Technische Hochschule Rosenheim

Faculty of Engineering

Curriculum

of the

International Bachelor of Engineering

Specialisation in Engineering and Management at Rosenheim Technical University of Applied Sciences

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1 Introduction

Engineers drive innovation and are technology integrators and enablers for almost all sectors of the economy in Germany. The International Bachelor of Engineering programme will enable you to take on managerial func-tions in engineering-technical occupational fields and also to function in higher-level and coordinating cross-sectional positions, as the degree programme provides a sound insight into the fields of activity of modern engi-neering sciences. In addition, you will have international competences as well as excellent German and English skills after completing your studies. Professionals combine regional, national and international levels and fields of activity, for example in industry (product development and manufacturing, software development, service, marketing and sales, planning, operation and testing of equipment/plants, quality management).

Basic studies which contain engineering fundamentals and German language courses are followed by the main studies in a specialisation chosen during the study programme. At Rosenheim campus, students can choose from the following specialisations: Electrical Engineering and Information Technology, Energy and Building Technology, Engineering and Management, Plastics Engineering / Sustainable Polymer Engineering, Mechanical Engineering, Mechatronics or Medical Technology.

In addition to an interdisciplinary, well-balanced range of modules at the respective campus and department, you can choose from attractive specialisation modules in the advanced course of study in each focus area and build up specific knowledge. This individual competence profile also enables you to manage very specialised projects or departments.

Note: Students who are not sure whether they want to study Engineering and Management or one of the other special-isations Electrical Engineering and Information Technology, Energy and Building Technology, Plastics Engi-neering, Mechanical Engineering, Mechatronics, Medical Technology or Sustainable Polymer Technology at the TH Rosenheim have the option of a flexible start semester in the IBE. Because the subjects in the first semester are the same in all specialisations, students can easily change to the specialisation of their choice after the first semester.

2 Preliminary remark

Extract from the Study and Examination Regulations SPO X [1] dated 27.05.2021 - § 6 Study plan:

(1) The Faculty of Management and Engineering shall draw up a study plan detailing the course of study in order to ensure the courses offered and to inform the students. It shall be adopted by the Faculty Council and made public at the university. The announcement of new regulations must be made at the latest at the beginning of the semester in which the regulations are to be applied for the first time. The study plan contains, in particular, regulations and information on:

1. The objectives, contents, semester hours per week, credit points, language of instruction and types of courses of the individual modules, insofar as this is not conclusively regulated in these Statutes, in particular a list of the current subject-specific compulsory elective modules including conditions and restrictions regarding the possibility of taking them.
2. The objectives and contents of the prepractice, the practical study semester and the course accompanying the practice as well as their form, organisation and number of credit points.
3. More detailed provisions on the examinations, certificates of attendance and admission requirements.
4. The assignment of the modules to the profile blocks.

(2) There is no claim that all profile blocks, subject-specific compulsory elective modules and elective modules will actually be offered. Similarly, there is no claim that the associated courses will be held if the number of participants is insufficient. Furthermore, the examination commission may set attendance requirements and maximum numbers of participants for certain courses. The study and examination regulations for the degree programme in Engineering and Management at TH Rosenheim can be found here

The study plan supplements the regulations from the SPO [1], the APO [2] and the RaPo [3]; in case of doubt, the examination regulations are binding.

3 Course of studies

The standard duration of the Bachelor's programme "Engineering and Management" is 8 semesters, of which 7 semesters are spent at the university and one practical study semester in the private sector.

Figure 1 shows the different courses of study. It is ensured that all subjects can be attended in order. Deviations from the suggested sequences are possible.

A prerequisite for studying is the ability to speak English at an appropriate level. For more detailed regulations, see chapter 6.

As a rule, the practical semester is to be completed in the 6th semester; if this is not possible, an individual plan can be drawn up. In this case, it is recommended that this be coordinated with the student advisory service. Further regulations on the practical study semester or the IPA project and the practical courses (PLV) can be found in chapter 7.3.

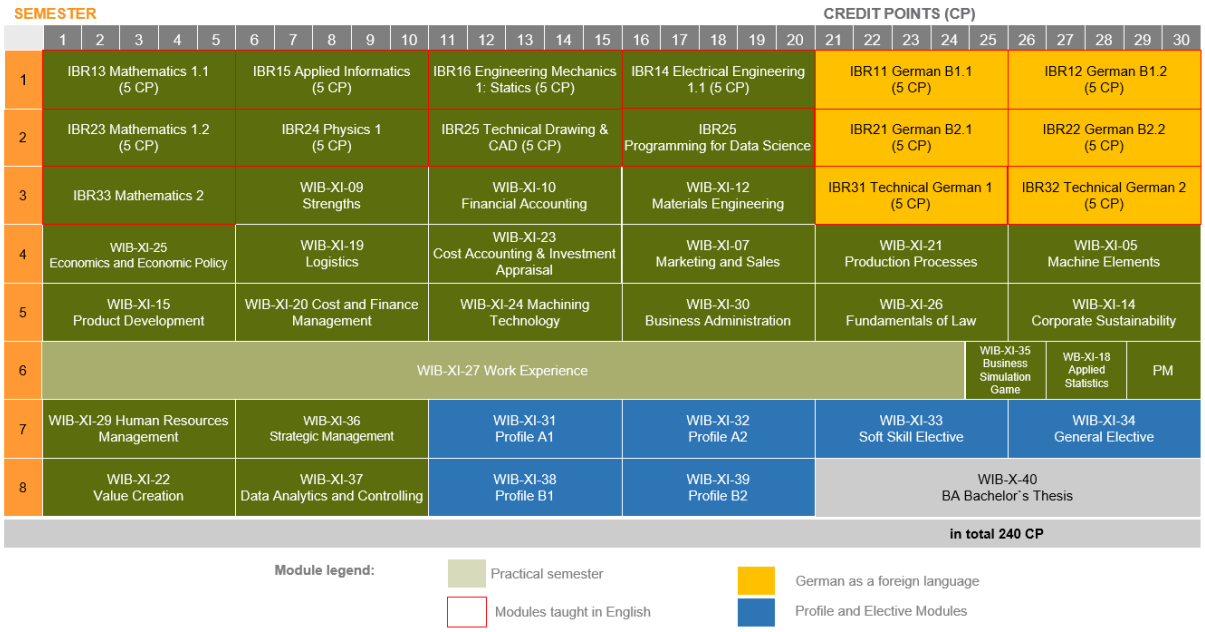

Figure 1: Study plan

Modul or Modul Group	Module Name or Designation of the Module Group	Study model with practical semester								
		Semester								
		1	2	3	4	5	6	7	8	Σ CP
IBR11	German B1.1	5								5
IBR12	German B1.2	5								5
IBR13	Mathematics 1.1	5								5
IBR14	Electrical Engineering 1.1	5								5
IBR15	Applied Informatics	5								5
IBR16	Engineering Mechanics 1:	5								5
IBR21	German B2.1		5							5
IBR22	German B2.2		5							5
IBR23	Mathematics 1.2		5							5
IBR24	Physics 1		5							5
IBR25.1	Technical Drawing and CAD		5							5
IBR25.2	Electrical Engineering 1.2		5							5
IBR31	Technical German 1			5						5
IBR32	Technical German 2			5						5
IBR33	Mathematics 2			5						5
WIB-X-05	Machine Elements			5						5
WIB-X-10	Financial Accounting			5						5
WIB-X-12	Materials Engineering			5						5
WIB-X-07	Marketing and Sales				5					5
WIB-X-21	Production Processes				5					5
WIB-X-15	Product Development Basics				5					5
WIB-X-16	Thermal Engineering				5					5
WIB-X-18	Quality Management - Praxis				1					1
WIB-X-19	Basic in Logistics				5					5
WIB-X-20	Cost Accounting				5					5
WIB-X-22	Digital Value Creation					5				5
WIB-X-23	Financing and Investment Appraisal					5				5
WIB-X-24	Machine Tools					5				5
WIB-X-25	Economics & Economic Policy					3				3
WIB-X-18	Quality Management and Statistics					3				3
WIB-X-26	Basics of Law					5				5
WIB-X-14	Basics in Corporate Sustainability					5				5
WIB-X-29	Human Resources Management							5		5
WIB-X-30	Seminar Business Administration							5		5
WIB-X-31	Profile A1							5		5
WIB-X-32	Profile A2							5		5
WIB-X-33	Soft Skill Elective							4		4
WIB-X-34	General Elective							2		2
WIB-X-35	Management Simulation Game							3		3
WIB-X-36	Strategic Management								2	2
WIB-X-37	Data Analytics and Controlling								5	5
WIB-X-38	Profile B1								5	5
WIB-X-39	Profile B2								5	5
WIB-X-28	Lectures for Practical Internship						6			6
WIB-X-27	Practical Internship						24			24
WIB-X-40	Bachelor`s Thesis								12	12
	Σ CP	30	30	30	31	31	30	29	29	240

Figure 2: Study plan

In the seventh and eighth semesters, students must choose two profile blocks. A profile block contains modules worth 10 CP, these are determined at the beginning of each semester, see chapter 7.

In addition, depending on personal inclination, elective subjects can be chosen from a catalogue (FWPM) with a total of 6 CP. Here, 2 CP are freely selectable and 4 CP are to be selected from the area of “soft skills”. For details see chapter 8.

The programme concludes with the Bachelor’s thesis, see chapter 9.

Further regulations on the course of studies can be found in the Study and Examination Regulations SPO [1], the APO [2] and the RaPo [3].

3.1 General

The basic studies during the first three semesters include central engineering fundamentals and integrated Ger-man language classes. These are taught predominantly in English. Parallel to this, students acquire the neces-sary German language skills in order to switch to the German-language main studies from the fourth semester onwards and complete their studies in German. For this purpose, they complete three semesters of German language courses in the amount of 10 CP per semester, beginning with the acquisition of language level B1 according to the CEFR (Common European Framework of Reference for Languages) – German language skills at level A2 according to the CEFR are a language admission requirement for the degree programme. The acqui-sition of German language skills up to level C1 according to the CEFR within the framework of the basic studies qualifies students to transfer to the German-language main studies. Language acquisition supports successful internships and creates the basis for a successful connection to the regional labour market. There is a common starting semester that qualifies students to study in each specialisation. From the second semester onwards, subject-specific compulsory modules supplement the joint modular study at the Rosenheim campus. From the second semester onwards, the compulsory modules required for training are added at the Rosenheim campus. From the third semester onwards, foreign students are introduced to German-language studies through selected German taught courses. In addition to the compulsory modules, from the fourth semester onwards students have the opportunity to take in-depth modules of their own choice in the defined areas. The basis of the degree programme, in addition to the German language modules with 30 CPs, is a broad basic education in engineering subjects. This includes 15 CPs in mathematics, 5 CPs in physics, 5 CPs in engineering mechanics, 5 CPs in elec-trical engineering and 5 CPs in applied informatics, which form the basis for all participating engineering degree programmes at the Rosenheim campus and cover a very broad range of subjects. The diversification begins in the second semester and is then clearly noticeable in the third semester, because in this semester mainly individ-ual modules are offered per specialisation.

3.2 Time regulations

In order to support rapid study progress, the following minimum achievements must be made: The examina-tions in the modules “Mathematics 1” and “Physics 1” must be taken by the end of the second semester. If students exceed this deadline for reasons for which they themselves are responsible, the associated examina-tions shall be deemed to have been taken for the first time and not passed. Only those students are entitled to enter the fourth study semester and to continue their studies who

- at least 25 credit points from the subject-related study basics as outlined in the study and examinations regulations, and
- have achieved at least 20 credit points from the language modules “German as a Foreign Language” as outlined in the study and examinations regulations.

By the end of the first semester at the latest, students must decide on one of the following concentrations:

- Energy and Building Technology (Faculty of Applied Sciences and Humanities)
- Electrical Engineering and Information Technology (Faculty of Engineering)
- Plastics Engineering / Sustainable Polymer Engineering (Faculty of Engineering)
- Mechanical Engineering (Faculty of Engineering)
- Mechatronics (Faculty of Engineering)
- Medical Technology (Faculty of Engineering)
- Engineering and Management (Faculty of Management and Engineering).

Further information can be found in the study and examination regulations at International Bachelor of Engi-neering. The exact details of the examinations, in particular of the compulsory elective modules, can be found in the “Announcement of the performance records”, which are published by the university at the beginning of each semester. The Bachelor’s thesis is an examination performance. The work begins with the issue of the topic by the examination committee. The maximum processing time is 5 months. If the maximum processing time is exceeded for reasons for which the student is responsible, the examination is deemed to have been failed. Deadlines: The standard period of study, including the Bachelor’s thesis, is 8 semesters. If the standard period of tudy is exceeded by more than 2 semesters, all examinations that have not been taken by then will be deemed as failed for the first time. It is therefore recommended to take the examinations as early as possible.

4 Module descriptions

The descriptions of the individual modules (incl. FWPM offered by the WI faculty) can be found in the module handbook (see appendix).

5 Module Overview

Module or module group	Module designation or designation of the module group	SWS	ECTS Points (CP)	Page
IBR11	German B1.1	4	5	S. 2
IBR12	German B1.2	4	5	S. 4
IBR13	Mathematics 1.1	5	5	S. 6
IBR14	Electrical Engineering 1.1	4	5	S. 8
IBR15	Applied Informatics	4	5	S. 10
IBR16	Engineering Mechanics 1: Statics	4	5	S. 12
IBR21	German B2.1	4	5	S. 14
IBR22	German B2.2	4	5	S. 16
IBR23	Mathematics 1.2	4	5	S. 18
IBR24	Physics 1	5	5	S. 20
IBR25.1	Technical Drawing and CAD	4	5	S. 23
WIB-XI-16	Programming for Data Science	4	5	S. 26
IBR31	Technical German 1 – B2/C1	4	5	S. 27
IBR32	Technical German 2 – B2/C1	4	5	S. 29
IBR33	Mathematics 2	4	5	S. 31

6 Foreign language and stay abroad

6.1 Foreign language

All framework conditions for foreign languages in the IBE-WI degree programme are regulated by the general language statutes of the TH Rosenheim, if not in the SPO.

It is recommended to consolidate one's own language skills within the framework of the FWPM "Softskill".

6.2 Stay abroad

6.2.1 Internship abroad

A practical phase of 18 weeks is planned in the 6th semester. This can be completed at home or abroad.
General information on the practical semester can be found at Internship Office.

Information on internships abroad can be found at International Office.

6.2.2 Study abroad

For a study semester abroad, we **generally** recommend the **7th semester** (i.e. the summer semester if you start in the winter semester). This semester contains many courses that facilitate the recognition of study and examination achievements made abroad, amounting to up to 30 ECTS per semester. A**lternatively**, you can complete the internship in the 7th semester and use the 6th semester for a semester abroad. We suggest this option for students who have **started their studies in the summer semester**, as well as for students who have chosen a partner university for which the summer semester already begins during the Rosenheim examination period of the winter semester. Information on studying abroad can be found at International Office.

6.3 Proof of suitable modules for recognition

We recommend that you exchange some modules in the 7th and 8th semesters so that your study plan has a high degree of flexibility with regard to the modules you choose abroad and

want to have credited in Rosen-heim. The following modules are particularly suitable for crediting study achievements gained abroad (cf. study semester abroad), in the amount of up to 30 ECTS per semester.

Human Resources Management	Frequent subject at external universities. Alternatively, a VHB course is available (creditable)
Profile Block A	Choice "International". This gives you the opportunity to receive credit for numerous subjects from the catalogue of our partner universities.
FWPM General	Freely selectable, provided that the content is suitable for the field of activity of a prospective industrial engineer.
FWPM Softskill	Subject from the area of "soft skills" (e.g. national language, presentation techniques, intercultural subjects)

Figure 3: Recommended modules for the 7th semester abroad

Strategic Management	Lecture only in winter semester, possibly comparable subject available at an external university
Profile Block B	
Data Analytics and Controlling	Lecture only in winter semester, possibly comparable subject available at an external university
Business Studies Seminar	Offered in the winter and also in the summer semester
Business Simulation	Offered in the winter and also in the summer semester
Bachelor Thesis	Can also be made abroad.

Figure 4: Recommended modules for the 8th semester in Rosenheim

In principle, the study and examination achievements obtained abroad can be credited to your studies at Rosenheim Technical University of Applied Sciences, provided that there are no significant differences with regard to the competences acquired.

Please discuss your planned stay abroad at an early stage with Prof. Dr. Unterlechner (International Officer of the WI Faculty) and coordinate your planned module catalogue with the WI Examination Committee before your stay abroad. To do so, please send the completed preliminary request for crediting of competences (can be found here) to the general mail address of the Examination Committee (pk-wi@th-rosenheim.de). In addition to the preliminary enquiry, please enclose all desired module descriptions of the foreign partner university as individual pdf documents. In case of urgent questions, you can also contact the chairman of the WI-Bachelor examination board, Prof. Dr. Wallner, directly.

The template (for the crediting of competences) and information on the recognition of study achievements from abroad after completion of the stay abroad can be found at International Office.

Please take into account that the examination board ultimately decides which modules you can receive credit for.

7 Practical semester WI-Bachelor

The practical study semester is to be completed as industrial project work (IPA) in a team in a company. An individual practical study semester is also possible upon request. It is also possible to complete an internship abroad; contact with the “International Office” at the university is recommended.

According to the SPO [1], the practical semester is scheduled for the 6th semester.

7.1 Practice phase

Duration: The scope is 18 weeks practical phase and 2 weeks block teaching or asynchronous e-learning modules.

Target:

- Imparting knowledge (working methods, methodical approaches) from selected functional areas of the company through engineering-related activities.
- Insights into technical, economic and organisational contexts of the company
- Insights into leadership and management issues

Training content:

The contents of the practical training should correspond to one or more of the fields below:

- Work preparation / production control
- Procurement / Purchasing
- Controlling / Cost accounting
- Data processing / information systems
- Development / Construction
- Logistics / Materials Management
- Human Resources Management
- Planning / Organisation
- Distribution

7.2 IPA - Industrial Project Work

Industrial Project Work, or IPA in German, offers students exciting project work in a team at a company. This team consists of at least two students.

Through the concretised project topic, students gain extensive know-how in project management and experience intensive practical experience with team-oriented work.

The complete IPA project is divided into two project phases over the course of a calendar year:

- Project phase 1
  Start is in the course of the summer semester around the beginning of May. Once a week, the IPA team works all day (7 dates) in the company to prepare for phase 2. In the first two weeks after the exams in the summer semester, the team completes eight additional full-day appointments in the company. The appointments in project phase 1 can be completed in blocks as an exception, only if otherwise not possible, in consultation with the companies. A written interim report must be submitted at the end of project phase 1.
- Project phase 2
  The IPA team works in the company over the winter semester, as in a “normal” practical study semes-ter. The project must be completed by 14 March at the latest. The results of the project work are to be presented in a written final report, which is also to be submit-ted to the Internship Office as an internship report. The project conclusion is the public project presentation at the university (IPA Day), this also flows in-to the assessment.

Due to the somewhat higher workload of the IPA project, up to 3 FWPM with 8 CP can be recognised. With IPA, you can complete both your practical study semester and all FPWM. Early planning is therefore advisable.

7.3 Successful completion

The practical semester has been successfully completed when the required practical periods with the prescribed contents have been proven by a certificate from the training company, a proper internship report has been submitted and accepted, participation in the PLV introductory block has been proven and the PLV final block with internship examination and colloquium (except for IPA participants) has been completed and passed.

8 Profile blocks

The modules of the different profile blocks are aligned on the one hand with typical job profiles of industrial engineers but also with current trends. Possible areas are:

Typical job profiles such as: Industrial Engineering, Logistics, International Sales and Purchasing or Raw Materials and Energy Management.

Current trends such as: Digitalisation, sustainability, virtualisation, internationalisation or ethics in companies.

A profile block always consists of 2 profile modules of 5 CP each. The following profile blocks are planned from SS 2024:

Profile block	Modules	
Sustainability	Sustainable product development	Digital material and value stream analysis
Supply Chain Management	Technical purchasing and sales	Digital business processes
Energy	Renewable energies	Energy industry
Digitisation	Data Science	Internet of things

Figure 5: profile blocks

Since the flexible design of the profile blocks is intended to achieve a current orientation of the degree programme, the profile modules may change. The named profile modules apply to the respective semester; there is no entitlement to a special profile block or a special profile module in the following semesters.

Furthermore, it is possible to choose one of the following alternatives instead of a profile block:

Internationalisation If a semester is completed abroad, it is possible to have other subjects from the local offer of the partner university recognised as a profile block in the sum of 10 CP. The subject combination must be approved by the examination board. To ensure recognition, it is recommended to fill out and have approved a corresponding preliminary recognition form prior to commencement.

Research project A research project (10 CP) in one of the research foci of the faculty (or the University) can be recognised as an alterna-tive to a profile block. Further regulations apply analogously to a student research project, the research project must be approved in advance by the examination board and must be supervised by a lecturer of the WI faculty.

Specialist required Elective Courses (FWPM) Modules attended (see point 8.1), course work (see point 8.2) and also the compulsory courses in industrial project work (see also point 7.2) can be credited as FWPM.

The required CP must be achieved in total; any division is possible. If more CP are achieved than required, only the maximum of achievable CP will be recognised.

Note that you will achieve 2 CP with a general FWPM (content should match the orientation of the degree pro-gramme in industrial engineering) and 4 CP from the area of “soft skills” (languages, presentation techniques, intercultural content, ….).

8.1 Modules

Subject-specific compulsory elective modules are modules from which each student must make a specific selection in accordance with the study and examination regulations. The selected modules are treated as compulsory modules.

Students can choose the FWPM both from the FWPM catalogue of WI, from profile modules or also from offers of other faculties (extended FWPM catalogue of the faculty WI). The current catalogue can be found in the study plan on the homepage

Other courses of other faculties or modules offered at the Virtual University of Bavaria (www.vhb.org) can also be chosen as FWPM after individual consultation and upon application (to the WI examination board).

Other subjects can also be recognised on application (to the examination board).

When choosing a foreign language as FWPM, a suitable, demanding level must be ensured and it can be freely chosen from the range offered by the Language Centre of TH Rosenheim.

8.2 Student research projects

General information

In order to expand the students’ options and to give them the opportunity to decide according to their interests, it should be possible to write a student research project. The tasks for such student research projects are set and announced by the professors of the Faculty of Management and Engineering. The topics can be theoretical, constructive, planning or experimental, e.g.:

- Research (market, literature, programme, other research)
- Creation of instructional videos
- Support for the planning of test and measurement facilities
- Construction of experimental and measuring equipment, laboratory set-ups, etc.
- Commissioning of test and measuring equipment, of laboratory equipment
- Creation of programmes for various applications, etc.
- Concept elaborations in the field of technology or organisation, etc.

Advantages for the students:

- independent project-related work
- Free time management of the work (without fixed lecture dates as with FWPM)
- Very good training effect for later final papers
- Less lead time required than with IPA

Specifications

- A student research project is credited as a FWPM with up to 5 CP. The crediting depends on the planned work-load of the thesis and is agreed with the lecturer at the beginning of the thesis.
- Each student can only complete one coursework during their studies.
- There is no entitlement to the assignment of a study paper. Depending on demand, student research papers are formulated and offered for processing.
- The maximum duration of the coursework is 6 months. Upon application to the respective WI examination board, the completion period can be extended.
- The Examinations Office receives the grade report of the student research project in the form of a form signed by the first and second examiners from the WI office or via the Online Service Centre. The topic is included in the degree certificate, the grade of the coursework is included with the weighting of the CP.
- Submission of the work in bound or spiral-bound form or in a loose-leaf binder.
- One copy of the coursework must be handed in for the first and second examiner. Archiving (at least two years) takes place with the first examiner.
- Topics can only be submitted by professors of the Faculty of Management and Engineering.

9 Bachelor's thesis

The Bachelor's thesis concludes the degree programme in industrial engineering. The Bachelor's thesis should be an independently prepared, application-oriented scientific work.

The Bachelor's thesis is assessed and graded by two examiners. At least one of these two examiners must be a full-time professor of the Faculty of Management and Engineering at TH Rosenheim. The topic is applied for in advance and assessed by the examiners.

The topic of the Bachelor's thesis can be chosen freely according to the student's own interests in the context of the Industrial Engineering and Management degree programme. The Bachelor's thesis can be worked on both at the university and outside the university. The topic and the outline must be agreed with the first examiner be-fore registration. The outline should clearly show the train of thought and the course of argumentation. This work outline can, after it has been agreed with the supervisor, also be rearranged, extended or strengthened after registration depending on the requirements. However, it must be ensured that the topic of the work remains the same in the case of major changes.

Registration for the Bachelor's thesis can take place at the earliest after completion of the practical phase of the practical semester. The submission of the Bachelor's thesis must take place 5 months after registration; the maximum duration of study must also be taken into account here.

10 Announcements of the performance records

The announcement of the performance records takes place exclusively via the website of TH Rosenheim. There is no right to a performance record for each module in each semester, but as a rule one performance record per module takes place in each semester.

11 Contact person

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12 References

[1] Study and Examination Regulations for the Bachelor's Degree Programme in Industrial

Engineering and Management at TH Rosenheim of 27 May 2021 [2] General Examination Regulations of TH Rosenheim of 02 August 2016 in the version of 08 April 2021 [3] Framework Examination Regulations for Universities of Applied Sciences of 17 October 2001

13 Abbreviations

CP | CreditPoints (ECTS) FWPM | Subject-specific compulsory elective module IPA | Industrial project work SPO | Study and Examination Regulations PLV | Practical courses VHB | Virtual University of Bavaria

14 Appendix

- Assignment table of modules from SPO IX to SPO X
- Course of studies “Flexisemester
- Module Manual SPO X
- FWPM catalogue
- Module Handbook FWPM
- Training guidelines for pre-practice

15 Module Descriptions

Version da7df0f8 for students
according to the SPO of May, 6th 2022

Module name	German B1.1		
Number(s)	**Abbreviation**	**Curriculum semester**	**ECTS**
IBR11		1	5
Responsible for the module	**Lecturer(s)**	**Teaching form**	**SWS**
Barbara Lembcke	Janika Hausner	SU	4
Form of examination	**Module duration**	**Module rotation**	**Language**
see SPO	1 Semester	Summer semester	German / Englisch
Total workload	**= Presence**	**+ Self-study**	**+ Exam preparation**
150 h	60 h	60 h	30 h

Applicability of the module in the degree programmes
IBE

Mandatory requirements according to examination regulations
-

Recommended prerequisites
A2 completed according to CEFR

Intended learning objectives
Advanced language use B1.1 according to CEFR The students can • understand frequently used expressions and clear standard language relating to study, work and leisure • cope with most everyday situations in the language area • express themselves simply and coherently on familiar topics and personal areas of interest • report on experiences and events • Describe hopes and goals • give brief reasons and explanations for plans and views • use some more complex grammatical structures.

Content
B1.1 (The module comprises parts of level B1) • Teaching and examination focus: Speaking and listening comprehension • Practical language skills for study and everyday life • Presenting and discussing (oral presentation of one's own opinion with brief justification) • Vocabulary (expanding the range of vocabulary for everyday life and study, noun-verb combinations, use of vocabulary in context) • Grammar (perfect / preterite / past perfect, future tense, passive voice, subjunctive II, verbs with prepositions, prepositions, adjective declension, accusative / dative / genitive, connectors and sentence combinations, relative clauses, etc.) • Pronunciation • intercultural competence
Recommended literature
• To be announced in the course

Module name	German B1.2		
Number(s)	**Abbreviation**	**Curriculum semester**	**ECTS**
IBR12		1	5
Responsible for the module	**Lecturer(s)**	**Teaching form**	**SWS**
Barbara Lembcke	Janika Hausner	SU	4
Form of examination	**Module duration**	**Module rotation**	**Language**
see SPO	1 Semester	Summer semester	German / Englisch
Total workload	**= Presence**	**+ Self-study**	**+ Exam preparation**
150 h	60 h	60 h	30 h

Applicability of the module in the degree programmes

IBE

Mandatory requirements according to examination regulations

-

Recommended prerequisites

A2 according to GER completed

Intended learning objectives

B1.2 (The module comprises parts of level B1)

- Teaching and examination focus: Writing and reading comprehension
- Practical language skills for study and everyday life
- Emails and written communication
- Written presentation of one's own opinion with brief justification on familiar topics
- Vocabulary (expanding the range of vocabulary for everyday life and study, noun-verb combinations, use of vocabulary in context)
- Grammar (perfect / preterite / past perfect, future tense, passive voice, subjunctive II, verbs with prepositions, prepositions, adjective declension, accusative / dative / genitive, connectors and sentence combinations, relative clauses, etc.)
- intercultural competence

Content
Level B1.2 • Teaching and examination focus: Writing and reading comprehension • Practical language skills for study and everyday life • Mails and written communication • Vocabulary and grammar • Intercultural competence
Recommended literature
• To be announced in the course

Module name	Mathematics 1.1		
Number(s)	**Abbreviation**	**Curriculum semester**	**ECTS**
IBR13	Maths 1.1	1	5
Responsible for the module	**Lecturer(s)**	**Teaching form**	**SWS**
Prof. Dr. Link	Prof. Dr. Link, Dr. Douka	SU	5
Form of examination	**Module duration**	**Module rotation**	**Language**
see SPO	1 Semester	Summer Semester	English
Total workload	**= Presence**	**+ Self-study**	**+ Exam preparation**
150 h	60 h	54 h	36 h

Applicability of the module in the degree programmes
IBE
Mandatory requirements according to examination regulations
none
Recommended prerequisites
General higher education qualification (Abitur), advanced technical college certificate (Fachhochschulreife) or equivalent
Intended learning objectives
The aim is to teach and deepen mathematical basics and their applications. The students are then able to formulate practical problems mathematically and solve them by selecting suitable methods. Due to the knowledge of mathematical basics, the students are able to independently deal with more advanced mathematical methods.
Brief description of the module
The students master the basics of linear algebra and vector calculus. They know the basics of calculus, can confidently deal with functions of a variable and are proficient in differential and integral calculus in a variable. They can handle and apply complex numbers.

Content

Lecture:

- Basics
- Linear algebra
- Differential and integral calculus of a variable
- Introduction to complex numbers

Exercises

Exercises accompanying the lectures

Recommended literature

- G. James, P. Dyke: Modern Engineering Mathematics, Pearson, 6th edn. , 2020
- G. James, P. Dyke: Advanced Modern Engineering Mathematics, Pearson, 4th edn. , 2011
- E. Kreyszig,: Advanced Engineering Mathematics, John Wiley & Sons, 10th edn. , 2011

Module name	Electrical Engineering 1.1		
Number(s)	**Abbreviation**	**Curriculum semester**	**ECTS**
IBR14	EE1	1	5
Responsible for the module	**Lecturer(s)**	**Teaching form**	**SWS**
Prof. Dr. Stubenrauch	Prof. Dr. Stubenrauch, Prof. Dr. Hagl	SU,Pr	4
Form of examination	**Module duration**	**Module rotation**	**Language**
see SPO	1 Semester	Summer Semester	English
Total workload	**= Presence**	**+ Self-study**	**+ Exam preparation**
150 h	60 h	54 h	36 h

Applicability of the module in the degree programmes

IBE

Mandatory requirements according to examination regulations

none

Recommended prerequisites

- Physical units and their conversion
- Angular, exponential and logarithmic functions
- Linear systems of equations with several unknowns
- Basic differential and integral calculus

Intended learning objectives

- are confident in the use and conversion of units
- apply modeling techniques in electrical engineering and describe the limited range of model validity
- are familiar with basic electric circuit devices and their voltage/current behavior
- simplify and solve DC circuits in a systematic fashion
- solving linear first order systems in time domain
- know the basic concepts of AC theory and measurements
- and apply computer-aided simulation methods (LTspice) to verify their calculations

Content

- Systems of units
- Basic electrotechnical quantities (charge, voltage, potential, current, work, power, resistance, conductance)
- Electronic components and circuit models (voltage/current source, Resistor, Diode, Transistor)
- Calculation of DC networks with standard methods (Ohm's Law, Kirchhoff's Laws, series- and parallel connection, source transformations, superposition)
- LTspice for simulation and verification of electrical circuits
- Operational amplifier circuits
- Capacitors and Inductors
- Analysis of first order circuits
- Basic AC circuit analysis

Recommended literature

- C. Alexander, M. Sadiku: Fundamentals of Electric Circuits, Mc Graw Hill, 7th Edition, 2020
- J.M. Fiore: DC Electrical Circuit Analysis: A Practical Approach, online available @dissidents (Creative Commons license), 2022, http://www.dissidents.com/books.htm

Module name	Applied Informatics		
Number(s)	**Abbreviation**	**Curriculum semester**	**ECTS**
IBR15	AppInf	1	5
Responsible for the module	**Lecturer(s)**	**Teaching form**	**SWS**
Prof. Dr. Klein	Prof. Dr. Klein	SU,Pr	4
Form of examination	**Module duration**	**Module rotation**	**Language**
see SPO	1 Semester	Summer Semester	English
Total workload	**= Presence**	**+ Self-study**	**+ Exam preparation**
150 h	60 h	54 h	36 h

Applicability of the module in the degree programmes

IBE

Mandatory requirements according to examination regulations

none

Recommended prerequisites

none

Intended learning objectives

After successful participation in the course, students are able to

- Understand the basic functioning of a computer
- Understand the computer's internal number representation and use the correct basic data types.
- produce programmes of medium complexity using control structures and functions and observing quality criteria (readability, maintainability and reusability).
- Design and implement algorithms
- use the version management tool Git
- use the C standard library
- analyse and evaluate other people's source code

Brief description of the module

The students learn the basics of procedural programming using the C language. In this context, the basics of computer architecture including memory model and data types are also taught. After successful participation, the students are able to design algorithms and implement programmes using control structures, functions and observing quality criteria.

Content

- Introduction to computer architecture and memory model
- Number systems, coding
- Basic data types and arrays
- Version management using Git
- Control structures
- Functions
- Arithmetic, bitwise and Boolean operators
- C standard library

Recommended literature

- B. Kernighan, D. Ritchie: Programmieren in C. ANSI C, Carl Hanser, 2.Auflage, 1990
- H. Erlenkötter: C:Programmieren von Anfang an, Rowohlt Taschenbuch, 25.Auflage, 1999
- A. Böttcher, F. Kneißl: Informatik für Ingenieure, Oldenbourg Verlag, 3.Auflage, 2012

Module name	Engineering Mechanics 1: Statics		
Number(s)	**Abbreviation**	**Curriculum semester**	**ECTS**
IBR16	Statics	1	5
Responsible for the module	**Lecturer(s)**	**Teaching form**	**SWS**
Prof. Dr. Schinagl, Prof. Dr. Wagner	Prof. Dr. Schinagl, Prof. Dr. Wagner	SU, Ü	4
Form of examination	**Module duration**	**Module rotation**	**Language**
see SPO	1 Semester	Summer semester	English
Total workload	**= Presence**	**+ Self-study**	**+ Exam preparation**
150 h	60 h	54 h	36 h

Applicability of the module in the degree programmes

IBE

Mandatory requirements according to examination regulations

none

Recommended prerequisites

Knowledge of mathematics and physics according to the contents of the FOS-Technology course or the Abitur (A-levels).

Intended learning objectives

After successful participation in the module courses, students are able to

- apply engineering-recognised methods of rigid-body statics to analyse technical components and assemblies under point and distributed loads with regard to internal and external forces, moments and their local curves.
- structure practical technical-mechanical systems.
- use the mathematical relationships generated with it for calculations.
- understand important special cases and apply the methods learned to them.
- document the methodical procedure for solving problems from structural analysis in a form-appropriate and comprehensible manner.

Brief description of the module

The course “Statics” is the first and essential part of technical mechanics. Here, the basics and methods for the calculation of internal and external forces and moments on static single and multi-body systems are taught. These basics are based on the equilibrium of forces and moments, which leads to mathematical equations and their solution via the free-cutting method. Important special cases, such as surface or wrap-around friction or distributed loads, are taken into account. Statics forms the basis for many other engineering fields and teaching modules.

Content

- Terms, basic laws, basic tasks of statics
- Central, plane force system
- Force, force couple and moment of a force
- Resultant force of a non-central planar force system
- Stock reactions
- Spatial force system
- Focus
- Internal forces and moments, internal force curves also under distributed loads
- Friction

Recommended literature

- Skript and Formulary
- M.Mayer: Technische Mechanik, Carl Hanser, 9th Edition, 2021
- D.Gross, W.Hauger, J.Schröder, W.A.Wall: Technische Mechanik 1:Statik, Springer Vieweg, 14th Edition, 2019
- C. Eller: Holzmann/Meyer/Schumpich Technische Mechanik Statik, Springer Vieweg, 15th Edition, 2018
- R.C. Hibbeler: Engeneering Mechanics: Statics, Pearson, 15th Edition, 2022
- D. Gross et. Al.: Statics – Formulas and Problems: Engineering Mechanics 1, Springer, 1st Edition, 2022

Module name	German B2.1		
Number(s)	**Abbreviation**	**Curriculum semester**	**ECTS**
IBR21		2	5
Responsible for the module	**Lecturer(s)**	**Teaching form**	**SWS**
Barbara Lembcke	Frau Hausner	SU	4
Form of examination	**Module duration**	**Module rotation**	**Language**
see SPO	1 Semester	Winter semester	German / English
Total workload	**= Presence**	**+ Self-study**	**+ Exam preparation**
150 h	60 h	60 h	30 h

Applicability of the module in the degree programmes

IBE

Mandatory requirements according to examination regulations

-

Recommended prerequisites

B1 according to GER completed

Intended learning objectives

Independent use of language B2 according to CEFR
The students can

- understand the main content of complex texts on concrete and abstract topics and on specialist discussions in their own area of specialisation
- communicate so spontaneously and fluently that a conversation with native speakers is possible without major effort on either side
- express themselves on a wide range of topics
- explain a point of view on a topical issue and state the advantages and disadvantages of various options.

Students have all the essential grammatical knowledge of the target language.

Content
B2.1 (The module comprises parts of level B2) • Teaching and examination focus: Speaking and listening comprehension • Practical language skills for study and everyday life • Presenting and discussing (detailed explanation of one's own point of view with advantages and disadvantages on current topics) • Description and brief interpretation of graphs and other charts • Vocabulary (deepening the known vocabulary spectrum and expanding it to include a subject-specific and a broad general range of topics, context-safe use, variation in language and expression) • Grammar (verbs, nouns and adjectives with prepositions, passive voice, connectors and conjunctions, subjunctive I and II, subjective meaning of modal verbs, etc. - precise use of all essential grammar structures in context) • Pronunciation • intercultural competence
Recommended literature
• To be announced in the course

Module name	German B2.2		
Number(s)	**Abbreviation**	**Curriculum semester**	**ECTS**
IBR22		2	5
Responsible for the module	**Lecturer(s)**	**Teaching form**	**SWS**
Barbara Lembcke	Frau Hausner	SU	4
Form of examination	**Module duration**	**Module rotation**	**Language**
see SPO	1 Semester	Winter semester	German / English
Total workload	**= Presence**	**+ Self-study**	**+ Exam preparation**
150 h	60 h	60 h	30 h

Applicability of the module in the degree programmes
IBE

Mandatory requirements according to examination regulations
-

Recommended prerequisites
B1 according to GER completed

Intended learning objectives
Independent use of language B2 according to CEFR The students can • understand the main content of complex texts on concrete and abstract topics and on specialist discussions in their own area of specialisation • communicate so spontaneously and fluently that a conversation with native speakers is possible without major effort on either side • express themselves on a wide range of topics • explain a point of view on a topical issue and state the advantages and disadvantages of various options Students have all the essential grammatical knowledge of the target language.

Content
B2.2 (The module comprises parts of level B2) • Teaching and examination focus: Writing and reading comprehension • Practical language skills for study and everyday life • Writing a graphic analysis and a short discussion • Vocabulary (deepening the known vocabulary spectrum and expanding it to include a subject-specific and a broad general range of topics, context-safe use, variation in language and expression) • Grammar (verbs, nouns and adjectives with prepositions, passive voice, connectors and conjunctions, subjunctive I and II, subjective meaning of modal verbs, etc. - precise use of all essential grammar structures in context) • intercultural competence
Recommended literature
• To be announced in the course

Module name	Mathematics 1.2		
Number(s)	**Abbreviation**	**Curriculum semester**	**ECTS**
IBR23	Maths 1.2	2	5
Responsible for the module	**Lecturer(s)**	**Teaching form**	**SWS**
Prof. Dr. Link	Prof. Dr. Link, Dr. Douka	SU	4
Form of examination	**Module duration**	**Module rotation**	**Language**
see SPO	1 Semester	Winter Semester	English
Total workload	**= Presence**	**+ Self-study**	**+ Exam preparation**
150 h	60 h	54 h	36 h

Applicability of the module in the degree programmes
IBE
Mandatory requirements according to examination regulations
none
Recommended prerequisites
General higher education qualification (Abitur), advanced technical college certificate (Fachhochschulreife) or equivalent
Intended learning objectives
The aim is to teach and deepen mathematical basics and their applications. The students are then able to formulate practical problems mathematically and solve them by selecting suitable methods. Due to the knowledge of mathematical basics, the students are able to independently deal with more advanced mathematical methods.
Brief description of the module
The students master the basics of linear algebra and vector calculus. They know the basics of analysis, can confidently deal with functions in several variables and are proficient in differential and integral calculus in several variables. Furthermore, the students are able to apply the basic integral transformations and the corresponding inverse transformations to elementary functions.

Content

Lecture:

- Basics
- Linear algebra
- Differential and integral calculus in several variables
- Integral transformations

Exercises

Exercises accompanying the lectures

Recommended literature

- G. James, P. Dyke: Modern Engineering Mathematics, Pearson, 6th edn. , 2020
- G. James, P. Dyke: Advanced Modern Engineering Mathematics, Pearson, 4th edn. , 2011
- E. Kreyszig,: Advanced Engineering Mathematics, John Wiley & Sons, 10th edn. , 2011

Module name	Physics 1		
Number(s)	**Abbreviation**	**Curriculum semester**	**ECTS**
IBR24	Physics 1	2	5
Responsible for the module	**Lecturer(s)**	**Teaching form**	**SWS**
Prof. Dr. Stanzel	Prof. Dr. Stanzel	SU,Pr	5
Form of examination	**Module duration**	**Module rotation**	**Language**
see SPO	1 Semester	Winter Semester	English
Total workload	**= Presence**	**+ Self-study**	**+ Exam preparation**
150 h	56 h	70 h	24 h

Applicability of the module in the degree programmes

In IBE

Mandatory requirements according to examination regulations

none

Recommended prerequisites

Mathematics and science school education:

- Knowledge of vector calculus (understanding the meaning of scalar and vector product)
- Be able to carry out a curve discussion of simple functions
- Understand the meaning of integration and differentiation of simple functions, be able to perform differentiation and integration of simple functions.
- Understand and calculate exponential and logarithm functions
- Understand and calculate trigonometric functions (sin, cos, tan)
- Be able to solve linear and quadratic equations

Intended learning objectives

After successful participation in the seminar-based teaching, students will be able to …

- Calculate safely with physical quantities and units including prefixes and powers and include them in all calculations.
- Understand and confidently apply the basic kinematic relationships between displacement, velocity and acceleration in translation and circular motion.
- Define the fundamental concept of force and describe the types of force.
- Use Newton's laws confidently and understand them as an important tool in solving problems.
- Understand and distinguish between the concepts of work, energy and power and apply the mechanical law of conservation of energy when solving problems.
- Set up the equation of motion of the one-mass oscillator for the free, damped and forced case and to discuss and interpret the different solution.
- Get to know different forms and realisations of oscillatory systems including damping and excitation mechanisms.
- Understand the phenomenon of resonance in forced oscillation in particular and understand and interpret the meaning of the amplitude resonance curve (amplitude frequency response).
- Name and distinguish thermal state and process variables.
- Calculate changes of state of the ideal gas and reproduce them in p-V diagrams.
- Name the main laws of thermodynamics and apply them to the evaluation and calculation of thermal processes.
- Safely consider heat capacities, phase transformations and heat transport mechanisms in calculations.
- Comprehend the principle of thermal plants based on circular processes.

Furthermore, after successful completion of the internship, students are able to …

- Independently understand the physical relationships in the context of the subject area.
- Perform uncertainty assessments safely.
- Plan experiments and record measurement data as well as evaluate, critically question and scientifically document the results obtained.
- Support each other through teamwork and to have professional discussions.

Brief description of the module

The module consisted of the blocks Size Units Uncertainty Test, Kinematics, Dynamics 1 (Translation), Vibration and Fundamentals of Thermodynamics. Accompanying the lecture, practical experiments are carried out for the subject area of quantities - units - uncertainty - experiment, for the understanding of the kinematic quantities velocity and acceleration as well as for the understanding of mechanical resonance and thermodynamics.

Content
Quantities, units, measurement and evaluation Physical quantities, units, orders of magnitude, significant digits, measurement uncertainties, calculating with uncertainties, compensation line, linearisation **Kinematics** Definition and relationship of displacement, velocity and acceleration as vectorial quantities, special cases: rectilinear and circular motion **Dynamics 1** Concept of force and Newton's axioms, examples of forces, work, energy, power, efficiency, mechanical law of conservation of energy **Oscillations** Setting up the equation of motion of the single-mass oscillator for the free, damped and forced case including discussion and interpretation of the solution, examples of oscillatory systems including damping and excitation mechanisms, resonance, amplitude resonance curve (amplitude frequency response), phase shift (phase frequency response). **Basics of thermodynamics** Thermal state and process variables, heat capacity, ideal gas, main laws of thermodynamics, cyclic processes, phase transformations, heat transport
Recommended literature
• P. A. Tipler, G. Mosca: Physics for Scientists and Engineers, W. H. Freeman, 6. Auflage , 2007

Module name	Technical Drawing and CAD		
Number(s)	**Abbreviation**	**Curriculum semester**	**ECTS**
IBR25.1	TZ-CAD	2	5
Responsible for the module	**Lecturer(s)**	**Teaching form**	**SWS**
Prof. Dr. Meierlohr, Prof. Dr. Reuter	Prof. Dr. Meierlohr, Prof. Dr. Reuter	SU,Ü	4
Form of examination	**Module duration**	**Module rotation**	**Language**
see SPO	1 Semester	Winter semester	English
Total workload	**= Presence**	**+ Self-study**	**+ Exam preparation**
150 h	60 h	54 h	36 h

Applicability of the module in the degree programmes

The module can be used/compulsory in the International Bachelor of Engineering degree programme. Overall, the students are given an overview of the topics in general mechanical engineering in the course of the lecture. The interaction of different engineering disciplines (e.g. mechanics, machine elements, manufacturing processes, materials technology, assembly technology, quality management, design and product development) is dealt with in particular. The system-technical insight gained creates the interdisciplinary prerequisite for the prospective engineers to understand the product life cycle (interdisciplinary development, production, operation and utilisation) of products and machines holistically.

Mandatory requirements according to examination regulations

none

Recommended prerequisites

Intended learning objectives

The students are able to specify and document components and assemblies in the form of hand sketches and technical drawings. The students are able to design components and assemblies with the help of a 3D CAD programme and to derive standard-compliant drawings from them. The students can

- transfer spatial facts into the two-dimensional drawing plane
- read and create standardised technical drawings,
- correctly and unambiguously specify basic functional requirements (e.g. fits, surfaces, edges) in technical drawings,
- Generate standardised parts lists,
- create axonometric freehand drawings of components,
- abstract technical sketch

Students learn the efficient use of a modern 3D CAD system and can

- Model sketch-based 3D bodies (turned and milled parts),
- create assemblies from several 3D bodies,
- derive standard-compliant production drawings of individual parts.

Brief description of the module

The course serves to learn the basics of design with a focus on the functionally unambiguous specification and communication of the component design as well as learning a modern 3D CAD system.

Content

Lecture Technical Drawing

- Structure and content of technical drawings
- Construction standards
- Projection drawing
- Representation of individual parts and groups
- Dimensioning, tolerances, fits, edge conditions
- Representation of standard machine elements
- Marking of weld seams Exercise

Technical drawing

- Two-dimensional and axonometric freehand drawing
- Standard-compliant technical drawing and specification
- Mapping of constructive elementary functions (fits, surfaces, edges)
- Specification of functional and production tolerances
- Construction skeletons using concrete product examples

Generation of solids and assemblies, as well as creation of drawings with the aid of a 3D CAD system, in particular:

- Possible uses of CAD programmes, market overview
- Sketching technique, geometric and dimensional conditions
- Functions for creating and removing material
- Model structure
- Module functions
- Drawing derivation

Recommended literature

- Normen DIN et al, Berlin, Beuth Verlag
- Lecture notes for the course
- Online help for the CAD programme
- Video Tutorial, Learning Campus, TH Rosenheim (in German)
- H. Hoischen, A. Fritz, et al.: Technisches Zeichnen, Carl Hanser, 37th Edition, 2020
- R. Gomeringer, et al.: Tabellenbuch Metall, Verlag Europa-Lehrmittel, 48th Edition, 2019
- R. Hanifan: Perfecting Engineering and Technical Drawing : Reducing Errors and Misinterpretations, Springer, 1st Edition, 2014
- S. Tornincasa: Technical Drawing for Product Design : Mastering ISO GPS and ASME GD&T, Springer Nature, 1st Edition, 2020

Module name	Programming for Data Science		
Number(s)	**Abbreviation**	**Curriculum semester**	**ECTS**
WIB-XI-16	-	see semester timetable	5
Responsible for the module	**Lecturer(s)**	**Teaching form**	**SWS**
Prof. Dr. N. Klarmann	Prof. Dr. N. Klarmann	SU,Ü,Pr	4
Form of examination	**Module duration**	**Module rotation**	**Language**
see Study and Exam-regulations as well as the announcements of the performance records for the semester	1 Semester	Winter semester	english
Total workload	**= Presence**	**+ Self-study**	**+ Exam preparation**
150 h	60 h	90 h	- h

Applicability of the module in the degree programmes

WI

Recommended prerequisites

No particular previous knowledge from other modules is required to participate in the course - basic English language skills as well as elementary math skills are sufficient.

Intended learning objectives

In the first part of the course, participants learn to write programs in Python by solving assignments in supervised exercises. The tutorials address typical problems that the participants will face in their future professional life. Furthermore, attendees learn how to develop programs that can handle large data sets. For this purpose, the commonly used data science libraries are introduced. This includes standard preprocessing steps such as cleaning, transforming, merging, or reshaping the data. Furthermore, students learn to extract valuable insights from large data sets by calculating arbitrary metrics (e.g., statistical properties) and/or visualizing the data.

Content

The course starts with an introduction to basic terms and concepts of programming such as control flows (e.g., if conditions, for loops), data types (e.g., integers, strings, floats), functions (modularized code segments) and the various programming paradigms. Furthermore, the concept of data-oriented programming is introduced. Students are going to understand under which conditions data is valuable and how it can support decision making in a variety of different applications.

Module name	Technical German 1 – B2/C1		
Number(s)	**Abbreviation**	**Curriculum semester**	**ECTS**
IBR31		3	5
Responsible for the module	**Lecturer(s)**	**Teaching form**	**SWS**
Barbara Lembcke	Frau Hausner	SU	4
Form of examination	**Module duration**	**Module rotation**	**Language**
see SPO	1 Semester	Summer Semester	German / English
Total workload	**= Presence**	**+ Self-study**	**+ Exam preparation**
150 h	60 h	60 h	30 h

Applicability of the module in the degree programmes

IBE

Mandatory requirements according to examination regulations

-

Recommended prerequisites

Level B2 according to CEFR or higher

Intended learning objectives

Specialised language use level B2/C1 according to CEFR
The students can

- understand a wide range of demanding texts
- express themselves spontaneously and fluently without often having to search for clearly recognisable words
- use the language in your studies, social and professional life
- express themselves clearly and in a structured way on complex issues, using various means to link texts.

Content

- Practical language skills for studying
- Oral examination forms in German
- Technical German for engineers
- Grammar
- Vocabulary
- Presenting and discussing
- Pronunciation
- intercultural competence

Recommended literature

- M. Steinmetz, H. Dintera: German for Engineers, Springer Vieweg, 2nd edition, 2018
- Further materials will be announced during the course

Module name	Technical German 2 – B2/C1		
Number(s)	**Abbreviation**	**Curriculum semester**	**ECTS**
IBR32		3	5
Responsible for the module	**Lecturer(s)**	**Teaching form**	**SWS**
Barbara Lembcke	Frau Hausner	SU	4
Form of examination	**Module duration**	**Module rotation**	**Language**
siehe SPO	1 Semester	Summer Semester	German / English
Total workload	**= Presence**	**+ Self-study**	**+ Exam preparation**
150 h	60 h	60 h	30 h

Applicability of the module in the degree programmes
IBE
Mandatory requirements according to examination regulations
-
Recommended prerequisites
Level B2 according to CEFR or higher
Intended learning objectives
Specialised language use level B2/C1 according to CEFR The students can • understand a wide range of demanding texts • express themselves spontaneously and fluently without often having to search for clearly recognisable words • use the language in your studies, social and professional life • express themselves clearly and in a structured way on complex issues, using various means to link texts.

Content

- Practical language skills for studying
- Written examination forms in German
- German for engineers
- Writing an internship report
- Grammar
- Vocabulary
- intercultural competence

Recommended literature

- M. Steinmetz, H. Dintera: German for Engineers, Springer Vieweg, 2nd edition, 2018
- Further materials will be announced in the course

Module name	Mathematics 2		
Number(s)	**Abbreviation**	**Curriculum semester**	**ECTS**
IBR33	Maths 2	3	5
Responsible for the module	**Lecturer(s)**	**Teaching form**	**SWS**
Prof. Dr. Link	Prof. Dr. Link, Dr. Douka	SU	4
Form of examination	**Module duration**	**Module rotation**	**Language**
see SPO	1 Semester	Summer Semester	English
Total workload	**= Presence**	**+ Self-study**	**+ Exam preparation**
150 h	60 h	54 h	36 h

Applicability of the module in the degree programmes
IBE
Mandatory requirements according to examination regulations
none
Recommended prerequisites
General higher education qualification (Abitur), advanced technical college certificate (Fachhochschulreife) or equivalent
Intended learning objectives
The aim is to teach and deepen mathematical basics and their applications. The students are then able to formulate practical problems mathematically and solve them by selecting suitable methods. Due to the knowledge of mathematical basics, the students are able to independently deal with more advanced mathematical methods.
Brief description of the module
The students master the basics of vector analysis and can apply them to simple problems. They can solve ordinary differential equations of first and second order. Furthermore, the students are able to apply the basic integral transformations and the associated inverse transformations to elementary functions. They know the basics of numerical mathematics and can apply them to simple problems.

Content

Lecture:

- Vector analysis
- Differential equations
- Integral transformations
- Fundamentals of numerical mathematics

Exercises

Exercises accompanying the lectures

Recommended literature

- G. James, P. Dyke: Modern Engineering Mathematics, Pearson, 6th edn. , 2020
- G. James, P. Dyke: Advanced Modern Engineering Mathematics, Pearson, 4th edn. , 2011
- E. Kreyszig,: Advanced Engineering Mathematics, John Wiley & Sons, 10th edn. , 2011