning as well as ergonomic workplace design. They have knowledge of the methods and programs for material flow planning and simulation. They develop skills for planning and structuring manufacturing systems (manufacturing layouts) They can work effectively and constructively with other people in business situations and in a company-wide environment across disciplines. They will be able to identify and assess complex planning tasks in a technical/economic context and to solve them in an interdisciplinary, holistic and methodical manner.
Content	• Factory planning • Human Factors and Work Design
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	4 SWS **S**, 1 SWS **Lab**
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	6th and 7th
Prerequisites	None
Prerequisites for awarding credit points	

Module usage	Industrial Engineering and Management (B.Sc.) Specialization Production Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
ECTS credits	6
Workload	Hours in class: 5 SWS => 75 h Self-study: 105 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German/ English

Submodule specification Factory Planning

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Specialization Production Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
Module name	Factory Planning
Module code	WI-B.609.1
Module category	Design of Work and Factory systems
Module type	Core module
Submodule manager	Prof. Dr.-Ing. Tobias Pfeifroth
Learning objectives	Graduates have knowledge of the basics and connections in the design of factory systems. • They acquire the ability to implement methods and procedures in production system analysis and system design. • They possess knowledge about the methods and programs for material flow planning and simulation. • They develop skills in the organization and planning of manufacturing systems. • They are able to work effectively with other people in company-wide projects in an interdisciplinary and constructive manner.

	• They are able to recognise complex tasks in factory planning in a technical and economic context and to solve them in an interdisciplinary, holistic and methodical way.
Content	• Introduction to o Concepts, tasks and goals o Systematics of the planning process o Project management in factory planning • planning bases o Analysis of the current situation o Determination of the production program/products o forms of production organisation o Determination of the planning parameters (Resources, personnel, areas) • planning implementation o Principle planning o Rough planning • ideal layout • real layout o Detailed planning • Material flow and storage technology o Material flow components o Warehousing • Site selection and construction planning
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	2 SWS **S**
Literature references	/1/ Aggteleky, B.: Fabrikplanung - Werksentwicklung und Betriebsrationalisierung: Bd. 1-3, München 1987-1990 /2/ Kettner, H./Schmidt, J./Greim, H.-R.: Leitfaden der systematischen Fabrikplanung, München - Wien 1984 /3/ Schmigalla, H.: Fabrikplanung, München - Wien 1995 /4/ Wiendahl, H.P.; Reichardt, J.; Nyhuis, P.: Handbuch Fabrikplanung, München Wien: Carl Hanser Verlag, 2. Auflage, 2014 /5/ Wiendahl, H.P.; Reichardt, J.; Nyhuis, P.: Handbook Factory Planning and Design, Berlin, Heidelberg: Springer Verlag 2015
Learning materials	PowerPoint slides, script, case studies
Learning formats	Seminar
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	6th
Prerequisites	None

Prerequisites for awarding credit points	Presentation and/or test (can be changed according to examination regulations)
Module usage	Industrial Engineering and Management (B.Sc.) Specialization Production Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
ECTS credits	3
Workload	Hours in class: 2 SWS => 30 h Self-study: 60 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Submodule specification Human Factors and Work Design

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Specialization Production Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
Module name	Human Factors and Work Design
Module code	WI-B.609.2
Module category	Design of work and factory systems
Module type	Core module
Submodule manager	Prof. Dr.-Ing. Burkhard Schmager
Learning objectives	Students achieve knowledge of the basics and connections in the field of Human factors and ergonomics. They have knowledge about application of methods for work design and occupational safety. They have mastered the implementation of methods and procedures in work analysis and work system planning as well as the ergonomic design of workplaces. They can effectively collaborate with other people in business situations with cross-disciplinary work design tasks They are able to recognise and assess complex tasks in work design in a technical and economic context and can solve them in an interdisciplinary, holistic and methodical manner.

Content	**Systematics and Fundamentals of Human Factors and Ergonomics** o Historical development o Fields of activity of ergonomics o Humans and Work System o Physiological basics o Psychological basics **Load and Stress Concept** o Basics of the concept o Influencing factors of load and strain o Application of the concept **Work structures and design** o Tasks of work design o Criteria of work design o Design of workplace and environment (anthropometry, physiological work design, environmental factors: climate, noise, lighting, colour) **Work Organisation and Labour Economics** o Industrial Psychology o Working time regulation and break design o Systems for time determination and specification o job evaluation and remuneration **Occupational Safety and Health Protection** o Importance of occupational safety in the company o New management approaches to occupational safety and health protection in the company
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	2 SWS **S**, 1 SWS **Lab**
Literature references	/1/ Jastrzebska-Fraczek, I./ Schmidtke, H.: Ergonomie, München 2013 /2/ Landau,K./Bokranz, R.: Produktivitätsmanagement von Arbeitssystemen, Schäffer-Poeschel 2006 /3/ Luczak, H./Volpert, W.: Arbeitswissenschaft, Stuttgart 1997 /4/ REFA (Hrsg.): Methodenlehre der Betriebsorganisation, München 2004 /5/ Schmager, B.: Gefährdungsbeurteilung - GB7, Reihe Pocket Power, München 1998 /6/ Schmager, B.: Arbeitsschutzmanagement - Leitfaden zur Einführung, München 1999 /7/ Schlick, M./ Bruder, R./ Luczak, H.: Arbeitswissenschaft, 4. Aufl., Springer Vieweg Verlag 2018 /8/ Skiba, R.: Arbeitssicherheit, Erich Schmidt Verlag, 2005 /9/ Ulich, E.: Arbeitspsychologie, 7. Aufl., vdf Verlag, 2011
Learning materials	Script, case studies, Whiteboard, Power Point Presentation

Learning formats	Seminar, group work, presentation
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	7th
Prerequisites	None
Prerequisites for awarding credit points	Presentation and written assignment (may be modified according to examination regulations)
Module usage	Industrial Engineering and Management (B.Sc.) Specialization Production Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
ECTS credits	3
Workload	Hours in class: 3 SWS => 45 h Self-study: 45 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German / English

Module specification International Economy

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module name	International Economy
Module code	WI-B.615
Module type	Core module
Module coordinator	Prof. Dr. rer. pol. Wolfgang Eibner
Learning objectives	The students should be able to recognize connections and above all consequences of real economic policy connections - with a focus on the importance of international organizations and committees of globalized economic coordination and cooperation - and to classify and evaluate their national and international interdependencies in their causalities to consumers and companies, as well as to synthesize current problems in this knowledge context.

Content	**1. Economic Policy**
	• Objectives and instruments of rational economic policy;
	• Economic policy within the framework of the German Stability Act, globalisation, digitalization – in a national, European and international context
	• Business cycle theories
	• Income and wealth distribution, tax justice definitions;
	• Government revenue; passive and active fiscal equalisation;
	• Debt: Institutional and economic limits;
	• Haavelmo-Theorem – theoretically and practically considered;
	• The Euro: chances and risks for the future viability of German and European industry
	• International trade: free trade areas, customs unions, advantages and disadvantages of free trade; means of protectionism
	
	2. internationally relevant organisations in the fields of trade, economy and finance
	  • The World Trade Organization (WTO);
	  • The International Monetary Fund (IMF);
	  • The World Bank Group;
	  • Regional Development Banks (IADB, AfD, etc.)
	  • General problems of international development promotion (dependency theory, intercultural

	differences, micro credits vs. capital-intensive project promotion); • The Organisation for Economic Cooperation and Development (OECD); • European Union (EU); • Informal international cooperation: G7, G11, G20, G77 and others; • Other international institutions, bodies or organizations
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	Seminar with 4 semester course hours (SWS)
Literature references	/1/ Eibner, W.: International Economic Integration: Selected International Organizations and the European Union, Munich 2008 /2/ Eibner, W.: International Trade: Theory and Policy, Munich 2006 /3/ Eibner, W.: Skript Wirtschaftspolitik, 12+. edition, Jena 2018 or newer /4/ George, S.: Change it, Munich 2016 /5/ George, S./ Sabelli, F.: Kredit und Dogma, Hamburg: 1995 /6/ Samuelson, P. A./ Nordhaus, W. D.: Volkswirtschaftslehre, 6. edition, Stuttgart 2016, also available in english /7/ Sachs, J. D.: Das Ende der Armut. Ein ökonomisches Programm für eine gerechtere Welt, 2. edition, Munich 2005, also available in english /8/ Weidenfeld, W./ W. Wessels (Hrsg.): Europa von A - Z, Taschenbuch der Europäischen Integration, Jährliche Erscheinungsweise seit 1980, aktuell 28. Auflage, Bonn, 2017 /9/ Weltbank: World Development Report, Washington, published every year
Learning materials	Overhead transparencies, educational videos, PowerPoint presentations, blackboard
Learning formats	Board work, seminar lessons, presentations, educational videos, self-study, exercises. In general, the entirety of multimedia knowledge transfer is offered.
Programme level	Bachelor
Start of programme (WS/SS)	Each WS and SS
Study semester	6th
Prerequisites	General Introduction into Economics

Prerequisites for awarding credit points	Presentation and tests
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
ECTS credits	6
Workload	Hours in class: 4 SWS => 60 h self-study: 120 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German, English if required

Module specification Applied Market Research

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
Module name	Applied market research
Module code	WI-B.453
Module type	Elective module
Module coordinator	Prof. Dr. rer. oec. Kathrin Reger-Wagner
Learning objectives	The students ... • can design market research processes on the basis of research questions • know the central instruments of qualitative and quantitative research • are able to design their own questionnaires and carry out an investigation • are able to assess the quality of market research • acquire the competence to evaluate market research data by means of empirical methods and to derive recommendations for practice
Content	1. functions and process of market research 2. research projects and data sources 3. secondary market research 4. data collection using qualitative and quantitative methods 5. questionnaire construction 6. sampling and data collection 7. data preparation and methods of data analysis 8. presentation of market research results 9. research ethics and data protection regulations
Teaching formats **L**ecture**,** **T**utorial**,** **S**eminar**,** **Lab** Work **(SWS)**	1 SWS **S**, 2 SWS **T**
Literature references	/1/ Kuß, A.; Wildner, R.; Kreis, H.: Marktforschung, aktl. Aufl., Wiesbaden. /2/ Magerhans, A.: Marktforschung. Eine praxisorientierte Einführung, aktl. Aufl., Wiesbaden. /3/ Theobald, A.: Praxis Online-Marktforschung, aktl. Aufl., Wiesbaden.
Learning materials	PowerPoint presentations, overhead transparencies, case studies, sample data sets

Learning formats	Market research project, test versions of online market research tools, evaluation program for survey data
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	4th, 6th and 7th
Prerequisites	Marketing Basics
Prerequisites for awarding credit points	AP (test and/or market research project)
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
ECTS credits	3
Workload	Hours in class: 3 SWS => 45h Self-study: 45 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German or English

Module specification Exhibition management

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
Module name	Exhibition management
Module code	WI-B.454
Module type	Elective module
Module coordinator	Prof. Dr. rer. oec. Kathrin Reger-Wagner
Learning objectives	The students ... • are able to explain the relevance of exhibitions in the context of marketing from an inter- and intramedial point of view. • can develop exhibition concepts based on the systematic exhibition management process • can assess exhibition stand concepts according to possible design options and objectives • acquire the competence to design communication instruments to accompany exhibitions • know the prerequisites for good personal interaction at exhibitions • are able to determine and interpret exhibition success indicators
Content	• Importance and general conditions of exhibitions • Exhibition management process • Exhibition strategy: exhibition objectives, selection and positioning • Exhibition stand concept • Communication before, during and after the trade fair • Personnel concept for exhibition appearances • Conversation at exhibitions • Exhibition Controlling: Procedures and Key Figures
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	Seminar with 2 semester course hours (SWS)
Literature references	/1/ Ter Weiler, D.S. et al: Messen machen Märkte, aktl. Aufl, Wiesbaden. /2/ Kirchgeorg, M. et al. (Hrsg.): Handbuch Messemanagement, aktl. Aufl., Wiesbaden. /3/ AUMA (Hrsg.): MesseTrend Studien, aktl. Aufl., Berlin

Learning materials	PowerPoint presentations, overhead transparencies, instructional videos, case studies
Learning formats	
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	4th, 6th and 7th
Prerequisites	Marketing Basics
Prerequisites for awarding credit points	AP (test and/or group project)
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
ECTS credits	3
Workload	Hours in class: 2 SWS => 30 h Self-study: 60 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German or English

Module specification Software practical course

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
Module name	Software practical course
Module code	WI-B.458
Module type	Elective module
Module coordinator	Prof. Dr.-Ing. Frank-Joachim Möller
Learning objectives	Students know the functional range of selected software products, they are able to operate software products in depth with regard to selected functions; they are able to solve complex tasks using software on the computer, they can derive a solution from the range of functions on their own and are able to structure and model data processing solutions using suitable presentation tools
Content	• Presentation of the software product or products • Intention of the software product and relevance in the business environment • Functional scope • Typical applications • Solving tasks hands-on on the computer
Teaching formats **L**ecture**,** **T**utorial**,** **S**eminar**,** **Lab** Work **(SWS)**	Practical course with 4 semester course hours (SWS) **Lab**
Literature references	Depending on the discussed software products: Manual, reference, case studies
Learning materials	computer programs
Learning formats	Hands-on computer training
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	4th, 6th, 7th
Prerequisites	
Prerequisites for awarding credit points	Tests
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)

	Industrial Engineering and Management - Digital Economy (B.Sc.)
ECTS credits	3
Workload	Hours in class: 4 SWS => 60 h Self-study: 30 h
Module duration	1 semester
Location	EAH Jena
Course time	According to schedule
Language(s) of instruction	German

Module specification Spanish I

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.) Environmental Technology Development (B. Sc.) Environmental Technology (B. Sc.)
Module name	Spanish I
Module code	WI-B.459
Module type	Elective module
Module coordinator	Dr. Berndt
Learning objectives	After completing the module, students will be able to read and understand simple texts. In addition, they will be able to successfully master simple communications. The aim is to provide students with basic language skills for a stay in a Spanish-speaking country (internship semester or university).
Content	▪ every day language ▪ leisure ▪ studying ▪ general professional situations
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	Seminar with 2 semester course hours (SWS)
Literature references	/1/ „Eñe – Ein Spanischbuch für Anfänger", Lehr- und Arbeitsbuch, Hueber –Verlag /2/ „Universo.ele – Spanisch für Studierende. A1", Lehr-und Arbeitsbuch, Hueber - Verlag
Learning materials	Textbook, copy templates, video + audio
Learning formats	Individual/ group work
Programme level	Bachelor
Start of programme (WS/SS)	WS and/ or SS
Study semester	4th and 7th semester -> Industrial Engineering and Management 4th and 6th semester -> Industrial Engineering and Management - Digital Economy 6th semester -> E-Commerce 3rd and 7th semester -> Environmental technology

	3rd semester -> Environmental Technology Development
Prerequisites	None
Prerequisites for awarding credit points	Regular attendance Written test
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.) Environmental Technology Development (B. Sc.) Environmental Technology (B. Sc.)
ECTS credits	3
Workload	Hours in class: 2 SWS => 30 h Self-study: 60 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German/ Spanish bilingual

Module specification Spanish II

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.) Environmental Technology Development (B. Sc.) Environmental Technology (B. Sc.)
Module name	Spanish II
Module code	WI-B.460
Module type	Elective module
Module coordinator	Dr. Berndt (Department of Fundamental Sciences)
Learning objectives	After completing the module, students will be able to read and understand more complex texts. In addition, they can successfully use modern communication methods (email, presentations, etc.). The aim is to provide students with further language training for a stay in a Spanish-speaking country (internship semester or university).
Content	Grammar: different tenses; irregular conjugations; extended vocabulary
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	Seminar with 2 semester course hours (SWS)
Literature references	/1/ „Eñe – Ein Spanischbuch für Anfänger", Lehr- und Arbeitsbuch, Hueber –Verlag /2/ „UNIVERSO.ele – Spanisch für Studierende" (A1 + A2). Hueber-Verlag
Learning materials	Textbook/ additional worksheets/ Internet
Learning formats	Individual/ group work/ E-learning (Moodle)
Programme level	Bachelor
Start of programme (WS/SS)	WS or SS
Study semester	4th, 6th and 7th
Prerequisites	Spanish I
Prerequisites for awarding credit points	Regular attendance Tests

Module usage	Industrial Engineering and Management (B.Sc.)
	Industrial Engineering and Management - International (B.Sc.)
	Industrial Engineering and Management - Digital Economy (B.Sc.)
	E-Commerce (B.Sc.)
	Environmental Technology Development (B. Sc.)
	Environmental Technology (B. Sc.)
ECTS credits	3
Workload	Hours in class: 2 SWS => 30 h
	Self-study: 60 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German/Spanish bilingual

Module specification Management methods in production

Department	Engineering and Management
Study programmes	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
Module name	Management methods in production
Module code	WI-B.463
Module type	Elective module
Module coordinator	Prof. Dr.-Ing. Uwe Herbst
Learning objectives	The students get an overview of operational, production-related management approaches and methods. They master practical tools for structured analysis, problem solving and decision-making in the operative environment. This enables them to work in practice: – to lead a mixed group to systematic and comprehensible problem solutions and decisions. – to analyse the actual situation of a production from different perspectives and to derive the required action from this. – to select suitable management tools in production and to participate in their application They also improve their ability to work result oriented in a team, and present results in front of a group.
Content	– Conflict area Production Management – Lean Production and the concept of waste – Systematic problem solving and decision-making – Basic understanding of Six-Sigma – Further practical management methods
Teaching formats Lecture, Tutorial, Seminar, Lab Work (SWS)	Seminar S with 3 semester course hours (SWS)
Literature references	/1/ Bauer, Produktionssysteme wettbewerbsfähig gestalten Methoden und Werkzeuge für KMU's, Hanser Verlag /2/ Brunner, Japanische Erfolgskonzepte Hanser Verlag /3/ Johan Wappis, Berndt Jung, Null-Fehler-Management Umsetzung von Six Sigma, Hanser Verlag
Learning materials	Presentation, Script
Learning formats	Seminar with case studies/ exercises

Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	4th, 6th and 7th
Prerequisites	Basic knowledge of production processes
Prerequisites for awarding credit points	Performance record accompanying the seminar
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
ECTS credits	3
Workload	Hours in class: 3 SWS => 45 h Self-study: 45 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification CAD Solidworks

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) Environmental Technology and Development (B. Sc.) Environmental Technology (B. Sc.)
Module name	CAD Solidworks
Module code	WI-B.466
Module type	Elective module
Module coordinator	Prof. Dr.-Ing. habil. Frank Engelmann
Learning objectives	After completion of the module, students are able to: • Create their own CAD models • Compile complex assemblies from the available models • Apply methods to check installation space collision analyses • Perform simple movement studies using assemblies • Creating drawing derivations from models and assemblies
Content	As part of the module, modelling and CAD models are taught using SolidWorks software. As part of this, the following functions are considered in more detail: • Modelling and dimensioning of sketches • Use or functions for extending or rotating sketches • Methods for modelling holes • Parametrisation of components • Modelling assemblies • Connections between individual assemblies • Collision and interference tests of assemblies • Movement of components in assemblies
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	2 SWS **S**
Literature references	/1/ Vogel, H.: Konstruieren mit SolidWorks, 8. Auflage, Carl Hanser, München 2017 /2/ Schabecker, Michael; Vajna, Sándor (Hrsg.): SolidWorks -kurz und bündig, 4. Auflage, Springer Vieweg, Wiesbaden 2016
Learning materials	Script, student version of SolidWorks
Learning formats	Seminar in "CAD Pool" centre with SolidWorks software
Programme level	Bachelor

Start of programme (WS/SS)	WS and SS
Study semester	3rd to 7th
Prerequisites	Basic knowledge of technical drawing modelling.
Prerequisites for awarding credit points	Final exam, homework
Module usage	Industrial Engineering and Management (B.Sc.)
	Industrial Engineering and Management - International (B.Sc.)
	Industrial Engineering and Management - Digital Economy (B.Sc.)
	Environmental Technology and Development (B. Sc.)
	Environmental Technology (B. Sc.)
ECTS credits	3
Workload	Hours in class: 2 SWS => 30 hours
	Self-study: 60 hours
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification ERP Systems - Basics

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module name	ERP Systems - Basics
Module code	WI-B.610.1
Module type	Elective module
Module coordinator	Dipl.-Ing. Klaus Gruhn
Learning objectives	Graduates acquire basic knowledge and ways of working with ERP systems. They compare and evaluate different ERP systems. They mastered the implementation of simple processes with in an ERP system. They make effective use of modern information technologies for enterprise business processes.
Content	• HW and SW system structures of ERP systems • Exemplary deepening of an ERP system solution • Application of ERP system modules in business practice with selected case studies
Teaching formats **L**ecture**,** **T**utorial**,** **S**eminar**,** **Lab** Work **(SWS)**	Seminar **S** with 1 semester course hour (SWS) and practical course **Lab** with 1 SWS
Literature references	/1/ UCC Uni Magdeburg/ Uni München: Lehrmaterialien zu SAP ERP. München-Magdeburg 2017 /2/ Norbert Gronau: Enterprise Resource Planning . Oldenburgverlag. München 2010 /3/ Reinhard Koether: Taschenbuch der Logistik. Fachbuchverlag Leipzig, 2011 /4/ Olaf Schulz: Der SAP-Grundkurs für Einsteiger und Anwender. SAP Press 2016
Learning materials	Lecture materials, literature, SW program with documentation, case studies
Learning formats	Seminar with SW Lab course
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	4th to 7th
Prerequisites	Production logistics
Prerequisites for awarding credit points	Tests

Module usage	Industrial Engineering and Management (B.Sc.)
	Industrial Engineering and Management - International (B.Sc.)
ECTS credits	3
Workload	Hours in class: 2 SWS => 30 h
	Self-study: 60 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification ERP Systems - Business Process Management

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
Module name	ERP Systems - Business Process Management
Module code	WI-B.610.2
Module type	Elective module
Module coordinator	Dipl.-Ing. Klaus Gruhn
Learning objectives	Graduates acquire the ability to map processes in ERP systems. They mastered the implementation of methods for the selection and introduction of ERP systems. They the usage of implementation strategies and adaptation of ERP systems. They mastered the execution of complex operational procedures.
Content	• Project management within the framework of ERP systems • Operational process structures and procedures • Methods for process modelling • Mapping of process structures and processes in an ERP system (customizing) • In-depth application of ERP system modules in complex case studies
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	**S**eminar with 1 semester course hour (SWS) and **Lab** course with 1 SWS
Literature references	/1/ UCC Uni Magdeburg / Uni München: Lehrmaterialien zu SAP ERP. München – Magdeburg 2017 /2/ Andreas Godatsch: Grundkurs Geschäftsprozess – Management. 8. Auflage. Springer Verlag Wiesbaden 2017 /3/ Schmelzer,H.J.; Sesselmann,W.: Geschäftsprozessmanagement in der Praxis. 8. Auflage. Hanser Fachbuchverlag München 2013 /4/ Knut Harmes: Geschäftsprozess- und Projektmanagement in der Praxis. Merkur Verlag Rinteln 2015 /5/ Heinrich Seidelmeier: Prozessmodellierung mit ARIS®. 4.Auflage. Springer Verlag Wiesbaden 2015
Learning materials	Lecture notes, literature, SW program with documentation, case studies
Learning formats	Seminar with SW Lab course
Programme level	Bachelor

Start of programme (WS/SS)	WS and SS
Study semester	4th to 7th
Prerequisites	Production logistics
Prerequisites for awarding credit points	Presentation or tests
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.)
ECTS credits	3
Workload	Hours in class: 2 SWS => 30 h Self-study: 60 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Robotics Project

Department	Engineering and Management
Study programmes	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
Module name	Robotics project
Module code	WI-B.740
Module type	Technical-economic project
Module coordinator	Prof. Dr.-Ing. Uwe Herbst
Learning objectives	• Experience in the implementation of production automation systems including robots • If required: application of methods and procedures in robot simulation • Knowledge of the application of economic feasibility studies • Ability to work in a team • Extending the experience in project management • Experience in the basics of software engineering
Content	• Project processing in robotics using selected examples (preferably from the current industrial task) o Goals and task definition o Steps of the planning process o Project management in robotics • Guidance and realization of the implementation o Description of tasks o Partial task entry o Simulation o Hardware implementation o Software implementation o Economic feasibility study
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	Practical course with 2 semester course hours (SWS)
Literature references	/1/ See Robotics submodule in Robotics and Machine Tools module /2/ Script Module Robotics and Machine Tools /3/ Manuals for various industrial robot systems /4/ Manuals for various simulation programs
Learning materials	Script, computer programs, case studies
Learning formats	Project work

Programme level	Bachelor
Start of programme (WS/SS)	WS and SS as well as cross-semester
Study semester	7th
Prerequisites	Basic knowledge of robots and programming
Prerequisites for awarding credit points	Term paper/ laboratory work
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
ECTS credits	6
Workload	Hours in class: 2 SWS = 30 h Self-study and laboratory work: 150 h
Module duration	1 semester
Location	EAH Jena
Course time	Individual schedule
Language(s) of instruction	German

Module specification Factory Planning and Design Project

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
Module name	Factory Design project
Module code	WI-B.741
Module type	Technical-economic Project
Module coordinator	Prof. Dr.-Ing. Burkhard Schmager
Learning objectives	• Graduates have in-depth knowledge of the systematics and execution of planning and design of factory systems • They are able to master the practical application of methods and procedures in material flow planning and simulation • they have deep knowledge about application of economic feasibility studies in factory design projects • they are able to identify complex tasks in a technical and economic context and they can solve these tasks in an interdisciplinary, holistic and methodical way • they are able to integrate themselves directly into the professional environment through a good developed practical orientation and they can cooperate with partners on different levels.

Content	• Projects in factory planning and design
	  - Fundamentals
	  - Design process steps
	  - Project management in factory planning & design
	• Guidance and implementation of planning concepts (case studies) to
	  - basic design rules
	  - Rough planning (ideal layout, real layout)
	  - detailed planning methods
	  - Realization of a factory design concepts
	  - Evaluation & assessment procedures of design concepts

Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	Practise based course with 2 semester course hours (SWS)
Literature references	/1/ Aggteleky, Béla: Fabrikplanung - Werksentwicklung und Betriebsrationalisierung Bd. 1: Grundlagen, Zielplanung, Vorarbeiten, München 1987 Bd. 2: Betriebsanalyse und Feasibility-Studie, München 1990

	Bd. 3: Ausführungsplanung und Projektmanagement, München 1988 /2/ Ehrmann, H.: Logistik, 6. Aufl., Kiehl Verlag 2014 /3/ Kettner, H./Schmidt, J./Greim, H.-R.: Leitfaden der systematischen Fabrikplanung, München - Wien 1984 /4/ Kuhn, A./Rabe, M.: Simulation in Produktion und Logistik, 1998 /5/ Schmigalla, H.: Fabrikplanung, München - Wien 1995 /6/ Schenk, M., Wirth, S., Müller, E.: Fabrikplanung und Fabrikbetrieb, 2. Aufl. Berlin, Heidelberg 2013 /7/ Warnecke, H.-J.: Aufbruch zum fraktalen Unternehmen, Berlin 1995 /8/ Wiendahl, H.-P.; Reichardt, J.; Nyhuis, P.: Handbook Factory Planning & Design, Springer Verlag 2015
Learning materials	Script, case studies, software programs
Learning formats	Seminar, group work
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	7th
Prerequisites	Basics of Factory Planning & Design
Prerequisites for awarding credit points	Student research project / Laboratory project
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.)
ECTS credits	6
Workload	Hours in class: 2 SWS => 30 h Self-study: 150 h
Module duration	1 semester
Location	EAH Jena
Course time	According to schedule
Language(s) of instruction	German / English

Module specification IT Project Business Process Management/ Business Applications

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
Module name	IT Project Business Process Management/ Business Applications
Module code	WI-B.745
Module type	Technical-business project
Module coordinator	Prof. Dr. Nico Brehm
Learning objectives	The students can solve a given problem with technical and economic aspects in a team. Technical and solution-oriented skills are acquired. Schedules, work packages and milestones can be worked out, coordinated and tracked. Experiences with team cooperation in the context of a concrete IT project with focus on business process management and business applications are acquired.
Content	Depending on the concrete task with different weighting: • Capturing and designing business processes with a view to supporting the processes through the possibilities of IT • Implementation of processes on IT solutions • Evaluation of IT solutions in the context of business processes • Application of requirements engineering techniques • Development of IT solutions • Requirements and procedures for the introduction of operational application systems • Customizing of Business Application Systems • Aspects of organizational development • Evaluation of economic aspects
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	Practical course with 2 semester course hours (SWS)
Literature references	/1/ Specific, thematic sources
Learning materials	Practical assignments
Learning formats	Project
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS

Study semester	7th
Prerequisites	Modules up to and including the 4th semester as well as (depending on the concrete problem) the module "Operational Application Systems".
Prerequisites for awarding credit points	Presentation and report/documentation
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.)
ECTS credits	6
Workload	Hours in class: 2 SWS => 30 h Self-study/preparation Lectures: 150 h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Bachelor thesis and colloquium

Department	Engineering and Management
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) Environmental Technology and Development (B. Sc.) Environmental Technology (B. Sc.)
Module name	Bachelor thesis and colloquium
Module code	WI-B.730
Module type	Core module
Module coordinator	Respective supervisor
Learning objectives	Goal- and decision-oriented processing of a complex task in a job-relevant environment
Content	Independent solving of a subject-specific topic with the help of scientific working techniques. This included the research and presentation of the state of the art, the development of the necessary theoretical basics, the problem-oriented and independent development of proposed solutions, the presentation and interpretation of the results. Presenting the findings to a specialist audience in presentations and discussions.
Literature references	/1/ Bänsch, A.: Wissenschaftliches Arbeiten – Seminar- und Diplomarbeiten, Oldenbourg Verlag, München Wien, 2003 8. Auflage, /2/ Scheld, G. A.: Anleitung zur Anfertigung von Praktikums-, Seminar- und Diplomarbeiten sowie Bachelor- und Masterarbeiten, Fachbibliothek Verlag, Büren, 2015, 8., aktualisierte Auflage /3/ Franz, S.: Wissenschaftliche Arbeiten mit Word 2013, Vierfarben Verlag, Bonn, 2013
Learning materials	Instructions for Bachelor thesis, technical literature, company publications
Learning formats	Independent processing of a task with scientific working techniques
Programme level	Bachelor
Start of programme (WS/SS)	WS and SS
Study semester	7th

Prerequisites	Proof of successful participation in all module examinations up to and including the 6th semester and the practical semester assigned to the course of study.
Prerequisites for awarding credit points	Submission of a bachelor thesis with at least a grade of "sufficient" and successful participation in the colloquium
ECTS credits	12 (Bachelor thesis) + 3 (Colloquium)
Workload	360 h + 90 h
Module usage	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) Environmental Technology and Development (B. Sc.) Environmental Technology (B. Sc.)
Module duration	1 semester
Location	Company, EAH Jena or other institutions
Language(s) of instruction	German or English

Module specification Mindfulness Based Student Training (MBST)

Department	Social Work
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.) Environmental Technology and Development (B.Sc.) Social Work (B.A.) Business Administration (B.A.) Business Information Systems (B.A.) Integral Module study
Module name	„**Mindfulness Based Student Training (MBST)**" Integrative study module
Module code	Social Work: 1.125.8 Engineering and Management: WI-B.763 Business Administration: B-GE-WF-08
Module type	Elective module Integrative study module (departments Social Work + Engineering and Management) Elective module (department Business Administration)
Module coordinator	Prof. Dr. Mike Sandbothe
Further module coordinators	Prof. Dr.-Ing. Burkhard Schmager Prof. Dr. Heiko Haase
Learning objectives	Professional Competencies: Upon completion of the module, students will be able to reflect the fundamentals of modern stress and resilience research and the current state of interdisciplinary (especially neurobiological) mindfulness research, critically assess them and evaluate and apply them both to their own study process and to their future careers. In addition, they have acquired basic knowledge of conflict resolution, communication, leadership and learning strategies. Interdisciplinary competences: After successful participation in the module, the students are able to consciously steer their own attention as a meta-competence and use it in a targeted way in order to develop social key competences such as respect, tolerance and compassion as well as personal key competences such as self-confidence and self-determination. In addition, mental clarity and the ability to clarify priorities are specifically promoted, especially under digital conditions (e.g. multitasking routines). In the course, students learn to work in mixed teams with people from other disciplines methodically and consciously in an attentive manner. For this purpose, communication and conflict

| | resolution strategies are taught and learning strategies are practiced which enable the cognitive space for new information to be sustainably expanded and ambivalence competence and ambiguity tolerance to be specifically strengthened.

A systemic awareness configured through mindfulness training, as it is conveyed in this module, helps to deal appropriately with complex issues, to recognise distant effects and to optimise the intellectual horizon for more than one perspective.

On this basis, central competences are trained that are required for systemic leadership behaviour in times of complex social, economic, technological and political transformation processes. Harvard psychologist Ellen Langer and MIT management researcher Otto Scharmer have pointed this out in their relevant publications.

In particular, the following competences are to be taught in addition to the technical competences:

Methodological competencies
The students...
... can use different techniques of the MBST with and without instructions
... can apply conflict resolution strategies
... can use special communication techniques

social competencies
The students...
... can develop more respect, tolerance and compassion

personal skills
The students...
... have an improved way of dealing with stress
...strengthen their psychic resilience,
... are more attentive and creative
... have an improved ability to concentrate
... can learn in a more sustainable, effective and brain-friendly way |
|---|---|

Content	In the developing digital society of the 21st century, communication processes at universities are also accelerating. More and more students are suffering from chronic stress with corresponding consequences for their health. This is shown by the current AOK study "Student Stress in Germany" (2016), which concludes that students overall feel more stressed than the average of employees in Germany. Mindfulness is a tool for effectively meeting the challenges of this development. Medical studies show that an attentive attitude improves the handling of stress and increases mental resilience. Furthermore, it contributes to a sustainable balance of body, mind and soul and supports mental concentration and creativity. Consciously practiced mindfulness represents a new cultural technique which can be regarded as the decisive basis of a successful educational system in the 21st century. The following contents are to be conveyed in the module: Mindfulness competence - Status of interdisciplinary (especially neurobiological) mindfulness research - established mindfulness techniques of the MBSR program - Mindfulness as meta-competence and resilience factor - Application of mindfulness to various fields of action stress competence - moderating stress research - Stress development and stress consequences - stress prevention - Application to various fields of action conflict resolution competence - conflict situations - Conflict reactions and patterns - conflict prevention - Application to various fields of action Leadership and communication skills - mindful leadership - Mindfulness in organizations - Mindful staff management Learning and examination competence

	- Methods of mindful exam preparation - Examination situations without stress and anxiety
Teaching formats **L**ecture**, T**utorial**, S**eminar**, Lab** Work **(SWS)**	Seminar **S**, combined with team teaching
Literature references	• Albrecht, R. (2015): Achtsamkeitstraining, Gesundheitsförderung und Prävention. In: Wozu gesund? – Prävention als Ideal. Kritisches Jahrbuch der Philosophie, Königshausen & Neumann, Würzburg, 125-139. • Horx, M. (2015): Gibt es einen Megatrend Achtsamkeit? Zukunftsreport 2016, Jahrbuch für gesellschaftliche Trends und Business-Innovationen, Zukunftsinstitut, Frankfurt a.M. • Ie, A./Ngnoumen, C./Langer, E.J. (2014): The Wiley Blackwell Handbook of Mindfulness, Wiley Blackwell, Oxford. • Kabat-Zinn, J. (1990): Gesund durch Meditation, Knaur, München. • Langer, E.J. (1997): The Power of Mindful Learning. Da Capo Press, Cambridge. • Sandbothe, M. (2015): Wozu „Gesundes Lehren und Lernen"? In: Wozu gesund? – Prävention als Ideal. Kritisches Jahrbuch der Philosophie, Königshausen & Neumann, Würzburg, 105-123. • Scharmer, C. Otto (2009): Theorie U. Von der Zukunft her führen, Auer, Heidelberg. • Siegel, D.J. (2014): Das achtsame Gehirn, Arbor, Freiburg.
Learning materials	Handouts
Learning formats	Power point presentation, group work, dyad work, methodical exercise practices
Programme level	Bachelor
Start of programme (WS/SS)	Annually (in WS)
Study semester	SW: Students in 5th/6th semester EM: Students from the 4th semester onwards BW: Students from the 1st semester onwards
Prerequisites	None
Prerequisites for awarding credit points	Social Work: Presentation, project diary, written elaboration for project presentation

	Engineering and Management: Project Diary, Homework Business Administration: Project Diary All participants*: active participation in the seminar, daily practice of mindfulness techniques at home during the examination period, regular documentation of the practice and participation in the medical and social-scientific evaluation (7 measurements) for a period of up to about one year.
Module usage	Engineering and Management Business Administration
ECTS credits	Social Work (SW): 6 Engineering and Management (EM): 3 or 6 Business Administration (BA): credit for optional module
Workload Hours in class: Self-study:	BA/EM: 90h SW: 180h 30h (2 SWS) BA/EM: 60h SW: 150h
Module duration	1 semester
Location	EAH Jena
Course time	According to timetable
Language(s) of instruction	German

Module specification Integrative Study Module Human Factors & Work Design

Department	Engineering and Management
Involved departments	Social Work (SW)
Study programme	Industrial Engineering and Management (B.Sc.) Industrial Engineering and Management - International (B.Sc.) Industrial Engineering and Management - Digital Economy (B.Sc.) E-Commerce (B.Sc.) Social Work (B.A.)
Module name	Human Factors & Work design
Module code	WI-B.752 SW 1.125
Module type	Elective module (integrative study module)
Module coordinator	Prof. Dr.-Ing. Burkhard Schmager
Further module coordinator	Prof. Dr. Heike Ludwig
Learning objectives	The main issue of the Integrative Module "Human Factors & Work Design" is to give students from various disciplines of the university (Industrial Engineering and Social Work as well as other engineering students if necessary) insights into other fields and their methods and to impart knowledge on interdisciplinary task processing. After completing the module, the students will have basic knowledge of fundamentals and interrelationships in the field of Human Factors and Ergonomics with a focus on work design from an economic-technical and social-science point of view. The students will know about basic definitions and usage of terms of different disciplines in the field of Human Factors & Ergonomics and work design as well as the communication culture of related disciplines. Students will be familiar with methods for work analysis and work design. In addition, using methods and procedures for work system analysis, work system planning, ergonomic design and elements of work psychology (e.g. motivation, conflict situations), students are able to examine a workplace from the perspectives of the various disciplines. Furthermore, they can discuss, analyse and evaluate the results obtained in the field of work design. By understanding and applying the acquired knowledge, a transfer of knowledge takes place that goes beyond the specific specialist competences of the study programme.

	They can recognise complex tasks in work design in the technical, economic and social context and they are able to solve them in an interdisciplinary, holistic and methodical way. Through the independent planning and execution of the project work in accompanied and independent work phases, the students have important competencies for working in small projects: among other things, the students are: - able to conduct basic research and they are able to structure and evaluate the results, - able to use presentation techniques to present results in a goal oriented way, - able to organize their own work processes under time restrictions, - are enabled - through the work in mixed teams - to cooperate with team members from other disciplines.
Content	**Systematics and fundamentals of Human Factors and Ergonomics** o Scientific approach and tasks of work science o Human Beings and Work System o Basics in Physiology **Work Psychology and Work Organization** o Work motivation (theories by Maslow, Herzberg or Heider) o Understanding conflicts o Working time regulations o job evaluation and payment **Concept of Load and Stress Factors** o Fundamentals o Influencing factors of load and strain o Measurement of influencing factors o Application of the concept **Work design and occupational health and safety** o Concept and criteria of work system design o Design of workplace and environment (anthropometry, physiological work design, environmental factors: climate, noise, lighting, colour) o Occupational safety and health protection in the company **Fundamentals of Empirical Research in Social Science** o Design of questionnaires o Conducting and evaluating interviews
Literature references	/1/ Freivalds, Andris: Niebel`s Methods, Standards and Work Design. Mc Graw Hill, 13thEd, New York 2014 /2/ Gerring, R.J./ Zimbardo, P.G.: Psychologie, Pearson Studium, München 2016

	/3/ Häder, M.: Empirische Sozialforschung, VS Verlag für Sozialwissenschaften, 2. Überarbeitete Auflage 2010
	/4/ Landau,K./Bokranz, R.: Produktivitätsmanagement von Arbeitssystemen, Schäffer-Poeschel 2006
	/5/ REFA (Hrsg.): Methodenlehre der Betriebsorganisation, München 1997
	/6/ Schmager, B.: Gefährdungsbeurteilung - GB7, Reihe Pocket Power, München 1998
	/7/ Schmager, B.: Arbeitsschutzmanagement - Leitfaden zur Einführung, München 1999
	/8/ Jastrzebska-Fraczek, I./ Schmidtke, H.: Ergonomie, München 2013
	/9/ Schlick, M./ Bruder, R./ Luczak, H.: Arbeitswissenschaft, 4. Aufl., Springer Verlag 2018
	/10/Ulich, E.: Arbeitspsychologie, 7. Aufl., vdf Verlag, 2011
Teaching formats **L**ecture**,** **T**utorial**,** **S**eminar**,** **Lab** Work **(SWS)**	Seminar **S** with 2 semester course hours (SWS)
Learning materials	Script, case studies, white board, power point slides
Learning formats	Seminar, small group work, project based learning
Programme level	Bachelor
Study semester	SW: Students from the 5th semester onwards EM: Students from the 6th semester onwards
Prerequisites	SW: completed module SW.1.114 (completed practical semester) EM: completed practical semester
Prerequisites for awarding credit points	Project diary in the form of group protocols, presentation including written documentation
ECTS credits	6

Workload
  - Hours in class: (SWS):
  - Self-study (h):
	180h
	 2 SWS (30h)
	 150 h

Start of programme (WS/SS)	Once a year (winter semester)
Module duration	1 semester
Location	EAH Jena
Language(s) of instruction	German