



Program and Course Description

Engineering and Management

Bachelor of Engineering (B. Eng.)

Study Regulation: WS 2015/16

as per: 13.02.2026

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1 Overview

Name of the program	Engineering and Management
Study type & degree	Bachelor of Engineering (full time)
First start date	WS 15/16; Start only in winter semester
Standard period of study	7 Semesters (210 ECTS, 148 SWS)
Study location	THI-Campus in Ingolstadt
Language of instruction	English
Cooperation	None
Admission requirement	University entrance qualification
Capacity	55 students p.a.
Program director	Prof. Dr. Andrea Eisenberg Tel.: +49 841 9348-3525 Raum: N112 E-Mail: Andrea.Eisenberg@thi.de

2 Introduction

The text describes the current state of the program modules in the bachelor's degree "Engineering and Management" according to its Study and Examination Regulation (German: SPO "Studien- und Prüfungsordnung").

The course description (German: "Modulhandbuch") provides the objectives and content of the individual compulsory modules and a breakdown of SWS (semester hours per week) per module and semester.

2.1 Objectives

The Bachelor of Engineering program "Engineering and Management" of Technische Hochschule Ingolstadt addresses students who intend to work for international companies in functions that require both, an engineering background as well as a thorough understanding of management practices.

The objective of the bachelor's degree "Engineering and Management" is to teach the expertise, methodological competence and social skills that enable students to independently apply scientific findings and methods and to act responsibly in the workplace and society in the occupational field of industrial engineering. Graduates are to be qualified to take on tasks in international enterprises and/or cross-border tasks.

2.2 Admission Requirements

The student's eligibility for the Bachelor's degree "Engineering and Management" is demonstrated by evidence of the general conditions according to the Ordinance on the Eligibility for Studying at the Universities of the Free State of Bavaria and the State-Recognized Non-State Universities (Eligibility Ordinance - QualV) of 2nd November 2007 (Law and Order Gazette 2007, p. 767, Bavarian Collection of Laws 2210-1-1-3-UK/-WFK) in its current version.

The binding regulations for this curriculum can be found in:

- Study and Examination Regulations (SPO) for the Bachelor's degree program "Engineering and Management" (B. Eng.) as of 24.11.2014.
- „Allgemeine Prüfungsordnung“ (APO) of Technische Hochschule Ingolstadt.
- „Immatrikulationssatzung“ of Technische Hochschule Ingolstadt.

The sequence of studies is influenced by the regulations of the Study and Examination Regulations ("Studien- und Prüfungsordnung").

2.3 Preliminary internship

The study program requires a preparatory internship (German: “Vorpraxis”) of at least 6 weeks, which must be completed before the start of the 4th semester (during semester breaks).

The preparatory internship is not part of our admission requirements.

2.4 Target Group

The program addresses prospective students,

- who would like to work as engineers at the interface between technology and business administration.
- who are enthusiastic about the development, production, purchasing and sales of products and services.
- with interest in interdisciplinary studies at the interface of technology, economy and sociology with a strong focus on the current state of foresight research and challenges of the future.
- that prefer a master's program fully taught in English, like to gain intercultural experience and go for an international career at home and abroad.

2.5 Structure of the program

The standard period of study is seven semesters. The course is divided into two study sections. The first part of the course comprises two theoretical semesters. The second part of the program comprises four theoretical and one practical semester, which is the fifth semester.

The practical training or preliminary work according to §9 of the THI matriculation statute is required.

The following figure shows the curriculum.

1. Semester			
Mathematics 1	Computer Science	Material Science	
Business Administration	Start-Up Project	Foreign Language 1	
2. Semester			
Mathematics 2	Mechanical Design 1	Physics	
Financial Accounting	Production Systems	Foreign Language 2	
3. Semester			
Software Development	Engineering Mechanics	Mechanical Design 2	
Cost Accounting	Automation Technologies	Foreign Language 3	
4. Semester			
Electrical Engineering	Power Engineering	Controlling	
Marketing	Production Planning & Logistics	Selected Topics in International Management	
Business Information Systems			
5. Semester			
Industry Internship		Seminar	
6. Semester			
Intercultural Studies	Project	Project- and Quality-Management	Electives
7. Semester			
Electives	Seminar	Bachelor's Thesis	

In the first two semesters, the modules are offered in both English and German. Each student is free to choose which modules they attend.

An overview of the German-language modules can be found in the table below:

Nr.	Module (English)	Module (German)
1.	Mathematics 1	Mathematik 1
2.	Mathematics 2	Mathematik 2
3.	Selected Topics in Physics	Physik
4.	Computer Science	Ingenieurinformatik
5.	Mechanical Design 1	Technische Mechanik 1
6.	Material Science	Werkstofftechnik
7.	Business Administration	Allgemeine Betriebswirtschaftslehre und VWL
8.	Financial Accounting	Bilanzierung
9.	Production Systems	Produktionstechnik
10.	Start-up Project	Projekt Führung und Gründung von Unternehmen

For the German-language module descriptions, please refer to the module handbook for the Bachelor's degree program in "Wirtschaftsingenieurwesen" (B-WI).

2.6 Prerequisites for advancement

Only students who have earned at least 42 ECTS credit points from the modules in the first part of the course are entitled to enter the second part of the course.

Only students who have achieved a grade of "sufficient" or higher in all the examinations and essential assessments done during the course in the first part of the course and have earned at least 20 ECTS credit points from the compulsory modules in the second part of the course are entitled to enter the practical studies semester.

2.7 Industry internship

The practical studies semester in the second part of the course lasts 20 weeks and is accompanied by classes.

The practical studies semester must be completed in a non-German speaking foreign country. Alternatively, the practical studies semester may be completed in German-speaking countries if a connection to international business is guaranteed (e.g., through work in the areas of international product management, global product development, international marketing, international production and logistics).

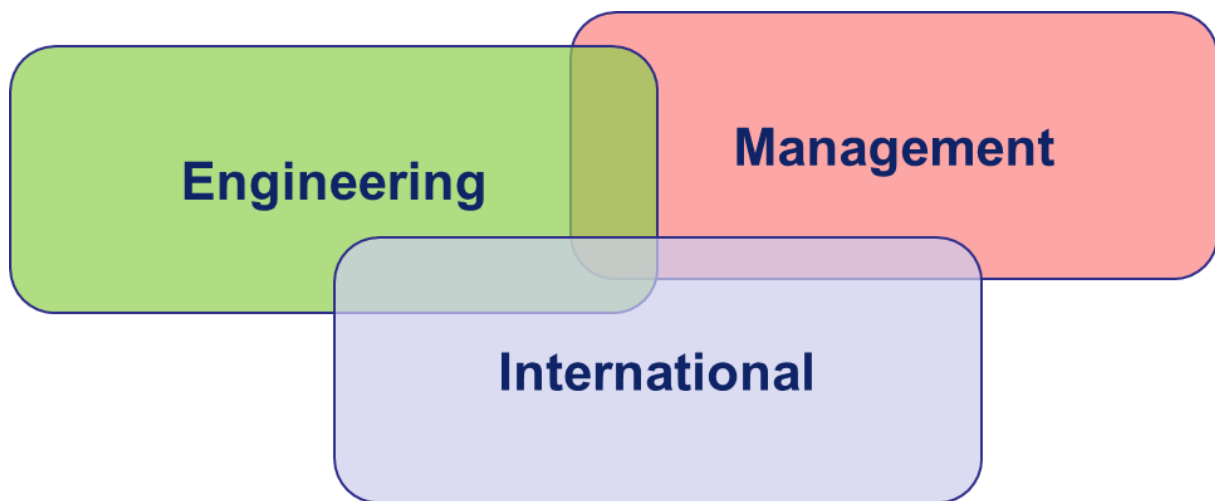
2.8 Concept

The program was established in the winter term 2015/2016.

The concept was built on the already well-established German-speaking course “Wirtschaftsingenieurwesen”. In addition, international aspects were included.

3 Qualification Profile

The program provides a sound engineering education with modules such as engineering mechanics, material sciences, mechanical design, computer science, mathematics, software development and electrical engineering. Besides, above mentioned job requirements regarding management know-how are met by lectures such as accounting, marketing and controlling. In addition to those competencies, “soft skills” are trained, e.g., by team projects and student presentations.

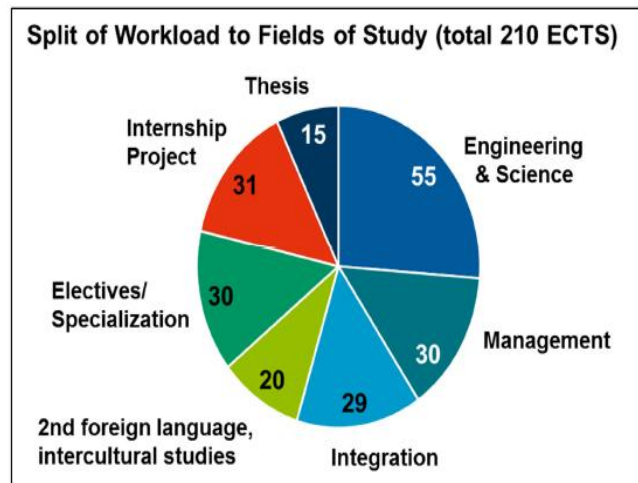


The studies also prepare students for international projects and positions. Specific modules such as “Intercultural studies”, “Selected topics in international management” and a second foreign language are part of the curriculum.

Students gain further international exposure by studying abroad at one of our partner universities. Internships, which are scheduled during the 5th semester, help to gain work experience as well as business contacts that may lead to future employment.

Last-but-not-least, lectures are taught in English - the language of international business. While attending lectures taught in the English language, students are encouraged to learn German as their second foreign language (courses scheduled during semesters 1, 2 and 3).

The total workload amounts to 210 ECTS. The curriculum consists of seven fields of study:



3.1 Mission Statement

The program integrates the guiding principle of teaching in the following way:

We prepare our students for the challenges of the future:

- It is an interdisciplinary program, which enables students to develop future-oriented solutions for interdisciplinary challenges.
- It qualifies students to help shape social changes such as the digital transformation and technological change. It sensitizes students to the sustainable use of the environment and resources, to socially responsible behavior and to social commitment.
- Personal development and team skills at the interface between technology and business are actively challenged and promoted.

We enable our students to develop solutions to problems based on scientific knowledge:

- High share of engineering modules in the curriculum, especially in the first stage of study.
- Technical and methodological competence in both technical and management modules in both study parts.
- Team skills and social skills are developed at the interface between technology and management, through internships, project work, elective modules and general scientific modules.

We open outstanding regional and international perspectives for our students:

- The bachelor program is fully taught in English, addresses international students and creates intercultural competences.
- In this way, the program contributes to a cosmopolitan, international campus.
- Our numerous cooperations with companies in the region enable our students to start their careers in the best possible way, both regionally and internationally.

We help all students discover and realize their individual potential:

- the bachelor program is international and intercultural. Hence, the program promotes performance in an appreciative cooperation. We meet each other with tolerance and openness and understand diversity as an opportunity to learn from each other and develop further.
- through the individual dialogue with lecturers, consisting of professors from the TH Ingolstadt and selected lecturers from research and industry.

3.2 Study Objectives

3.2.1 Subject-specific Competencies

The students acquire in-depth knowledge in the areas of engineering and management.

The studies also prepare students for international projects and positions. Specific modules such as “Intercultural studies”, “Selected topics in international management” and a second foreign language are part of the curriculum.

3.2.2 Interdisciplinary Competencies of the Study Program

Methodical competences:

The graduates are able:

- to work scientifically.
- to plan, compile and lead projects.
- to analyze interdisciplinary problems, to recognize comprehensive correlations, to transfer learned competences to new tasks and to evaluate the technical, economic and social impact of compiled solutions.

Social competences:

The graduates are able:

- to compile complex tasks in cross-functional and international teams, to solve conflicts in teams and to lead teams.
- to speak English fluently (incl. technical terms) and to react sensitively in intercultural affairs.
- to communicate their competences and to communicate generally.
- to convince and to become accepted.

Self-competence:

The graduates are able:

- to organize themselves and to manage their time.
- to have analytical and outcome-oriented intellectual power.
- to work target-oriented and autonomously.
- to present their results and themselves.

3.2.3 Examination Concept of the Program

The modules / examination subjects are specified in accordance with the curriculum including the type of examination and, in addition to written examinations, mainly consist of study work with colloquium, practical work, seminar work, project work, presentation and oral examination. The technical and business modules of the first part of the course are usually examined in writing.

When developing the course, care was taken to ensure that a sensible mix of different types of exams is used. The triad of technology - business - interdisciplinary also forms the framework for the exams.

Module	Form of examination
Mathematics 1	schrP
Computer Science	schrP
Physics	schrP
Business Administration	schrP
Start-up project	PA
Foreign Language 1 (German or English)	LN
Mathematics 2	schrP
Mechanical Design 1	schrP
Material Science	schrP
Financial Accounting	schrP
Production Systems	schrP
Foreign Language 2 (German or English)	LN
Software Development	schrP
Engineering Mechanics	schrP
Mechanical Design 2	SA
Cost Accounting	schrP
Automation Technology	schrP
Foreign Language 3 (German or English)	LN
Electrical Engineering	schrP
Power Engineering	schrP
Controlling	schrP
Marketing	schrP
Selected Topics in International management	mdIP
Production Planning and Logistics	schrP
Industry Internship	PrB
Seminar	LN
Project and quality management	schrP
Intercultural Studies	StA
Business Information Systems	schrP
Project	PA
Electives in Engineering and Management	6 LN

Bachelor Thesis Seminar	Koll
Bachelor Thesis	BA

3.2.4 Practical relevance of the program

All lecturers have a long-standing background in industry and / or an above-average academic qualification. The methods learned are used in projects in the following semesters. In addition, the practical semester, and a Bachelor thesis, usually written in cooperation with industry, ensure the application relevance.

3.2.5 Contribution of individual modules to the objectives of the program

Module	Professional competencies	Methodological competencies	Social competencies	Personal competencies
Mathematics 1	++	+	o	o
Computer Science	++	+	o	o
Mechanical Design 1	+	++	o	+
Business Administration	+	++	+	o
Start-up project	+	+	++	++
Foreign Language 1	o	++	++	o
Mathematics 2	++	+	o	o
Physics	++	+	o	o
Material Science	++	+	o	o
Financial Accounting	++	++	o	o
Production Systems	+	+	o	+
Foreign Language 2	o	++	++	o
Software Development	+	++	o	+
Engineering Mechanics	+	++	o	+

Mechanical Design 2	+	++	0	+
Cost Accounting	+	++	0	0
Automation Technology	++	++	0	0
Foreign Language 3	0	++	++	0
Module	Professional competencies	Methodological competencies	Social competencies	Personal competencies
Electrical Engineering	++	++	0	0
Power Engineering	++	++	0	0
Controlling	+	++	0	+
Marketing	+	+	++	++
Selected Topics in International management	+	++	0	+
Production Planning and Logistics	+	++	+	+
Industry Internship	+	+	++	++
Seminar	+	++	+	++
Project and quality management	+	++	+	0
Intercultural Studies	0	+	++	++
Business Information Systems	+	+	0	+
Project	+	+	++	++
Electives in Engineering and Management	++	++	++	++
Bachelor Thesis Seminar	+	++	0	++
Bachelor Thesis	+	++	++	++

3.3 Possible professional fields

The program is designed to allow graduates to succeed in inter-disciplinary jobs in an international environment. Graduates of this program are in great demand. There is a wide field of application in specialist or management roles in national or international companies and organizations.

Graduates are especially well prepared to take on specialist and management roles in the following areas:

- International Product Manager
- Cost Engineer
- Industrial Engineer, especially for companies with international production network
- Manager International Project
- Strategic Purchasing Manager
- Assistant to board member
- International Sales Manager, esp. for high-tech products
- Management Consultant
- Team leads global functions, e.g., purchasing, IT, planning.

4 Dual Studies

In cooperation with selected industry partners, the study program can also be completed in dual studies model. The dual study model is offered as a study program with in-depth practice, in which the regular study program is supplemented by intensive practical phases in a company. It is also offered as „Verbundstudium“ (combined dual study program), which combines university studies with a regular vocational training/apprenticeship.

In dual study model, academic and practical phases (especially during semester breaks and for the final thesis) regularly alternate during study. The lecture times in the dual study model correspond to the standard study and lecture times at the THI.

By having a significantly longer practical period, by benefitting from a linking of corporate topics with the contents of selected modules and by attending modules adapted specifically to the needs of dual study programs, students develop strong general practical competencies but also company-, domain- and sector-specific competencies. Additionally, to subject matter competencies also elements of personal development such as an assertive presence, presenting, working in teams and organizing work are trained and promoted in this study program. Thereby, graduates of this study program adapt more easily and fast to divisions, projects and processes of companies.

The curriculum of the two dual degree program models differs from the regular degree program concept in the following points:

- **Preliminary practice and practical semester in a cooperating company**
In both dual study models, the preliminary practice for the study program and the practical semester are carried out in the cooperating company.
- **Dual modules**
Separate FW subjects are regularly offered for dual students in the degree program. These courses are held at the university or a dual partner. Separate projects and separate practical seminars are also offered for dual students. Projects and practical seminars can be credited for competencies acquired outside of the university in the company as a place of learning. Where possible, individual courses are held by lecturers from the cooperation companies.
- **Final thesis in the cooperation company**
In both dual study models, the final thesis is written at a cooperating company, usually on a practice-relevant topic related to the focus of study.

Organizationally, the two dual degree program models are characterized by the following components:

- **Introductory track**
As part of the obligatory introductory week at the beginning of the program, a separate event is offered for dual degree students.
- **Mentoring**
The central contact persons for dual students in the faculty are the respective program head of studies. They organize an annual mentoring meeting with the dual students of the respective study program.

- **Quality management**

In the evaluation and surveys at the THI on the quality assurance of the dual study separate question blocks are included.

- **„Forum dual “**

Organized by the Career Service and Student Counseling (CSS), the “Forum Dual” takes place once a year. The “Forum dual” promotes the professional-organizational exchange between the dual cooperation partners and the faculty and serves to ensure the quality of the dual study programs. All cooperation partner in the dual study program as well as representatives and dual students of the faculty are invited to the meeting.

Formal-legal regulation for dual studies for all degree programs of the THI are regulated in the APO (see §§ 17, 18 und 21) and the enrollment statutes (see §§ 8b und 18).

According to the above description, the following modules are different for dual students:

- Start-Up Project (5 ECTS)
- Marketing (5 ECTS)
- Production Planning and Logistics (5 ECTS)
- Project- and Quality-Management (5 ECTS)
- Project (5 ECTS)
- Internship (24 ECTS)
- Praxis-Reflexion für Dual-Studierende (FW) (2,5 ECTS)
- Strategic Management (FW) (5 ECTS)
- CAD/CAM für Zerspanung, 3D-Druck und Robotik (FW) (5 ECTS)
- Digital Factory Basics (FW) (5 ECTS)
- Qualitätssicherung (FW) (5 ECTS)
- Bachelor Thesis Seminar (3 ECTS)
- Bachelor Thesis (12 ECTS)

More detailed description can be found in the corresponding module description.

5 Description of Modules

5.1 Compulsory Modules

Mathematics 1			
Module abbreviation:	MA1_EGM_E	SPO-No.:	1
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory subject	1
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only winter term
Responsible for module:	Schlickewei, Ulrich		
Lecturers:	Schlickewei, Ulrich		
Credit points / SWS:	5 ECTS / 5 SWS		
Workload:	Contact hours:	58 h	
	Self-study:	67 h	
	Total effort:	125 h	
Subjects of the module:	1-Mathematics		
Lecture types:	SU/Ü-Lecture with exercises		
Examinations:	schrP90 - written exam, 90 minutes		
	Further information: None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
Students: • have developed their ability to recognize which questions in engineering sciences can be tackled by mathematical methods and are able to post such questions themselves. • understand the logical way of reasoning, distinguish between a premise, a consequence, and a rule, and, furthermore, can build a line of argument within engineering applications. • recognize known types of problems both in familiar and in new contexts, can solve such problems using known methods. • understand the mathematical language used in the engineering literature and can describe in both oral and written form their own reasoning and solution approaches. • have acquired confidence in handling the introduced mathematical methods.			
Content:			
• Complex numbers: basics, rules, applications • Sequences and series: basics, convergence, applications • Real functions of a single variable: basics, elementary functions, limits and continuity			

- Differential calculus in R: derivatives, rules of differentiation, applications
- Power series: basics, Taylor development, radius of convergence, applications
- Integration in R: basics, methods of integration, applications

Literature:

- STRANG, Gilbert, 2010. *Calculus*. Wellesley, Mass.: Wellesley-Cambridge Press. ISBN 978-0-9802327-4-5
- STEWART, James, 2016. *Calculus*. Belmont, Calif.: Thomson Brooks/Cole. ISBN 978-1-305-26672-8, 1-305-26672-2
- HARTMAN, Gregory, FITZPATRICK, Sean, JORDAN, Alex, VOLLET, Carly, 2018. *APEX Calculus 1* [online]. PDF e-Book. ISBN 978-1719219594. Available via: <https://opentext.uleth.ca/apex-calculus/apex-calculus.html>.
- HARTMAN, Gregory, FITZPATRICK, Sean, JORDAN, Alex, VOLLET, Carly, 2018. *APEX Calculus 2* [online]. PDF e-Book. ISBN 978-1719263382. Available via: <https://opentext.uleth.ca/apex-calculus/apex-calculus.html>.
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- HARTMAN, Gregory, STITZ, Carl, ZEAGER, Jeff, FITZPATRICK, Sean, 2024. *Elementary Linear Algebra* [online]. PDF e-Book. Available via: <https://opentext.uleth.ca/Math1410/>.
- ARENS, Tilo, 2015. *Mathematik* [online]. Berlin [u.a.]: Springer Spektrum PDF e-Book. ISBN 978-3-642-44919-2, 978-3-642-44918-5. Available via: <https://doi.org/10.1007/978-3-642-44919-2>.
- WEITZ, Edmund and Heike STEPHAN, 2021. *Konkrete Mathematik (nicht nur) für Informatiker: mit vielen Grafiken und Algorithmen in Python*. Berlin: Springer Spektrum. ISBN 978-3-662-62617-7
- KOCH, Jürgen and Martin STÄMPFLE, 2018. *Mathematik für das Ingenieurstudium*. München: Hanser. ISBN 978-3-446-45166-7, 3-446-45166-8

Additional remarks:

There will be voluntary intermediate tests. With these a maximum of 10% of bonus points for the final exam can be accumulated.

Mathematics 2			
Module abbreviation:	MA2_EGM_E	SPO-No.:	2
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory subject	2
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only summer term
Responsible for module:	Schlickewei, Ulrich		
Lecturers:	Schlickewei, Ulrich		
Credit points / SWS:	5 ECTS / 5 SWS		
Workload:	Contact hours:	58 h	
	Self-study:	67 h	
	Total effort:	125 h	
Subjects of the module:	2-Mathematics		
Lecture types:	SU/Ü-Lecture with exercises		
Examinations:	schrP90 - written exam, 90 minutes		
	Further information: None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
Mathematics 1			
Objectives:			
Students: • have further developed their ability to recognize which questions in engineering sciences can be tackled by mathematical methods and are able to post such questions themselves. • understand the logical way of reasoning, distinguish between a premise, a consequence, and a rule, and, furthermore, can build a line of argument within engineering applications. • recognize known types of problems both in familiar and in new contexts, can solve such problems using known methods. • understand the mathematical language used in the engineering literature and can describe in both oral and written form their own reasoning and solution approaches. • have acquired confidence in handling the discussed mathematical methods.			
Content:			
• Basic linear algebra: vectors, matrices, linear systems of equations, determinants, inverse matrices • Eigenvalues and eigenvectors of matrices, diagonalization, quadratic forms, applications • Ordinary differential equations: basics, solution methods, applications			

- Differentiation in $\mathbb{R}^n$: basics, rules, applications
- Integration in $\mathbb{R}^n$: basics, methods of integration, applications
- Curves: basics, vector analysis, applications

Literature:

- STRANG, Gilbert, 2017. *Calculus*. Wellesley, MA: Wellesley-Cambridge Press. ISBN 978-0-9802327-5-2
- STEWART, James, 2016. *Calculus*. Belmont, Calif.: Thomson Brooks/Cole. ISBN 978-1-305-26672-8, 1-305-26672-2
- STRANG, Gilbert, 2021. *Introduction to linear algebra*. Wellesley: Cambridge Press. ISBN 978-1-7331466-5-4, 1-7331466-5-2
- LAY, David C., Steven R. LAY and Judi J. MCDONALD, 2022. *Linear algebra and its applications*. Boston: Pearson. ISBN 978-1-292-35122-3
- HARTMAN, Gregory, FITZPATRICK, Sean, JORDAN, Alex, VOLLET, Carly, 2018. *APEX Calculus* [online]. PDF e-Book. Available via: <https://opentext.uleth.ca/apex-calculus/apex-calculus.html>.
- HARTMAN, Gregory, STITZ, Carl, ZEAGER, Jeff, FITZPATRICK, Sean. *Elementary Linear Algebra* [online]. PDF e-Book. Available via: <https://opentext.uleth.ca/Math1410/>.
- ARENS, Tilo, 2015. *Mathematik*. Berlin [u.a.]: Springer Spektrum. ISBN 978-3-642-44918-5, 978-3-642-44919-2
- PAPULA, Lothar, *Mathematik für Ingenieure und Naturwissenschaftler*.
- KOCH, Jürgen and Martin STÄMPFLE, 2018. *Mathematik für das Ingenieurstudium*. München: Hanser. ISBN 978-3-446-45166-7, 3-446-45166-8

Additional remarks:

There will be voluntary intermediate tests. With this a maximum of 10% of bonus points for the final exam can be accumulated.

The final will be a digital written exam in a computer pool.

Selected topics in Physics			
Module abbreviation:	PHYS_EGM_E	SPO-No.:	3
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory subject	2
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only summer term
Responsible for module:	Haug, Thomas		
Lecturers:	Haug, Thomas (PHYS_EGM_E) Polzer, Richard (PHYS_EGM_E_P)		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	3-Selected topics in Physics Selected topics in Physics (admission requirement)		
Lecture types:	SU/Ü/Pr-Lecture with exercises and practical course		
Examinations:	3-Selected topics in Physics: schrP90 - written exam, 90 minutes (PHYS_EGM_E) Selected topics in Physics (admission requirement): LN - participation without/with success (PHYS_EGM_E_P) Further information: Prerequisite for participating in the written examination is a successfully completed practical course (admission requirement): Three laboratory experiments in small groups, each consisting of preparation, execution and report. Written examination (90 minutes) Permitted aids: pocket calculator, not programmable; any written documents (printed or handwritten)		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
PrA - Practical course (Admission requirement) Three laboratory experiments in small groups, each consisting of preparation, execution and report.			
Recommended prerequisites:			
None			
Objectives:			
After participating in the module courses, students can - understand and correctly apply the physical concepts related to kinematics, dynamics, fluid mechanics and thermodynamics. - examine motion and collision processes and to evaluate oscillations.			

- analyse simple flow processes without friction.
- assess and evaluate thermodynamic cycle processes.
- determine simple heat transfer processes between solids and fluids.
- perform selected physical experiments independently and in a team, evaluate and assess the data.

Content:

- Kinematics of the mass point, free fall, horizontal throw
- Dynamics, Newton's axioms, mass, force, gravitation
- Momentum, work, energy, power, conservation of energy, sustainability
- Collision processes: elastic and inelastic collisions
- Rotary motion, torque, angular momentum, analogy of translation and rotation
- Mechanics of rigid bodies, moment of inertia, Steiner's theorem
- Oscillations, harmonic oscillation, free damped oscillation
- Mechanics of liquids and gases, pressure, gravitational pressure, Bernoulli's equation
- Kinetic theory of gases, gas pressure, thermal energy
- 1st law of thermodynamics, heat capacity, change of state of ideal gases
- Thermodynamic cycles
- Heat transfer, convection, thermal radiation, sustainable thermal management

The event includes the following sustainability aspects of the UN (SDGs):
4: Quality Education; 7: Affordable and clean Energy; 13: Climate Action

Literature:

- TIPLER, Paul A., 2007. *Physics for Scientists and Engineers*. ISBN-13: 978-1429202657

Additional remarks:

No additional remarks.

Computer Science			
Module abbreviation:	CS_EGM_E	SPO-No.:	4
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory subject	1
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only winter term
Responsible for module:	Oelker, Martin		
Lecturers:	Oelker, Martin (CS_EGM_E) Oelker, Martin (CS_P_EGM_E)		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	4-Computer Science (CS_EGM_E) Computer Science (admission requirement) (CS_P_EGM_E)		
Lecture types:	SU/Ü/Pr-Lecture with exercises and practical course		
Examinations:	4-Computer Science:		
	schrP90 - written exam, 90 minutes (CS_EGM_E) Computer Science (admission requirement): LN - participation without/with success (CS_P_EGM_E)		
	Further information: Prerequisite for participation in the written examination is a successfully completed practical course.		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
Practical course			
Recommended prerequisites:			
None			
Objectives:			
After completing this module, students will be able to			
• exhibit a practical understanding of the broad and dynamic field of computer science. • apply their knowledge to the basic principles of data processing. • deal with basic terms and key concepts of computing and computer systems. • apply their theoretical understanding of computer networks to the Internet. • adhere to the basic concepts of cybersecurity in their daily use of computers.			
Students are enabled to code simple structures with Python.			
After successful completion of the module they can			

• use different Python GUIs (IDE, Jupyter notebook, Terminal) • write small programs which highlight the use of control structures etc. • use libraries like NumPy and Pandas
Content:
• Information and information representation for automated processing • Concepts of modern computer architectures • General concepts of operating systems • Programming principles and universal concepts of programming languages • Algorithms and data structures • General principles of computer networking • Basic concepts of cybersecurity • Basic concepts: data types, control statements, functions • OOP: classes in Python • Python libraries: NumPy, Pandas
Literature:
• BROOKSHEAR, J. Glenn and Dennis BRYLOW, 2020. <i>Computer Science: an overview</i>. 13. edition. Harlow: Pearson. ISBN 1-292-26342-3, 978-1-292-26342-7 • TANENBAUM, Andrew S. and Todd AUSTIN, 2013. <i>Structured computer organization</i>. Boston, Mass.; Munich [u.a.]: Pearson. ISBN 978-1-299-92455-0, 978-0-273-77533-1 • TANENBAUM, Andrew S. and Herbert BOS, 2015. <i>Modern operating systems</i>. Boston: Pearson. ISBN 978-1-292-06195-5 • TANENBAUM, Andrew S., David WETHERALL and Nick FEAMSTER, 2020. <i>Computer networks</i>. Harlow, United Kingdom: Pearson Education Limited. ISBN 978-1-292-37401-7
Additional remarks:
No additional remarks.

Mechanical Design 1			
Module abbreviation:	MD1_EGM_E	SPO-No.:	5
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory subject	2
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only summer term
Responsible for module:	Tröber, Philipp		
Lecturers:	Tröber, Philipp		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	5-Mechanical Design 1 (MD1_EGM_E)		
Lecture types:	SU/Ü-Lecture with exercises		
Examinations:	5-Mechanical Design 1: schrP120 - written exam, 120 minutes (MD1_EGM_E)		
	Further information: None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
At the end of the course, students are able to - reproduce specific terms, definitions and which standards must be taken into account regarding the creation of technical drawings - create complete and standardized graphic representations of technical components - apply the different projection methods - select tolerances and fits appropriate to function and production - evaluate the mountability of an assembly by a tolerance stack - develop new components and assemblies by linking their knowledge and design them for production			
Content:			
- Symbolic representations used in technical drawings - Projection methods for the graphic representation of technical components and products - All views of a component including sectional views, detailed views			

• Dimensioning of components about function, manufacturing and inspection as well as the associated dimensioning rules • ISO tolerance system, free and general tolerances, shape and position tolerances, tolerance stack-up • Surface specifications • Typical machine elements and standard parts and their graphic representation • Design guidelines for various manufacturing processes • Creation of freehand sketches • Geometrical product specification
Literature:
• GOMERINGER, Roland and others, 2018. <i>Mechanical and Metal Trades Handbook</i>. Haan-Gruiten: Verlag Europa-Lehrmittel, Nourney, Vollmer GmbH & Co. KG. ISBN 978-3-8085-1915-8, 3-8085-1915-0
Additional remarks:
Moodle course with • Lecture notes • Lecture videos • Self-tests • Practice exercises

Material Science			
Module abbreviation:	MATSCI_EGM_E	SPO-No.:	8
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory subject	1
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only winter term
Responsible for module:	Landesberger, Martin		
Lecturers:	Landesberger, Martin (MATSCI_EGM_E) Landesberger, Martin (MATSCI_P_EGM_E)		
Credit points / SWS:	5 ECTS / 5 SWS		
Workload:	Contact hours:	58 h	
	Self-study:	67 h	
	Total effort:	125 h	
Subjects of the module:	8-Material Science (MATSCI_EGM_E) Material Science (admission requirement) (MATSCI_P_EGM_E)		
Lecture types:	SU/Ü/Pr-Lecture with exercises and practical course		
Examinations:	8-Material Science: schrP 90 Min – written exam 90 min. (MATSCI_EGM_E) Material Science (admission requirement): LN - participation without/with success (MATSCI_P_EGM_E)		
	Further information: The admission requirement for the exam is a short presentation of a material science related topic, which is provided by the lecturer. The presentation will be given in front of class.		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After successfully completing the lecture, the students will be able to:			
• explain different types of chemical bonds and metallic lattice structures and can relate them to material properties like plastic formability. • explain the role of dislocations and structural defects in plastic deformation and distinguish between different hardening mechanisms. • understand the principles, temperature and time dependence of diffusion, and can apply them to relevant technical processes. • read and analyse phase diagrams, especially the iron-carbon system, and understand solid-state transformation mechanisms such as martensitic and precipitation reactions.			

• evaluate how nucleation, crystal growth, and heat treatment affect solidification and microstructure, and how these in turn influence material properties. • explain basic material testing methods for mechanical property evaluation (hardness, tensile, fatigue, etc.).
Content:
• Atomic structure and the nature of chemical bonding • Structures of solids, especially metals • Imperfections in real crystals • Plastic deformation in ideal and real crystals, hardening effects by disorders • Diffusion – mechanism, meaning and applications • Phases and phase diagrams • Kinetics of solidification • Kinetics of solid-state reactions – martensitic transformation and precipitation reactions • Materials testing and material properties
Literature:
• ASKELAND, Donald R. and Wendelin J. WRIGHT, c 2016. <i>The science and engineering of materials</i>. Boston, Mass.: Cengage Learning. ISBN 978-1-305-07710-2, 1-305-07710-5 • CALLISTER, William D. and David G. RETHWISCH, 2020. <i>Materials science and engineering: an introduction</i>. 10. edition. Hoboken, NJ: Wiley. ISBN 978-1-119-45391-8 • FISCHER, Traugott, 2009. <i>Materials science for engineering students</i>. Amsterdam [u.a.]: Elsevier, Academic Press. ISBN 978-0-12-373587-4, 0-12-373587-4
Additional remarks:
No additional remarks.

Business Administration			
Module abbreviation:	BA_EGM_E	SPO-No.:	9
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	General Elective Subject	1
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only winter term
Responsible for module:	Eisenberg, Andrea		
Lecturers:	Albrecht, Tobias; Eisenberg, Andrea		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	9-Business Administration (BA_EGM_E)		
Lecture types:	SU/Ü-Lecture with exercises		
Examinations:	9-Business Administration: schrP90 - written exam, 90 minutes (BA_EGM_E)		
	Further information: None		
Usability for other study programs:	None		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
The students - understand (on a high level) the various disciplines of business administration including the respective decision needs. - gain basic knowledge about selected practical business topics, which are not covered in subsequent subjects of the curriculum, including the setup of a company and human resource management. - can evaluate the implications of economics for business decisions. - can calculate and draw demand curve, supply curve and market equilibria as well as can apply the instruments to real life cases. - can analyse the importance of monetary policy, especially can explain the role of the central banks and can calculate a consumer price index and an inflation rate.			
Content:			
Subjects of business administration and economics: economic principle, resources, companies, business as a science			

- Profit generation: the term profit, limitations, balance sheet, profit-/loss statement, shareholder value, entrepreneurial risks, leverage effect
- Production factors (management, labour, means of production, raw material), further differentiation of management activities (leadership, planning, decision making, organization, monitoring)
- Setup of a company: legal form, alliances & partnering, choice of industrial location
- Human resource management: planning, recruiting, personnel layoff, personnel deployment, development, leadership
- Microeconomics: market forms (polypoly, oligopoly, monopoly), price formation in the different market forms, market failure
- Macroeconomics: monetary policy, definition of money, money creation, instruments of central banks, causes and consequences of inflation and deflation, consumer price index and inflation rate, economic welfare, gross domestic profit (GDP), economic growth

Literature:

- MANKIW, Nicholas Gregory and Mark P. TAYLOR, 2023. *Economics*. Andover, Hampshire: Cengage. ISBN 978-1-4737-8698-1

Additional remarks:

No additional remarks.

Financial Accounting			
Module abbreviation:	FINACC_EGM_E	SPO-No.:	10
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	General Elective Subject	2
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only summer term
Responsible for module:	Eisenberg, Andrea		
Lecturers:	Eisenberg, Andrea		
Credit points / SWS:	5 ECTS / 5 SWS		
Workload:	Contact hours:	58 h	
	Self-study:	67 h	
	Total effort:	125 h	
Subjects of the module:	10- Financial Accounting (FINACC_EGM_E)		
Lecture types:	SU/Ü-lecture with exercises		
Examinations:	10-Financial Accounting:		
	schrP90 - written exam, 90 minutes (FINACC_EGM_E)		
	Further information:		
	None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
Students			
- gain an understanding of the theoretical background of financial accounting. - know how to analyse the structure and the positions of a balance sheet and can determine the initial value and the subsequent measurement of balance sheet positions based on different accounting standards. - can solve business problems according to German GAAP and IFRS accounting. - can analyse the content of an annual report. - can prepare balance sheets, profit and loss accounts and cash flow statements for several years.			
Content:			
- Basic principles of accounting - German and European accounting principles and IFRS accounting standards - Balance Sheet: structure and balance sheet positions, initial recognition and subsequent measurement according to German GAAP and according to IFRS			

• Profit and loss accounts: structure and positions, determination of profit according to German GAAP, EU directive and according to IFRS • Accruals accounting • Cash effective and non-cash effective transactions, cash flow statements • Annual reports • Case study: Founding and closing of a firm over six periods, preparation of balance sheet, profit and loss accounts and cash flow statements for each period • Weekly exercise session
Literature:
• WEETMAN, Pauline and Darren JUBB, 2024. <i>Financial accounting: an introduction</i>. Harlow, England: Pearson. ISBN 978-1-292-45706-2 • ALEXANDER, David and Christopher NOBES, 2020. <i>Financial accounting: an international introduction</i>. Harlow, England: Pearson. ISBN 978-1-292-29585-5 • IASB, <i>IAS 1, 16, 36: International Accounting Standards</i>.
Additional remarks:
No additional remarks.

Production systems			
Module abbreviation:	PRODSYS_EGM_E	SPO-No.:	11
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	2
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only summer term
Responsible for module:	Meyer, Roland		
Lecturers:	Meyer, Roland		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	43 h	
	Total effort:	125 h	
Subjects of the module:	11-Production systems (PRODSYS_EGM_E)		
Lecture types:	SU/Ü/Pr-Lecture with exercises and practical course		
Examinations:	11-Production systems: schrP90 - written exam, 90 minutes (PRODSYS_EGM_E)		
	Further information:		
	None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After attending this lecture students will be able to: • know and be secure with the areas, elements and typical terms of production engineering. • know state of art, basic ways of organizing and applying production systems. • understand and asses the concept of added value, waste and profitability in production. • recognize, describe and assess types of machine tools and their applications. • incorporate and contribute to tasks within an industrial production planning department regarding machining areas and assembly tasks. • solve tasks in designing production systems in teams and can present the results. • understand actual digital methods and supports in production systems, the impact and implications of sustainability and apply them to organisation as well as to technology of production systems.			
Content:			
• Introduction • Machine tools			

- Lean manufacturing
- Assembly technology
- Digital manufacturing
- Sustainable production
- Production logistics
- Production training
- Excursion to production company

Literature:

- FREIVALDS, Andris and Benjamin W. NIEBEL, 2014. *Niebel's Methods, standards, and work design*. 13. edition. New York, NY: McGraw-Hill. ISBN 978-0-07-337636-3, 0-07-337636-1
- KOETHER, Reinhard, 2007. *Technische Logistik*. München: Hanser. ISBN 978-3-446-40761-9, 3-446-40761-8
- MARTIN, Heinrich, 2016. *Transport- und Lagerlogistik: Systematik, Planung, Einsatz und Wirtschaftlichkeit*. 10. edition. Wiesbaden: Springer Vieweg. ISBN 978-3-658-14551-4, 3-658-14551-X
- HESSE, Stefan and Viktorio MALISA, 2020. *Grundlagen der Handhabungstechnik*. München: Hanser. ISBN 978-3-446-46335-6
- DANGELMAIER, Wilhelm, 1999. *Fertigungsplanung: Planung von Aufbau und Ablauf der Fertigung Grundlagen, Algorithmen und Beispiele* [online]. Berlin, Heidelberg: Springer Berlin Heidelberg PDF e-Book. ISBN 978-3-642-98045-9, 978-3-642-98046-6. Available via: <https://doi.org/10.1007/978-3-642-98045-9>.
- GOLDRATT, Eliyahu M. and Jeff COX, 2016. *The Goal: A process of ongoing improvement*. Routledge: London and New York. ISBN 978-0-566-08664-9, 978-0-566-08665-6
- KROEMER, Karl H. E., Hiltrud J. KROEMER and Katrin E. KROEMER-ELBERT, 2020. *Engineering physiology: bases of human factors engineering/ergonomics*. Cham, Switzerland: Springer. ISBN 978-3-030-40626-4, 978-3-030-40629-5
- MAYNARD, Harold Bright and others, 2001. *Maynard's industrial engineering handbook*. New York: McGraw-Hill. ISBN 0-07-144927-2, 978-0-07-041102-9
- TAYLOR, Frederick Winslow, 2019. *The principles of scientific management*. Boca Raton: CRC Press; Taylor & Francis Group.
- LIKER, Jeffrey K., 2020. *The Toyota way: 14 management principles from the world's greatest manufacturer*. New York [u.a.]: McGraw-Hill. ISBN 978-1-260-46851-9

Additional remarks:**Bonuspoints System:**

In this lecture there may be tasks which will lead to bonus points to the exams in case of good execution. At maximum 5 bonus points may be given.

Start-up Project			
Module abbreviation:	SuP_EGM_E	SPO-No.:	12
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory subject	1
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only winter term
Responsible for module:	Götz, Heike		
Lecturers:	Eisenberg, Andrea		
Credit points / SWS:	5 ECTS / 5 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	48 h	
	Total effort:	125 h	
Subjects of the module:	12-Start-up Project (SuP_EGM_E)		
Lecture types:	SU/Ü-Lecture with practical exercises		
Examinations:	12-Start-up Project: Project report (SuP_EGM_E)		
	Further information: Introductory part - TOPSIM simulation game (compulsory participation, admission requirement for project part) Project work (compulsory participation in group meetings) with the following components: - Presentation (oral presentation) - Research task (written form) - Project report (written form)		
	Notes on the lecture dates: The TOPSIM simulation game is part of the introductory week and takes place as a block seminar at the beginning of the semester. The project part usually takes place fortnightly. The exact dates can be found in the semester schedule.		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
Students can successfully work on and solve complex practice-orientated tasks over the course of a semester. Students are able to:			

- systematically familiarise themselves with a specialist topic that is new to them.
- collect and analyse information and data in a goal-oriented manner and cite it in a scientifically correct way.
- find well-founded solutions to specific business issues in a team.
- present work results convincingly and document them in accordance with technical and scientific standards.
- apply methods of creativity techniques and project management.

Dual students:

After attending the lecture, dual students have reflected on the organization of their company and the contribution of functional roles in their company, particularly in the context of innovation processes. In addition, they have developed their personal and social skills and are, for example, able to handle simple managerial tasks within the framework of a project.

Content:

Introduction:

- Conduct the Management Simulation "TOPSIM" (in small teams)

Project:

- Company's organisational structures, contributions of business functions, interfaces
- Elements of a business plan
- Presentation techniques and student presentations
- Research techniques (incl. documentation) and research task for students (E-learning course from teaching library)
- Setup of a mock business plan (medium size teamwork for students)

Dual students:

Due to the practical experience gained in their partner company dual students are in a better starting position for achieving the learning objectives.

In the context of management simulation, they take leadership roles and thereby incorporate actively their practical experience. In the "lessons learned" part they additionally have the task to reflect the simulation compared to the real situation as in their company. The results are presented in a brief presentation at the annual shareholders' meeting.

In the project part they primarily work on strategic tasks for which they incorporate their knowledge and their competencies acquired during their practical experience.

Literature:

- TOPSIM - General Management Participant Manual

Additional remarks:

No additional remarks.

Electrical Engineering			
Module abbreviation:	EGM_ETEC_E	SPO-No.:	13
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	4
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only summer term
Responsible for module:	Haug, Thomas		
Lecturers:	Haug, Thomas		
Credit points / SWS:	5 ECTS / 5 SWS		
Workload:	Contact hours:	58 h	
	Self-study:	67 h	
	Total effort:	125 h	
Subjects of the module:	13-Electrical Engineering (EGM_ETEC_E)		
Lecture types:	SU/Ü-Lecture with practical exercises		
Examinations:	13-Electrical Engineering: schrP90 - written exam, 90 minutes (EGM_ETEC_E) Further information: Written exam, 90 minutes Permitted aids: pocket calculator, not programmable any written documents (printed or handwritten)		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After participating in the module courses, students can • use the basic physical laws of electrical engineering and understand their relations. • calculate with electrical and magnetic field quantities. • analyse direct current and alternating current networks. • calculate alternating current networks with the help of complex numbers and phasors. • explain the principles of semiconductor technology and of the most important electronic components. • familiarise themselves with subjects regarding electrical engineering self-reliant and within a team and can discuss these matters competently.			

Content:
• Direct current circuits: voltage, current, Ohm's law, energy, power, Kirchhoff's laws, Thevenin equivalent, Norton equivalent circuit, series connection, parallel connection, maximum power transfer, calculation of networks • Electric field: electric field quantities, capacitance, energy in the electrostatic field, forces in the electrostatic field, switching operations • Magnetic field: magnetic field quantities, coil inductance, magnetic circuit, magnetic flux law, magnetic energy of the coil, forces in the magnetic field, induction law, self-induction, switching operations • Alternating current circuit: sinusoidal change of electric quantities, circuit analysis of alternating current networks, power, frequency response, transformers • Three-phase system: star connection, delta connection, power, symmetrical load, asymmetrical load • Semiconductors: diode, transistor, operational amplifier, basics of electric circuits • Measuring electric quantities
Literature:
• HACKER, Viktor, SUMEREDER, Christof, 2020. <i>Electrical engineering: fundamentals</i> [online]. München; Wien: De Gruyter Oldenbourg PDF e-Book. ISBN 978-3-11-052111-5, 978-3-11-052113-9. Available via: https://doi.org/10.1515/9783110521115. • N. MAKAROV, Sergey, LUDWIG, Reinhold, BITAR, Stephen J., 2019. <i>Practical Electrical Engineering</i> [online]. Cham: Springer International Publishing PDF e-Book. ISBN 978-3-319-96692-2. Available via: https://doi.org/10.1007/978-3-319-96692-2. • HAGMANN, Gert, 2020. <i>Grundlagen der Elektrotechnik: das bewährte Lehrbuch für Studierende der Elektrotechnik und anderer technischer Studiengänge ab 1. Semester</i>. 18. edition. Wiebelsheim: AULA-Verlag. ISBN 978-3-89104-830-6, 3-89104-830-0 • TIPLER, Paul Allen and Gene MOSCA, 2008. <i>Physics for scientists and engineers</i>. New York: Freeman. ISBN 978-1-4292-0124-7, 1-4292-0124-X
Additional remarks:
Bonus system: Experimental tasks (in the laboratory or digital) may be set during the course, which must be completed and documented in laboratory reports. In addition, weekly test questions (quiz) may be answered. Depending on the quality of the achieved results, bonus points for the exam performance can be earned with the laboratory reports and the performance in the test questions.

Software Development			
Module abbreviation:	SWD_EGM	SPO-No.:	14
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	3
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only winter term
Responsible for module:	Schiendorfer, Alexander		
Lecturers:	Kriegl, Daniel; Lodes, Lukas		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	14-Software Development (SWD_EGM)		
Lecture types:	SU/Ü/Pr-Lecture with exercises and practical courses		
Examinations:	14-Software Development: schrP90 - written exam, 90 minutes (SWD_EGM)		
	Further information: None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
The students gain a practical understanding of the field of software development as an engineering tool to solve problems. After completing the module, they can: • design, build, and test software applications using the Python programming language. • understand and document customer requirements and solve problems using coding/technology. • communicate the architecture of their software effectively to a team of software developers. • improve and debug existing code. • use automated tests to make sure the software is implemented correctly. • understand the need to work with other professionals, e.g. UX designer, graphic designer, product manager, technical writer.			
Content:			
• Application areas of software development: mobile apps, web applications, tools for automation of repeating tasks, smart factories, artificial intelligence, etc. • The Python programming language			

- Variables, conditional statements, functions and code reuse
- Data structures: Lists, dictionaries
- Effective testing and debugging
- Object-oriented analysis & design (Inheritance, Polymorphism)
- Simple algorithms and an informal introduction to algorithmic complexity
- Development of user-friendly graphical user interfaces
- The whole software development process from analysis to testing

Literature:

- KLEIN, Bernd, 2021. *Einführung in Python 3: für Ein- und Umsteiger*. München: Hanser. ISBN 978-3-446-46556-5
- PILONE, Dan and Russ MILES, 2008. *Headfirst software development: [a brain-friendly guide]*. Beijing [u.a.]: O'Reilly. ISBN 0-596-52735-7, 978-0-596-52735-8
- FREEMAN, Eric and Elisabeth ROBSON, 2020. *Headfirst design patterns*. ISBN 978-1-492-07800-5

Additional remarks:

Bonus points system:

In lectures, there may be tasks and quizzes, which will lead to bonus points for the exam in case of good execution. At most 10% of the final grade can be improved via bonus points.

Engineering Mechanics			
Module abbreviation:	EngMECH_EGM	SPO-No.:	15
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	3
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only winter term
Responsible for module:	Haug, Thomas		
Lecturers:	Haug, Thomas		
Credit points / SWS:	5 ECTS / 5 SWS		
Workload:	Contact hours:	58 h	
	Self-study:	67 h	
	Total effort:	125 h	
Subjects of the module:	15-Engineering Mechanics (EngMECH_EGM)		
Lecture types:	S/Pr-Seminar/Practical course		
Examinations:	15-Engineering Mechanics: schrP90 - written exam, 90 minutes Further information: Written exam, 90 minutes Permitted aids: non-programmable calculator Written documents (handwritten or printed)		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After participating in the module courses, students are able to • explain the effects of forces and moments. • analyse and calculate static problems and apply equilibrium equations. • determine balance points and centroids of areas and bodies. • determine competent outer and inner load reactions. • solve friction problems. • estimate stresses, strains and deformations of bars and beams.			
Content:			
• Introduction to the basics of statics (bars, beams, plates, etc., bearings and hinges, equilibrium conditions)			

- Central and common force systems, free-body diagram, moments
- Balance points, centroids
- Supporting structures, Truss structures and Determinacy
- Friction
- Definition of stresses and strains, deformation, stress state, Mohr's circle
- Linear elastic material law, elasticity theory
- Combined loading
- bending of beams, stress and deformation
- Torsion

Literature:

- GROSS, Dietmar, Band 12013. *Engineering mechanics* [online]. Berlin [u.a.]: Springer PDF e-Book. ISBN 978-3-642-30319-7. Available via: <https://doi.org/10.1007/978-3-642-30319-7>.
- GROSS, Dietmar, GROSS, Dietmar, HAUGER, Werner, SCHRÖDER, Jörg, WALL, Wolfgang A., BONET, Javier, Band 2[2018. *Engineering mechanics* [online]. Berlin [u.a.]: Springer PDF E-Book. ISBN 978-3-662-56272-7. Available via: <https://doi.org/10.1007/978-3-662-56272-7>.
- GROSS, Dietmar, GROSS, Dietmar, HAUGER, Werner. *Technische Mechanik, Band 1-4* [online]. PDF e-Book.
- GROSS, Dietmar and others, 2017. *Statics – formulas and problems: engineering mechanics 1*. Berlin, Heidelberg: Springer. ISBN 978-3-662-53854-8
- HIBBELER, Russell C. and Jun Hwa LEE, 2023. *Engineering mechanics, statics*. Harlow, UK: Pearson. ISBN 1-292-44404-5, 978-1-292-44404-8
- KESSEL, Siegfried, FRÖHLING, Dirk, 2012. *Technische Mechanik: zweisprachiges Lehrbuch zu Grundlagen der Mechanik fester Körper = Engineering mechanics: bilingual textbook on the fundamentals of solid mechanics* [online]. Wiesbaden: Springer Vieweg PDF e-Book. ISBN 978-3-8348-2182-9. Available via: <https://doi.org/10.1007/978-3-8348-2182-9>.
- GABBERT, Ulrich, RAECKE, Ingo, 2013. *Technische Mechanik für Wirtschaftsingenieure: mit 301 Abbildungen, 16 Tabellen, 83 Beispielen* [online]. München: Hanser PDF E-Book. ISBN 978-3-446-43595-7, 978-3-446-43253-6. Available via: <https://doi.org/10.3139/9783446435957>.
- HIBBELER, Russell C., 2018. *Mechanics of materials*. Harlow: Pearson. ISBN 978-1-292-17828-8

Additional remarks:

Bonus system:

Weekly test questions (quiz) may be answered. Depending on the quality of the results achieved, bonus points for the exam performance can be earned.

Mechanical Design 2			
Module abbreviation:	EGM_MDES2_E	SPO-No.:	16
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	3
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only winter term
Responsible for module:	Tröber, Philipp		
Lecturers:	Tröber, Philipp		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	16-Mechanical Design 2 (EGM_MDES2_E)		
Lecture types:	SU/Ü-Lecture with exercises		
Examinations:	16-Mechanical Design 2: SA - Seminar paper with written elaboration (15-20 pages) and with oral examination (15min) and oral presentation (15-20 minutes) (EGM_MDES2_E)		
	Further information: None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
At the end of the course, students will be able to • apply the procedure of the systematic and method-based approach in product development. • state the interrelationships between development and design and other departments of a developing and manufacturing company. • independently develop sophisticated products by applying the methods taught and using adequate working techniques. • interpret the communication required for product development in a company. • apply the knowledge to be a functional and social member of a project team. • independently develop components and assemblies including the derivation of technical drawings using the 3D CAD system CATIA.			
Content:			
• Basic phases of the product development process			

- Requirement list and specification, functional specification
- Abstraction
- Functional structures
- Creativity and other techniques to find solutions
- Systematic preparation of solution approaches (morphology) and variation as well as combination techniques
- Evaluation of concepts and concept selection
- Creation of technical drafts, draft construction
- Basic design rules, guidelines and principles
- Basic construction elements
- Semester exercise to implement the material learned
- Working with the 3D CAD system CATIA (component design, assembly design, drawing generation)

Literature:

- PAHL, Gerhard, BEITZ, Wolfgang, WALLACE, Ken, 1996. *Engineering Design: A Systematic Approach* [online]. London: Springer London PDF e-Book. ISBN 978-1-4471-3581-4. Available via: <https://doi.org/10.1007/978-1-4471-3581-4>.
- CADFOLKS, 2014. *CATIA V5-6R2014 For Beginners*.

Additional remarks:

No additional remarks.

Power Engineering			
Module abbreviation:	POWE_EGM	SPO-No.:	17
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	4
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only summer term
Responsible for module:	Bschorer, Sabine		
Lecturers:	Bschorer, Sabine		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	17-Power Engineering: Power Engineering (POWE_EGM)		
Lecture types:	SU/Ü/Pr-Lecture with exercises and practical courses		
Examinations:	17-Power Engineering: schrP90 - written exam, 90 minutes (POWE_EGM)		
	Further information: None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After attending the module courses, participants will be able to • correctly apply the subject-specific terminology. • describe and evaluate the most important methods of energy conversion and discuss their pros and cons. • evaluate and calculate fundamental problems of thermodynamics (e.g. enthalpy, entropy, T-s-diagram, heat transfer) and fluid dynamics. • calculate and evaluate cyclic processes. • estimate the efficiency of different methods of power and heat generation. • discuss and evaluate the social relevance and the environmental effects of the different energy technologies.			
Content:			
• The actual situation of energy supply • Influence on environment and climate • Thermal cycles for power and heat generation			

○ Steam and gas turbine process ○ The combined cycle power plant ○ Combined heat and power plant (CHP) ● Use of nuclear power ● Basics of renewable energy ● Hydropower; wind power; biomass; solar energy ● Storage of energy ● Laboratory session with wind turbine, CHP, electrolysis/fuel cell, solar technology
Literature:
● DEMIREL, Yaşar, 2016. <i>Energy: Production, Conversion, Storage, Conservation, and Coupling</i> [online]. Cham: Springer International Publishing PDF e-Book. ISBN 978-3-319-29650-0, 978-3-319-29648-7. Available via: https://doi.org/10.1007/978-3-319-29650-0. ● QUASCHNING, Volker, 2016. <i>Understanding renewable energy systems</i>. London and New York: Routledge. ISBN 978-1-138-78194-8, 978-1-138-78196-2
Additional remarks:
No additional remarks.

Cost Accounting			
Module abbreviation:	COSTA_EGM	SPO-No.:	18
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	3
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only winter term
Responsible for module:	Eisenberg, Andrea		
Lecturers:	Aydin, Tolga		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	18-Cost Accounting (COSTA_EGM)		
Lecture types:	SU/Ü-Lecture with exercises		
Examinations:	18-Cost Accounting: schrP90 - written exam, 90 minutes (COSTA_EGM)		
	Further information: None		
Usability for other study programs:	None		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
Students • can classify cost by nature of cost, by traceability of cost and by cost behaviour. • can prepare a simple calculation of inventory, COGS and price based on a blanket rate. • can perform an allocation and apportionment of overhead cost with a cost allocation sheet based on absorption costing and can apply the results to calculate the unit cost based on process costing and job order costing. • understand the concept of variable costing and the contribution margin and can apply it to problems of short-term decision such as product portfolio decision, break even analysis and decisions under limited resources. • understand the importance of standard costing, can prepare a static and a flexible budget and can calculate and interpret different types of variances.			
Content:			
• Difference between financial and cost accounting • Classification of cost according to nature, traceability and behaviour			

- Absorption costing: blanket rate, allocation and apportionment of overhead cost with cost allocation sheet, process costing, job order costing with plant-wide allocations rate, departmental overhead rate and machine hour rates
- Variable costing: contribution margin, direct costing, multi-step contribution analysis, decision making with contribution margin, economies of scale, pricing decisions, break-even analysis, product mix, production process selection
- Standard costing: purpose of standard costing, static and flexible budget, variance analysis
- International comparison of accounting applications
- Casework

Literature:

- TASCHNER, Andreas and Michel CHARIFZADEH, 2016. *Management and cost accounting: tools and concepts in a central European context*. Weinheim: Wiley-VCH. ISBN 978-3-527-50822-8, 3-527-50822-8
- DRURY, Colin and Mike TAYLES, 2024. *Management and cost accounting*. Andover: Cengage. ISBN 978-1-4737-9124-4

Additional remarks:

No additional remarks.

Marketing			
Module abbreviation:	EGM_MKT_E	SPO-No.:	19
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	4
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only summer term
Responsible for module:	Schwandner, Gerd		
Lecturers:	Schwandner, Gerd		
Credit points / SWS:	5 ECTS / 5 SWS		
Workload:	Contact hours:	58 h	
	Self-study:	67 h	
	Total effort:	125 h	
Subjects of the module:	19-Marketing (EGM_MKT_E)		
Lecture types:	SU/Ü-Lecture with exercises		
Examinations:	19-Marketing: schrP90 - written exam, 90 minutes (EGM_MKT_E)		
	Further information: None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
The students are able to: • explain the tasks of marketing in a company and discuss why market-oriented management is required, including concepts such as customer satisfaction or purchase behaviour. • distinguish the relationship between business strategy, marketing plan (esp. market segmentation and positioning) and marketing-mix. • analyse markets, develop a market segmentation and select viable target markets. • develop market mix policies (product, price, place, promotion) while ensuring that individual policies are complementary (integrated marketing). • apply key marketing tools in practice. For dual students: Dual students are invited to bring their experiences and current marketing topics from their partner companies into the discussion in the respective chapters of the class. In this way, they learn to transfer theoretical methods into the practice of their partner companies.			

Content:

- Marketing fundamentals: customer orientation, purchase behaviour of consumers, purchase behaviour of organizations, customer relationship management, differences in B2B versus B2C marketing
- Key terms and tools of business strategy
- Market research, market segmentation, target market definition, positioning and differentiation
- Product policy, incl. innovation, brand management, after-sales management
- Price (and terms and conditions), incl. price determination process, price-demand-function, price differentiation and modification, value-pricing
- Distribution policy, incl. sales channels, push vs. pull, vertical marketing systems, multichannel sales, introduction to retail and wholesale business
- Communications (Promotion), incl. advertising, sales promotion, public relations, personal selling, direct marketing
- Selected marketing topics, e.g. e-commerce, internet marketing, viral marketing

Literature:

- KOTLER, Philip and Kevin KELLER, 2019. *Marketing Management*. 15. edition. Boston: Pearson. ISBN 978-1-292-09262-1

Additional remarks:

No additional remarks.

Business Information Systems			
Module abbreviation:	BusinfSyst_EGM	SPO-No.:	20
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	4
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only summer term
Responsible for module:	Zehbold, Cornelia		
Lecturers:	Zehbold, Cornelia		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	20-Business Information Systems (BusinfSyst_EGM)		
Lecture types:	SU/Ü/Pr-Lecture with exercises and practical courses		
Examinations:	20-Business Information Systems: schrP90 - written exam, 90 minutes (BusinfSyst_EGM)		
	Further information: None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
Computer sciences			
Objectives:			
The module “Business Information Systems” provides students with contents and challenges of Business Informatics and gives insights into current developments in business practice. After attending the lecture students will be able to • assess contents, objectives, and challenges of information systems in the business world (focus is on the design, implementation, management, and control of information and communication technology [ICT] as well as on the management of interfaces between systems and companies). • distinguish between different types of information and communication systems. • earn in-depth knowledge about requirements for the effective and efficient use of ICT as well as about the importance of information systems for company success in the context of the increasing digitalization of the economy and society. • solve business problems in the field of information systems by applying systematic approaches.			
Content:			
• The importance of information systems • IT infrastructures and web technologies			

- Databases and information management
- Operational information processing (ERP, SCM, CRM, etc.)
- E-procurement and e-commerce
- Business process management
- IT-enabled knowledge management
- Green IT
- IT-enabled decision making
- E-Society and political/legal aspects of information systems
- Applications and case studies: information systems in business practice
- Digitization of the economy and society

Literature:

- LAUDON, Kenneth C. and Jane Price LAUDON, 2022. *Management information systems: managing the digital firm*. Harlow, England: Pearson. ISBN 978-1-292-40357-1
- LAUDON, Kenneth C., Jane Price LAUDON and Detlef SCHODER, 2016. *Wirtschaftsinformatik: eine Einführung*. Hallbergmoos: Pearson Deutschland. ISBN 978-3-86326-765-0

Additional remarks:**Note:**

A detailed breakdown of the workload (total 125 h) will be given in the first lecture. The exercises include web-based training and identifying alternative solutions in teams.

Bonus system:

In the course exercises are held that lead to a bonus point for the examination depending on the quality of the solution. The maximum bonus points is based on APO.

Study abroad:

Similar subjects are offered at many partner universities abroad. In English-speaking countries, they are offered under the title "Business Information Systems", "Management Information Systems" or simply "Information Systems".

Controlling			
Module abbreviation:	EGM_CONTR_E	SPO-No.:	21
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	4
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only summer term
Responsible for module:	Eisenberg, Andrea		
Lecturers:	Eisenberg, Andrea		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	21-Controlling (EGM_CONTR_E)		
Lecture types:	SU/Ü-Lecture with practical exercises		
Examinations:	21-Controlling: schrP90 - written exam, 90 minutes (EGM_CONTR_E)		
	Further information: None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
Students • understand the meaning of strategic management and the role of management accounting. • can apply the costing approaches target costing and activity-based costing to business cases. • can calculate different key financial indicators and interpret them. • make investment decisions based on static and dynamic methods. • prepare budgets, both static and a flexible budget • can perform a detailed variance analysis • can calculate the elements of the working capital life cycle. • can solve case studies by applying the knowledge acquired in the class.			
Content:			
• Controlling and Management accounting • Strategic management and management accounting • Strategy formulation, implementation and evaluation			

- Modern costing approaches: Target Costing and Activity-based costing
- Investment appraisal: Static and dynamic methods
- Key Financial indicators, value-based and profitability ratios
- Budgeting, budgeting process, static and flexible budgets, working-life cycle
- Case studies

Literature:

- WEETMAN, Pauline and Darren JUBB, 2024. *Financial and management accounting: an introduction*. Harlow, England: Pearson. ISBN 978-1-292-45704-8
- DAVID, Fred R., Forest R. DAVID and Meredith E. DAVID, 2023. *Strategic management: concepts and cases: a competitive advantage approach*. Harlow, England: Pearson. ISBN 978-1-292-44140-5, 1-292-44140-2
- GRANT, Robert M., 2025. *Contemporary strategy analysis*. Hoboken, NJ: Wiley. ISBN 978-1-394-25159-9

Additional remarks:

No additional remarks.

Selected topics in International Management			
Module abbreviation:	EGM_STIM_E	SPO-No.:	22
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	4
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only summer term
Responsible for module:	Schwandner, Gerd		
Lecturers:	Hirl, Andreas; Lessig, Rudolf; Schwandner, Gerd		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	22-Selected topics in International Management (EGM_STIM_E)		
Lecture types:	SU/Ü-Lecture with practical exercises		
Examinations:	22-Selected topics in International Management: mdlP - oral exam, 15 minutes (EGM_STIM_E)		
	Further information: None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After completing the international management and the transfer pricing parts of the seminar, the students will be able to: • explain and discuss key terms and challenges in conduction international business. • analyse the environment that multinational enterprises face, incl. cultural differences, political influence/trade barriers, foreign exchange. • evaluate options for companies to internationalize their business, including selection of markets and market entry modes. • explain the relevant terms and base concepts such as the structure of international firms, cross-border transfer prices and the arm’s length principle. • calculate the global tax rate of a group based on the international taxation of company profits. • select the appropriate transfer pricing method for a given business transaction and calculate the transfer price and the resulting profit of each involved entity.			
Content:			
International management part:			

- Introduction: globalization, international business, scenarios going forward
- Environment: cultural, political & legal, economical, society & ethics
- Trade and investment: trade theory, governmental influence, cross-national cooperation and agreements (bilateral, regional, global), the European Union, other regional trade blocs
- Foreign exchange: FX markets and instruments, the IMF, exchange-rate regimes, the Euro, business impact of FX rates
- Strategy and structure: international strategy analysis, country evaluation and selection, export-import, collaboration-direct investment, organization of international business

Transfer pricing part:

- International taxation of company profits and global tax rate
- Definition of transfer prices, cross-border transactions and the arm's length principle
- Types of intercompany cross-border transactions
- Transfer pricing methods and comparability issues
- Transfer pricing documentation
- Intercompany service provision and financing
- Case work: development of cross border transfer pricing system

Literature:

- DANIELS, John D., Lee H. RADEBAUGH and Daniel P. SULLIVAN, 2013. *International Business*. 14. edition. Harlow: Pearson. ISBN 978-0-273-76695-7
- HOLLENSSEN, Svend, 2014. *Global Marketing*. Harlow: Pearson. ISBN 978-0-273-77316-0

Additional remarks:

No additional remarks.

Intercultural Studies			
Module abbreviation:	IntCult_EGM	SPO-No.:	24
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	6
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only summer term
Responsible for module:	McDonald, James		
Lecturers:	McDonald, James		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	24-Intercultural Studies (IntCult_EGM)		
Lecture types:	SU/Ü-Lecture with practical exercises		
Examinations:	24-Intercultural Studies: Student research project without oral examination, 8 - 15 pages elaboration, 15 - 20 pages presentation (IntCult_EGM)		
	Further information: None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
At the end of the course students will be able to: • know relevant theories of culture and intercultural communication. • solve case studies and practical examples related to intercultural communication (e.g management styles, corporate cultures). • apply theory, case study content in a variety of chosen contexts (determined by participants). • understand culture and its effects on communication in self and others.			
Content:			
• Introduction to relevant theories of culture and intercultural communication (basics and definitions, significance in the globalised world, cultural differences and similarities) • Values, norms and customs: cultural models (e.g. Hofstede, Hall), stereotypes and prejudices • Intercultural conflicts: causes and solutions, communication in conflict situations, globalisation and its effects on cultures • Cultural hybridisation: challenges and opportunities, intercultural working environment			

- Intercultural teams, leadership and cooperation
- Case studies and practical exercises related to intercultural communication (e.g. management styles, corporate cultures)
- Seminar discussions and reflections, analysing real situations, reading and writing exercises related to course material

Literature:

- HOFSTEDE, Geert, 2011. *Culture's consequences: comparing values, behaviours, institutions, and organizations across nations*. Thousand Oaks [u.a.]: Sage Publ. ISBN 978-0-8039-7324-4, 978-0-8039-7323-7
- HALL, Edward Twitchell, 2003. *Beyond culture*. 40. edition. New York, NY: Anchor Books. ISBN 0-385-12474-0, 978-0-385-12474-4
- TROMPENAARS, Fons and Charles HAMPDEN-TURNER, 2020. *Riding the waves of culture: understanding diversity in global business*. London; Boston: Nicholas Brealey Publishing. ISBN 978-1-529-34618-3, 1-529-34618-5
- STOUDEMIRE, Tyronne, 2024. *Diversity Done Right: Navigating Cultural Difference to Create Positive Change in the Workplace*. Newark: John Wiley & Sons, Incorporated. ISBN 978-1-394-23070-9
- LUSTIG, Myron W. and Jolene KOESTER, 2012. *Intercultural competence: interpersonal communication across cultures*. Boston [u.a.]: Pearson Prentice Hall. ISBN 978-0-205-21124-1, 0-205-21124-0

Additional remarks:

No additional remarks.

Project			
Module abbreviation:	PROJ_EGM	SPO-No.:	25
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	6
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	winter and summer term
Responsible for module:	Meintrup, David		
Lecturers:	Reuter, Stefan; Schneider, Yvonne		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	25-Project: Project (PROJ_EGM)		
Lecture types:	P-Project		
Examinations:	25-Project: PA-Project report oral presentation (15 min) written elaboration (5-25 pages) (PROJ_EGM)		
	Further information: None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After completing the module, students will be able to:			
- independently manage a semester-long, complex project, demonstrating responsibility and self-direction. - acquire new knowledge rapidly and adapt to evolving project challenges. - analyse and solve multifaceted problems by integrating technical and business perspectives, using methods and tools from their foundational studies. - apply project management strategies and collaborate effectively within a team. - communicate, present, and document project results convincingly to stakeholders.			
Regular attendance is mandatory for the successful execution of team-based project work. The specific requirements regarding mandatory attendance are determined by the respective instructor.			

For dual students: Due to their broader practical experience and the application of theoretical content in their companies, after passing the module dual students are capable to deal with more depth with the project task and to solve more complex problems. An increased methodological and social competency leads to a deeper understanding of team processes.
Content: • Team project on selected topic for one semester • Interdisciplinary focus (engineering & management) • Apply project management methods and tools • Analyse and structure complex, practical problems • Combine technical and business knowledge • Collaborate in teams to solve challenges • Document, present, and reflect on project results
Literature: • HEMMRICH, Angela, HARRANT, Horst, 2015. <i>Projektmanagement: in 7 Schritten zum Erfolg</i> [online]. München: Hanser PDF E-Book. ISBN 978-3-446-44733-2, 978-3-446-44620-5. Available via: https://doi.org/10.3139/9783446447332.
Additional remarks: For dual students: • Dual partner companies are invited to bring in project topics which are worked on by their dual students. Potentially, non-dual students can participate in these projects if capacity allows for this. • It is possible to do projects in the practical phase, given the content-wise suitability. The process of recognition and grading follows the standard credit transfer process documented in the guidelines.

Automation Technologies			
Module abbreviation:	AUT_EGM	SPO-No.:	26
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	3
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only winter term
Responsible for module:	Großmann, Daniel		
Lecturers:	Großmann, Daniel		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	26-Automation Technologies (AUT_EGM)		
Lecture types:	SU/Ü/Pr-Lecture with exercises and practical courses		
Examinations:	26-Automation Technologies: schrP90 - written exam, 90 minutes (AUT_EGM)		
	Further information: None		
Usability for other study programs:	None		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After attending the lecture, students will be able to • have a basic understanding of automation technology. • recognise automation potential and the demand for automation. • have a basic understanding of information and communication technology in automation systems. • develop automation systems.			
Content:			
• Basics of industrial process and control • Sensors and actuators • Automation controller • Programming of automation controllers (with exercise) • Operation and monitoring • Industrial communication			

• Development of automation systems
Literature:
• DEY, Chanchal, SEN, Sunit Kumar, 2020. <i>Industrial automation technologies</i> [online]. Boca Raton; London; New York: CRC Press, Taylor & Francis Group PDF e-Book. ISBN 978-0-429-29934-6. Available via: https://doi.org/10.1201/9780429299346.
Additional remarks:
No additional remarks.

Production Planning and Logistics			
Module abbreviation:	EGM_PPL_E	SPO-No.:	27
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	4
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only summer term
Responsible for module:	Jattke, Andreas		
Lecturers:	Jattke, Andreas		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	46 h	
	Self-study:	79 h	
	Total effort:	125 h	
Subjects of the module:	27-Production Planning and Logistics (EGM_PPL_E)		
Lecture types:	SU/Ü-Lecture with exercises		
Examinations:	27-Production Planning and Logistics: schrP90 - written exam, 90 minutes (EGM_PPL_E)		
	Further information: None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
The students are able to: • select production planning and control methodologies in different branches and sizes of industry. • distinguish production planning philosophies push versus pull. • define adequate KPI's to control the success of production planning methodologies. • define production planning methodologies in the whole supply chain including external customers and suppliers. • integrate the meaning of PPS systems in line with digitalisation in industry 4.0. For dual students: Dual students have reflected experiences from their partner companies in the light of the learned methods of production planning and logistics. They are capable to explain their application in concrete practice examples from their partner companies. Additionally, they are able to analyze and judge the method of production planning implemented in their partner company.			

Content:
• PPC Strategies • Production Programme Planning and Lot sizing • Order and Capacity Scheduling • Integration of PPC in ERP and Industry 4.0 • Production Controlling and KPI's • Different examples from industry
Literature:
• BUZACOTT, John A., 2013. <i>Production planning and control: basics and concepts</i>. München: Oldenbourg. ISBN 978-3-486-72247-5, 3-486-72247-6
Additional remarks:
Dual students are invited to bring in different elements of production planning and logistics from their partner companies into the module. In this way they transfer the competencies acquired in class to the reality of their companies.

Internship			
Module abbreviation:	EGM_INTSHIP_E	SPO-No.:	30
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	5
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	winter and summer term
Responsible for module:	Schneider, Yvonne		
Lecturers:			
Credit points / SWS:	24 ECTS / 0 SWS		
Workload:	Contact hours:	0 h	
	Self-study:	600 h	
	Total effort:	600 h	
Subjects of the module:	30-Internship (EGM_INTSHIP_E)		
Lecture types:	Pr-Internship		
Examinations:	30-Internship: internship report (EGM_INTSHIP_E) Further information: • Internship report to describe content, character and key learnings of internship. • The practical studies semester must be completed in a non-German speaking foreign country. • Alternatively, the practical studies semester may be completed in German-speaking countries if a connection to international business is guaranteed (e.g. through work in the areas of international product management, global product development, international marketing, international production and logistics).		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After completing the internship semester, students will be able to: • describe and explain technical and business processes and their interrelations within a company. • identify and reflect on typical tasks and responsibilities of management engineers in professional practice. • apply discipline-specific knowledge, methods, and tools acquired during the degree program to real-world tasks and problems.			

- develop and present application-oriented solutions using scientifically grounded approaches,
- work independently on assigned tasks and complete them within defined timeframes.
- critically reflect on their own professional behaviour and identify areas for personal and professional development in the context of their future career.

Dual students do their internship at their partner company. They benefit from their broader and deeper previous practical experience and from their knowledge of the company and work on more challenging topics. A systematic reflection of the linking of study contents and practice at the company in the context of the internship takes place.

Content:

The internship semester enables students to gain practical insights into the professional field of industrial engineering and management. The focus of the internship is aligned with the operational tasks of the host company and builds upon the technical, economic, and methodological foundations taught in the academic program. Typical contents of the internship semester include:

- gaining familiarity with technical and business processes and understanding their interdependencies within the company,
- working on practical assignments in the field of industrial engineering and management,
- applying and deepening engineering and management knowledge in company-based projects,
- gaining insight into company-specific workflows, organizational structures, and project management practices,
- reflecting on one's own professional role and further developing personal and social competencies in a real-world work context.

According to §29 (3) APO dual students do their internships at their partner company. In their internship report they report on the link between study program and practical experiences.

Literature:

Specific to the company profile.

Additional remarks:

- The internship can only be conducted in companies which are approved.
- The qualifications of the supervisor should be on the same level as the degree of the respective study programme.
- Universities and associated organisations are not permitted to host internships

Seminar			
Module abbreviation:	EGM_SEM_E	SPO-No.:	31
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	3
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	winter and summer term
Responsible for module:	Meintrup, David		
Lecturers:	Bednarz, Martin; Bock, Jürgen; Dern, Peter; Meintrup, David; Moser, Christina; Oelker, Martin; Pelzel, Robert; Steffel, Pauline; Tröber, Philipp		
Credit points / SWS:	2 ECTS / 2 SWS		
Workload:	Contact hours:	23 h	
	Self-study:	27 h	
	Total effort:	50 h	
Subjects of the module:	31-Seminar: Seminar (EGM_SEM_E)		
Lecture types:	S-Seminar		
Examinations:	31-Seminar: LN - participation without/with success (EGM_SEM_E)		
	Further information:		
	Examination performance. Performance record for active participation in the 3-day seminar. Evaluation "with success" (m. E.) / "without success" (o. E.).		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After completing the module, students: • deepen their subject-specific knowledge and apply it independently in practice. • utilize social and methodological skills (e.g., moderation, presentation) effectively. • collaborate in teams to address tasks and solve problems together.			
Content:			
3-day block course on job-oriented competencies: • team-oriented decision-making • excursions, workshops, seminars • continuing education courses • key qualifications (moderation, presentation, conflict management, rhetoric, etc.)			

Literature:
Will be provided by each lecturer at the beginning of the seminar.
Additional remarks:
None

Project- and Quality-Management			
Module abbreviation:	PQM_EGM	SPO-No.:	32
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	6
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only summer term
Responsible for module:	Pelzel, Robert		
Lecturers:	Bauer, Rudolf		
Credit points / SWS:	4 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	53 h	
	Total effort:	100 h	
Subjects of the module:	32-Project- and Quality-Management (PQM_EGM)		
Lecture types:	SU/Ü-lecture with exercises		
Examinations:	32-Project- and Quality-Management: LN - written exam, 90 minutes (PQM_EGM) Further information: Exam condition Successful participation with presence duty in the lessons.		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
By attending the course, the students will be able to: • understand basic principles and methods of Project Management. • structure and plan an industrial or engineering project. • understand the requirements regarding a professional Project Manager. • know main characteristics of Agile Project Management. • understand basics of a comprehensive Quality Management. • know specific Quality methods, which shall be applied in various use cases. For dual students: Dual students have reflected experiences from their partner companies in the light of the learned methods and are capable to demonstrate the practical application of the methods in practical examples from their companies.			

Content:

- Project characteristics & organization
- SMART project goals and objectives
- Stakeholder Management
- Project planning elements, e.g. objectives, milestones, work breakdown structure, Gantt chart
- Resource and Cost planning, Target costing
- Project execution and control
- Earned Value Analysis, Milestone Trend Analysis, Cost Trend Analysis
- Change-, Risk-, Claim Management
- Hard- and soft skills for successful Project Management
- Communication, Negotiation
- Agile Project Management, Scrum
- Basics of Quality Management
- Total Quality Management (TQM) and Quality Management Systems
- Quality Standards, EQA, ASPICE or similar
- Quality Management Methods
- Lean six sigma

Literature:

Will be announced at the beginning of the lecture.

Additional remarks:

No additional remarks.

Bachelor Thesis Seminar			
Module abbreviation:	EGM_BSEM_E	SPO-No.:	29
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	winter and summer term
Responsible for module:	Eisenberg, Andrea		
Lecturers:			
Credit points / SWS:	3 ECTS / 2 SWS		
Workload:	Contact hours:	23 h	
	Self-study:	52 h	
	Total effort:	75 h	
Subjects of the module:	29.1-Bachelor Thesis Seminar (EGM_BSEM_E)		
Lecture types:	S-Seminar		
Examinations:	29.1-Bachelor Thesis Seminar: LN - participation without/with success (EGM_BSEM_E)		
	Further information: None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After attending this module, students are able to: • know methods of scientific work. • conduct systematic literature research. • compile a clear structure and high-level table of content for their thesis. • conduct expert discussions about the structure and storyline of their thesis. Dual students additionally acknowledge the regulations of their partner company regarding the preparation of scientific work. They must ensure that the topic and the structure of their thesis is agreed between their advisor in the company and the supervising professor at the university.			
Content:			
Introduction • Scientific and methodological requirements			

• Relevant formal regulations • Methods of research and documentation (incl. introduction by the library) Identification of a topic Getting started and organizing: • Getting in contact with companies • Designing a project plan • Defying a structure / high-level table of content • Registration of the thesis
Literature:
• BOOTH, Wayne C. and others, 2024. <i>The craft of research</i>. Chicago; London: The University of Chicago Press. ISBN 978-0-226-82667-7, 978-0-226-83388-0 • HOLTOM, Daniel and Elizabeth M. FISHER, 2011. <i>Enjoy writing your science thesis or dissertation: a step-by-step guide to planning and writing dissertations and theses for undergraduate and graduate science students</i>. London: Imperial College Press. ISBN 1-86094-090-0, 1-86094-207-5
Additional remarks:
No additional remarks.

Bachelor Thesis			
Module abbreviation:	EGM_BTHESIS	SPO-No.:	29
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	Compulsory Subject	7
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	winter and summer term
Responsible for module:	Eisenberg, Andrea		
Lecturers:			
Credit points / SWS:	12 ECTS / 0 SWS		
Workload:	Contact hours:	0 h	
	Self-study:	300 h	
	Total effort:	300 h	
Subjects of the module:	29.2-Bachelor Thesis (EGM_BTHESIS)		
Lecture types:	BA-Bachelor Thesis		
Examinations:	BA-Bachelor Thesis		
	Further information: None		
Usability for other study programs:	None		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After completing his/her bachelor thesis, students can - analyse and solve an engineering and/or management related topic using scientific methods within an appropriate timeframe. - apply scientific engineering and/or management methods. - work self-dependent and solve the given problem in a structured and creative manner. Dual students are able to - analyse a problem present in their partner company using scientific methods and propose a solution. - present and defend their graduation work in a way suitable for management.			
Content:			
- Topic of the thesis shall preferably be a practical topic provided by a company - The Bachelor thesis work is supervised by a THI professor - The thesis work will be accompanied by two evaluators, one of them being responsible for the appraisal			

- The Bachelor thesis shall comprise a workload of approximately 300 hours

Dual students:

The Bachelor thesis must be done in cooperation with the partner company. The student finalizes the topic together with his/her advisor at the company. The results are presented to the dual partner and the supervising professor.

Literature:

Specific to the topics of the Bachelor thesis.

Additional remarks:

No additional remarks.

5.2 Foreign Languages

Chinese A1			
Module abbreviation:	SZ_CHIN_A1	SPO-No.:	6
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	General Elective Subject	
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	Chinese	1 semester	winter and summer term
Responsible for module:	Chen, Jing		
Lecturers:	Yuan, Lei		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	6-Chinese A1 (SZ_CHIN_A1)		
Lecture types:	SU/Ü-Lecture with practical exercises		
Examinations:	LN - written exam, 90 minutes		
	Further information:		
	None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After attending the course, students (without prior knowledge) will be able to			
• develop an initial understanding of the structure of Chinese writing and language. • recognize and distinguish the four tones of Mandarin Chinese. • read and write basic Chinese characters correctly and form simple sentences with them. • introduce themselves in short sentences and talk about simple topics such as family, food, daily routine, or weather. • recognize basic cultural differences (e.g., in greetings or politeness.			
Content:			
• Introducing yourself • Nationality • Telling the time			

• Going to a restaurant • Shopping • Family • Phrases for using the telephone • Going to the doctor • Leisure activities • Weather
Literature:
• ZHU, Xiaoxing, 2011. <i>Chinesisch erleben: Leben in China</i>. Beijing: Higher Education Press. ISBN 978-7-04-019054-0
Additional remarks:
None

English for Business and Engineering 1			
Module abbreviation:	EnglBusiness1_E	SPO-No.:	6
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	General Elective Subject	1
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only winter term
Responsible for module:	Reicherstorfer, Anja		
Lecturers:	Reicherstorfer, Anja		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	6-English for Business and Engineering 1 (EnglBusiness1_E)		
Lecture types:	SU/Ü-Seminar with practical exercises		
Examinations:	schrP 90 - written exam, 90 minutes		
	Further information: None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
Students are able to: • handle various situations they might encounter in today’s business world, including meetings and negotiations. • write effective and accurate business correspondence (enquiry, offer, order). • give a presentation on a current international business topic or a technical innovation and lead a discussion on the topic. • know presentation skills including effective structuring, body language, time management and describing business trends (describing graphs). • use visual aids for effective presentation of statistics and numbers. • develop Business English vocabulary.			
Content:			
• Reading and analysis of Business and Engineering texts • Listening skills practice • Writing basic business texts			

• How to summarize a text • Business & Engineering vocabulary • Group work in role plays and case studies • Selected business skills: presentations, meetings, negotiations, etc.
Literature:
• DUBICKA, Iwonna, 2019. <i>Business Partner B2+: Coursebook</i>. Hallbergmoos: Pearson Education. ISBN 978-3-86894-814-1, 978-3-86894-813-4 • BONAMY, David, 2011. <i>Technical English 4, Course Book</i>. ISBN 9781408229552
Additional remarks:
The course contains an online part. Every student must hold a presentation in class.

English for Business and Engineering 2			
Module abbreviation:	EnglBusiness2_EG	SPO-No.:	6
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	General Elective Subject	2
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only summer term
Responsible for module:	Reicherstorfer, Anja		
Lecturers:	Reicherstorfer, Anja		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	6-English for Business and Engineering 2 (EnglBusiness2_EG)		
Lecture types:	SU/Ü-Lecture with integrated exercises		
Examinations:	LN - written exam, 90 minutes (EnglBusiness2_EG)		
	Further information: None		
Usability for other study programs:	Please see the subject recognition list of SCS.		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After attending the seminar students will be able to: • improve business and engineering communication skills – communicate clearly and professionally in various business and engineering contexts. • expand business and technical vocabulary by learning and practicing industry-specific terminology and expressions. • develop writing skills in writing emails, reports, proposals, and other business documents. • enhance listening and speaking skills – improve understanding of spoken English in meetings, presentations, and negotiations. • improve presentation skills – Learn how to prepare and deliver effective business presentations. • achieve personal and professional growth, supporting their career development through improved language proficiency.			
Content:			
Communication Skills • Negotiations			

• Interviews • Managing difficult conversations • Presentations Writing Skills • Different Types of Reports • Letters and emails • Different Types of Academic Writing Reading and Listening Skills • Business texts • Engineering texts • Business conversation situations
Literature:
• DUBICKA, Iwonna, 2019. <i>Business Partner B2+: Coursebook</i>. Hallbergmoos: Pearson Education. ISBN 978-3-86894-814-1, 978-3-86894-813-4 • BOYLE, Mike and Lindsay WARWICK, 2014. <i>Skillful Level 4: Reading and Writing; Student's Book with Digibook access</i>. München: Hueber Verlag. ISBN 978-3-19-422576-3, 3-19-422576-6
Additional remarks:
No additional remarks.

English for Business and Engineering 3			
Module abbreviation:	EngBusiness3_EG	SPO-No.:	6
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	General Elective Subject	3
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only winter term
Responsible for module:	Reicherstorfer, Anja		
Lecturers:	Reicherstorfer, Anja		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	6-English for Business and Engineering 3 (EngBusiness3_EG)		
Lecture types:	SU/Ü-Seminar with practical exercises		
Examinations:	LN - written exam, 90 minutes (EngBusiness3_EG)		
	Further information: None		
Usability for other study programs:	None		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After attending the seminar students will be able to: • improve business and engineering communication skills – communicate clearly and professionally in various business and engineering contexts. • expand business and technical vocabulary by learning and practicing industry-specific terminology and expressions. • develop writing skills in writing emails, reports, proposals, and other business documents. • enhance listening and speaking skills – improve understanding of spoken English in meetings, presentations, and negotiations. • improve presentation skills – Learn how to prepare and deliver effective business presentations. • achieve personal and professional growth, supporting their career development through improved language proficiency.			
Content:			
• CV and application form • Most common job interview questions			

• How to write an argumentative essay • Product design specification document • Product recall notice • Enquiry • Offer • Orders • Letter of complaint • Negotiation skills
Literature:
• BONAMY, David, 2015. <i>Technical English 4, Course Book, B2-C1</i>. ISBN 978-1-4082-2955-2
Additional remarks:
No remarks.

French A1			
Module abbreviation:	SZ_FRANZ_A1	SPO-No.:	6
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	General Elective Subject	
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	German	1 semester	winter and summer term
Responsible for module:	Reicherstorfer, Anja		
Lecturers:	Abdallah, Zahra		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	6-French A1 (SZ_FRANZ_A1)		
Lecture types:	SU/Ü-Lecture with practical exercises		
Examinations:	LN - written exam, 90 minutes (SZ_FRANZ_A1)		
	Further information: None		
Usability for other study programs:	None		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After attending this course, students should be able to			
- hold simple conversations, for example, introduce themselves, ask for directions, or talk about a hobby. - expand their vocabulary for everyday situations, such as family, food, shopping, and leisure. - form and understand simple sentences, especially short, clear statements. - know the most important grammar rules, such as the use of the present tense, personal pronouns, and how to ask simple questions. - read and understand short texts, such as simple advertisements or emails. - write simple texts themselves, such as a short message or a postcard.			
Content:			
- Greetings and introductions (name, age, origin), farewells (Bonjour, Salut, Au revoir), polite expressions (please, thank you, excuse me) - People and family (naming family members, talking about yourself and others)			

- Numbers and dates (numbers from 0 to 100, days of the week, months, seasons, dates and times)
- Everyday situations (shopping, ordering in a restaurant, giving and asking for directions)
- Food and drink (naming foods and drinks, talking about preferences)
- Leisure and hobbies (talking about leisure activities, forming simple sentences about hobbies)
- Basic grammar: the present tense of the most important verbs (être, avoir, aller, faire), personal pronouns, simple questions and negations, articles (un, une, le, la)
- Everyday communication (having short conversations, reading and writing simple texts (e.g., postcards, short emails))

Literature:

- SCHREITMÜLLER, Fabienne, 2017. *Langenscheidt fit in 30 Tagen - Französisch: Niveau A1-A2: der schnelle Sprachkurs mit Buch, 2 Audio-CDs und Audio-Wortschatztrainer auf 1 MP3-CD: Lernkalender mit Tipps vom Coach und Trainingsplan*. München; Wien: Langenscheidt. ISBN 978-3-468-28029-0
- GRÉGOIRE, Maïa, 2015. *Grammaire progressive du français: niveau débutant complet ; avec 200 exercices*. Paris: CLE International / SEJER. ISBN 978-209-038156-6, 978-3-12-529948-1

Additional remarks:

None

French A2			
Module abbreviation:	SZ_FRANZ_A2	SPO-No.:	6
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	General elective subject	
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	German	1 semester	winter and summer term
Responsible for module:	Reicherstorfer, Anja		
Lecturers:	Abdallah, Zahra		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	6-French A2 (SZ_FRANZ_A2)		
Lecture types:	SU/Ü-Lecture with practical exercises		
Examinations:	LN - written exam, 90 minutes (SZ_FRANZ_A2)		
	Further information: None		
Usability for other study programs:	None		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After attending the course, students will be able to			
• understand short, simple everyday conversations (e.g., about family, hobbies, shopping). • understand short, simple texts (e.g., emails, postcards, advertisements, directions). • hold short conversations and ask and answer simple questions. • use simple sentence structures and learned expressions. • master the present tense of regular and common irregular verbs, use of the passé composé and future proche, personal pronouns, simple relative clauses, and degrees of comparison of adjectives. • use polite forms and culturally appropriate expressions (e.g., greetings, expressions of thanks).			
Content:			
• Passé composé, Imparfait, Futur, Conditionnel, Impératif, Pronoms personnels, déterminants et pronoms équivalents, adverbes, prop. subordonnées, comparatif et superlative • Organizing vacations and trips			

- Writing letters, including application letters
- Work organization in a company, professional correspondence, phone calls, meetings

Literature:

- SCHREITMÜLLER, Fabienne, 2017. *Langenscheidt fit in 30 Tagen - Französisch: Niveau A1-A2; der schnelle Sprachkurs mit Buch, 2 Audio-CDs und Audio-Wortschatztrainer auf 1 MP3-CD: Lernkalender mit Tipps vom Coach und Trainingsplan*. München; Wien: Langenscheidt. ISBN 978-3-468-28029-0

Additional remarks:

None

German A1 Intensive			
Module abbreviation:	GermanA1_E	SPO-No.:	6
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	General Elective Subject	1
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	German	1 semester	only winter term
Responsible for module:	Reicherstorfer, Anja		
Lecturers:	Donovan, Elke		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	6- German A1 Intensive (GermanA1_E)		
Lecture types:	SU/Ü-Lecture with practical exercises		
Examinations:	LN - written exam, 90 minutes (GermanA1_E)		
	Further information: None		
Usability for other study programs:	None		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
Students are able to			
- understand and use familiar everyday expressions and simple phrases, which relate to the satisfaction of concrete needs - introduce themselves and others, - ask and answer questions about personal details (name, origin, interests, ...) - communicate in a simple manner			
Content:			
Acquisition of most fundamental language concepts allowing students to communicate in everyday situations, evaluate situations, communicate wishes and preferences and gain basic communication skills, e.g.			
- alphabet, numbers and ordinal numbers - pronunciation - word types (nouns, verbs, adjectives, pronouns, prepositions) - tenses (present tense, perfect tense, past tense)			

- most common regular and irregular verbs, reflexive verbs, modal verbs, separable verbs
- negation and questions

Literature:

- KRENN, Wilfried and Herbert PUCHTA, 2015. *Motive Kompaktkurs DaF, Kursbuch, Lektion 1 - 8, Deutsch als Fremdsprache*. München: Hueber. ISBN 978-3-19-001880-2
- KRENN, Wilfried and Herbert PUCHTA, 2015. *Motive Kompaktkurs DaF, Arbeitsbuch, Lektion 1 - 8, Deutsch als Fremdsprache*. München: Hueber. ISBN 978-3-19-031880-3
- FANDRYCH, Christian and Ulrike TALLOWITZ, 2008. *Klipp und Klar, Übungsgrammatik Grundstufe Deutsch in 99 Schritten*. Stuttgart: Klett. ISBN 978-3-12-675322-7; 978-3-12-675327-2; 978-3-12-675427-9

Additional remarks:

None

German A2 Intensive EG			
Module abbreviation:	German A2 Intensive_EG	SPO-No.:	6
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	General Elective Subject	2
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	German	1 semester	only winter term
Responsible for module:	Reicherstorfer, Anja		
Lecturers:	Donovan, Elke		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	62 h	
	Self-study:	63 h	
	Total effort:	125 h	
Subjects of the module:	6- German A2 Intensive EG (German A2 Intensive_EG)		
Lecture types:	SU/Ü - lecture with integrated exercises (German A2 Intensive_EG)		
Examinations:	LN - written exam, 90 minutes		
	Further information: None		
Usability for other study programs:	None		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
After attending the course, students will be able to			
• hold simple conversations on familiar topics, e.g., shopping, directions, leisure time. • expand their vocabulary on topics such as family, work, health, travel, and everyday situations, and use frequently used expressions and idioms. • master the most important tenses, especially the perfect, past, and present tenses, form simple comparisons and intensifications, use prepositions correctly, and formulate simple questions and negations. • understand short, clear conversations and instructions. • communicate in familiar situations, e.g., shopping, in a restaurant, at the doctor's office. • understand and write short texts, advertisements, emails, and letters.			
Content:			
• Everyday life and routine (talking about daily routines, describing appointments and plans, expressing habits and preferences) • Travel and directions (giving and asking for directions, naming modes of transportation, planning trips, and talking about vacation destinations)			

- Shopping and food (shopping at the supermarket, ordering at a restaurant and asking for recommendations, describing food and drinks)
- Housing and surroundings (describing apartments and houses, talking about the neighborhood)
- Health and body (naming body parts, talking about health and ailments, communicating at the doctor's office or pharmacy)
- Work and career (talking about your job, describing working hours and activities, understanding and writing simple job applications and resumes)
- Leisure and hobbies (talking about hobbies and leisure activities, accepting or declining invitations, reporting on past events)
- Grammar and language structures - Past tense and perfect tense for past events, modal verbs, expanding vocabulary (adjectives, adverbs), comparative forms, prepositions (on, in, next to, between), pronouns, expanding questions and negations
- Everyday communication (having short conversations, writing simple letters, emails, and messages, exchanging information, and asking for help)

Literature:

- KRENN, Wilfried and Herbert PUCHTA, 2015. *Motive A2, Kompaktkurs Deutsch als Fremdsprache, Kursbuch*. München: Hueber. ISBN 978-3-19-001881-9
- KRENN, Wilfried and Herbert PUCHTA, 2015. *Motive A2, Kompaktkurs DaF, Arbeitsbuch, Lektion 9 - 18*. München: Hueber. ISBN 978-3-19-031881-0
- FANDRYCH, Christian and Ulrike TALLOWITZ, 2008. *Klipp und Klar, Übungsgrammatik Grundstufe A1-B1*. Stuttgart: Klett. ISBN 978-3-12-675427-9

Additional remarks:

None

German B1 Intensive			
Module abbreviation:	GermanB1_EG	SPO-No.:	6
Curriculum:	Programme	Module type	Semester
	Engineering and Management (SPO SS 15)	General Elective Subject	3
Module attributes:	Language of instruction	Duration of module	Frequency of offer
	English	1 semester	only winter term
Responsible for module:	Reicherstorfer, Anja		
Lecturers:	Pohl, Esther		
Credit points / SWS:	5 ECTS / 4 SWS		
Workload:	Contact hours:	47 h	
	Self-study:	78 h	
	Total effort:	125 h	
Subjects of the module:	6-German B1 Intensive (GermanB1_EG)		
Lecture types:	SU/Ü: Lecture with integrated exercises		
Examinations:	LN - written exam, 90 minutes (GermanB1_EG)		
	Further information: None		
Usability for other study programs:	Please see the subject recognition list of SCS (Study Service Center).		
Prerequisites according examination regulation:			
None			
Recommended prerequisites:			
None			
Objectives:			
Students can - improve communication skills deal with everyday situations in Germany - understand information (weather, family, how to plan your vacation) - express and represent their own opinion - compare things - be polite and hand out advice			
Content:			
Acquisition of fundamental language concepts allowing students to express themselves simply and coherently on familiar topics of personal interest (about personal experiences, events, dreams, hopes, objectives). Grammar: - passive voice - prepositions (local, modal, temporal) - modal verbs, separable verbs, subjunctive II - reflexive verbs (accusative, dative)			

- past tense (Perfekt, Präteritum)
- declination of adjectives, adjectives of degree
- prefixes
- adverbs
- infinitive clause, reported questions, subordinate clause, relative clause, conjunctions
- pronouns (possessive, demonstrative)
- cases (genitive, dative, accusative)
- reading and listening comprehensions
- role plays

Literature:

- KRENN, Wilfried and Herbert PUCHTA, 2015. *Motive B1. Kompaktkurs DaF: Deutsch als Fremdsprache*. München: Hueber Verlag.

Additional remarks:

Minimum number of participants: 8 students

5.3 Electives in Engineering and Management

Starting with winter semester 2024/25, there is a separate module handbook for the descriptions of the elective modules, which is part of the semester curriculum for the bachelor's degree program "Engineering and Management". This can be found on the Moodle page of your degree program under "General Information": <https://moodle.thi.de/course/view.php?id=3804§ion=2>

Note:

Please note that *not all modules* listed in the handbook for electives can be selected for your degree program or specialization. The current list of selectable modules for your degree program or specialization can be found in Moodle under: <https://moodle.thi.de/mod/folder/view.php?id=213758>