

B.Eng.

International Bachelor of Engineering

Specialization

Environmental

Technology



Curriculum

Winter semester 2024/25

Dean of Studies: Prof. Dr.-Ing. Johannes Lindner

Valid for students who have started their studies from winter semester 2022/23 onwards

SPO 2022

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Preliminary remark

The Faculty of Chemical Technology and Economics (CTW) draws up a study plan (in accordance with § 5 of the study and examination regulations) to ensure the range of courses on offer and to inform students.

The curriculum is adopted by the Faculty Council and published by the university. New regulations are announced at the latest at the beginning of the lecture period of the semester to which they apply for the first time.

The curriculum is subordinate to the following ordinances and statutes:

- Bavarian Higher Education Innovation Act (BayHIG)
- General Examination Regulations of TH Rosenheim (APO)
- Study and Examination Regulations for the International Bachelor of Engineering degree program (SPO)

In particular, the curriculum contains information, regulations and details on:

1. the module plan and curriculum of the International Bachelor of Engineering program,
2. more detailed provisions on proof of performance and participation,
3. compulsory elective modules,
4. the subject-specific elective subjects,
5. the objectives and content of the practical semester and the practical courses as well as their form and organization.

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1 Course of study, credit points and module plan

1.1 Course of study and credit points

The Bachelor's degree course in International Bachelor of Engineering – Environmental Technology has a standard duration of 8 semesters and is designed as a full-time course. It comprises 7 theoretical semesters and one practical semester. The practical semester takes place in the 6th semester. The maximum duration of study is specified by the applicable APO.

The first two semesters are currently held at Campus Rosenheim and largely follow the subjects of the International Bachelor of Engineering at Campus Rosenheim. The same subjects are to be taken and are validated as the respective subject at Campus Burghausen. The exception is Physical Chemistry, which takes place in English online in the first semester instead of Electrotechnics 1.

240 CP must be completed in the entire Bachelor's degree program. On average, students should take 30 CP per semester.

The Bachelor's degree program International Bachelor of Engineering - Environmental Technology is largely defined by *compulsory modules*. Compulsory modules must be taken by all students. Section 3.1 shows the distribution of these modules.

In addition to the practical semester, numerous laboratory practical courses with an average scope of approx. 7 CP per theoretical semester are anchored in the course of study.

The range of compulsory elective modules (FWPM) is redefined each semester and announced before the start of the semester (for more information, see section 3.3.1).

Information on the *general science electives (AWPM)* can be found in section 3.3.2.

Information on the *compulsory elective modules (WPM)* can be found in section 3.3.3.

The current version of the Study and Examination Regulations (SPO) for the program International Bachelor of Engineering – Environmental Technology defines the requirements for admission to the 4th semester and the practical semester (6th semester).

1.2 Module plan with details of credit points and examination concept

SEMESTER	FWPM = Fachwissenschaftliches Wahlpflichtmodul										= enthält Praktikumsinheit										CREDIT POINTS (CP)													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30				
1	IBB 7 Mathematik 1 (5 CP)	IBB 8 Applied Informatik (5 CP)	IBB 9 Physics 1 (5 CP)	IBB 10 Technical Mechanics (5 CP)	IBB 11 Mathematics 2 (5 CP)	IBB 12 Technical Drawings & CAD (5 CP)	IBB 13 Basic Chemistry (5 CP)	IBB 14 Physikalische Chemie (5 CP) Prüfung	IBB 15 Wärme- und Stofftransport (5 CP)	IBB 16 Elective Module Group 1: Anorganische Chemie (5 CP)	IBB 17 Chemische Verfahrenstechnik (5 CP)	IBB 18 Toxikologie und Bodenschutz (5 CP)	IBB 19 Fluidmechanik im Anlagenbau (5 CP)	IBB 20 Recyclingtechnologien (5 CP)	IBB 21 Thematische Verfahrenstechnik (5 CP)	IBB 22 Thematische Verfahrenstechnik 1 (5 CP)	IBB 23 Mechanische Verfahrenstechnik 1 (5 CP)	IBB 24 Umweltanalytik & Umweltmesstechnik (6 CP)	IBB 25 Wasseraufbereitung und Abwasserbehandlung (5 CP)	IBB 26 Nachhaltiges Produktdesign (5 CP)	IBB 27 Simulationen der Umweltechnologie (5 CP)	IBB 28 Inmisionsschutz und Luftreinhaltung (5 CP)	IBB 29 Green Technology (5 CP)	IBB 30 Erneuerbare Energiesysteme (5 CP)	IBB 31 German B1.1 (5 CP)	IBB 32 German B1.2 (5 CP)	IBB 33 German B2.1 (5 CP)	IBB 34 German B2.2 (5 CP)	IBB 35 German B3.1 (5 CP)	IBB 36 German B3.2 (5 CP)	IBB 37 Organische Chemie (5 CP)	IBB 38 Umweltanalytik & Umweltmesstechnik (6 CP)	IBB 39 Bachelorarbeit (10 CP)	IBB 40 insgesamt 210 CP
2	UT 24 Werkstofftechnik und Materialwissenschaften 1 (5 P)	UT 25 Werkstofftechnik und Materialwissenschaften 2 (5 CP)	IBB 17 Chemische Verfahrenstechnik (5 CP)	IBB 18 Toxikologie und Bodenschutz (5 CP)	IBB 19 Fluidmechanik im Anlagenbau (5 CP)	IBB 20 Recyclingtechnologien (5 CP)	IBB 21 Thematische Verfahrenstechnik (5 CP)	IBB 22 Thematische Verfahrenstechnik 1 (5 CP)	IBB 23 Mechanische Verfahrenstechnik 1 (5 CP)	IBB 24 Umweltanalytik & Umweltmesstechnik (6 CP)	IBB 25 Wasseraufbereitung und Abwasserbehandlung (5 CP)	IBB 26 Nachhaltiges Produktdesign (5 CP)	IBB 27 Simulationen der Umweltechnologie (5 CP)	IBB 28 Inmisionsschutz und Luftreinhaltung (5 CP)	IBB 29 Green Technology (5 CP)	IBB 30 Erneuerbare Energiesysteme (5 CP)	IBB 31 German B1.1 (5 CP)	IBB 32 German B1.2 (5 CP)	IBB 33 German B2.1 (5 CP)	IBB 34 German B2.2 (5 CP)	IBB 35 German B3.1 (5 CP)	IBB 36 German B3.2 (5 CP)	IBB 37 Organische Chemie (5 CP)	IBB 38 Umweltanalytik & Umweltmesstechnik (6 CP)	IBB 39 Bachelorarbeit (10 CP)	IBB 40 insgesamt 210 CP								
3	UT 38 Praxisbegleitende Lehrveranstaltung (5 CP)	UT 39 Wasseraufbereitung und Abwasserbehandlung (5 CP)	UT 40 Nachhaltiges Produktdesign (5 CP)	UT 41 Simulationen der Umweltechnologie (5 CP)	UT 42 Inmisionsschutz und Luftreinhaltung (5 CP)	UT 43 Green Technology (5 CP)	UT 44 Erneuerbare Energiesysteme (5 CP)	UT 45 German B1.1 (5 CP)	UT 46 German B1.2 (5 CP)	UT 47 German B2.1 (5 CP)	UT 48 German B2.2 (5 CP)	UT 49 German B3.1 (5 CP)	UT 50 German B3.2 (5 CP)	UT 51 Organische Chemie (5 CP)	UT 52 Umweltanalytik & Umweltmesstechnik (6 CP)	UT 53 Bachelorarbeit (10 CP)	UT 54 insgesamt 210 CP																	

Legende Modulzuordnung: ■ Chemisch-technologische Module ■ Angewandte Verfahrenstechnik ■ Mathematisch-Naturwissenschaftliche Grundlagen ■ Allgemeine Ingenieurwissenschaften ■ Chemieingenieur PLUS ■ Praxis

Kommentiert [KA1]: Titel UT 11 neu: Fluidmechanik im Anlagenbau

Kommentiert [KA2R1]: Modulnummer Toxikologie und Bodenschutz: UT 39
 Modulnummer Ökobilanzierung / Circular Economy: UT 41
 Modulnummer Erneuerbare Energiesysteme: UT 42

Kommentiert [KA3R1]: UT 15 fällt weg, dafür UT 40 Wasseraufbereitung und Abwasserbehandlung

Kommentiert [KA4R1]: Semester 7 und 8: Prüfungsformen rausnehmen, damit alles einheitlich ist.

2 Examinations

2.1 General information

The current version of the Study and Examination Regulations (SPO) for the International Bachelor of Engineering program regulates the type and scope of examinations in the compulsory modules, compulsory elective modules and compulsory elective modules. The SPO specifies which requirements must be met in order to take individual examinations.¹

The announcement of the examination modalities in compulsory and elective modules as well as the detailed provisions on the performance and participation certificates is made by posting in the [showcases of the Examination Office "Examinations" on the Burghausen campus and / or announcement in the Online Service Center \(OSC\) of TH Rosenheim](#).

If the examination of a module is made up of several partial examinations, the overall grade is generally determined by the arithmetic mean of the individual grades weighted with the credit points (ECTS), whereby each partial examination must be passed with at least a sufficient grade. The overall grade of the completed degree program is also calculated by weighting the respective credit points (ECTS) from the relevant individual modules [see appendix to the SPO].

If examinations leading to final grades are carried out in the form of group work, the individual performances must be clearly distinguishable and assessable.

With regard to repeating examinations, the regulations of the Examinations Office and the higher-level regulations must be observed.

You can find answers to frequently asked questions about examinations (examination period and deadlines, registration for examinations, admission to examinations, inability to take examinations and withdrawal from examinations, examination results, failed and repeat examinations and examination bodies and responsibilities) at:

<https://www.th-rosenheim.de/home/infos-fuer/studierende/studienorganisation/pruefungen/>

2.2 Regulations on admission requirements, aids for examinations and participation in practical courses as part of the course of study

Regulations on admission requirements and permitted aids as well as participation in internships as part of the degree program are regulated in the announcements of the performance assessments for the respective valid study and examination regulations. [Please refer to the announcement at](#)

<https://www.th-rosenheim.de/home/infos-fuer/studierende/studienorganisation/formalia/studienregelungen/pruefungsankuendigungen/>

Further regulations for participation in the following modules:

¹ e.g. successful completion of an internship as part of the module for admission to the written examination, or passing a written examination is a prerequisite for admission to an examination in a subsequent module.

Kommentiert [KA5]: Sollte CP nicht auch in IBE durch ECTS ersetzt werden?

Kommentiert [KA6R5]: --> müsste wahrscheinlich einheitlich für alle IBE - Spezialisierungen umgesetzt werden.

- IBB 15 / UT 05 Heat and mass transfer processes - Submodule UT 05.2 Practical course in heat and mass transfer:
 - o 100% compulsory participation in the practical course
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course experiments by the lecturer)
- UT 39 Toxicology and Soil protection - Submodule UT 39.2 Practical course in Toxicology and Soil protection:
 - o 100% compulsory participation in the practical course
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course experiments by the lecturer)
- IBB 12 / UT 10 Apparatus engineering - Sub-module UT 10.2 Practical course in apparatus engineering:
 - o 100% compulsory participation in the practical course
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course by the lecturer)
- UT 11 Plant Engineering - Sub-module UT 11.2 Practical course on fittings and piping:
 - o Compulsory participation in the practical course of 100%
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course by the lecturer)
- UT 12 Recycling Technologies - Submodule UT 12.2 Practical course in recycling technologies:
 - o Compulsory participation of 100 % in the practical course
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course experiments by the lecturer)
- UT 13 Measurement Technology - Submodule UT 13.2 Practical Training in Measurement Technology:
 - o 100% compulsory participation in the practical course
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course experiments by the lecturer)
- UT 14 Environmental Analysis & Environmental Measurement Technology - Sub-module UT 14.3 and UT 14.4 Practical course in Environmental Analysis & Environmental Measurement Technology:
 - o 100% compulsory attendance of the practical course

- o Test certificates from the practical course (confirmation of participation and successful completion of the practical course experiments by the lecturer)
- UT 40 Water and waste water treatment - Submodule UT 40.2 Practical course in Water and waste water treatment:
 - o
 - o 100% compulsory attendance of the practical course
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course experiments by the lecturer)
- UT 16 Air pollution and immission control - Sub-module UT 16.2 Practical course in air pollution and immission control:
 - o Compulsory participation in the practical course of 100%
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course experiments by the lecturer)
- UT 17 Chemical Process Engineering - Submodule UT 17.2 Practical course in Chemical Process Engineering 1:
 - o 100% compulsory participation in the practical course
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course experiments by the lecturer)
- UT 19 Mechanical Process Engineering 1 - Sub-module UT 19.2 Practical course in Mechanical Process Engineering 1:
 - o Compulsory participation in the practical course of 100%
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course experiments by the lecturer)
- UT 20 Mechanical Process Engineering 2 - Sub-module UT 20.2 Practical course in Mechanical Process Engineering 2:
 - o 100% compulsory participation in the practical course
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course experiments by the lecturer)
- UT 21 Thermal Process Engineering - Submodule UT 21.2 Practical Training in Thermal Process Engineering 1:
 - o 100% compulsory participation in the practical course
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course experiments by the lecturer)

- UT 22 Simulation Methods in Environmental Technology - Submodule UT 22.2 Practical course in Simulation Methods in Environmental Technology:
 - o 100% compulsory participation in the practical course
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course experiments by the lecturer)
- UT 23 Introduction to Environmental Technology - Sub-module UT 23.1 Practical course Introduction to Environmental Technology:
 - o Compulsory participation in the practical course of 100
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course experiments by the lecturer)
- UT 24 Materials Engineering and Materials Science 1 - Sub-module UT 24.2 Practical course in materials science/materials testing 1:
 - o Compulsory participation in the practical course of 100%
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course experiments by the lecturer)
- UT 25 Materials Engineering and Materials Science 2 - Submodule UT 25.2 Practical course in materials science/materials testing 2:
 - o 100% compulsory participation in the practical course
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course experiments by the lecturer)
- UT 26 Inorganic Chemistry - Submodule UT 26.2 Practical course in Inorganic Chemistry:
 - o Compulsory participation in the practical course of 100%
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course experiments by the lecturer)
- UT 27 Organic Chemistry - Submodule UT 27.2 Practical course in organic chemistry:
 - o Compulsory participation in the practical course of 100%
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course experiments by the lecturer)
- UT 28 Green Technology - Sub-module UT 28.2 Practical course in Green Technology :
 - o Compulsory participation in the practical course of 100%
 - o Test certificates from the practical course (confirmation of participation and successful completion of the practical course by the lecturer)
- UT 30 Sustainable Product Design - Submodule UT 30.2 Practical Course in Sustainable Product Design:

Development of a product design and presentation of the results (confirmation of successful completion by the lecturer).

- UT 34 FWPM II - Elective module UT 34.1 FWPM Trade Fair:
 - o Compulsory participation in the course ('project sessions') of 80 % as well as continuous active participation in the project work in preparation and follow-up as well as on the day of the trade fair
- UT 34 FWPM II - elective modules with work placement:
 - o 100% compulsory participation in the work placement
 - o Test certificates from the work placement (confirmation of participation and successful completion of the work placement by the lecturer)
- UT 36 Practical course:
 - o Confirmation of participation and successful completion of the exercises by the lecturer

3 Curriculum and modules

3.1 Curriculum

Since not all of the lectures listed are offered every semester, there may be postponements in individual cases.

There is no entitlement to all selectable modules actually being offered. Similarly, there is no entitlement to the corresponding courses being held if there are insufficient participants. Participation in courses may be refused in the curriculum due to limited capacity (in accordance with the APO). ~~Further details will be provided in the announcements of the performance assessments for the respective semester of the International Bachelor of Engineering – Environmental Technology degree program (posted in the "Examinations" display case by the Examinations Office on the Burghausen campus and / or the announcement at~~

The number of students in the practical courses per semester may be limited. The admission requirements are announced at the beginning of each semester.

3.2 Modules and module descriptions

A detailed description of the modules and their sub-modules with the learning objectives / teaching content, lecturer details, semester, SWS and ECTS are described in the module handbook of the International Bachelor of Engineering – Environmental Technology degree program (see appendix).

3.3 Compulsory elective modules

Compulsory elective subject and compulsory elective module as a compulsory subject

When registering for a certificate of achievement from the published catalogs of compulsory elective modules (UT 33 and UT 34), the corresponding modules are listed as compulsory modules with all the consequences under examination law. Participants in these compulsory modules are listed by name on the corresponding lists of participants and grades.

Modules as voluntary elective modules

If participation in a module is only in the form of a voluntary elective module with no effect on the Bachelor's examination, registration must be waived and an elective certificate form must be submitted to the examiner to document the grade. Participants in such voluntary elective modules are not listed on the corresponding lists of participants and grades. The corresponding transcripts of records are therefore not recorded in the Online Service Center.

An elective module is therefore only included in the Bachelor's examination certificate if the graded elective module certificate is submitted to the Examinations Office at the latest before the last performance record in a compulsory module required for the Bachelor's examination is taken.

3.3.1 Subject-specific compulsory elective modules (FWPM)

Building on the course content of the previous semesters, compulsory elective modules are offered in the 7th and 8th semesters for individual in-depth study. The range is adapted to current requirements each semester. An overlap in the timetabling of individual compulsory elective modules with each other or with compulsory lectures cannot be ruled out.

The first modules that are reported to the Examination Office are relevant for grading in chronological order until the number of required ECTS is reached or exceeded for the first time. Additional modules can be included in the certificate as elective modules upon request.

The choice of FWPM for the following semester takes place at the end of the previous semester. The selection of FWPMs takes place in the community (FWPM selection). You will receive the necessary information during the respective semester. FWPMs take place subject to a sufficient number of participants. The number of participants for the FWPM is limited.

<i>Subject catalog FWPM</i>				
<i>Module no.</i>	<i>Designation</i>	<i>Type of course</i>	<i>SWS / credit points</i>	<i>Temporal position</i>
UT 33 ²	FWPM I: <ul style="list-style-type: none"> ▪ <i>Modules of the subject catalogue UT 33 - see module handbook UTW</i> ▪ <i>UT 33.1 (=B 30.1) FWPM Trade fair*</i> ▪ <i>In addition, modules from the subject catalog B 30- see module handbook BWT (take place regularly in the winter semester)</i> 	SU, Ü, PA, Pr	4 SWS / 5 ECTS	<i>7th semester, at the earliest from the start of the 4th semester*</i>
UT 34	FWPM II: <ul style="list-style-type: none"> ▪ <i>Modules of the subject catalog UT 34 - see module handbook UTW</i> 	SU, Ü, PA, Pr	4 SWS / 5 ECTS	<i>8th semester, at the earliest from the start of the 5th semester*</i>

3.3.2 General science electives

General science electives are not currently included in the curriculum.

3.3.3 Compulsory elective modules

Compulsory elective modules are not currently included in the curriculum.

3.4 Electives

Electives can be taken voluntarily. If successfully completed, these can be listed in the Diploma Supplement.

4 Practical phase / Practice semester

4.1 Training plan for the practical phase

The practical phase (module UT 37) is accompanied by module UT 36 "Practical course" with a preparatory introductory block before and a final block (presentation of internship report) after the practical semester.

² Any combination of sub-modules is possible in order to achieve a total of at least 5 ECTS. When combining individual modules with a total of more than 5 ECTS (e.g. 3 + 3), the overall grade for the module is calculated from the weighted average.

Successful participation in all parts of modules UT 36 and UT 37 is a prerequisite for recognition of the practical semester!

(1) Time scope and timing

18 weeks of practical work and practical course (UT 36 Practical course (4 SWS))

Practical semester				
Module no.	Designation	Temporal position	Duration	ECTS
UT 36	Practical course (part 1)	5th semester	2 SWS	
UT 37	Practical phase	5th semester	18 W.	25
UT 36	Practical course (Part 2: Presentation of the internship report)	7th semester	2 SWS	5

(2) Training centers and training content

The practical semester must be completed in a suitable company in which challenging activities are carried out or challenging projects are worked on that provide a broad insight into the work of a process automation engineer, for example in the areas listed below:

-
- Environmental measurement technology
- Waste management
- Water and Soil protection
- Air pollution and immission control
- Project engineering, especially environmental technology plants
- Recycling
- Licencing procedures and public authority management
- Maintenance
- Ressource efficiency management

The Internship **Office** maintains a **list of companies** that have already accepted students from TH Rosenheim for an internship semester in the past and therefore meet the basic requirements for a company for the internship semester. The internship semester can of course also be completed at other companies not included on this list - in this case, however, the prior approval of the internship coordinator is required. In any case, however, it must be ensured that the student is employed in an area of responsibility that matches the subject focus of the International Bachelor of Engineering – Environmental Technology degree program.

In addition, companies publish current **offers for students on the online platform of the Technical University's Career Service** at:

<https://www.th-rosenheim.de/studium-und-weiterbildung/im-studium/kurs-programm-und-zusatzangebote/career-center>

If the internship semester is to be completed abroad, the International Office of TH Rosenheim must be contacted at an early stage.

(3) Training objective

- Insight into engineering activities through specific tasks and practical solutions to tasks in the field of environmental technology
- Insight into the technical and organizational contexts and sociological problems of the company. Familiarization with engineering activities from the fields of chemistry, plant design and applied process engineering etc. to promote an interdisciplinary view and the possibility of critical questioning, e.g.
 -
 - What are the possibilities to assess the consequences of handling waste, waste water and emissions?
 - How can processes be optimized with respect to environmental sustainability and resource efficiency?
 - Can linear economy systems be replaced by circular economy?
 - Can fossil raw material be replaced by sustainable raw material over different value chains?
- Application and consolidation of the knowledge and skills acquired during previous training

(4) Evidence required

- Training contract in accordance with the requirements of the Internship Office
- Internship report based on scientific working techniques
- Certificate from the company confirming successful completion of the practical semester (practical phase)

(5) Proof of performance for module UT 37"Practical phase"

- 10-minute presentation (for more details see chapter 4.3UT 36)
- Internship report and internship certificate: Criteria relevant to passing the course are the timely submission of the internship report and the internship certificate from the supervising company as well as the assessment of the internship report as "successfully completed".

4.2 Requirements for the internship report

In accordance with the General Examination Regulations (APO), the student is obliged to prepare a report in due time in accordance with the Faculty Council, in which the progress of the practical training can be seen.

The timely submission as well as the form and content of the report will be taken into account when deciding on the successful completion of the practical semester.

(1) *Submission of the report*

The reports must be submitted to the Internship Office on the Burghausen campus. The latest submission deadline is announced by the Internship Office each semester. See also: <https://www.th-rosenheim.de/home/infos-fuer/studierende/studienorganisation/praxissemester-praktika/> → "Dates in the practical semester" → Schedule for the respective winter semester / summer semester

(2) *External form and layout of the report*

The report must be reviewed by the internship office and lecturers in specified sections within a short processing period. For this reason, the external form must be suitable for quick distribution:

In a loose-leaf binder (A4 format, not bound, no folders), please insert in the following order:

1. Cover sheet (form cover sheet overall report) → Template see link to the Internship Office
2. Form(s) "Certificate" of the training position(s) → Template see link to the Internship Office
3. Affidavit (template see link to the Internship Office)
4. One page company and activity description ³
5. An independently written report (signed on the last page by the company's instructor and the student) must be submitted in German or, alternatively, in English. The summary must be written in German and English).

The report and the company and activity description including appendix must be submitted in printed form to the Internship Office at the Burghausen Campus.

The forms can be found at: <https://www.th-rosenheim.de/home/infos-fuer/studierende/studienorganisation/praxissemester-praktika/>

The instructions for preparing the report can be found in the guidelines for academic work at the Burghausen campus: <https://learning-campus.th-rosenheim.de/course/view.php?id=6676>

³ The company/job description should contain the most important information/characteristics about the company. Furthermore, the most important activities in which the student was involved are listed here in keywords. Finally, a short statement about the company and the internship from the student's point of view. This page is not signed off by the company.

(3) *Structure and scope*

The report serves to check whether the trainee has dealt in depth with environmental technology issues in practice in accordance with the objectives. The report must show that the task was carried out in a predominantly independent, engineering-like manner. It is assumed that the report meets the requirements for scientific work.

The report must **be** at least 20 pages and no longer than 30 pages DIN A4. This may also include documents that the trainee has prepared independently for the training company (but at least 5 pages of new work according to the above structure). Company and office documents (information leaflets, brochures, plans, etc.) may be added to the report. As with the drafting of the report, care must be taken to ensure that the confidentiality obligation is not breached. Such additions are not counted towards the required minimum scope of the overall report. All documents in the report must be listed on the cover sheet.

The report builds on the specialist knowledge gained at the end of the 5th semester, i.e. the reader does not have to repeat any connections known from their studies, but can take them for granted!

The following **structure** is recommended for the report:

- Task and objective
- Preparatory work (evaluation of literature and standards, data procurement, work equipment, planning of implementation)
- Execution of the task
- Results and findings
- Critical statement, conclusion, possibly outlook (suggestions for improvement)
- References and sources

The report has its own **cover sheet** (see "Cover sheet internship report" [at https://www.th-rosenheim.de/home/infos-fuer/studierende/studienorganisation/praxissemester-praktika/](https://www.th-rosenheim.de/home/infos-fuer/studierende/studienorganisation/praxissemester-praktika/)) with at least the following information:

- Name of the intern
- Internship company, department, supervisor
- Topic of the report and associated module from the curriculum

4.3 Practical course (UT36)

The practical semester is accompanied by an introductory block (in the 6th semester) and a final block (in the 8th semester). All events will be announced in good time. This also includes participation in the final block of students from the previous practical semester (UT 36) as an audience member.

The introductory block serves to convey the subject area of the practical course for everyday working life. The introductory block consists of the following parts:

- Participation (as an audience member) in the final block of students from the previous practical semester at the beginning of the 5th semester
- Participation in the UT 36 module during the 5th semester on various topics in preparation for practical work

The final block consists of a 10-minute presentation followed by a professional feedback discussion (max. 5 minutes) on the activities during the internship semester or training.

5 Bachelor thesis

5.1 General conditions

The requirements for registration, examiner selection, completion time, return of the topic, submission and presentation of the Bachelor's thesis and academic degree and Bachelor's examination certificate are regulated in the following examination regulations:

- A) General Examination Regulations (APO) of TH Rosenheim in the latest version
- B) Study and Examination Regulations (SPO) for the Bachelor's degree program International Bachelor of Engineering at TH Rosenheim in the latest version

The current versions of the examination regulations are available on the homepage of TH Rosenheim. Students are obliged to familiarize themselves independently with the requirements for writing a thesis in the above-mentioned examination regulations.

5.1.1 External bachelor theses

The implementation of projects as part of final theses in or for companies and authorities is a long-standing practice at TH Rosenheim. It is welcomed and encouraged for mutual benefit. The following elements need to be taken into account for external bachelor theses:

The company should grant access to the two auditors at their request so that they can inform themselves on site about the subject matter and progress of the work.

In the event of additional supervision by an external institution, this institution must be consulted for coordination purposes and a signature must be obtained.

5.1.2 Registration of a Bachelor thesis

The student independently chooses the topic and the two examiners, i.e. agrees the title and content of the topic with them.

You can register your Bachelor's thesis online using the web forms provided by TH Rosenheim:

<https://www.th-rosenheim.de/home/infos-fuer/studierende/studienorganisation/abschlussarbeiten/>

With regard to registration, the regulations set out in the applicable APO must be observed.

5.1.3 Requirements for the Bachelor thesis

The **completed Bachelor's thesis** must contain the following:

- Please note the supplement under the following link:
<https://www.th-rosenheim.de/home/infos-fuer/studierende/studienorganisation/abschlussarbeiten/>

- A cover sheet in accordance with Annex 4 of the General Examination Regulations of TH Rosenheim must be used when writing a thesis. You can find a corresponding template under 'Word template for academic papers' in the Learning Campus (<https://learning-campus.th-rosenheim.de/course/view.php?id=6676>).
- Theses must be accompanied by a declaration from the student that they have written the thesis independently, have not yet submitted it elsewhere for examination purposes, have not used any sources or aids other than those specified and have marked verbatim and analogous quotations as such.
- A half-page abstract of the paper in German and English before the table of contents, as well as 3 to 5 keywords on the content of the paper
- Text pages with numbered pages, illustrations, tables and references
- Attached drawings and tables must be folded according to standards and enclosed in a glued-in pocket.
- Compilation of the literature used (journal articles, books, Internet, etc.)
- The completed thesis (with appendix) must be uploaded to the document management system for theses (DMS) via the university's website in the form of a single pdf file. In addition, a bound copy (no spiral binding) including appendix and, if applicable, including calculation files in Excel format or results from industry software etc. must be handed over to the examiners, provided they declare this when agreeing to be appointed as examiners. The time of uploading the file to the DMS is decisive for meeting the submission deadline. The bound copy (if requested by the examiners) must also be submitted to the examiners by the latest submission date.
- The files are temporarily stored in the DMS and deleted from the server after 2 years. The bound copies of the Bachelor's thesis remain with the two examiners after the grades have been announced.

5.1.4 Assessment of the Bachelor thesis

The following criteria are used to assess the Bachelor's thesis:

- Structuring the work
- Content quality of the elaboration
- Applied methods and theories
- Independence of the problem solution
- Degree of novelty and complexity of the task
- Linguistic and formal quality of the elaboration
- Literature research and processing

5.1.5 Submission of the Bachelor thesis

The Bachelor's thesis must be uploaded to the DMS in pdf format by the deadline. Depending on the information provided by the examiners, additional bound copies (no spiral binding) incl. appendix and, if applicable, incl. calculation files in Excel format or results from industry software etc. must be submitted to the examiners by the deadline.

5.2 Presentation / oral examination

The results of the Bachelor's thesis are presented in the presentation. The presentation should show that the student can discuss scientific questions and present results clearly. The oral examination must be held after submission of the Bachelor's thesis (usually **within 4 weeks**).

The presentation, including the subsequent discussion, lasts **30 minutes** and is taken into account in the assessment of the Bachelor's thesis.

Students on the same degree program may attend the presentation as an audience member, subject to availability. Participation does not extend to the discussion. The public may be excluded from the presentation for important reasons or at the candidate's request.

5.3 Bachelor's certificate and academic degree

If all examinations have been passed and the Bachelor's thesis has been graded at least "sufficient", the graduate will receive a **certificate** shortly after the presentation, in which all coursework completed is listed together with the respective credit points. Grades are listed for the coursework in connection with which the graduate has taken a course-related examination. The certificate also contains the topic and grade of the Bachelor's thesis as well as the overall grade. The certificate is signed by the Chair of the Examination Board. The graduate also receives a diploma supplement in English.

When the certificate is issued, graduates of the Bachelor's degree program are awarded the **academic degree** "Bachelor of Engineering", abbreviated to "B.Eng." is awarded.

6 Contact persons

Contact person	Function	Area of responsibility (see also Rules of Procedure of the Faculty CTW)
Dominik Pentlehner Dominik.Pentlehner@th-rosenheim.de Phone +49 8031 805 4020	Dean Faculty CTW	Represents the faculty, decides on faculty positions, ensures the professional structure and content of the study programs and their compliance
Edda Kremper Edda.Kremper@th-rosenheim.de Phone +49 8031 805 4002 Fax: +49 8031 805 4001	Secretariat Faculty CTW	Administration and organization Incl. lecture organization, room and appointment postponements
Diana Mödl Diana.Moedl@th-rosenheim.de Phone +49 8031 805 4003		
Tamara Siegert tamara.siegert@th-rosenheim.de Phone +49 8031 805 4005		
Johannes Lindner Johannes.Lindner@th-rosenheim.de Phone +49 8031 805 4024	Dean of Studies	Organization and coordination of the degree program and proposals for the content of the degree program
Franziska Wohlfart franziska.wohlfart@th-rosenheim.de Phone +49 8031 805 2843	Study program assistant	Contact for students, lecturers and professors Administrative tasks within the framework of the study program organization
Angela Klüpfel angela.kluepfel@th-rosenheim.de Phone +49 8031 805 40380	Student advisory service	Supporting students in selecting and attending courses appropriate to their goals
Arno Bücken arnold.buecken@th-rosenheim.de Phone +49 8031 805 4035	Chair of the CTW Faculty Examination Board	Examination matters, application for crediting of examinations, final theses (approval of registration and extension of Bachelor theses)

Kommentiert [KA7]: Wenn es um Studiengangsfachberatung UWT geht (Dominik ist für CHE)

Contact person	Function	Area of responsibility (see also Rules of Procedure of the Faculty CTW)
Johannes Völkl johannes.voelkl@th-rosenheim.de Phone +49 8031 805 4037	Representative for the practical semester	Contact for internships Module CI 137
Silvia Seibold Silvia.Seibold@th-rosenheim.de Phone +49 8031 805 4022	International Representative Faculty CTW	Contact person for stays abroad as part of your studies (for all degree programs at the Faculty of CTW)
Werner Thar Werner.Thar@th-rosenheim.de Phone +49 8031 805 4025	Head of Examination and Study Affairs Faculty CTW	Contact internship office, examination office, study office
Sibylle Möbius International@th-rosenheim.de Phone +49 8031 805 2118	International Office of TH Rosenheim	Advice on issues relating to semesters abroad and internships abroad
Ferdinand Bär Studienberatung@th-rosenheim.de Phone +49 8031 805 2489	Central Student Advisory Service of TH Rosenheim	Information and advice on all aspects of studying for students, pupils, prospective students from practice, high school graduates, teachers or parents

Appendix Module Handbook UWT

B.Eng.

International Bachelor of Engineering – Specialisation Environmental Technology

Studiendekan: Prof. Dr.-Ing. Johannes Lindner

Gültig für Studierende, die ihr Studium ab dem SS 2022 aufgenommen haben
(SPO 2022)



Modulhandbuch

Diese Version wird sukzessiv mit den jeweils verantwortlichen Lehrenden weiterentwickelt.
Dies gilt für die Lehre und die Praktika. Inhalte und Regelungen korrespondieren mit dem
Studienplan und der Prüfungsordnung

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Abkürzungsverzeichnis

Abkürzung	Definition
B.Eng.	Bachelor of Engineering
BA	Bachelorarbeit
BWL	Betriebswirtschaftslehre
CHE	Chemieingenieurwesen (Abkürzung hochschulintern)
CI	Chemieingenieurwesen (Abkürzung laut Curriculum)
CP	Credit Point / Leistungspunkt
CT	Chemtronik (Abkürzung laut Curriculum)
CTR	Chemtronik (Abkürzung hochschulintern)
DV	Datenverarbeitung
ECTS	European Credit Transfer System
Ex	Exkursion
FEM	Finite-Elemente-Methode
FWPM	Fachwissenschaftliches Wahlpflichtmodul
FOS/BOS	Fachoberschule / Berufsoberschule
HS	Hochschule
mdIP	Mündliche Prüfung
P	Prüfungen
PB	Praxisbericht
Pr	Praktikum
PStA	Prüfungsstudienarbeit
S	Seminar
schrP	Schriftliche Prüfung
SPO	Studien- und Prüfungsordnung
SU	Seminaristischer Unterricht
SWS	Semesterwochenstunden
TH	Technische Hochschule
TN	Teilnahmenachweis
Ü	Übung
UT	Umwelttechnologie (Abkürzung laut Curriculum)
UWT	Umwelttechnologie (Abkürzung hochschulintern)

Studien- und Prüfungsordnung

Die jeweils aktuelle Studien- und Prüfungsordnung kann auf der Homepage der Technischen Hochschule Rosenheim unter

<https://www.th-rosenheim.de/home/infos-fuer/studierende/studienorganisation/formalia/studienregelungen/studien-und-pruefungsordnungen/>

eingesehen werden.

Studenten, die ihr Studium zum SS 2024 aufgenommen haben, folgen in den Fächern dem Studienplan zur Satzung der SPO von 2024. Studenten in höherem Semester folgen dem Studienplan zur SPO in der Satzung von 2020.

Modulbeschreibungen

Im Folgenden sind die einzelnen Module sowie Teilmodule des Studiengangs Umwelttechnologie aufgeführt. Für jedes Modul bzw. Teilmodul werden folgende Punkte angegeben bzw. beschrieben:

- Modulnummer und Bezeichnung sowie Modulverantwortlicher
- Studiengang
- Zielgruppe/Semesterlage/Häufigkeit
- Verwendbarkeit des Moduls
- Lernziel des Moduls bzw. Kompetenzen
- Referenten
- Credit Points (ECTS)
- Semesterwochenstunden (SWS)
- Gesamtworkload / Aufteilung der Stunden pro Modul bzw. Teilmodul
- Prüfungsleistung und Leistungsbewertung auf Modulebene (d.h. Zusammensetzung der Modulnote bzw. Verrechnung von Teilprüfungen)
- Kursvoraussetzungen
- Modulinhalte
- Art der Lehrmethode sowie Unterrichtssprache
- Prüfungsleistung und Leistungsbewertung auf Modulebene bzw. Teilmodulebene
- Zulassungsvoraussetzungen zur Prüfung
- [Hilfsmittel](#) in der [Prüfung](#)*
- Literatur

Diese Auflistung ermöglicht einen schnellen Überblick über die jeweiligen Module des Studiengangs Umwelttechnologie (B. Eng.).

[*\) Hinweis: Beachten Sie dazu unbedingt die Aushänge - im Schaukasten „Prüfungen“ am](#)

Campus Burghausen und / oder die Bekanntmachung unter <https://www.th-rosenheim.de/studium-und-weiterbildung/im-studium/studienorganisation/studienregelungen/pruefungsankuendigungen> - nur diese sind rechtlich verbindlich!

Module 1. Semester

Module name		German B1.1	
Number(s)	Abbreviation	Curriculum semester	ECTS
IBR11 (IBB 1)		1	5
Responsible for the module	Lecturer(s)	Teaching form	SWS
Prof. Dr. Zentgraf	Frau 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			
<p>Advanced language use B1.1 according to CEFR Students will be able to</p> <ul style="list-style-type: none"> • Understand frequently used expressions and clear standard language related to study, work and leisure. • Cope with most everyday situations in the language area • Express themselves simply and coherently on familiar topics and areas of personal interest • Report on experiences and events • Describe hopes and goals • Give brief reasons and explanations for plans and views. 			
Content			
<p>Level B1.1</p> <ul style="list-style-type: none"> • Teaching and examination focus: Speaking and listening comprehension • Practical language skills for study and everyday life • Present • Vocabulary and grammar • Pronunciation • Intercultural competence 			

Recommended literature
<ul style="list-style-type: none"> To be announced in the course

Module name		German B1.2	
Number(s)	Abbreviation	Curriculum semester	ECTS
IBR12 (IBB2)		1	5
Responsible for the module	Lecturer(s)	Teaching form	SWS
Prof. Dr. Zentgraf	Frau 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			
<p>Advanced language use B1.2 according to CEFR Students will be able to</p> <ul style="list-style-type: none"> Understand frequently used expressions and clear standard language related to study, work and leisure. Cope with most everyday situations in the language area Express themselves simply and coherently on familiar topics and areas of personal interest Report on experiences and events Describe hopes and goals Give brief reasons and explanations for plans and views. 			
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 (IBB 7)	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: <ul style="list-style-type: none"> • Basics • Linear algebra • Differential and integral calculus of a variable • Introduction to complex numbers Exercises Exercises accompanying the lectures
Recommended literature
<ul style="list-style-type: none"> • 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	Physical Chemistry		
Number(s)	Abbreviation	Curriculum semester	ECTS
IBB14	PC	1	5
Responsible for the module	Lecturer(s)	Teaching form	SWS
Prof. Dr. Pentlehner	Dr. Oscar Rojas,	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	75 h	40 h	35 h
Applicability of the module in the degree programmes			
IBB			
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 students are familiar with the elementary principles and concepts of general and physical chemistry. Students are able to understand, reproduce and apply the basic concepts and models of chemistry. They are able to fundamentally interpret the influence of physical quantities on chemical reactions. The students have a basic knowledge of the most important concepts in chemistry, which serve as a basis for further chemical subjects. They know the smallest building blocks of chemistry, atoms, the structure of matter and the most important boundary concepts of bonding forms. Furthermore, students can assess the fundamentals of quantum mechanics based on key experiments and the derived consequences. These are a prerequisite for the following discussion of the advantages and limitations of various models of chemical bonding and matter in general. Through an introduction to reaction kinetics, students have a basic understanding of the process of chemical reactions, which serves as the basis for the chemical engineering courses. Based on basic knowledge of thermodynamics, students understand chemical processes and in particular chemical equilibrium and can derive and calculate their targeted influence. The students deepened the content of the lecture by independently working on application-oriented exercises. The students are able to present and discuss their solution approach.

Content

1. Basics of quantum mechanics and structure of matter

- Light and waves, atomic spectra, photo effect, Franck-Hertz experiment, wave-particle dualism, Bohr's atomic model, Schrödinger equation, structure of the electron shell and PSE: structure, trends, systematics

2. Chemical bonding and molecules (see also module CI 107)

- Schrödinger equation for molecules (H_2^+ , H_2 , ..), LCAO-MO method,
- Types of bonding (ionic, covalent and metallic bonding)
- VSEPR, intra- and intermolecular bonds, octet rule, notation, isomerism
- MO theory and hybridization, heteronuclear bonding • Metallic bonding, metals and semiconductors

3. Introduction to reaction kinetics

- Terms and definitions
- Formal kinetics, reactions of different orders
- Pressure and temperature dependence
- Methods for determining kinetics (e.g. concentration measurement)
- Reaction coordinates and profiles, transition state theory, catalysis

4. Introduction to (chemical) thermodynamics

- Terms and definitions (system, state variables)
- Reaction enthalpies, standard enthalpies of formation
- Second law, entropy (statistical and thermodynamic interpretation), entropy of mixture
- Third law, equilibrium and law of mass action, chemical potential, Le Chatelier
- free energy and the connection to phase equilibria,
- Applications, e.g. precipitation, complex formation, acid-base and redox reactions as well as adsorption, extraction and ion exchange processes; Chromatography
- Interaction of kinetics and thermodynamics

Recommended literature

- Atkins, P. et al. (2006): Chemie. Einfach alles. Wiley-VCH-Verlag
- Atkins, P. (2013): Physikalische Chemie. Wiley-VCH-Verlag, 5. Auflage, ISBN 978-352-7-33247-2
- Mortimer, C. E., Müller, U. (2015): Chemie. Georg Thieme Verlag, 12. Aufl.
- Otto, M.: Analytische Chemie. Wiley-VCH
- Riedel, E. (2013): Allgemeine und Anorganische Chemie. De Gruyter Verlag, 11. Aufl.
- Riedel, E. (2013): Allgemeine und Anorganische Chemie – Übungsbuch. De Gruyter Verlag, 11. Aufl.
- Wedler (2012): Lehrbuch der Physikalischen Chemie (mit Übungsbuch). Wiley-VCH

Module name		Applied Informatics	
Number(s)	Abbreviation	Curriculum semester	ECTS
IBR15 (IBB 8)	Applnf	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			
<p>After successful participation in the course, students are able to</p> <ul style="list-style-type: none"> • 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			
<p>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.</p>			

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 (IBB 10)	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			
<p>After successful participation in the module courses, students are able to</p> <ul style="list-style-type: none"> • 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: Holzmamm/Meyer/Schumpich Technische Mechanik Statik, Springer Vieweg, 15th Edition, 2018
- R.C. Hibbeler: Engineering Mechanics: Statics, Pearson, 15th Edition, 2022
- D. Gross et. Al.: Statics – Formulas and Problems: Engineering Mechanics 1, Springer, 1st Edition, 2022

Module 2. Semester

Module name		German B2.1	
Number(s)	Abbreviation	Curriculum semester	ECTS
IBR21 (IBB 3)		2	5
Responsible for the module	Lecturer(s)	Teaching form	SWS
Prof. Dr. Zentgraf	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 completed according to CEFR			
Intended learning objectives			
<p>Independent language use B2 according to CEFR Students can</p> <ul style="list-style-type: none"> • Understand the main contents of complex texts on concrete and abstract topics and on technical discussions in their own field of specialisation. • Communicate so spontaneously and fluently that a conversation with a native speaker is possible without much effort on either side. • Express themselves on a wide range of topics • Explain a point of view on a current issue and state the advantages and disadvantages of different options. 			

Module name		German B2.2	
Number(s)	Abbreviation	Curriculum semester	ECTS
IBR22 (IBB 4)		2	5
Responsible for the module	Lecturer(s)	Teaching form	SWS
Prof. Dr. Zentgraf	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 completed according to CEFR			
Intended learning objectives			
<p>Independent language use B2 according to CEFR Students can</p> <ul style="list-style-type: none"> • Understand the main contents of complex texts on concrete and abstract topics and on professional discussions in their own field of specialisation. • Communicate so spontaneously and fluently that a conversation with a native speaker is possible without much effort on either side. • Express themselves on a wide range of topics • Explain a point of view on a current issue and state the advantages and disadvantages of different options. 			
Content			
<p>Level B2.2</p> <ul style="list-style-type: none"> • Teaching and examination focus: Writing and reading comprehension • Practical language skills for study and everyday life • Writing an internship report • Vocabulary and grammar • Intercultural competence 			

Recommended literature
<ul style="list-style-type: none"> • To be announced in the course

Module name		Mathematics 1.2	
Number(s)	Abbreviation	Curriculum semester	ECTS
IBR23 (IBB 11)	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 (IBB 9)	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			
<p>Mathematics and science school education:</p> <ul style="list-style-type: none"> • 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 (IBB 12.2 and IBB 19)	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			
<p>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.</p>			
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		Basic Chemistry	
Number(s)	Abbreviation	Curriculum semester	ECTS
IBR25.3 (IBB 13)	Chem.	2	5
Responsible for the module	Lecturer(s)	Teaching form	SWS
Prof. Dr. Larbig	Prof. Dr. Larbig	SU	4
Form of examination	Module duration	Module rotation	Language
schrP	1 Semester	Winter Semester	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			
none			
Recommended prerequisites			
Intended learning objectives			
<p>The students understand the structure of atoms and the formation of the different types of chemical bonds. The students can apply different atomic and molecular models to practical tasks. Simple redox equations can be created independently. Electrochemical concepts can be applied to galvanic cells and to issues related to corrosion and corrosion protection.</p>			
Brief description of the module			
<p>In this module students receive knowledge of basic concepts in chemistry, including atomic models, theories of chemical bonds, electrochemistry and redox equations.</p>			

Content

Basics of chemistry

- Atomic models and the chemical bond
- Intermolecular forces
- chemical reactions and stoichiometry
- Fundamentals of organic chemistry Metals and electrochemistry Redox equations Electrochemical series
- galvanic cells
- Corrosion and protection against corrosion
- Electrochemistry

Recommended literature

- lecture notes