Karlsruher Institut für Technologie

Module Handbook
Chemical and Process Engineering Bachelor 2015 (Bachelor of Science (B.Sc.))

SPO 2015

Summer term 2025

Date: 22/02/2025

KIT DEPARTMENT OF CHEMICAL AND PROCESS ENGINEERING

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1 General Information

1.1 Study program details

KIT-Department	KIT Department of Chemical and Process Engineering
Academic Degree	Bachelor of Science (B.Sc.)
Examination Regulations Version	2015
Regular terms	6 terms
Maximum terms	12 terms
Credits	180
Language	Deutsch
Grade calculation	Weighted by (Weight * CP)
Additional Information	Link to study program www.ciw.kit.edu Department https://www.ciw.kit.edu/1627.php Business unit Studium und Lehre https://www.sle.kit.edu/vorstudium/bachelor-chemieingenieurwesen-verfahrenstechnik.php

1.2 Qualification Goals

The Bachelor's program provides knowledge on scientific fundamentals and methodical expertise in the area of Chemical and Process Engineering. The Bachelor degree qualifies students to enroll for a Master's program. Furthermore, it enables students to apply the acquired theoretical knowledge to a concrete professional field.

The compulsory program in the first and second year focuses on methodical and qualified fundamental knowledge of mathematics, natural sciences and engineering. This includes in particular the knowledge of heat and mass transfer and the most important unit operations in the field of thermal, chemical and mechanical process engineering. Graduates will be able to balance engineering processes appropriately.

The knowledge acquired in the first and second year is not only the basis for the third year of the Bachelor's program, but also for the following Master's studies. Mandatory elective courses in the third year of study offer the opportunity to gain in-depth knowledge in a specialist area for the first time. As part of the specialization, students will apply basic process engineering knowledge in a project work. In addition to technical aspects, working on a project in a team as well as preparing, interpreting and presenting the results are important parts of the specialization subject.

Within their Bachelor's thesis, students prove the ability to work on specialized problems in the field of chemical and process engineering independently and within a defined time frame using scientific methods.

Graduates are qualified to identify, abstract, and solve technical problems using the basic knowledge provided during the Bachelor's program. Furthermore, they can evaluate products and processes systematically as well as select and apply analyzing and simulation tools. They are able to combine theory and practice as well as to organize and implement projects independently. Graduates are able to collaborate with experts in other fields.

1.3 Studies and Examination Regulations

The legal basis for the study program and the examinations is the

Studien und Prüfungsordnung des Karlsruher Instituts für Technologie (KIT) für den Bachelorstudiengang Chemieingenieurwesen und Verfahrenstechnik
(Study and Examination Regulations of the Karlsruhe Institute of Technology (KIT) for the Bachelor Course of Studies in Chemical and Process Engineering)
of 05 August 2015 amended on 24 February 2020.

1.4 Organizational issues

General Information

Current information on degree programs and dates for information sessions can be found on the faculty web pages. http://www.ciw.kit.edu/english/studium.php

Recognition of achievements according to § 19 SPO

A request for recognition of services which

- At another university
- Abroad
- Outside the higher education system

can be submitted to the Bachelor Examination Board within one semester. There, if necessary after consultation with the subject representative, it will be determined whether the performance is equivalent to a performance envisaged in the curriculum of the course of study and can be recognised. Achievements completed as part of a semester abroad can also be recognized at a later date.

For forms, please refer to the website of the KIT Faculty of Chemical and Process Engineering **https://www.ciw.kit.edu/bpa.php**

2 Curriculum Bachelor Chemical and Process Engineering

2.1 Semester overview

Semester CP	Fundamentals of Mathematics and Natural Sciences	Fundamentals of Scientific Engineering	Thermodynamics und Transport Processes	Fundamentals of Process Engineering	Lab Courses, Elective Courses, Thesis
1 **33**	Advanced Mathematics I (7) General and Inorganic Chemistry (6)	Engineering Mechanics: Statics (5) Mechanical Design (9) Material Science and Engineering (4)			Laboratory I Part I (2)
2 **31**	Advanced Mathematics II (7) Computational Methods (5) Organic Chemistry (5)	Engineering Mechanics: Strength of Material (5) Material Science and Engineering (5)			Basic Practical Course Part II (4)
3 **30**	Advanced Mathematics III (7) Computational Methods – Lab (3)	Engineering Mechanics: Dynamics (5)	Thermodynamics I (7)		Advanced Practical Course (5) Soft Skill Qualification (3)*
4 **29**			Thermodynamics II (7) Heat and Mass Transfer (7) Fluiddynamics (5) Control Engineering and System Dynamics (5)		Mandatory Elective Course I (5)*
5 **32**	Elementary Physics (7)			Chemical Process Engineering (6) Thermal Process Engineering (6) Mechanical Processing (6)	Mandatory Elective Course II (5)* Specialization/ Project Work (2)**
6 **25**					Specialization/ Project Work (10)** Soft Skill Qualification (3)* Bachelor Thesis (12)

Numbers in brackets: Credit points (CP)

* The distribution of the *Soft Skill Qualifications* and *Mandatory Elective Courses* over the semesters is a suggestion and can also be arranged differently depending on the modules selected.
In the area of *Soft Skill Qualifikations*, at least one of the modules *Industrial Business Administration* or *Ethics and Material Cycles* must be selected.

** The *Specialization/ Project Work* lasts two semesters and always begins in the winter semester. A profile subject can be chosen from approx. 10 offers. The distribution of the workload between winter and summer semesters may differ for individual profile subjects.

2.2 Overview: Fields and Modules

Area	Module	Responsible	SWS	CP
47 CP Fundamentals of Mathematics and Natural Sciences	Advanced Mathematics I	Griesmeier	6	7
	Advanced Mathematics II	Griesmeier	6	7
	Advanced Mathematics III	Griesmeier	6	7
	Computational Methods	Stein	3 + P	8
	General and Inorganic Chemistry	Ruben	5	6
	Organic Chemistry	Meier	4	5
	Elementary Physics	Pilawa	6	7
38 CP Fundamentals of Scientific Engineering	Engineering Mechanics: Statics and Strength of Material	Willenbacher	8	10
	Engineering Mechanics: Dynamics	Klahn	4	5
	Material Science and Engineering	Schneider	8	9
	Mechanical Design A	Matthiesen/ Albers	8	9
	Control Engineering and System Dynamics	Meurer	4	5
26 CP Thermodynamics and Transport Processes	Thermodynamics I	Enders	5	7
	Thermodynamics II	Enders	5	7
	Fluiddynamics	Nirschl	4	5
	Heat/ Mass Transfer	Wetzel	5	7
18 CP Fundamentals of Process Engineering	Mechanical Processing	Dittler	4	6
	Thermal Process Engineering	Zeiner	4	6
	Chemical Process Engineering	Wehinger	4	6
10 CP Mandatory Elective Courses	2 Elective Modules		4 each	5 each
11 CP Laboratories	Basic Practical Course	Horn, Sinanis	P	6
	Either: Process Machines Or: Practical Course in Organic Chemistry for Chemical Engineers	Gleiß Rapp	P	5
6 CP Soft Skill Qualifikations	2 Elective Modules		2 each	3 each
12 CP Specialization/ Project Work	1 Elective Module			12
12 LP	Bachelorarbeit			12
SUMME				180

CP: Credit Points (ECTS), SWS: weekly teaching hours

2.3 Lectures/ Exercises/ Laboratories
(Semester Overview, Attendance Time hours per week)

	1. Semester (WS)					2. Semester (SS)				
	V	**Ü**	**P**	***CP***	***E***	**V**	**Ü**	**P**	***CP***	***E***
Advaned Mathematics I and II	4	2	-	*7*	*S+K*	4	2	-	*7*	*S+K*
Computational Methods	-	-	-	-	-	2	1	P	*5*	*K*
Engineering Mechanics: Statics/ Strength of Material	2	2	-	*5*	-	2	2	-	*5*	*K*
General and Inorganic Chemistry (AAC)	3	2	-	*6*	*K*	-	-	-	-	-
Material Science and Engineering I and II	3	1	-	*4*	-	2	2	-	*5*	*M*
Mechanical Design A	4	2	-	*9*	*S+K*	-	-	-	-	-
Organic Chemistry for Engineers	-	-	-	-	-	2	2	-	*5*	*K*
Basic Lab Course	-	-	P	*2*	*S*	-	-	P	*4*	*S*
Total credit points/ Number of graded exams				*33*	*3*				*31*	*5*

	3. Semester (WS)					4. Semester (SS)				
	V	**Ü**	**P**	***LP***	***E***	**V**	**Ü**	**P**	***LP***	***E***
Advanced Mathematics III	4	2	-	*7*	*S+K*	-	-	-	-	-
Engineering Mechanics: Dynamics	2	2	-	*5*	*S+K*	-	-	-	-	-
Computational Methods	-	-	P	*3*	*S*	-	-	-	-	-
Control Engineering and System Dynamics	-	-	-	-	-	2	2	-	*5*	*K*
Fluiddynamics	-	-	-	-	-	2	2	-	*5*	*S+K*
Technical Thermodynamics I and II	3	2	-	*7*	*S+K*	3	2	-	*7*	*S+K*
Fundamentals of Heat- and Masstransfer	-	-	-		-	3	2	-	*7*	*K*
Mandatory Elective Courses	-	-	-	-	-	2	2	-	*5*	*K*
Lab (Chemistry or Process Engineering) 2 weeks Feb./March	-	-	P	*5*	*S*	-	-	-	-	-
Soft Skill Qualification	2	-	-	*3*	*S*	-	-	-	-	-
Total credit points/ Number of graded exams				*30*	*3*				*31*	*5*

	5. Semester (WS)					6. Semester (SS)				
	V	**Ü**	**P**	***LP***	***E***	**V**	**Ü**	**P**	***LP***	***E***
Chemical Process Engineering	2	2	-	*6*	*K*	-	-	-	-	-
Thermal Process Engineering	2	2	-	*6*	*K*	-	-	-	-	-
Mechanical Processing	2	2	-	*6*	*K*	-	-	-	-	-
Elementary Physics	4	2	-	*7*	*K*	-	-	-	-	-
Mandatory Elective Courses	4	2	-	*5*	*K*	-	-	-	-	-
Specialization/ Project Work	1	1	-	*2*	-	1	1	P	*10*	*A+M*
Soft Skill Qualification*					-	*2*	-	-	*3*	*S*
Bachelor Thesis	-	-	-		-	360 hrs			*12*	*A*
Total credit points/ Number of graded exams				*32*	*5*				*25*	*3*

WS: Wintersemester, SS: Sommersemester
V: Lecture; Ü: Exercise P: Practial/ Lab; CP: Credit Points E: Examination
K: Written exam, M: Oral Exam, A: Examination of another type/ thesis, S: Completed Coursework (ungraded)

3 Field of study structure

Mandatory	
Orientation Exam *This field will not influence the calculated grade of its parent.*	
Bachelor's Thesis	12 CR
Fundamentals of Mathematics and Natural Sciences	47 CR
Fundamentals of Scientific Engineering	38 CR
Thermodynamics and Transport Processes	26 CR
Fundamentals of Process Engineering	18 CR
Mandatory Elective Courses	10 CR
Laboratories *First usage possible from Oct 01, 2023.*	11 CR
Specialization/ Project Work	12 CR
Interdisciplinary Qualifications	6 CR
Voluntary	
Master's Transfer Account *This field will not influence the calculated grade of its parent.*	

3.1 Orientation Exam

Election notes
As an orientation exam, the following partial achievements must be passed by the end of the third semester:

- Advanced Mathematics I
- General and Inorganic Chemistry

Mandatory		
M-CIWVT-100874	Orientation Exam	0 CR

3.2 Bachelor's Thesis

Credits
12

Prerequisite:

The Bachelor thesis may only be started when the requirements (at least 120 LP) have been fulfilled.

Procedure for registering the Bachelor's thesis

Registration for the Bachelor's thesis is handled by the Bachelor Examination Board:

- Registration before starting the thesis
- If possible, send documents to the Bachelor Examination Board via the Institute Secretariat.
- The Bachelor Examination Board requires the following documents no later than four weeks after the start of the work
  - Admission certificate https://www.ciw.kit.edu/1838.php filled out and signed
  - Copy of the assignment (signed by the person submitting the assignment)
- The Bachelor Examination Board will record and register the Bachelor thesis in the campus management system. The deadline for submission is also recorded by the Bachelor Examination Board.

Submission of the Bachelor's thesis:

- The maximum processing time is four months. The submission deadline is recorded in the campus management system. The thesis must be handed in within the deadline.
- When submitting the Bachelor's thesis, students must declare that they have written the thesis independently and have not used any sources or aids other than those specified. The exact wording can be found in the study and examination regulations.
  - The following must be handed in1 copy at the dean's office/at the Bachelor Examination Board.
  - Handing in at the supervisor after consultation
- The date of submission is the date of submission to the Bachelor Examination Board.

Mandatory		
M-CIWVT-103204	Module Bachelor's Thesis	12 CR

3.3 Fundamentals of Mathematics and Natural Sciences

Credits
47

Mandatory		
M-MATH-100280	Advanced Mathematics I	7 CR
M-MATH-100281	Advanced Mathematics II	7 CR
M-MATH-100282	Advanced Mathematics III	7 CR
M-CIWVT-101956	Computational Methods	8 CR
M-CHEMBIO-101117	General and Inorganic Chemistry	6 CR
M-CHEMBIO-101115	Organic Chemistry for Engineers	5 CR
M-PHYS-100993	Elementary Physics	7 CR

3.4 Fundamentals of Scientific Engineering

Credits
38

Mandatory		
M-CIWVT-101128	Engineering Mechanics: Dynamics	5 CR
M-MACH-102567	Material Science and Engineering	9 CR
M-MACH-106527	Mechanical Design A *First usage possible from Oct 01, 2023.*	9 CR
M-CIWVT-106308	Control Engineering and System Dynamics *First usage possible from Apr 01, 2023.*	5 CR
M-CIWVT-104006	Engineering Mechanics: Statics and Strength of Materials *First usage possible from Oct 01, 2017.*	10 CR

3.5 Thermodynamics and Transport Processes

Credits
26

Mandatory		
M-CIWVT-101129	Thermodynamics I	7 CR
M-CIWVT-101130	Thermodynamics II	7 CR
M-CIWVT-101131	Fluiddynamics	5 CR
M-CIWVT-101132	Fundamentals of Heat and Mass Transfer	7 CR

3.6 Fundamentals of Process Engineering

Credits
18

Mandatory		
M-CIWVT-101135	Mechanical Processing	6 CR
M-CIWVT-101134	Thermal Process Engineering	6 CR
M-CIWVT-101133	Chemical Process Engineering	6 CR

3.7 Mandatory Elective Courses

Credits
10

Election notes
In most cases, two modules totaling 10 ECTS are chosen (regardless of whether the modules are offered in the summer or winter term). For most optional subjects, participation is not recommended before the fourth semester.

Mandatory Elective Courses (Election: at least 10 credits)		
M-CIWVT-103297	Applied Apparatus Engineering	5 CR
M-CIWVT-106475	Biopharmaceutical Process Engineering *First usage possible from Apr 01, 2025.*	6 CR
M-CIWVT-106434	Bioprocess Engineering *First usage possible from Oct 01, 2024.*	5 CR
M-CIWVT-106030	Catalysts for the Energy Transition *First usage possible from Oct 01, 2022.*	5 CR
M-CIWVT-106433	Introduction into Bioengineering *First usage possible from Apr 01, 2024.*	5 CR
M-ETIT-105690	Electrochemical Energy Technologies *First usage possible from Apr 01, 2021.*	5 CR
M-ETIT-105703	Laboratory Course: Electrochemical Energy Technologies *First usage possible from Oct 01, 2021.*	5 CR
M-CIWVT-101136	Energy Process Engineering	5 CR
M-CIWVT-106880	Advanced Methods in Linear Control *First usage possible from Oct 01, 2024.*	6 CR
M-CIWVT-106444	Intensification of Bioprocesses *First usage possible from Apr 01, 2025.*	6 CR
M-MACH-106528	Mechanical Design B-C *First usage possible from Oct 01, 2023.*	12 CR
M-CIWVT-101137	Industrial Organic Chemistry	5 CR
M-CIWVT-101126	Food Biotechnology *First usage possible until Sep 30, 2025.*	5 CR

3.8 Laboratories

Credits
11

Note regarding usage
First usage possible from Oct 01, 2023.

Mandatory		
M-CIWVT-106500	Basic Practical Course	6 CR
Advanced Practical Course (Election: 1 item)		
M-CIWVT-101139	Process Machines	5 CR
M-CHEMBIO-101116	Practical Course in Organic Chemistry for Chemical Engineers	5 CR

3.9 Specialization/ Project Work

Credits
12

In the fifth semester the possibility of profile building exists for the first time. Eleven specialization subjects are available. The size and structure of these specialization subjects are similar. All specialization subjects extend over two semesters, start in the winter semester and end at the end of May at the latest. In the winter semester, lectures usually take place in which extended, subject-specific knowledge is imparted. Subsequently, research-related project work is carried out in small groups. Prerequisites for participation in the profile subjects are at least 60 ECTS and at least one successfully completed internship (e.g. general and inorganic chemistry, process engineering,...).

The learning control of specialization subjects consists of two parts which are listed in the description of the module description (e.g. oral examination and presentation of the project work). The specialization subject is only passed if both partial examinations are passed (evaluated with at least "sufficient"). A failed partial performance can only be repeated once. Dates for repeat exams will be agreed with the person responsible for the subject.

As the practical work is carried out in the laboratory, the number of participants in the individual specialization subjects is limited. The registration for the specialization subjects is usually possible in July. Within a registration period of two weeks, students have the opportunity to choose their preferred subject (at least one first and one second wish). After the registration deadline, the places will be allocated automatically, taking into account your wishes as far as possible.

Before the start of the registration period, an information event will be held on **22. June 2022** in which the individual subjects will be presented and the registration procedure explained.

The location and time of the information event will be published in good time on the faculty's and student council's homepages.

The registration process is divided into two stages:
In July, the desired profile subjects can be selected via the following portal https://portal.wiwi.kit.edu/
After the allocation you can choose your specialization subject in the Study Portal, the choice is approved online by the faculty, afterwards the registration for the individual examinations is possible.

Election regulations

Elections in this field require confirmation.

Specialization/ Project Work (Election: at least 12 credits)		
M-CIWVT-101145	Energy and Environmental Engineering	12 CR
M-CIWVT-101147	Mechanical Separation Technology	12 CR
M-CIWVT-101148	Food Technology	12 CR
M-CIWVT-106448	Air Pollution Control *First usage possible from Oct 01, 2023.*	12 CR
M-CIWVT-101143	Biotechnology	12 CR
M-CIWVT-101154	Micro Process Engineering	12 CR
M-CIWVT-101153	Process Development and Scale-up	12 CR
M-CIWVT-104457	Fundamentals of Refrigeration	12 CR
M-CIWVT-105995	Circular Economy *First usage possible from Oct 01, 2022.*	12 CR
M-CIWVT-106477	Automation and Control Systems Engineering *First usage possible from Oct 01, 2023.*	12 CR
M-CIWVT-106700	Formulation and Characterisation of Energy Materials *First usage possible from Oct 01, 2024.*	12 CR
M-CIWVT-106825	Chemical Reaction Engineering *First usage possible from Oct 01, 2024.*	12 CR

3.10 Interdisciplinary Qualifications

Credits
6

A total of 6 LPs must be completed in the area of "soft skill qualifications" during the Bachelor's programe. Non-technical modules, such as modules from other subject areas, language courses or other courses offered by the House of Competence (HoC) or the Centre for Applied Cultural Studies and General Studies (FORUM), belong to interdisciplinary qualifications.

Registration in the Campusmanagement System

Additional credits and interdisciplinary qualifications cannot always be registered directly in the CAS system (e.g. some modules from another faculty). In any case, you must contact Julia Hofer before the examination.

Exception:
interdisciplinary qualification at the House of Competence (HoC) or Language Centre

If the Soft Skill Qualification is taken at the HoC or Language Centre, then no certificate of approval is required for an examination achievement, as the achievements are automatically posted in the CAS system under "unallocated credits".

If you want to credit a performance that is listed under " unallocated credits", you have submit a form to the Masters Examination Board.

For forms, please refer to the website of the KIT Faculty of Chemical and Process Engineering **https://www.ciw.kit.edu/bpa.php**

Election notes
3 of the 6 LPs are fixed: At least one of the following modules must be selected:

- Ethics and Global Material Cycles
- Industrial Business Administration

Modules in the range of 3 LP can be freely selected. The following can be done

- either both of the above mentioned modules
- or any modules of at least 3 LP (e.g. HoC or FORUM courses)

can be selected.

Soft Skill Qualifications (Election: at least 6 credits)		
M-CIWVT-101149	**Ethics and Global Material Cycles**	3 CR
M-WIWI-100528	**Industrial Business Administration**	3 CR
M-CIWVT-105848	**SmartMentoring** *First usage possible from Oct 01, 2021.*	3 CR
M-CIWVT-106534	**Data-Driven Modeling with Python** *First usage possible from Oct 01, 2023.*	3 CR

3.11 Master's Transfer Account

Students who have already earned at least 120 LP in their Bachelor's programe can earn credit points from a consecutive Master's programe at KIT up to a maximum of 30 LP.

Exams can be taken in the following subjects:

- Advanced Fundamentals
- Internship
- Soft Skill Qualifications

Further information on individual modules can be found in the module manual of the Master's program.

Within the first Master's semester, achievements can be taken over into the master program. Please contact the Master's Examination Board.
There is no obligation to transfer achievements form Master Transfer Account!

Election notes
Please note: Upon successful completion of all studies and exams needed for the bachelor's degree, a control of success registered as a prior master's examination may only be passed as long as you are enrolled in the bachelor's program. You should not yet have been admitted to the master's program and the master's semester should not yet have started.

This means that as soon as your admission to the master's program has been expressed and the master's semester has started, your participation in the examination is the **first regular examination** attempt within the framework of your master's studies.

Master Transfer Account (Election: at most 30 credits)		
M-CIWVT-101992	Single Results	30 CR

Modelled Conditions
The following conditions have to be fulfilled:

1. You need to have earned at least 120 credits in the following fields:
    - Fundamentals of Scientific Engineering
    - Fundamentals of Mathematics and Natural Sciences
    - Laboratories
    - Specialization/ Project Work
    - Thermodynamics and Transport Processes
    - Interdisciplinary Qualifications
    - Fundamentals of Process Engineering
    - Mandatory Elective Courses

4 Modules

M 4.1 Module: Automation and Control Systems Engineering [M-CIWVT-106477]

Responsible: Prof. Dr.-Ing. Thomas Meurer
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work (Usage from 10/1/2023)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
12	Grade to a tenth	Each winter term	2 terms	German	4	1

Mandatory			
T-CIWVT-113088	Automation and Control Systems Engineering - Exam	6 CR	Meurer
T-CIWVT-113089	Automation and Control Systems Engineering - Project Work	6 CR	Meurer

Modeled Conditions
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your course of studies.

M 4.2 Module: Advanced Mathematics I [M-MATH-100280]

Responsible: Prof. Dr. Roland Griesmaier
Organisation: KIT Department of Mathematics
Part of: Fundamentals of Mathematics and Natural Sciences

Credits	Grading scale	Duration	Language	Level	Version
7	Grade to a tenth	1 term	German	3	3

Mandatory			
T-MATH-100275	Advanced Mathematics I	7 CR	Arens, Griesmaier, Hettlich
T-MATH-100525	Tutorial Advanced Mathematics I *This item will not influence the grade calculation of this parent.*	0 CR	Arens, Griesmaier, Hettlich

Competence Certificate
Learning assessment is carried by a written examination of length 120 minutes and by homework assignments (pre-requesite). A "pass" result on the pre-requesite is a requirement for registration for the corresponding written examination.

Prerequisites
none

Competence Goal
The students know the fundamentals of one-dimensional calculus. They can reliably use limits, functions, power series and integrals. They understand central concepts such as continuity, differentiability or integrability and they know important statements about these concepts. The students can follow the arguments leading to these statements as presented in the lectures and are able to independently prove simple assertions based on these statements.

Content
Fundamentals, sequences and convergence, functions and continuity, series, differential calculus of one real variable, integral calculus

Module grade calculation
The module grade is the grade of the written examination

Workload
In class: 90 hours

- lectures, tutorials and examinations

Independent study: 120 hours

- independent review of course material
- work on homework assignments
- preparation for written exams

Literature
will be announced in class.

Base for
Advanced Mathematics II

M 4.3 Module: Advanced Mathematics II [M-MATH-100281]

Responsible: Prof. Dr. Roland Griesmaier
Organisation: KIT Department of Mathematics
Part of: Fundamentals of Mathematics and Natural Sciences

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
7	Grade to a tenth	Each summer term	1 term	German	3	2

Mandatory			
T-MATH-100276	Advanced Mathematics II	7 CR	Arens, Griesmaier, Hettlich
T-MATH-100526	Tutorial Advanced Mathematics II *This item will not influence the grade calculation of this parent.*	0 CR	Arens, Griesmaier, Hettlich

Competence Certificate
Learning assessment is carried by a written examination of length 120 minutes and by homework assignments (pre-requesite). A "pass" result on the pre-requesite is a requirement for registration for the corresponding written examination.

Prerequisites
none

Competence Goal
The students know about the fundamentals of linear algebra. The are able to use vectors, linear maps and matrices without problems. They have basic knowledge about Fourier series. The students also can theoretically and practically deal with initial value problems of ordinary differential equations. They can make use of classical solution techniques for linear differential equations.

Content
vector spaces, linear maps, eigenvalues, Fourier series, differential equations, Laplace transform

Module grade calculation
The module grade is the grade of the written examination.

Workload
In class: 90 hours

- lectures, tutorials and examinations

Independent study: 120 hours

- independent review of course material
- work on homework assignments
- preparation for written exams

Recommendation
The following modules should have been taken: Advanced Mathematics 1

Literature
will be announced in class.

Base for
Advanced Mathematics III

M 4.4 Module: Advanced Mathematics III [M-MATH-100282]

Responsible: Prof. Dr. Roland Griesmaier
Organisation: KIT Department of Mathematics
Part of: Fundamentals of Mathematics and Natural Sciences

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
7	Grade to a tenth	Each winter term	1 term	German	3	2

Mandatory			
T-MATH-100277	Advanced Mathematics III	7 CR	Arens, Griesmaier, Hettlich
T-MATH-100527	Tutorial Advanced Mathematics III *This item will not influence the grade calculation of this parent.*	0 CR	Arens, Griesmaier, Hettlich

Competence Certificate
Learning assessment is carried by a written examination of length 120 minutes and by homework assignments (pre-requesite). A "pass" result on the pre-requesite is a requirement for registration for the corresponding written examination.

Prerequisites
none

Competence Goal
The students know about differential calculus for vector-valued functions of several variables and about techniques of vector calculus such as the definition and application of differential operators, the computation of domain, line and surface integrals and important integral theorems. They have basic knowledge about partial differential equations and know basic facts from stochastics.

Content
Multidimensional calculus, domain integrals, vector calculus, partial differential equations, stochastics.

Module grade calculation
The module grade is the grade of the written examination.

Workload
In class: 90 hours

- lectures, tutorials and examinations

Independent study: 120 hours

- independent review of course material
- work on homework assignments
- preparation for written exams

Recommendation
The following modules should have been taken before: Advanced Mathematics I and II

Literature
will be announced in class.

M 4.5 Module: Advanced Methods in Linear Control [M-CIWVT-106880]

Responsible: Prof. Dr.-Ing. Thomas Meurer
Organisation: KIT Department of Chemical and Process Engineering
Part of: Mandatory Elective Courses (Usage from 10/1/2024)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	2 terms	German	4	1

Mandatory			
T-CIWVT-113088	Automation and Control Systems Engineering - Exam	6 CR	Meurer

Competence Certificate
Learning control is an oral exam lasting approx. 30 minutes.

Prerequisites
None.

Module grade calculation
The module grade is the grade of the oral exam.

M 4.6 Module: Air Pollution Control [M-CIWVT-106448]

Responsible: Prof. Dr.-Ing. Achim Dittler
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work (Usage from 10/1/2023)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
12	Grade to a tenth	Each winter term	2 terms	German	4	1

Mandatory			
T-CIWVT-113046	Air Pollution Control	7 CR	Dittler
T-CIWVT-113047	Air Pollution Control - Project Work	5 CR	Dittler

Competence Certificate
The learning control consists of two partial achievements:

1. oral examination, duration 30 minutes
2. project work

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Conditions
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your course of studies.

Competence Goal
Students undertstand transport behavior and methods of size distribution measurement of airborne fine particles in the context of environmental and nanotechnology. They are able to apply this knowledge to solve basic problems of particle technology in a team oriented approach.

Content
The classes provide a knowledge base of methods of particle dispersion, particle transport processes in gases, as well as methods for their characterization with applications in the environment and industrial product design. Practical experience related to these concepts is developed in a team based lab project.

Module grade calculation
The module grade is calculated from the grades of the two partial achievments:
40 % project work, 60 % oral examination.

Workload

- Attendance time: 56 h (V+Ü) + 120 (project work) + 10 (Excoursion)
- Self-Study: 24 h
- Oral examination: 140 h

Literature
Skriptum Gas-Partikel-Messtechnik

M 4.7 Module: Applied Apparatus Engineering [M-CIWVT-103297]

Responsible: Dr. Martin Neuberger
Organisation: KIT Department of Chemical and Process Engineering
Part of: Mandatory Elective Courses

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each summer term	1 term	German	4	1

Mandatory			
T-CIWVT-106562	Applied Apparatus Engineering	5 CR	Neuberger

Competence Certificate
Success Control is an written examination of 90 minutes duration according to § 4 Abs. 2 Nr. 1 SPO.

Prerequisites
None

Competence Goal
The students will be able to describe the necessary steps for concept, planning and calculation of a construction of a machine until the commissioning. This contains the choice and declaration of single components. The students will apply the principles of the machine design with respect to the requirements for different educts, products and processes.

Additionally to technical aspects, the students will learn about cost management, time management and quality management. The students will know the sequence of licensing and providing procedures.

Content
Project Management
Project time management, project cost management, work breakdown structure

Process of Machine Design
Product (requirements with respect to corrosion, purity, cleanness ...), process (manufacturing, pressure, temperature, ...), selection of materials and components (motors, pumps, vans, fittings), maintenance, repair, safety, manufacturing process (welding, brazing ...), transport, commissioning, performance test, approval ...

Procurement
Technical specification, call for tenders, contract design, claim management

Quality Management
Certification concerning ISO 9001:2015, quality planning, quality approval
e.g. welding process qualification, qualified welders ...
material qualification report, control of manufacturing and mounting, commissioning

Workload
Attendance time: 60 h
Self-study: 45 h
Exam preparation: 45 h

Literature
Walter Wagner: Planung im Anlagenbau; Vogel Business Media; Auflage: 3. Auflage (August 2009)

M 4.8 Module: Basic Practical Course [M-CIWVT-106500]

Responsible: Prof. Dr. Harald Horn
Dr. Sokratis Sinanis
Organisation: KIT Department of Chemical and Process Engineering
Part of: Laboratories (mandatory)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	pass/fail	Each winter term	2 terms	German	3	1

Mandatory			
T-CIWVT-113117	Laboratory Work: General Chemistry	2 CR	Horn, West
T-CIWVT-113118	Practical Course: Process Engineering	4 CR	Sinanis

M 4.9 Module: Biopharmaceutical Process Engineering [M-CIWVT-106475]

Responsible: Prof. Dr. Jürgen Hubbuch
Organisation: KIT Department of Chemical and Process Engineering
Part of: Mandatory Elective Courses (Usage from 4/1/2025)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German	4	1

Mandatory			
T-CIWVT-113023	Biopharmaceutical Process Engineering	6 CR	Hubbuch

Competence Certificate
Learning controlis a written examination of 120 min duration.

Prerequisites
None

Competence Goal
Overview on unit operations for protein separations and respective analytics used in the biotechnological industry.

Content
The elcture series adresses fundamentals in biotechnological purification of bio-products and respective analytics.

Module grade calculation
The module grade ist the grade of the written exam.

Workload

- Lectures and exercises: 60 hrs
- Homework: 80 hrs
- preparation of examination: 40 hrs

Literature
will be announced

M 4.10 Module: Bioprocess Engineering [M-CIWVT-106434]

Responsible: Prof. Dr.-Ing. Alexander Grünberger
Prof. Dr. Jürgen Hubbuch
Organisation: KIT Department of Chemical and Process Engineering
Part of: Mandatory Elective Courses (Usage from 10/1/2024)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each winter term	1 term	German	3	1

Mandatory			
T-CIWVT-113019	Bioprocess Engineering	5 CR	Grünberger, Hubbuch

Competence Certificate
Learning control is a written exam lasting approx. 120 minutes.

Prerequisites
None

Competence Goal
The students are able to apply basic operations and concepts of process engineering to bioprocesses. They can transfer reaction engineering approaches to microbial metabolism and use them to understand real processes. They know different processes, bioreactors and process control strategies in theory and learn how to calculate and evaluate real processes from a theoretical and application perspective. They will learn to interpret, discuss and critically assess various bioprocesses in detail. Students can analyze, structure and formally describe problems in the area of biotechnological separation processes. The students are able to critically assess the different procedures.

Content
Bioprocess engineering encompasses the design, operation, control, and optimization of biochemical processes involving various biological pathways or reactions mediated by living cells of animals, plants and microorganisms or enzymes under controlled conditions for the efficient biotransformation of raw material into a range of products at requisite scales. Bioprocesses have been developed for production of wide variety of commercial products ranging from cheap to expensive specialty chemicals as antibiotics, therapeutic proteins and vaccines. Bioprocess engineering is thus the backbone of the biotechnology industry that translates the research and development to the industries and mainly consists of three fields: (i) Upstream processing (ii) Bioreactor and bioreactions (iii) downstream processing.

The course will link with basic engineering and biotechnological knowledge gained in the first years of studies. Knowledge of previous courses will be reinforced and applied for the technical development of bioprocesses. The objective of this course is to provide the students with the necessary and fundamental insight of bioprocess engineering. This includes fundamentals in biocatalysis (mainly cells as biocatalysts), microbial kinetics, mass and energy balance in bioprocesses and kinetics of bioprocesses and fermentation. Here focus will be laid on fundamental kinetic and stoichiometric principles of microbial metabolism. Based on that design and evaluation of cultivation media will be discussed. In the second part bioreactor engineering design, operation and optimization principles of fermentation processes for the production of high value bio-products will be discussed. Topics include fundamentals of process control strategies such as batch, fed-batch and continues cultivations. Construction operation, function of different types of bioprocesses will be demonstrated. Advantages and disadvantages will be discussed. First insights into bioprocess analytics and control will be given. Finally, an outlook into emerging topics within bioprocess engineering is given, including topics such as automatization and digitalization of bioprocesses and economic and sustainability considerations of bioprocesses. Furthermore, introduction into fundamentals of downstream processing will be given, including cell disruption, solid-liquid separation, partitioning, adsorption and chromatography. The students will learn to think interdisciplinary and to apply the key principles of the different bioprocess development steps. Lecture contents will be deepened by exercises.

Module grade calculation
Grade of the module is the grade of the written examination.

Workload

- Lectures: 60 h
- Homework: 50 h
- Exam Preparation: 40 h

Literature

- Horst Chmiel, Bioprozesstechnik, 2011, DOI:10.1007/978-3-8274-2477-8
- Wilfried Storhas, Bioverfahrensentwicklung, 2013, ISBN: 978-3-527-32899-4
- Clemens Posten, Integrated Bioprocess Engineering, 2018, DOI:10.1515/9783110315394

M 4.11 Module: Biotechnology [M-CIWVT-101143]

Responsible: Prof. Dr. Jürgen Hubbuch
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
12	Grade to a tenth	Each winter term	2 terms	German	4	4

Mandatory			
T-CIWVT-103668	Biotechnology	3 CR	Henke
T-CIWVT-103669	Biotechnology	9 CR	Perner-Nochta

Competence Certificate
The module comprises two graded learning controls:

1. written examination lastin 90 minutes.
2. practical work/ protocol/ presentation

- project plan
- project work
- poster presentation/ talk
- report

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Conditions
The following conditions have to be fulfilled:

1. You have to fulfill one of 8 conditions:
    1. The module M-CIWVT-101138 - Lab Work Process Engineering must have been passed.
    2. The module M-CIWVT-101139 - Process Machines must have been passed.
    3. The module M-CIWVT-101722 - General Chemistry and Chemistry of Aqueous Solutions must have been passed.
    4. The module M-CIWVT-101964 - Laboratory Work in General and Inorganic Chemistry must have been passed.
    5. The module M-CHEMBIO-101115 - Organic Chemistry for Engineers must have been passed.
    6. The course T-CIWVT-103331 - Laboratory Work: Biology for Engineers must have been passed.
    7. The module M-CIWVT-106427 - Basic Practical Course in Natural Sciences must have been passed.
    8. The module M-CIWVT-106500 - Basic Practical Course must have been passed.
2. You need to have earned at least 60 credits in your course of studies.

Competence Goal
Basic understanding of processes and synthesis of processes in biotechnologic production

lecture Bioanalytics:

The students can describe the selection and implementation of methods for the analysis of biomolecules. Students will be able to evaluate the advantages and limitations of the various methods with regard to their areas of application in biotechnological research in the context of various biomolecules (in particular DNA, RNA, proteins/enzymes, metabolites). Students are able to select suitable methods and experimental designs for their own (future) work in the context of qualitative and quantitative bioanalytics.

Lecture „Management of scientific projects“ and exercises:
The students are able to conduct literature research on their own, design own experiments, evaluate their own data, write own scientific texts. They can plan their own small project regarding time and finances required and prepare a project plan as well as present it. They can prepare a (scientific) poster and present it.

Project Work:
The students are able to do own scientific research and practical work in the field of biotechnology. They know how to analyse their own gained data and prepare a project report.

Content
lecture Bioanalytics:

The lecture will introduce the most important methods for the analysis of biomolecules. According to the genetic information flow in the cell, methods of bioanalysis for DNA, RNA, proteins/enzymes and metabolites are taught. The theory and application of methods are illustrated using research examples. Methods focus on sequencing technologies, protein analysis, enzymology, chromatographic methods and the basics of mass spectrometry and NMR. Other microscopy methods and reporter systems for analyzing biomolecules in whole cells are also presented.

Lecture „Management of scientific projects“ and exercises:
The lecture covers literature research, design of experiments, data evaluation, scientific writing and project management; in parts it is software-based and carried out in an electronic classroom.

Practical excercises cover literature research, preparation of a project plan, presentation of the project plan, preparation of a poster, presentation of the poster

Procect Work:
Accomplishment of autonomous investigation and practical work in the field of biotechnology, preparation of a project report

Module grade calculation
weighted mean based on LP.

Workload
Bioanalytics:

- Lectures and Exercises: 30 h
- Homework: 30 h
- Exam Preparation: 30 h

Management of scientific projects:

- Lectures and Exercises: 45 h
- Homework: 45 h

Lab Work:

- Lab: 80 h
- Homework: 10 h

Project:

- Lab: 10 h
- Homework: 80 h

Literature
Will be announced.

M 4.12 Module: Catalysts for the Energy Transition [M-CIWVT-106030]

Responsible: TT-Prof. Dr. Moritz Wolf
Organisation: KIT Department of Chemical and Process Engineering
Part of: Mandatory Elective Courses (Usage from 10/1/2022)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each summer term	1 term	English	4	1

Mandatory			
T-CIWVT-112214	Catalysts for the Energy Transition	5 CR	Wolf

Competence Certificate
Learing control ist an oral exam, duration approx. 20 minutes.

Prerequisites
None.

Competence Goal
The students are able to explain properties and basic relationships in catalysis, know the preparation methods of heterogeneous catalysts and are familiar with characterisation techniques and their interpretation. They understand the interlink between the macroscopic and microscopic structural properties and activity, selectivity and stability based on exemplary sustainable applications of heterogeneous catalysis for the energy transition.

Content
Lecture:

- Introduction to catalysis: classification, significance and terminology
- Aspects of the (global) energy transition
  - Renewable energy sources
  - Hydrogen economy: production, purification, storage and transportation
- Components, preparation, characterisation and deactivation of heterogeneous catalysts for the following application examples
  - Production and conversion of synthesis gas
  - Valorisation of carbon dioxide: (point) sources, Power-to-X, sustainable chemicals
  - Chemical hydrogen storage
- Literature studies on catalyst design
  - Structure-reactivity and structure-stability relations
  - Alternative catalyst concepts

Practice:

- Processing and interpretation of data from catalyst characterisation
- Use cases from inand science

Module grade calculation
The module grade is the grade of oral examination.

Workload

- Attendance time: Lectures and exercises 45 h
- Self-study: 50 h
- Exam preparation: 55 h

Literature
Announced in lectures/on slides.

Fundamentals:

- I. Chorkendorff, J. W. Niemantsverdriet, *Concepts of Modern Catalysis and Kinetics*, 2003, Wiley.
- G. Ertl (Ed.), *Handbook of Heterogeneous Catalysis*, 2008, Wiley.

M 4.13 Module: Chemical Process Engineering [M-CIWVT-101133]

Responsible: Prof. Dr.-Ing. Gregor Wehinger
Organisation: KIT Department of Chemical and Process Engineering
Part of: Fundamentals of Process Engineering

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	3	2

Mandatory			
T-CIWVT-101884	Chemical Process Engineering	6 CR	Wehinger

Competence Certificate
Learning control is a written examination lasting 120 minutes.

Prerequisites
None

Competence Goal
Students can analyse and design reactors for chemical and enzymatic-biochemical conversions in homogeneous phase. They are able to promote the formation of a certain desired product in multi-step reactions, when parallel and consecutive steps can yield further products. Furthermore, students can apply balances of energy to identify conditions of safe reactor operation when exo- and endothermic reactions are run.

Content
Application of mass and energy balances for the analysis and design of ideal reactors for single-phase conversions, and for the identification of optimum operation conditions.

Module grade calculation
grade of the written examination

Workload

- Attendance time: lectures and exercises: 60 h
- self-study: 60 h
- preparation of examination. 60 h

Recommendation
Courses of 1st - 4th semester

Literature

- Skript Chemische Verfahrenstechnik I, https://ilias.studium.kit.edu
- G.W. Roberts: Chemical Reactions and Chemical Reactors, Wiley VCH 2009
- O. Levenspiel: Chemical Reaction Engineering, John Wiley & Sons Inc. 1998

M 4.14 Module: Chemical Reaction Engineering [M-CIWVT-106825]

Responsible: Prof. Dr.-Ing. Gregor Wehinger
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work (Usage from 10/1/2024)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
12	Grade to a tenth	Each winter term	2 terms	German	4	1

Mandatory			
T-CIWVT-113695	Chemical Reaction Engineering - Exam	6 CR	Wehinger
T-CIWVT-113696	Chemical Reaction Engineering - Project Work	6 CR	

M 4.15 Module: Circular Economy [M-CIWVT-105995]

Responsible: Prof. Dr.-Ing. Dieter Stapf
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work (Usage from 10/1/2022)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
12	Grade to a tenth	Each winter term	2 terms	German	4	2

Mandatory			
T-CIWVT-112172	Circular Economy - Oral Exam	8 CR	Stapf
T-CIWVT-112173	Circular Economy - Project Work	4 CR	Stapf

Competence Certificate
The learning control consists of two partial achievements:

1. Oral exam on lectures, exercises and case studies, duration approx. 30 minutes.
2. Project work, exmaination of another type. The term paper and the presentation of the results are graded.

Prerequisites
Participation in the Specialization/ Project Work is only possible if the following achievements have been made:

- At least 60 credits
- At least one lab

Modeled Conditions
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your course of studies.

Competence Goal
The students understand important material systems and essential process steps of the provision and recycling of mineral and metallic raw materials and anthropogenic carbon. With the aim of closing cycles, they can use methods of process evaluation, such as analysis and assessment of process chains using efficiency indicators. To do this, students work on increasingly complex case studies in a team using scientific methods and finally apply these methods during project work.

Content
Introduction to transition in resources and technologies towards a sustainable circular economy. Knowledge acquisition in system analysis, in process efficiency assessment and in sustainability evaluation. Motivation for process engineering research and development in the field of sustainable raw material supply of a climate-neutral society:

- Material flow and process knowledge of the primary and the recycling industries
- Methodological knowledge (business management basics of relevance, material flow analysis, determination of performance indicators)
- Independent scientific work (application of knowledge, analysis, assessment) in case studies / as project work.

Module grade calculation
The module grade is the CP-weighted average of the two partial achievements.

Workload
Attendance time:

- Lectures and exercises: 45 h
- Project work: 80

Self-study:

- Wrap up lectures: 45 h
- Wrap up case studies: 60 h
- Preparation term paper and presentation: 40 h

Exam preparation: 90 h

M 4.16 Module: Computational Methods [M-CIWVT-101956]

Responsible: Prof. Dr. Oliver Thomas Stein
Organisation: KIT Department of Chemical and Process Engineering
Part of: Fundamentals of Mathematics and Natural Sciences

Credits	Grading scale	Duration	Language	Level	Version
8	Grade to a tenth	2 terms	German	3	1

Mandatory			
T-MATH-102250	Introduction to Informatics and Algorithmic Mathematics - Exam	5 CR	Dörfler, Krause
T-CIWVT-101876	Application of Numerics in Engineering	3 CR	Stein

Competence Certificate
The learning control consists of two partial achievements:

1. written examination lasting 75 minutes.
2. oral examination lasting approx. 10 minutes.
   Students must have understood knowledge about the content of the task and its solution and be able to reproduce it in their own words.

Prerequisites
None

Competence Goal
Higher programming languages, design and description of algorithms, basic algorithms from mathematics and computer science, implementation of mathematical concepts on computers, modeling and simulation of scientific and technical problems.

Students are able to solve engineering problems applying numerical methods, to solve a problem within a fixed time-frame in a team and to show their results in a concludin presentation.

Content
The course offers the basics to advanced studies. Key concepts of the lectures are: structured program design, iteration, recursion, data structures (in particular: arrays), procedural programming with functions and methods, developing application-oriented programs. In computer labs, the mathematical concepts will be implemented.

Fundamentals to solve problems in process engineering by applying numerical methods.

Module grade calculation
The module grade ist the grade of the written exam.

Workload
Lecture:

- attendance time: 60 h
- self-study: 90 h

practical work, programming:

- attendance time: 10 h
- self-study: 80 h

M 4.17 Module: Control Engineering and System Dynamics [M-CIWVT-106308]

Responsible: Prof. Dr.-Ing. Thomas Meurer
Organisation: KIT Department of Chemical and Process Engineering
Part of: Fundamentals of Scientific Engineering (Usage from 4/1/2023)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each summer term	1 term	German	3	1

Mandatory			
T-CIWVT-112787	Control Engineering and System Dynamics	5 CR	Meurer

Competence Certificate
Learning control is a written exam, duration120 minutes.

Prerequisites
None

Competence Goal
Provision of linear system theory and simple controls for technical systems to CIW and BIW engineers.

Content
Dynamic systems, Properties of important systems and modeling, Stability, Controller design, Estimation

Module grade calculation
The module grade is the grade of the written exam.

Workload
Attendance Time:

- Lectures:30 hrs.
- Exercises 15 hrs.

Self-study:

- Preparation and wrap-up lectures sample course: 60 hrs.
- Exam preparation: 45 hrs.

Literature

- Meurer: Regelungstechnik und Systemdynamik, Vorlesungsskript.
- Aström, R. Murray: Feedback Systems, Princeton University Press, 2008.
- C.T. Chen: Linear System Theory and Design, Oxford Univ. Press, 1999.
- Lunze: Regelungstechnik I, Springer-Verlag, 2010.
- Lunze: Regelungstechnik II, Springer-Verlag, 2010.
- H. Unbehauen: Regelungstechnik I, Vieweg, 2005.

M 4.18 Module: Data-Driven Modeling with Python [M-CIWVT-106534]

Responsible: Dr.-Ing. Frank Rhein
Organisation: KIT Department of Chemical and Process Engineering
Part of: Interdisciplinary Qualifications (Usage from 10/1/2023)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
3	pass/fail	Each winter term	1 term	German	3	1

Mandatory			
T-CIWVT-113190	Data-Driven Modeling with Python	3 CR	Rhein

M 4.19 Module: Electrochemical Energy Technologies [M-ETIT-105690]

Responsible: Prof. Dr.-Ing. Ulrike Krewer
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: Mandatory Elective Courses (Usage from 4/1/2021)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each winter term	1 term	English	4	1

Mandatory			
T-ETIT-111352	Electrochemical Energy Technologies	5 CR	Krewer

Competence Certificate
Type of Examination: Written exam
Duration of Examination: 120 minutes

Prerequisites
none

Competence Goal
Students have well-grounded knowledge of electrochemical energy technologies for conversion and storage of electrical energy. They know the working principle of fuel cells, batteries and electrolysers and their components. They understand the underlying electrochemical, electrical and physical processes, and the resulting loss processes as function of operation and cell design. Participation in the course puts them in a position to build cells and evaluate and understand their performance and operating behavior. Furthermore, they can select the appropriate electrochemical cell for a given application, analyse, interpret and operate it.

Content
Lecture:

- Application and operating principle of fuel cells, batteries and elec-trolysers
- Thermodynamics, potential and voltage of electrochemical cells
- Kinetics and electrochemical reactions
- Transport processes in electrochemical cells
- Composition and types of fuel cells and electrolysers
- Composition and types of batteries
- Operation and characterization of electrochemical cells
- Electrochemical systems

Exercise:

- Application of the theory to batteries and fuel cells including example calculations.

Module grade calculation
The module grade is the grade of the written exam.

Workload

1. Attendance in lectures: 30 * 45 Min. = 22,5 h
2. Attendance in excercises: 15 * 45 Min. = 11,25 h
3. Preparation/follow-upder Vorlesungen und Übungen: 76,25 h (approx. 1,75 h per lecture/exercise)
4. Preparation of and attendance in examination: 40 h

In total: 150 h = 5 LP

M 4.20 Module: Elementary Physics [M-PHYS-100993]

Responsible: Prof. Dr. Wolfgang Wernsdorfer
Organisation: KIT Department of Physics
Part of: Fundamentals of Mathematics and Natural Sciences

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
7	Grade to a tenth	Each winter term	1 term	German	3	2

Mandatory			
T-PHYS-101577	Elementary Physics	7 CR	Wernsdorfer

Competence Certificate
See components of this module.

Prerequisites
The module *Advanced Mathematics I* has to be passed.

Modeled Conditions
The following conditions have to be fulfilled:

1. The module M-MATH-100280 - Advanced Mathematics I must have been passed.

Recommendation
Contents of *Engineering Mechanics: Dynamics*

Literature

- P. Tipler, Physik für Wissenschaftler und Ingenieure, Springer 2015
- E. Hering, R. Martin, M. Stohrer, Physik für Ingenieure, Springer 2016

M 4.21 Module: Energy and Environmental Engineering [M-CIWVT-101145]

Responsible: Prof. Dr. Reinhard Rauch
Prof. Dr.-Ing. Dimosthenis Trimis
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
12	Grade to a tenth	Each winter term	2 terms	German	4	4

Mandatory			
T-CIWVT-103527	Energy and Environmental Engineering Project Work	4 CR	Rauch, Trimis
T-CIWVT-108254	Energy and Environmental Engineering	8 CR	Rauch, Trimis

Competence Certificate
The learning control consists of two partial achievements:

- Written examination, duration 120 minutes
- Examination of another type, project work

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Conditions
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your course of studies.

Competence Goal
The students will be able to discuss, analyze and compare applications in energy engineering and environmental protection (primary/secundary means, efficiency, raw materials etc.).

Content
Introduction into production of fuels (chemical energy carriers) from fossil and renewable sources and their use, prevention of formation of pollutants, removal of pollutants, review and selected examples, fundamentals and applications of high temperature energy conversion.

Module grade calculation
The module grade is the CP-weighted average of the two partial achievements.

Workload
Attendance time: 60 h
Excoursions: 20 h
Self-Study: 90 h
Project work: 90 h
Exam preparation: 100 h

Recommendation
Courses of 1st - 4 th semester

Literature
lecture notes and specific literature indicated during lectures, additionally:
J. Warnatz, U. Maas, R.W. Dibble: Combustion, Spinger Verlag, Berlin, Heidelberg 1997
G. Schaub, T. Turek: Energy Flows, Material Cycles and Global Development, Springer Verlag, Berlin 2011
M. Crocker (Hrsg.): Thermochemical Conversion of Biomass to Liquid Fuels and Chemicals, Springer-Verlag, Berlin 2010
E. Rebhan (Hrsg.): Energiehandbuch – Gewinnung, Wandlung und Nutzung von Energie, Springer-Verlag, Berlin 2002
B. Elvers (Hrsg.): Handbook of Fuels, Wiley-VCH, Weinheim 2008

M 4.22 Module: Energy Process Engineering [M-CIWVT-101136]

Responsible: Dr. Frederik Scheiff
Prof. Dr. Oliver Thomas Stein
Organisation: KIT Department of Chemical and Process Engineering
Part of: Mandatory Elective Courses

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each winter term	1 term	German	4	1

Mandatory			
T-CIWVT-101889	Energy Process Engineering	5 CR	Scheiff, Stein

Competence Certificate
Learning control is a written examination lasting 150 min.

Prerequisites
None.

Competence Goal
Students learn to classify energy and the different appearances of energy,knowledge of the different energy sources and the national and global energy demand,knowledge and solution of simple tasks in energy conversion with different conversion methods

Content
Basics: Concepts, forms of appearance of energy, systems and balances

Process Engineering: Energy carriers, energy conversion, energy transportation and storage, decentral energy systems

Ecology / Economy / Policy

Module grade calculation
Grade of the written examination

Workload
lectures: 56 h

self-study: 50 h

preparation of examination: 44 h

Recommendation
Thermodynamik

Literature

- In der Vorlesung angegebene Litaratur, zusätzlich:
- P. Stephan, K. Schaber, K. Stephan, F. Mayinger: Thermodynamik, Springer Verlag, Berlin 2006
- J. Warnatz, U. Maas, R.W. Dibble: Combustion, Spinger Verlag, Berlin, Heidelberg 1997
- G. Schaub, T. Turek: Energy Flows, Material Cycles and Global Development, Springer Verlag, Berlin 2011
- VDI-Gesellschaft Energietechnik (Hrsg.): Energietechnische Arbeitsmappe, Springer-Verlag , Berlin 2000
- M. Crocker (Hrsg.): Thermochemical Conversion of Biomass to Liquid Fuels and Chemicals, Springer-Verlag, Berlin 2010
- E. Rebhan (Hrsg.): Energiehandbuch – Gewinnung, Wandlung und Nutzung von Energie, Springer-Verlag, Berlin 2002
- B. Elvers (Hrsg.): Handbook of Fuels, Wiley-VCH, Weinheim 2008

M 4.23 Module: Engineering Mechanics: Dynamics [M-CIWVT-101128]

Responsible: TT-Prof. Dr. Christoph Klahn
Organisation: KIT Department of Chemical and Process Engineering
Part of: Fundamentals of Scientific Engineering

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each winter term	1 term	German	3	2

Mandatory			
T-CIWVT-101877	Engineering Mechanics: Dynamics, Exam	5 CR	Klahn
T-CIWVT-106290	Engineering Mechanics: Dynamics	0 CR	Klahn

Competence Certificate
The learning control consists of two partial achievements

1. Completed coursework/ prerequisite
2. a written examination lasting 120 minutes

Prerequisites
None

Competence Goal
Students possess basic knowledge in Engineering Mechanics/Dynamics, they are familiar with problem solving and able to use this knowledge for theoretical analysis and solution of practical engineering problems.

Content
Kinematics and dynamics of mass point;
Kinematics and dynamics of rigid body;
The principle of linear momentum, angular momentum, work and energy theorem;
Oscillation of the systems with one or more freedom degrees;
Relative movement of mass point;
Methods in analytical Mechanics, Lagrange equation;

Module grade calculation
grade of the written examination. Superior preliminary test can be credited according to §7,13 SPO.

Workload
lectures and exercises: 56 h
self study: 56 h
preparation for examination 40h

Recommendation
modules of 1. -2. semester.

Literature

- Gross/Ehlers/Wriggers/Schröder/Mülle: Formeln und Aufgaben zur Technischen Mechanik 3, 13. Auflage https://doi.org/10.1007/978-3-662-66190-1
- Kühlhorn/Silber: Technische Mechanik für Ingenieure, Hüthig 2000
- Hibbler: Dynamik,Pearson 2006, 10. Auflage
- Wriggers/Nackenhorst/Beuermann/Spiess/Löhnert: Technische Mechanik kompakt, Teubner2006

M 4.24 Module: Engineering Mechanics: Statics and Strength of Materials [M-CIWVT-104006]

Responsible: Prof. Dr. Norbert Willenbacher
Organisation: KIT Department of Chemical and Process Engineering
Part of: Fundamentals of Scientific Engineering (Usage from 10/1/2017)

Credits	Grading scale	Duration	Language	Level	Version
10	Grade to a tenth	2 terms	German	3	4

Mandatory			
T-CIWVT-103687	Engineering Mechanics: Statics and Strength of Materials	10 CR	Hochstein, Oelschlaeger, Willenbacher

Competence Certificate
Learning Control is a written examination lasting 90 minutes.

Prerequisites
None

Content
forces and momentums, static balance, bearings, frameworks, tension/ elongagion in general (3D), internal force variables of beams, friction, principle of virtual work, tension/ elongation in rods, hypothesis of stabiligy, torsion, buckling

Module grade calculation
The module grade ist the grade of the written exam.

Workload
Attendance time: 120 h
Self-study: 120 h
Exam preparation: 60 h

Literature

- ross/Hauger/Schnell/Schröder: Technische Mechanik
  Bd. 1: Statik, Springer 2004, 8. Auflage;
  Bd. 2: Elastostatik Springer (2002) 7. Auflage,
- Hibbeler:
  Technische Mechanik 1- Statik, Pearson (2005), 10. Auflage;
  Technische Mechanik 2 - Festigkeitslehre, Pearson (2006) 5. Auflage
  Mechanics of Materials, Pearson (2004),
- Kühhorn/Silber: Technische Mechanik für Ingenieure, Hüthig (2000)
- Wriggers/Nackenhorst/Beuermann/Spiess/Löhnert: Technische Mechanik kompakt, Teubner (2006)
- Müller/Ferber: Technische Mechanik für Ingenieure (mit CD-Rom), Fachbuchverlag Leipzig (2005)
- Richard/Sander: Technische Mechanik - Festigkeitslehre, Vieweg (2006)

M 4.25 Module: Ethics and Global Material Cycles [M-CIWVT-101149]

Responsible: Prof. Dr. Reinhard Rauch
Organisation: KIT Department of Chemical and Process Engineering
Part of: Interdisciplinary Qualifications

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
3	pass/fail	Each summer term	1 term	German	3	4

Mandatory			
T-CIWVT-112372	Global Material Cycles	1 CR	Rauch
T-CIWVT-112373	Ethics	2 CR	Hillerbrand

Competence Certificate
Examination consists of

1. Ethics: regular attendance at lectures and exercises; short presentation; written elaboration
2. Global Material Cycles: written exmaination (ungraded), duration 60 minutes.

Prerequisites
None

Competence Goal
Basic understanding of: Examples of global material cycles and effects caused by human societies, Important limitations for material and energy conversion by human societies (civilization, industrialization), Basic knowledge in engineering ethics, Competences in "handling" with ethical questions for engineers

Content
Bio-geosphere as environment for human life. selected examples of global material cycles. limits of man-made material and energy conversion. sustainability as term. priority rules for sustainability and for shaping the future. technology assessment, engineering codes. responsibility individual, collective, corporate

Workload

- lectures and exercises: 15 h
- homework: 45 h
- preparation of examination: 30 h

Literature

- I. v. d. Poel, L. Royakkers: Ethics, Technology and Engineering: An Introduction, Wiley-Blackwell 2011
- H. Lenk, M. Maring: Natur-Umwelt-Ethik, LIT Verlag Münster 2003
- G. Schaub, Th. Turek: Energy Flows, Material Cycles, and Global Development - A Process Engineering Approach to the Earth System, Springer Verlag Berlin 2010

M 4.26 Module: Fluiddynamics [M-CIWVT-101131]

Responsible: Prof. Dr.-Ing. Hermann Nirschl
Organisation: KIT Department of Chemical and Process Engineering
Part of: Thermodynamics and Transport Processes

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each summer term	1 term	German	3	2

Mandatory			
T-CIWVT-101882	Fluiddynamics, Exam	5 CR	Nirschl
T-CIWVT-101904	Fluiddynamics, Tutorial	0 CR	Nirschl

Competence Certificate
Learning control consists of:

1. written exam of 120 minutes duration according to § 4 (2) SPO.

2. Non-graded precondition for participation according to § 4 (3) SPO:
eihter 4 of 5 compulsory exercises have to be approved
or a group presentation has to be given during the lecture

Prerequisites
none

Competence Goal
The students have the ability to analyse, to structure and to describe problems in fluid dynamics. The also can use the specific methods for the calculation of specific flows with the studied tools. Besides they are able to discuss the different procedures critically.

Content
Fundamentals of fluid dynamics: hydro static, aerostatik, compressible and incompressible flows, turbulent flows, Navier-Stokes equations, boundary layer theory

Module grade calculation
grade of the written examination

Workload
lecture 2 SWH, exercises 2 SWH: 56 h
self-study: 56 h
preparation of examination: 56 h

Recommendation
Courses of 1st - 3rd semester

Literature
Nirschl, Zarzalis: Skriptum Fluidmechanik

Zierep: Grundzüge der Strömungslehre, Teubner 2008

Prandtl: Führer durch die Strömungslehre, Teubner 2008

M 4.27 Module: Food Biotechnology [M-CIWVT-101126]

Responsible: Dr.-Ing. Nico Leister
Organisation: KIT Department of Chemical and Process Engineering
Part of: Mandatory Elective Courses (Usage until 9/30/2025)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each winter term	1 term	German	3	2

Mandatory			
T-CIWVT-101898	Food Biotechnology	5 CR	Leister

Competence Certificate
Learning control is a written examination lasting 120 minutes

Prerequisites
None

Competence Goal
The students will know about basics to secure food (and life science product) safety.

Content
The students will learn about microorganisms being important for food safety and biotechnological food production. Based on some historical products student will learn modern process technology. Technologies to secure food (and life science product safety) will be teached. Using actual case studies students will learn how food process engineers work. Process and product design will be rehearsed and practised in exercises and commented students' presentations.

Module grade calculation
The module grade ist the grade of the written examination.

Workload
Attendance time/ lectures and exercises:

- 30 hrs self-study using the materials provided in ILIAS.
- 30 hrs lectures and exercises: discussion of the independently prepared learning content

Selbststudium:

- 50 hrs wrap-up of lectures and exercises
- 40 hrs exam preparation

Recommendation
Independent preparation of the classroom sessions using material in the ILIAS course (videos, worksheets, sample assignments) is essential for participation.

Literature

- Lebensmittelmikrobiologie (J. Krämer, UTB Ulmer)
- Lebensmittelbiotechnologie (Heinz Rutloff, Akademie Verlag)
- Lebensmittelverfahrenstechnik, Teil A (Schuchmann, Wiley)
- Lebensmittelbiotechnologie: eine Einführung (P. Czermak, GIT)
- Lebensmittelbiotechnolige (R. Heiss, Springer)
- Lexikon der Lebensmitteltechnologie (B. Kunz, Springer)
- Taschenatlas der Biotechnologie und Gentechnik (Rolf D. Schmid, Wiley)
- Mikroorganismen in Lebensmitteln (H. Keweloh, Pfanneberg)
- Mikrobiologie der Lebensmittel (G. Müller, H. Weber, Behr's)
- Grundzüge der Lebensmitteltechnik (H.-D. Tscheuschner, Behr's)
- Vorlesungsfolien, Skripte mit Übungsfragen, Vorlesungsvideos (ILIAS), FAQ zum Vorlesungsstoff und bereit gestellten Materialien (MS Teams)

Base for
special subject food technology

M 4.28 Module: Food Technology [M-CIWVT-101148]

Responsible: Dr.-Ing. Nico Leister
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work

Credits	Grading scale	Duration	Language	Level	Version
12	Grade to a tenth	2 terms	German	4	5

Mandatory			
T-CIWVT-103528	Food Technology	5 CR	Leister
T-CIWVT-103529	Food Technology Project Work	7 CR	Leister

Competence Certificate
The learning control consists of two partial achievements:

1. Oral examination (in the group) lasting approx. 45 minutes
2. Project work (presentation and report of results)

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Conditions
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your course of studies.

Competence Goal
The students are able to design and evaluate simple food products. They learned to define, focus and solve tasks milestone-oriented as an interdisciplinary team. The gained in depth insight in the influence of recipe and process parameters on food quality parameters using a selected product produced on pilot scale. They will be able to present targets and results of their team project in a clear, conceptual and comprehensible manner.

Content
Lecture: Basic introduction to the design and quality assurance of selected foods;
project work (team work): definition, production and evaluation of selected products as a team; presentation and defense of the project and its results incl. degustation in a bigger group;
field trip to industrial production plants

Module grade calculation
The module grade is the CP-weighted average of the two partial achievements.

Workload

- Attendance time: 115 hrs
  (lecture 2 SWS, project work 5 SWS)
- self study: 185 hrs
  (project design, project meetings, research on project work, lab, preparation and wrap-up)
- exam preparation: 60 hrs

Literature
Will be offered within the lecture, depending on products available

M 4.29 Module: Formulation and Characterisation of Energy Materials [M-CIWVT-106700]

Responsible: Dr.-Ing. Claude Oelschlaeger
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work (Usage from 10/1/2024)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
12	Grade to a tenth	Each winter term	2 terms	German	4	1

Mandatory			
T-CIWVT-113478	Formulation and Characterisation of Energy Materials - Exam	8 CR	Oelschlaeger
T-CIWVT-113479	Formulation and Characterisation of Energy Materials - Project Work	4 CR	Oelschlaeger

Competence Certificate
The learning control consists of two partial achievements:

1. project work (teamwise)
2. oral examinations (courses)

The oral examinations have to be passed as a precondition for project work

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Conditions
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your course of studies.

Competence Goal
Basic knowledge about the design of complex fluids based on dispersions or emulsions by chemical engineering processes. Fundamental comprehension of applications and working properties, flow behavior and colloidal stability of disperse systems. Applying this knowledge in context of their project work. They gather experience in teamoriented problem solving.

Content
Representation of a systematic of the relation between the quality aspects of products and their physico-chemical properties. Furthermore, these properties are generated in the respective production processes. This systematics is fundamentally presented in the lecture "Fabrication and rheological characterization of energy materials".The application of this systematics is practiced on specific case studies.

M 4.30 Module: Fundamentals of Heat and Mass Transfer [M-CIWVT-101132]

Responsible: Dr.-Ing. Benjamin Dietrich
Prof. Dr.-Ing. Thomas Wetzel
Organisation: KIT Department of Chemical and Process Engineering
Part of: Thermodynamics and Transport Processes

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
7	Grade to a tenth	Each summer term	1 term	German	3	2

Mandatory			
T-CIWVT-101883	Fundamentals of Heat and Mass Transfer	7 CR	Dietrich, Wetzel

Competence Certificate
Learning control is a written examination lasting 180 minutes.

Prerequisites
none

Competence Goal
Elaborating the fundamental physics and laws of heat and mass transfer and at the provision of knowledge about of the methodological tools required for solving engneering tasks in these fields.

Content
Heat Transfer: Definitions - System, balances and conservation equations, kinetics of heat transfer, heat conduction, heat radiation, heat transfer between solids and moving fluids, dimensionless numbers.

Mass Transfer: Kinetics of mass transfer, equilibrium, diffusion and mass flow, Knudsen- and multi-component diffusion, Lewis analogy of heat and mass transfer.

Module grade calculation
Grade of the written examination

Workload

- lecture: 75 h
- self-study: 55 h
- preparation of examination: 80 h

Recommendation
Courses of 1st - 3rd semester, especially fundamentals of themodynamics.

Literature
v. Boeckh, Wetzel: Wärmeübertragung, Springer 2009

M 4.31 Module: Fundamentals of Refrigeration [M-CIWVT-104457]

Responsible: Prof. Dr.-Ing. Steffen Grohmann
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
12	Grade to a tenth	Each winter term	2 terms	German	3	4

Mandatory			
T-CIWVT-109117	Fundamentals of Refrigeration, Oral Examination	6 CR	Grohmann
T-CIWVT-109118	Fundamentals of Refrigeration, Project Work	6 CR	Grohmann

Competence Certificate
The learning control consists of two partial achievements:

1. Project work/ presentation, examination of another type
2. Oral exam of about 30 minutes duration

The project work is a prerequisite for the oral examination.

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Conditions
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your course of studies.

Competence Goal
Students are able to explain and apply the fundamentals of refrigeration to various refrigeration technologies. They are able to describe properties of refrigerants and working fluids, and to assess their environmental impact based in different criteria. The students can develop concepts of refrigeration and heat pump processes using phase diagrams and fluid property models, and they are able to explore the energy consumption based on first and second law analyses. They are able to design various circuit configurations, to dimension and select refrigeration compressors and heat exchangers, and to design suitable control systems.

Content
Introduction to the fundamentals of refrigeration, phase diagrams, energy transformation based on first and second law analyses, refrigerants and working fluids including their environmental impact, design of common refrigeration and heat pump processes, major circuit components and process control.

Module grade calculation
The module grade is the CP-weighted average of the two partial achievements.

Workload
Attendance time: Lecture 2 SWS, Exercises 1 SWS: 45 h
Self-Study: 60 h
Exam Praparation: 75 h
Project work including presentation: 180 h

Recommendation
None

Literature

- Jungnickel, H., Agsten, R. und Kraus, W.E., 3. Auflage (1990), Verlag Technik GmbH, Berlin
- v. Cube, H.L. (Hrsg.), Lehrbuch der Kältetechnik Band 1 und 2, 4. Auflage (1997), C.F. Müller, Heidelberg
- Gosney, W.B., Principles of Refrigeration, Cambridge University Press, Cambridge, 1982
- Berliner, P., Kältetechnik Vogel-Verlag, Würzburg (1986 und frühere)
- Kältemaschinenregeln, Deutscher Kälte- und Klimatechnischer Verein (DKV) (Herausgeber)
- DKV-Arbeitsblätter für die Wärme- und Kältetechnik in: C.F. Müller Verlag, Hüthig Gruppe, Heidelberg, wird jeweils aktualisiert (Sept. 2008)

M 4.32 Module: General and Inorganic Chemistry [M-CHEMBIO-101117]

Responsible: Prof. Dr. Mario Ruben
Organisation: KIT Department of Chemistry and Biosciences
Part of: Fundamentals of Mathematics and Natural Sciences

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	3	1

Mandatory			
T-CHEMBIO-101866	General and Inorganic Chemistry	6 CR	Ruben

Competence Certificate
graded: written examination (150 min)

Prerequisites
none

Competence Goal
The students get a basic understanding of the inorganic chemistry. With the knowledge of the periodic table of the elements and basic knowledge of the chemical bond the students are able to describe different compounds and to estimate different reactivities.

Content
Structure of the matter, nuclear models, periodic table of the elements.The chemical bond. Structure of Metals, ion crystals, covalent bonds, metal complexes. Chemical reactions, chemical equilibrium, law of mass action, solubility product. Acids and bases, redox reactions

Module grade calculation
grade of the written examination

Workload
Lectures and exercises: 56h

Homework and preparation of examination: 94h

Literature
Mortimer, Müller (aktuelle Auflage): Chemie, Thieme Verlag

Riedel (aktuelle Auflage): Moderne Anorganische Chemie, de Gruyter Verlag

Hollemann, Wieberg (aktuelle Auflage): Lehrbuch der Anorganischen Chemie, de Gruyter Verlag

M. Binnewies, M. Jäckel, H. Willner, G. Rayner-Canham: Allgemeine und Anorganische Chemie, Spektrum Verlag 2004

C. E. Housecroft, A. G. Sharpe, Anorganische Chemie, Pearson Verlag 2006.

Base for
Anorganisch chemisches Praktikum

M 4.33 Module: Industrial Business Administration [M-WIWI-100528]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: Interdisciplinary Qualifications

Credits	Grading scale	Duration	Level	Version
3	pass/fail	1 term	3	1

Mandatory			
T-WIWI-100796	Industrial Business Administration	3 CR	Fichtner

Competence Certificate
The assessment of this course is a ungraded written examination (60 min) according to §4(2), 1 of the examination regulation.

Prerequisites
None

Competence Goal
Students are able to describe and differentiate legal forms for industrial enterprises.

Students will gain knowledge about different ways of financing to raise capital.

The students gain knowledge about the basics of financial accounting and are able to record and book performance and capital flows occurring in companies.

The students gain knowledge about different types of cost accounting and are able to apply them.

Students gain knowledge of the basics of investment planning and are able to evaluate investments economically.

The students gain knowledge about the basics of linear optimization and can solve simple optimization problems with the Simplex algorithm.

The students gain knowledge about basic marketing methods and can describe and differentiate them from each other.

The students gain knowledge about basic methods of project management and can apply them to practical examples.

Content

- Goals and basics
- Legal framework for industrial enterprises
- financial accounting
- cost accounting
- investment calculation
- optimisation
- network technique

Workload
The total workload for this course is approximately 90 hours.

M 4.34 Module: Industrial Organic Chemistry [M-CIWVT-101137]

Responsible: Prof. Dr. Reinhard Rauch
Organisation: KIT Department of Chemical and Process Engineering
Part of: Mandatory Elective Courses

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each winter term	1 term	German	3	1

Mandatory			
T-CIWVT-101890	Industrial Organic Chemistry	5 CR	Rauch

Competence Certificate
Learning control is a written examination of 120 min duration according to § 4 Abs. 2 SPO.

Prerequisites
Organic Chemistry

Competence Goal
Consolidate knowledge of organic materials and types of chemical reactions; understand logic relations between types of chemical reaction and technical processes, for selected examples; understand industrial material conversion pathways from raw materials to final products.

Content
Feedstock's for industrial processes of organic chemistry, industrial production of basic chemicals and intermediates using practical examples, digitalization and industry 4.0 in the chemical industry.

Mechanism during formation of synthetic macromolecules, production and properties of plastics and polymers, spectroscopic methods of analyzing organic molecules.

Module grade calculation
grade of the written examination

Workload
lecture: 60 h
self-study: 40 h
preparation of examination: 50 h

Literature
Handouts
Onken, Behr: Chem. Prozeßkunde, Wiley-VCH 1996
Arpe: Industrielle Org. Chemie, Wiley-VCH 2007
Brahm: Polymerchemie kompakt, Hirzel 2009
Tieke: Makromolekulare Chemie, Wiley-VCH 2014
Hesse u.a.: Spektroskop. Methoden in der OC, Thieme 2011

M 4.35 Module: Intensification of Bioprocesses [M-CIWVT-106444]

Responsible: Prof. Dr.-Ing. Dirk Holtmann
Organisation: KIT Department of Chemical and Process Engineering
Part of: Mandatory Elective Courses (Usage from 4/1/2025)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German	4	1

Mandatory			
T-CIWVT-112998	Intensification of Bioprocesses - Written Exam	6 CR	Holtmann

Competence Certificate
The learing controlis a written examination, duration: 90 minutes.

Prerequisites
None

Competence Goal
Technical and methodological competencies

Students will be able to:

- explain the concepts of process intensification
- describe different intensified processes quantitatively
- design and evaluate bioprocess engineering processes on the basis of PI
- analyse interdisciplinary problems at the interface of technology and biological systems and develop solutions to problems
- develop processes with optimal productivities using as little energy and raw materials as possible by combining the advantages of individual disciplines

Social and personal competence

The students will be able to:

- analyse the framework conditions for innovative processes and identify the essential aspects
- identify and evaluate (interdisciplinary) process options
- become independently familiar with new topics
- summarize complex scientific processes

Content
Companies in the chemical and biotechnology industries face particular challenges in times of rising raw material costs, increased competition, and shorter product life cycles.

Process-intensified operations offer great potential for resource efficiency by helping to save materials and energy. According to a generally accepted definition, "Process Intensification (PI) is a collection of revolutionary innovative principles (paradigm shifts) for equipment and processes that can lead to significant improvements in process or process chain efficiency, investment and operating costs, quality, waste, process safety (and other aspects)".

In recent years, process intensification methods have been increasingly used in bioprocess engineering (USP and DSP). These methods are the focus of this module. The following topics are covered in the module:

- Definition of PI, distinction between process optimization and PI.
- Examples from chemical engineering
- Intensified bioreactors and reactor selection (e.g., single-use technologies, rotating bed reactors, enzyme membrane reactors, biofilm reactors)
- PI through adapted operating modes (e.g., repeated fed-batch, perfusion, continuous processes, in situ product removal)
- Process intensification through immobilized enzymes and microorganisms
- Integration of chemo- and biocatalysis
- Electro biotechnological processes
- Photo biotechnological processes
- Use of ultrasound and microwaves for bioprocess intensification
- Bioprocesses in alternative reaction media
- Use of extremophilic organisms / unconventional production organisms

In all sub-areas, the focus is on the quantitative description of the intensified processes.

Module grade calculation
The module grade is the grade of the written exam.

Workload

- Attendance time: 60 hrs lectures and exercieses
- Preparation and wrap-up lectures: 80 hrs
- Exam preparation: 40 hrs

Recommendation
Fundamentals in bioprocess engineering are required.

Literature

- Frerich J. Keil (2017) Process intensification, doi.org/10.1515/revce-2017-0085
- Andrzej Stankiewicz, Tom van Gerven, Georgios Stefanidis (2019) The Fundamentals of Process Intensification, Wiley-VCH, Weinheim, ISBN: 978-3-527-32783-6
- VDI ZRE Publikationen: Kurzanalyse Nr. 24, Ressourceneffizienz durch Prozessintensivierung
- Burek et al (2022) Process Intensification as Game Changer in Enzyme Catalysis, https://doi.org/10.3389/fctls.2022.858706

Further literature recommendations will be announced.

M 4.36 Module: Introduction into Bioengineering [M-CIWVT-106433]

Responsible: Prof. Dr.-Ing. Alexander Grünberger
Prof. Dr.-Ing. Dirk Holtmann
Prof. Dr. Jürgen Hubbuch
Dr.-Ing. Ulrike van der Schaaf

Organisation: KIT Department of Chemical and Process Engineering

Part of: Mandatory Elective Courses (Usage from 4/1/2024)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each summer term	1 term	German	3	1

Mandatory			
T-CIWVT-113018	Introduction into Bioengineering	5 CR	Grünberger, Holtmann, Hubbuch, van der Schaaf

M 4.37 Module: Laboratory Course: Electrochemical Energy Technologies [M-ETIT-105703]

Responsible: Prof. Dr.-Ing. Ulrike Krewer
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: Mandatory Elective Courses (Usage from 10/1/2021)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each summer term	1 term	German	3	2

Mandatory			
T-ETIT-111376	Laboratory Course: Electrochemical Energy Technologies	5 CR	Röse

Competence Certificate
The examination consists of a different kind of graded assessment including four experiments. The overall impression is rated. To pass the module, all experiments must be successfully completed. In case of failure, the laboratory course has to be repeated completely.

Attendance at the safety briefing and participation in an entry colloquium is mandatory (ungraded).

Prerequisites
The prerequisite for admission to the module is that students have successfully passed the module “M-ETIT-105690 – Electrochemical Energy Technologies”.

Modeled Conditions
The following conditions have to be fulfilled:

1. The module M-ETIT-105690 - Electrochemical Energy Technologies must have been passed.

Competence Goal
The students deepen and strengthen their previously learned basic knowledge from the lecture "Electrochemical Energy Technologies". They understand how to experimentally analyze and quantitatively describe processes at interfaces under substate conversion by charge transfer. They are able to build electrochemical cells, understand their functional principle and are able to determine electrochemical processes. Furthermore, they are able to apply electrochemical measurement methods specifically to questions that are relevant for the analysis of modern energy converters and storage technologies.

They are also able to document and evaluate measured data and to critically discuss the results. They can competently carry out error estimations and confidently master computer-assisted data evaluation.

Content
Four selected electrochemistry experiments will be carried out:

Experiment 1: Determination of transport parameters of reversible systems

- Voltammetry at a stationary electrode
- Voltammetry at a rotating disc electrode

Experiment 2: Determination of hydrogen and oxygen overvoltage

Experiment 3: Construction of a polymer electrolyte membrane fuel cell

Experiment 4: Investigation of the self-constructed PEM fuel cell under various operating conditions

Module grade calculation
The module grade results of the assessment of the written reports. Details will be given during the lecture.

Workload
1. attendance in laboratory practical course: 4x 5 h (block course)

2. preparation / follow-up: 30 h

3. preparation of written reports: 100 h

M 4.38 Module: Material Science and Engineering [M-MACH-102567]

Responsible: Dr.-Ing. Johannes Schneider
Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals of Scientific Engineering

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each term	2 terms	German	3	1

Mandatory			
T-MACH-105148	Examination Material Science I & II	9 CR	Schneider

Competence Certificate
oral exam

Prerequisites
None

Competence Goal
The students are able to describe the relationship between atomic structure, microscopical observations, and properties of solid materials.

The students can describe the typical property profiles and can name applications for the most important engineering materials.

The students are able to describe standard materials characterization methods and can explain the evaluation of these methods. They can judge materials on base of the data obtained by these methods.

The students are able to describe the basic mechanisms of hardening for ferrous and non-ferrous materials and reflect these mechanisms using phase and TTT diagrams.

The students can interpret given phase, TTT or other diagrams relevant for materials science, gather information from them and can correlate them regarding the microstructure evolution.

The students can describe the phenomena correlated with materials science in polymers, metals and ceramics and depict differences.

The students know about standard materials characterization methods and are able to asses materials on base of the data obtained by these methods.

Content
Atomic structure and atomic bonds

Structures of crystalline and amorphous solids

Defects in crystalline solids

Alloys

Transport and transformation phenomena in the solid state
Corrosion

Wear

Mechanical properties
Testing of materials
Ferrous materials

Non-ferrous metals and alloys

Polymers

Engineering ceramics
Composites

Module grade calculation
grade of the oral exam

Workload
regular attendance: 90 hours
self-study: 180 hours

Learning type
lectures and exercices

Literature
W. Bergmann: Werkstofftechnik I + II, Hanser Verlag, München, 2008/9
M. Merkel: Taschenbuch der Werkstoffe, Hanser Verlag, München, 2008
R. Schwab: Werkstoffkunde und Werkstoffprüfung für Dummies, Wiley VCH, Weinheim, 2011
J.F. Shackelford; Werkstofftechnologie für Ingenieure, Pearson Studium, München, 2008 (E-Book)
J.F. Shackelford,: Introduction to Materials Science for Engineers. Prentice Hall, 2008
lecture notes and lab script

M 4.39 Module: Mechanical Design A [M-MACH-106527]

Responsible: Prof. Dr.-Ing. Tobias Düser
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Electrical Engineering and Information Technology
KIT Department of Mechanical Engineering

Part of: Fundamentals of Scientific Engineering (Usage from 10/1/2023)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
9	Grade to a tenth	Each winter term	1 term	German	3	3

Mandatory			
T-MACH-112984	Mechanical Design A	7 CR	Düser, Matthiesen
T-MACH-112981	Mechanical Design A, Workshop	2 CR	Düser, Matthiesen

Competence Certificate
See individual courses

Prerequisites
None

Competence Goal
In mechanical design, students acquire skills in analysis and synthesis using examples. These include both individual machine elements such as bearings or springs and more complicated systems such as gears or couplings. After completing the machine design theory, the students are able to apply the contents learned to other technical systems - even those not known from the lecture - by transferring the principles of action and basic functions learned from examples to other contexts. This enables students to independently analyze unknown technical systems and synthesize suitable systems for given problems.

Content
MD A

- Springs
- Technical Systems
- Bearings
- Sealings
- Component Joints
- Gears

Module grade calculation
The module grade ist the grade of the written exam.

Annotation
None

Workload
MKL A: Total workload: 240 h, thereof attendance 75 h, divided into lecture + exercise: 4 SWS -> 60 h as well as workshop: 1 SWS -> 15 h; self-study 165 h

Recommendation
None

Learning type
Lectures, exercises and semester-long workshops as well as project work

Literature
Grundlagen der Berechnung und Gestaltung von Maschinenelementen; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-22033-X oder Volltextzugriff über Uni-Katalog der Universitätsbibliothek

Grundlagen von Maschinenelementen für Antriebsaufgaben; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-29629-8

Base for
None

M 4.40 Module: Mechanical Design B-C [M-MACH-106528]

Responsible: Prof. Dr.-Ing. Tobias Düser
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Electrical Engineering and Information Technology
KIT Department of Mechanical Engineering

Part of: Mandatory Elective Courses (Usage from 10/1/2023)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
12	Grade to a tenth	Each winter term	2 terms	German	4	1

Mandatory			
T-MACH-112985	Mechanical Design B and C	6 CR	Düser, Matthiesen
T-MACH-112982	Mechanical Design B, Workshop	3 CR	Matthiesen
T-MACH-112983	Mechanical Design C, Workshop	3 CR	Matthiesen

Competence Certificate
See individual courses

Prerequisites
None

Competence Goal
In mechanical design, students acquire skills in analysis and synthesis using examples. These include both individual machine elements such as bearings or springs and more complicated systems such as gears or couplings. After completing the machine design theory, the students are able to apply the contents learned to other technical systems - even those not known from the lecture - by transferring the principles of action and basic functions learned from examples to other contexts. This enables students to independently analyze unknown technical systems and synthesize suitable systems for given problems.

Content
MD B

- Design
- Tolerances & Fittings
- Gear Transmission
- Clutches

MD C

- Bolt connections
- Dimensioning
- Electric Motors + Hydraulics

Module grade calculation
The module grade ist the grade of the written exam.

Annotation
None

Workload
MKL B: Total workload: 180 h, thereof attendance: 67.5 h, divided into lecture + tutorial: 3 SWS -> 45 h and workshop: 1.5 SWS -> 22.5; self-study 112.5 h

MKL C: Total workload: 180 h, of which attendance: 67.5 h, divided into lecture + exercise: 3 SWS -> 45 h as well as workshop: 1.5 SWS -> 22.5; self-study 112.5 h

Recommendation
None

Learning type
Lectures, exercises and semester-long workshops as well as project work

Literature
Grundlagen der Berechnung und Gestaltung von Maschinenelementen; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-22033-X oder Volltextzugriff über Uni-Katalog der Universitätsbibliothek

Grundlagen von Maschinenelementen für Antriebsaufgaben; Steinhilper, Sauer, Springer Verlag, ISBN 3-540-29629-8

Base for
None

M 4.41 Module: Mechanical Processing [M-CIWVT-101135]

Responsible: Prof. Dr.-Ing. Achim Dittler
Organisation: KIT Department of Chemical and Process Engineering
Part of: Fundamentals of Process Engineering

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	3	2

Mandatory			
T-CIWVT-101886	Mechanical Processing	6 CR	Dittler

Competence Certificate
The learning control is a written examination lasting 120 minutes.

Prerequisites
None

Competence Goal
Students have a basic understanding of properties & behavior of particulate systems in important engineering applications; they are able to use this understanding for calculations and design of selected processes.

Content

- Unit operations of mechanical processing - introduction and overview
- Particle size distribution - determination, depiction, conversion
- Forces on particles in flows
- Separating function - characterization of a separations process
- Fundamentals of mixing and stirring
- Introduction to dimensional analysis
- Characterizations of packings
- Capillarity in porous systems
- Flow through porous systems, fluidized bed
- Fundamentals of agglomeration
- Fundamentals of storage and conveyance

Module grade calculation
The module grade is the grade of the written exam.

Workload

- Attendance time: Lectures and exercises: 60 hrs
- Self-study: 45 hrs (about three hours per week)
- Preparation of examination: 75 hrs

Recommendation
Courses of 1st - 4th semester

Literature

- Dittler, Skriptum MVT
- Löffler, Raasch: Grundlagen der Mechanischen Verfahrenstechnik, Vieweg 1992
- Schubert, Heidenreich, Liepe, Neeße: Mechanische Verfahrenstechnik, Deutscher Verlag Grundstoffindustrie, Leipzig 1990
- Dialer, Onken, Leschonski: Grundzüge Verfahrenstechnik&Reaktionstechnik, Hanser Verlag 1986
- Zogg: Einführung in die Mechanische Verfahrenstechnik, Teubner 1993

M 4.42 Module: Mechanical Separation Technology [M-CIWVT-101147]

Responsible: Dr.-Ing. Marco Gleiß
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
12	Grade to a tenth	Each winter term	2 terms	German	4	3

Mandatory			
T-CIWVT-103448	Mechanical Separation Technology Exam	8 CR	Gleiß
T-CIWVT-103452	Mechanical Separation Technology Project Work	4 CR	Gleiß

Competence Certificate
The learning control consists of two partial achievements:

1. An oral individual examination with a duration of about 30 minutes for the lecture "Mechanical Separation Technology" and related exercises

2. Project work. Practical collaboration, written report and oral presentation of the results are rated.

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Conditions
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your course of studies.

Competence Goal
The students are able to explain the fundamental laws and the derived physical principles of the particle separation from liquids and not only to relate them to the principally suited separation apparatuses but also special variants. They have the ability to apply the relationship betwen product operation and design parameters to different separation techniques. They can analyse separation problems with scientific methods and give alternative problem solution proposals. The students are able to execute their fundamental and process knowledge practically to the example of beer brewing.

Content
Physical fundamentals, apparatuses, applications,strategies; characterisation of particle systems and slurries; pretreatment methods to enhance the separability of slurries; fundamentals, apparatuses and process technology of static and centrifugal sedimentation, flotation, depth filtration, crossflow filtration, cake forming vacuum and gas overpressure filtration, filter centrifuges and press filters; filter media; selection criteria and scale-up methods for separation apppartuses and machines; apparatus combinations; case studies to solve sparation problems.

Module grade calculation
The module grade is the CP-weighted average of the two partial achievements.

Workload
Lecture 3 SWS exercises 1 SWS:

- attendance time: 60h
- self-study: 80h
- examination preparation: 80h

project work

- attendance time and self-study: 140h

Literature
Anlauf: Script "Mechanische Separationstechnik - Fest/Flüssig-Trennung"

M 4.43 Module: Micro Process Engineering [M-CIWVT-101154]

Responsible: Prof. Dr.-Ing. Peter Pfeifer
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
12	Grade to a tenth	Each winter term	2 terms	German	4	3

Mandatory			
T-CIWVT-103666	Micro Process Engineering	7 CR	Pfeifer
T-CIWVT-103667	Micro Process Engineering	5 CR	Dittmeyer, Pfeifer

Competence Certificate
The learning control consists of three partial achievements:

1. Oral examination of about 25 minutes duration
2. project work

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Conditions
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your course of studies.

Competence Goal
The students are able apply the methods of process intensification by microstructuring of the reaction zone and are capable of analyzing the advantages and disadvantages while transferring given processes into microreactors. With knowledge of special production processes for micro reactors, students are able to design microstructured systems in terms of heat exchange and to analyze the possibilities of transferring processes from conventional technology into the microreactor with regard to heat transfer performance. They understand also how the mechanisms of mass transport and mixing interact in microstructured flow mixers, and are able to apply this knowledge to the combination of mixing and reaction. They can also analyze possible limitations in the process adaptation and are thus able to design microstructured reactors for homogeneous reactions appropriately. The students understand the significance of the residence time distribution for the conversion and selectivity and are capable of analyzing the interaction of mass transport by diffusion and hydrodynamic residence time in microstructured equipment in given applications.

Content
Basic knowledge of micro process engineering systems: fabrication of microstructured systems and interaction with processes, intensification of heat exchange and special effects by heat conduction, residence time distribution in reactors and peculiarities in microstructured systems, structured flow mixers (designs and characterization) and dimensioning of structured reactors with regard to heat and mass transfer.

Module grade calculation
The module grade is the CP-weighted average of the two partial achievements.

Workload

- Attendance time: Lectures and exercises 60 hrs
- Self-study: 60 hrs
- Exam preparation: 2 weeks/ 60 hrs
- Project work: 180 hrs

Literature
Scriptum (slides collection)

text books:

- Kockmann, Norbert (Hrsg.), Micro Process Engineering, Fundamentals, Devices, Fabrication, and Applications, ISBN-10: 3-527-31246-3
- Micro Process Engineering - A Comprehens (Hardcover), Volker Hessel (Editor), Jaap C. Schouten (Editor), Albert Renken (Editor), Yong Wang (Editor), Junichi Yoshida (Editor), 3 Bände, 1500 Seiten, Wiley VCH, ISBN-10: 3527315500
- Winnacker-Küchler: Chemische Technik, Prozesse und Produkte, BAND 2: NEUE TECHNOLOGIEN, Kapitel Mikroverfahrenstechnik S. 759-819, ISBN-10: 3-527-30430-4
- Emig, Gerhard, Klemm, Elias, Technische Chemie, Einführung in die chemische Reaktionstechnik, Springer-Lehrbuch, 5., aktual. u. erg. Aufl., 2005, 568 Seiten, ISBN-10: 3-540-23452-7 (Kapitel Mikroreaktionstechnik S. 444-467)
- Chemical Kinetics, ISBN 978-953-51-0132-1 "Application of Catalysts to Metal Microreactor Systems", P. Pfeifer, http://www.intechopen.com/books/chemical-kinetics/application-of-catalysts-to-metal-microreactor-systems

M 4.44 Module: Module Bachelor's Thesis [M-CIWVT-103204]

Responsible: Prof. Dr.-Ing. Achim Dittler
Organisation: KIT Department of Chemical and Process Engineering
Part of: Bachelor's Thesis

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
12	Grade to a tenth	Each term	1 term	German	3	3

Mandatory			
T-CIWVT-106365	Bachelor's Thesis	12 CR	

Prerequisites
§ 14 (1) SPO

Modeled Conditions
The following conditions have to be fulfilled:

1. You need to have earned at least 120 credits in your course of studies.

Competence Goal
Students are able to work on specialised problems with scientific methods independently and within a defined time frame.

M 4.45 Module: Organic Chemistry for Engineers [M-CHEMBIO-101115]

Responsible: Prof. Dr. Michael Meier
Organisation: KIT Department of Chemistry and Biosciences
Part of: Fundamentals of Mathematics and Natural Sciences

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	Grade to a tenth	Each summer term	1 term	German	3	1

Mandatory			
T-CHEMBIO-101865	Organic Chemistry for Engineers	5 CR	Meier

Competence Certificate
graded: written examination

Prerequisites
none

Competence Goal
Relevance of Organic Chemistry; fundamental and method-oriented knowledge;correlation between structure and reactivity;knowledge of important concepts and principles;self-solving of problems in Organic Chemistry

Content
Nomenclature, electronic structure and bonding of organic molecules; Organic substance classes and functional groups; Reaction mechanisms and synthesis of organic compounds; Stereoisomers and optical activity; Synthetic polymers and biopolymers;Identification of organic compounds

Module grade calculation
grade of the written examination

Workload
lectures and exercises: 34h

homework and preparation of examination: 86h

Literature
Paula Y. Bruice: Organic Chemistry, 5th ed., Prentice Hall, 2007

Paula Y. Bruice: Study guide and solutions manual, 5th ed., Prentice Hall, 2007

K.P.C. Vollhardt, Neil Schore: Organic Chemistry, 5th ed., Palgrave Macmillan, 2006

K.P.C. Vollhardt, Study guide and solutions manual, 5th ed., Palgrave Macmillan, 2006

M 4.46 Module: Orientation Exam [M-CIWVT-100874]

Organisation: KIT Department of Chemical and Process Engineering
Part of: Orientation Exam

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
0	pass/fail	Each term	2 terms	German	3	1

Mandatory			
T-MATH-100275	Advanced Mathematics I	7 CR	Arens, Griesmaier, Hettlich
T-MATH-100525	Tutorial Advanced Mathematics I	0 CR	Arens, Griesmaier, Hettlich
T-CHEMBIO-101866	General and Inorganic Chemistry	6 CR	Ruben

Modelled deadline
This module must be passed until the end of the **3. term**.

Prerequisites
None

M 4.47 Module: Practical Course in Organic Chemistry for Chemical Engineers [M-CHEMBIO-101116]

Responsible: Dr. Andreas Rapp
Organisation: KIT Department of Chemistry and Biosciences
Part of: Laboratories (Advanced Practical Course)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	pass/fail	Each winter term	1 term	German	3	1

Mandatory			
T-CHEMBIO-101868	Practical Course in Organic Chemistry for Chemical Engineers	5 CR	Rapp

Competence Certificate
protocols and analytical results

Prerequisites
Compulsory preconditions: written examination OC

Competence Goal
After that course the students should be able to build up a reaction apparatus, to handle hazardous materials and perform chemical reactions. Furthermore the students get an insight in most important purification procedures, e.g. distilation, extraction.

Content
Key reactions in Organic Chemistry, e.g.: nucleophilic substitution, electrophilic aromatic substitution, carbony compounds, additions to non-activated double bonds

Module grade calculation
average out of lab experiments/ analytical results

Workload
lectures and exercises: 45h

homework and preparation of examination: 75h

Literature
Schwetlick: Organikum, Wiley-VCH

M 4.48 Module: Process Development and Scale-up [M-CIWVT-101153]

Responsible: Prof. Dr.-Ing. Jörg Sauer
Organisation: KIT Department of Chemical and Process Engineering
Part of: Specialization/ Project Work

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
12	Grade to a tenth	Each winter term	2 terms	German	4	4

Mandatory			
T-CIWVT-103530	Process Development and Scale-up	8 CR	Sauer
T-CIWVT-103556	Process Development and Scale-up Project Work	4 CR	Sauer
T-CIWVT-111005	Exercises Process Development and Scale-up	0 CR	Sauer

Competence Certificate
The learning control consists of three partial achievements:

- Project work/ presentation and report
- Ungraded online-tests (prerequisite for oral examination)
- Individual oral examination, duration 30 minutes

Prerequisites
Participation requires

- minimum 60 ECTS
- minimum 1 lab course

Modeled Conditions
The following conditions have to be fulfilled:

1. You need to have earned at least 60 credits in your course of studies.

Competence Goal
The students are capable of developing energy and material balances for complex processes in process technology and to analyze processes in terms of potentials for optimization. They are able to derive suitable methods for the optimization of such processes.
The students are able to calculate the costs of major pieces of equipment and to apply estimation methods for investment costs of production plants. Together with the calculation of variable production costs they are able to analyze the profitability of a chemical process plant. Furthermore the students learn basic concepts of project management, they are enabled to work in teams and guided for intependent scientific work.

Content
Introduction into the basics of process development and project management for the development of chemical processes from the lab into production scale, including the design of a chemical process, design of miniplants and scale-up into production scale. Overview over methods for the economic, technical evaluation of processes and the preparation of business concepts.

Module grade calculation
50 % oral examination, 50 % project work.

Annotation
As part of the project study a visit to the IKFT and the bioliq plant at the Campus North is intended, as well as an excursion to an industrial company.

Workload
Lecture and Exercise:
Attendance time: 45 h
Self-study: 90 h
Exam preparation: 45 h
Project work: 180 h

Literature

- Vorlesungs- und Übungsfolien (KIT Studierendenportal ILIAS)
- Helmus, F. P., Process Plant Design: Project Management from Inquiry to Acceptance, Wiley-VCH, 2008.
- Towler, G., Sinnott, R. K., Chemical Engineering Design: Principles, Practice and Economics of Plant and Process Design, Butterworth-Heinemann, 2012.
- Peters, M.S., Timmerhaus, K.D., West R.E.: Plant Design and Economics for Chemical Engineers, 2003, Mc Graw-Hill, NY.
- Seider, W.D., Seader, J.D., Lewin, D. R., Widagdo, S.: Product and Process Design Principles, Wiley & Sons, NY, 2010.
- Vogel, G.H.:. Verfahrensentwicklung, Wiley-VCH, 2002.
- Belbin, R.M., Management Teams, Why They Succeed or Fail, Routledge, NY, 2013.
- Busse von Colbe, W.; Coenenberg, A.G., Kajüter, P., Linnhoff, U., Betriebswirtschaftslehre für Führungskräfte, 2002, S. 148

M 4.49 Module: Process Machines [M-CIWVT-101139]

Responsible: Prof. Dr.-Ing. Hermann Nirschl
Organisation: KIT Department of Chemical and Process Engineering
Part of: Laboratories (Advanced Practical Course)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
5	pass/fail	Each winter term	1 term	German	3	1

Mandatory			
T-CIWVT-101903	Laboratory Work Process Machines	5 CR	Gleiß

Competence Certificate
Learning control is a completed courswwork (not graded):
during lab course for each experiment
starting colloquium oral/written, practical work, written report

Prerequisites
written exam "organic chemistry" must be passed.

Competence Goal
The students are able to explain fundamentals of process design for selected process apparatuses and machines. They have the ability to carry out practical experiments to these processes by themselves after advice and according to a manual, to collect experimental data, to describe and to interpret them. They can make easy calculations regarding the design of the examined processes.

Content

- error calculation
- pumps
- electroseparator
- power input into stirred vessels
- heat transfer in and out stirred vessels
- refrigerator/heat pump
- emulsification
- tranport of plastic granulate in a scrw-reactor
- volume flow measurement of gases
- residence time measurement

Module grade calculation
Non graded

Workload
presence time: 7 experiments, 30 h
preparation and reports: 120 h

Literature
scripts for lecture and manuals for lab course

M 4.50 Module: Single Results [M-CIWVT-101992]

Responsible: Dr.-Ing. Barbara Freudig
Organisation: KIT Department of Chemical and Process Engineering
Part of: Master's Transfer Account

Credits	Grading scale	Language	Level	Version
30	pass/fail	German	3	6

Master Transfer Examinations (Election: at least 30 credits)			
T-CIWVT-106149	Initial Exam Process Technology and Plant Design	0 CR	Scheiff
T-CIWVT-106148	Practical Course Process Technology and Plant Design	0 CR	Scheiff
T-CIWVT-106150	Process Technology and Plant Design Written Exam	8 CR	Scheiff
T-CIWVT-106028	Particle Technology Exam	6 CR	Dittler
T-CIWVT-106032	Kinetics and Catalysis	6 CR	Wehinger
T-CIWVT-106033	Thermodynamics III	6 CR	Enders
T-CIWVT-106035	Computational Fluid Dynamics	6 CR	Nirschl
T-CIWVT-106029	Biopharmaceutical Purification Processes	6 CR	Hubbuch
T-CIWVT-106036	Internship	14 CR	Bajohr
T-CIWVT-112766	Bioprocess Development	6 CR	Grünberger
T-CIWVT-113235	Excercises: Membrane Technologies	1 CR	Horn, Saravia
T-CIWVT-113236	Membrane Technologies in Water Treatment	5 CR	Horn, Saravia
T-CIWVT-114107	Thermal Process Engineering II	6 CR	Zeiner

Prerequisites
None

M 4.51 Module: SmartMentoring [M-CIWVT-105848]

Responsible: Dr.-Ing. Barbara Freudig
Organisation: KIT Department of Chemical and Process Engineering
Part of: Interdisciplinary Qualifications (Usage from 10/1/2021)

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
3	pass/fail	Each winter term	1 term	German	3	2

Mandatory			
T-CIWVT-111761	SmartMentoring - Group Management	2 CR	Freudig

M 4.52 Module: Thermal Process Engineering [M-CIWVT-101134]

Responsible: Prof. Dr.-Ing. Tim Zeiner
Organisation: KIT Department of Chemical and Process Engineering
Part of: Fundamentals of Process Engineering

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each winter term	1 term	German	3	2

Mandatory			
T-CIWVT-101885	Thermal Process Engineering	6 CR	Zeiner

Competence Certificate
Sucess control is a written examination taking 120 minutes in time according to § 4 Abs. 2 SPO.

From winter term 21/22: 180 minutes.

Prerequisites
None

Competence Goal
Students can explain fundamental knowledge in the field of Thermal Separations. Emphasis is laid on the difference between methodological tools and their application for the description of selected unit operations. They can work on standard types of problems in the field of Thermal Process Engineering. They can solve it mathematically and can apply methologocal tools adequate. Furthermore, the students can quantitatively apply these tools and skills to processes and problems which are new to them.

Content
The tought methodological tools are balancing of conservative quantities, thermodynamic equilibrium and their application to single- and multi-stage processes. Within this module the following unit operations are introduced: Distillation, Rectification, Absorption, Extraction, Evaporation, Crystallisation, Drying, Adsorption/Chromatography.

Module grade calculation
The mark of the module is equal to the mark of the written examination.

Workload
Attendence time (lecture and tutorials): 56 h
Self study: 44 h
Examination preparation: 80 h

Recommendation
Courses of 1st - 4th semester

Literature
personal prints, scientific text books

M 4.53 Module: Thermodynamics I [M-CIWVT-101129]

Responsible: Prof. Dr. Sabine Enders
Organisation: KIT Department of Chemical and Process Engineering
Part of: Thermodynamics and Transport Processes

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
7	Grade to a tenth	Each winter term	1 term	German	3	2

Mandatory			
T-CIWVT-101878	Thermodynamics I, Tutorial	0 CR	Enders
T-CIWVT-101879	Thermodynamics I, Exam	7 CR	Enders

Competence Certificate
The learning control consists of two partial achievements:

1. Written examination lasting 120 min
2. Prerequisite for participation: Completed coursework;
   2 of 3 compulsory exercises have to be approved

Prerequisites
Before taking the written exam, the compleded coursework must be passed.

Competence Goal
Students are able to analyse and to design energy conversion processes by applying the first and second law of thermodynamics. They understand the behaviour of real pure substances, and they are able to explain thermodynamic processes with and without phase change by means of state diagrams and process schemes.

Content
Fundamental terms; thermodynamic equilibrium and temperature; properties and equation of state for ideal gases; energy and first law for closed systems; balances for open systems; entropy and thermodynamic potentials; second law; equations of state for pure component caloric properties; phase change behavior of pure component systems and state diagrams; thermodynamic cycles for power generation, refrigeration and heat pumps; exergy

Module grade calculation
The module grade is the grade of the written examination.

Workload
Lectures and exercises: 70 h
Homework: 80 h
Preparation of Examination : 60 h

Recommendation
courses of 1st and 2nd semester

Literature

- Schaber, K.: Skriptum Thermodynamik I (www.ttk.uni-karlsruhe.de)
- Stephan, P., Schaber, K., Stephan, K., Mayinger, F.: Thermodynamik, Band 1 Einstoffsysteme, 18. Aufl., Springer, 2009
- Baehr, H. D.: Thermodynamik, 11.Aufl., Springer, 2002
- Sandler, S. I.: Chemical, Biochemical and Engineering Thermodynamics, J. Wiley & Sons, 2006

M 4.54 Module: Thermodynamics II [M-CIWVT-101130]

Responsible: Prof. Dr. Sabine Enders
Organisation: KIT Department of Chemical and Process Engineering
Part of: Thermodynamics and Transport Processes

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
7	Grade to a tenth	Each summer term	1 term	German	3	2

Mandatory			
T-CIWVT-101880	Thermodynamics II, Tutorial	0 CR	Enders
T-CIWVT-101881	Thermodynamics II, Exam	7 CR	Enders

Competence Certificate
The learning control consists of two partial achievements:

1. Written examination lasting 120 min
2. Prerequisite for participation: Completed coursework;
   2 of 3 compulsory exercises have to be approved

Prerequisites
Before taking the written exam, the compleded coursework must be passed.

Competence Goal
Students understand the behavior of real gases, gas-vapor mixtures, simple real mixtures, chemical equilibria of ideal gases. They are able to explain and to analyse corresponding thermodynamic processes by means of state diagrams and process schemes. They are able to analyse and to design these processes based on balance equations and phase equilibria.

Content
Real gases and liquification of gases; thermodynamic potentials; characterization of mixtures; mixtures of ideal gases; gas-vapor mixtures and processes with humid air; phase equilibria and phase diagrams, laws of Raoult and Henry, liquid-liquid equilibria; enthalpy of mixtures; general description of mixtures and chemical potential; reaction equilibria of ideal gases; fundamentals of combustion processes.

Module grade calculation
The module grade is the grade of the written examination.

Workload
Lectures and exercises: 70 h
Homework: 80 h
Preparation of Examination : 60 h

Recommendation
courses of 1st - 3rd semester

Thermodynamics I

Literature

- Stephan, P., Schaber, K., Stephan, K., Mayinger, F.: Thermodynamik, Band 2: Mehrstoffsysteme und chemische Reaktionen, 15. Aufl., Springer, 2010
- Baehr, H. D., Kabelac, S. : Thermodynamik, 14. Aufl., Springer, 2009
- Sandler, S. I.: Chemical, Biochemical and Engineering Thermodynamics, J. Wiley & Sons, 2006
- Gmehling, J., Kolbe, B.: Thermodynamik, 2. Auflage, VCH Verlag Weinheim, 1992

5 Courses

T 5.1 Course: Automation and Control Systems Engineering - Exam [T-CIWVT-113088]

Responsible: Prof. Dr.-Ing. Thomas Meurer
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106477 - Automation and Control Systems Engineering
M-CIWVT-106880 - Advanced Methods in Linear Control

Type	Credits	Grading scale	Version
Oral examination	6	Grade to a third	1

Events					
WT 24/25	2243020	Advanced Methods in Linear Control	3 SWS	Lecture / Practice (/ 🗣	Meurer
WT 24/25	2243021	Exkursion im Profilfach Automatisierungs- und Regelungstechnik	1 SWS	Excursion (E / 🗣	Meurer
Exams					
ST 2025	7243020	Automation and Control Systems Engineering - Exam			Meurer, Jerono

Legend: 🖳 Online, 💮 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.2 Course: Advanced Mathematics I [T-MATH-100275]

Responsible: PD Dr. Tilo Arens
Prof. Dr. Roland Griesmaier
PD Dr. Frank Hettlich

Organisation: KIT Department of Mathematics

Part of: M-CIWVT-100874 - Orientation Exam
M-MATH-100280 - Advanced Mathematics I

Type	Credits	Grading scale	Recurrence	Version
Written examination	7	Grade to a third	Each term	3

Events					
WT 24/25	0131000	Höhere Mathematik I für die Fachrichtungen Maschinenbau, Geodäsie und Geoinformatik, Materialwissenschaft und Werkstofftechnik, und Ingenieurpädagogik	4 SWS	Lecture	Hettlich
WT 24/25	0131200	Höhere Mathematik I für die Fachrichtungen Chemieingenieurwesen und Verfahrenstechnik, Bioingenieurwesen, und Mechatronik und Informationstechnik	4 SWS	Lecture	Hettlich
Exams					
WT 24/25	6700007	Advanced Mathematics I			Arens, Griesmaier, Hettlich
ST 2025	6700025	Advanced Mathematics I			Arens, Griesmaier, Hettlich

Competence Certificate
Learning assessment is carried out by written examination of 120 minutes length.

Prerequisites
A "pass" result on the pre-requesite in AM I is a requirement for registration for the examination in AM I.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MATH-100525 - Tutorial Advanced Mathematics I must have been passed.

T 5.3 Course: Advanced Mathematics II [T-MATH-100276]

Responsible: PD Dr. Tilo Arens
Prof. Dr. Roland Griesmaier
PD Dr. Frank Hettlich

Organisation: KIT Department of Mathematics

Part of: M-MATH-100281 - Advanced Mathematics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	7	Grade to a third	Each term	2

Events					
ST 2025	0180800	Höhere Mathematik II für die Fachrichtungen Maschinenbau, Geodäsie und Geoinformatik, Materialwissenschaft und Werkstofftechnik, und Ingenieurpädagogik	4 SWS	Lecture	Arens
ST 2025	0181000	Höhere Mathematik II für die Fachrichtungen Chemieingenieurwesen und Verfahrenstechnik, Bioingenieurwesen, und Mechatronik und Informationstechnik	4 SWS	Lecture	Arens
Exams					
WT 24/25	6700008	Advanced Mathematics II			Arens, Griesmaier, Hettlich
ST 2025	6700001	Advanced Mathematics II			Arens, Griesmaier, Hettlich

Competence Certificate
Learning assessment is carried out by written examination of 120 minutes length.

Prerequisites
A "pass" result on the pre-requesite in AM II is a requirement for registration for the examination in AM II.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MATH-100526 - Tutorial Advanced Mathematics II must have been passed.

T 5.4 Course: Advanced Mathematics III [T-MATH-100277]

Responsible: PD Dr. Tilo Arens
Prof. Dr. Roland Griesmaier
PD Dr. Frank Hettlich

Organisation: KIT Department of Mathematics

Part of: M-MATH-100282 - Advanced Mathematics III

Type	Credits	Grading scale	Recurrence	Version
Written examination	7	Grade to a third	Each term	2

Events					
WT 24/25	0131400	Höhere Mathematik III für die Fachrichtungen Maschinenbau, Materialwissenschaft und Werkstofftechnik, Chemieingenieurwesen und Verfahrenstechnik, Bioingenieurwesen, und Mechatronik und Informationstechnik	4 SWS	Lecture	Griesmaier
Exams					
WT 24/25	6700009	Advanced Mathematics III			Arens, Griesmaier, Hettlich
ST 2025	6700002	Advanced Mathematics III			Arens, Griesmaier, Hettlich

Competence Certificate
Learning assessment is carried out by written examination of 120 minutes length.

Prerequisites
A "pass" result on the pre-requesite in AM III is a requirement for registration for the examination in AM III.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MATH-100527 - Tutorial Advanced Mathematics III must have been passed.

T 5.5 Course: Air Pollution Control [T-CIWVT-113046]

Responsible: Prof. Dr.-Ing. Achim Dittler
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106448 - Air Pollution Control

Type	Credits	Grading scale	Recurrence	Version
Oral examination	7	Grade to a third	Each summer term	1

Events					
WT 24/25	2244020	Gas Particle Measurement Technology	2 SWS	Lecture / 🗣	Dittler
WT 24/25	2244021	Exercises on 2244020 Gas Particle Measurement Technology	1 SWS	Practice / 🗣	Dittler, und Mitarbeitende
Exams					
WT 24/25	7244021	Air Pollution Control			Dittler

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is an oral examination lasting approx. 30 minutes.

Prerequisites
None

T 5.6 Course: Air Pollution Control - Project Work [T-CIWVT-113047]

Responsible: Prof. Dr.-Ing. Achim Dittler
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106448 - Air Pollution Control

Type	Credits	Grading scale	Version
Examination of another type	5	Grade to a third	1

Events					
ST 2025	2244022	Air Pollution Control - Project Work	2 SWS	Project (P / 🗣	Dittler, und Mitarbeitende
Exams					
WT 24/25	7244022	Air Pollution Control - Project Thesis			Dittler

Legend: 🖥 Online, ⛆ Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a project work; examination of another type.

Prerequisites
None

T 5.7 Course: Application of Numerics in Engineering [T-CIWVT-101876]

Responsible: Prof. Dr. Oliver Thomas Stein
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101956 - Computational Methods

Type	Credits	Grading scale	Version
Completed coursework (oral)	3	pass/fail	2

Events					
WT 24/25	2232150	Practical Course Numerics in Engineering Science	3 SWS	Practical course / 🗣	Stein, und Mitarbeitende
Exams					
WT 24/25	7231108_Kolloquium	Application of Numerics in Engineering			Habisreuther, Stein

Legend: 💻 Online, 🌐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
Written Examination T-MATH-102250 - Einstieg in die Informatik und algorithmische Mathematik

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MATH-102250 - Introduction to Informatics and Algorithmic Mathematics - Exam must have been started.

T 5.8 Course: Applied Apparatus Engineering [T-CIWVT-106562]

Responsible: Dr. Martin Neuberger
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-103297 - Applied Apparatus Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	1

Events					
ST 2025	2245830	Applied Apparatus Engineering	4 SWS	Lecture /	Neuberger
Exams					
WT 24/25	7291956	Applied Apparatus Engineering			Neuberger
ST 2025	7291956	Applied Machine Design			Neuberger

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Learning Control is a written examination, 90 minutes duration.

Prerequisites
None

T 5.9 Course: Automation and Control Systems Engineering - Project Work [T-CIWVT-113089]

Responsible: Prof. Dr.-Ing. Thomas Meurer
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106477 - Automation and Control Systems Engineering

Type	Credits	Grading scale	Version
Examination of another type	6	Grade to a third	1

Events					
WT 24/25	2243020	Advanced Methods in Linear Control	3 SWS	Lecture / Practice (/ 🗣	Meurer
WT 24/25	2243021	Exkursion im Profilfach Automatisierungs- und Regelungstechnik	1 SWS	Excursion (E / 🗣	Meurer
ST 2025	2243022	Automation and Control Systems Engineering - Project Work	3 SWS	Project (P / 🗣	Meurer
Exams					
WT 24/25	7243022	Automation and Control Systems Engineering - Project Work			Meurer, Jerono

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.10 Course: Bachelor's Thesis [T-CIWVT-106365]

Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-103204 - Module Bachelor's Thesis

Type	Credits	Grading scale	Recurrence	Version
Final Thesis	12	Grade to a third	Each term	3

Final Thesis
This course represents a final thesis. The following periods have been supplied:

Submission deadline	4 months
Maximum extension period	4 weeks
Correction period	6 weeks

T 5.11 Course: Biopharmaceutical Process Engineering [T-CIWVT-113023]

Responsible: Prof. Dr. Jürgen Hubbuch
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106475 - Biopharmaceutical Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each term	1

Events					
ST 2025	2214040	Biopharmaceutical Process Engineering	3 SWS	Lecture / 🗣	Hubbuch
ST 2025	2214041	Excercises on 2241040 Biopharmaceutical Process Engineering	1 SWS	Practice / 🗣	Hubbuch, und Mitarbeiter
Exams					
ST 2025	7223001	Biopharmaceutical Process Engineering (previously Downstream Processing)			Hubbuch

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a written examination lasting 120 minutes.

Prerequisites
None

Workload
180 hours

T 5.12 Course: Biopharmaceutical Purification Processes [T-CIWVT-106029]

Responsible: Prof. Dr. Jürgen Hubbuch
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading scale	Version
Written examination	6	Grade to a third	1

Events					
WT 24/25	2214010	Biopharmaceutical Purification Processes	3 SWS	Lecture / 🗣	Hubbuch, Franzreb
WT 24/25	2214011	Exercises on 2214010 Biopharmaceutical Purification Processes	1 SWS	Practice / 🗣	Hubbuch, Franzreb
Exams					
WT 24/25	7223011	Biopharmaceutical Purification Processes			Hubbuch
ST 2025	7223011	Biopharmaceutical Purification Processes			Hubbuch

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The examination is a written examination with a duration of 120 minutes (section 4 subsection 2 number 1 SPO).

T 5.13 Course: Bioprocess Development [T-CIWVT-112766]

Responsible: Prof. Dr.-Ing. Alexander Grünberger
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading scale	Version
Written examination	6	Grade to a third	1

Events					
ST 2025	2213020	Bioprocess Development	2 SWS	Lecture / 🗣	Grünberger
ST 2025	2213021	Bioprocess Development - Exercises	2 SWS	Practice / 🗣	Grünberger
Exams					
WT 24/25	7222001	Bioprocess Development			Grünberger
ST 2025	7222001	Bioprocess Development			Grünberger

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.14 Course: Bioprocess Engineering [T-CIWVT-113019]

Responsible: Prof. Dr.-Ing. Alexander Grünberger
Prof. Dr. Jürgen Hubbuch

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-106434 - Bioprocess Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Exams			
WT 24/25	722122-VBP-947	Bioprocess Engineering	Grünberger, Hubbuch
ST 2025	722122-VBP-947	Bioprocess Engineering	Grünberger, Hubbuch

Competence Certificate
Written examination with a duration of 120 minutes (section 4 subsection 2 No. 1 SPO).

T 5.15 Course: Biotechnology [T-CIWVT-103668]

Responsible: Dr. Nadja Alina Henke
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101143 - Biotechnology

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each term	2

Events					
WT 24/25	2214215	Bioanalytics	2 SWS	Lecture / 🗣	Henke, Bleher
Exams					
WT 24/25	7214215	Bioanalytics			Henke, Bleher
ST 2025	7223003	Biotechnology			Wörner

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

T 5.16 Course: Biotechnology [T-CIWVT-103669]

Responsible: Dr.-Ing. Iris Perner-Nochta
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101143 - Biotechnology

Type	Credits	Grading scale	Version
Examination of another type	9	Grade to a third	2

Events					
WT 24/25	2214210	Profile Subject Biotechnology - Management of Scientific Projects	3 SWS	Lecture / Practice (/ 🗣	Perner-Nochta, Grünberger, und Mitarbeitende
WT 24/25	2214211	Profile Subject Biotechnology - Laboratory Work (2214210)	6 SWS	Practical course / 🗣	Perner-Nochta, Grünberger, und Mitarbeitende
WT 24/25	2214212	Profile Subject Biotechnology - Exercises on Management of Scientific Projects (2214210)	1 SWS	Practice / 🗣	Perner-Nochta, und Mitarbeitende
Exams					
WT 24/25	7223002	Biotechnology			Perner-Nochta, Hubbuch

Legend: 💻 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is an examination of another type, project work.

Prerequisites
None

T 5.17 Course: Catalysts for the Energy Transition [T-CIWVT-112214]

Responsible: TT-Prof. Dr. Moritz Wolf
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106030 - Catalysts for the Energy Transition

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	1

Events					
ST 2025	2231410	Catalysts for the Energy Transition	2 SWS	Lecture / 🗣	Wolf
ST 2025	2231411	Übungen zu 2231410 Catalysts for the Energy Transition	1 SWS	Practice / 🗣	Wolf
Exams					
WT 24/25	7231410	Catalysts for the Energy Transition			Wolf
ST 2025	7200100	Catalysts for the Energy Transition			Wolf

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Oral exam, duration approx. 20 minutes.

Prerequisites
None.

T 5.18 Course: Chemical Process Engineering [T-CIWVT-101884]

Responsible: Prof. Dr.-Ing. Gregor Wehinger
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101133 - Chemical Process Engineering

Type	Credits	Grading scale	Version
Written examination	6	Grade to a third	1

Events					
WT 24/25	2220010	Chemical Process Engineering	2 SWS	Lecture / 🗣	Wehinger
WT 24/25	2220011	Exercises on 2220010 Chemical Process Engineering	2 SWS	Practice / 🗣	Wehinger, und Mitarbeitende
WT 24/25	2220012	Repetitorium zur Klausur Chemische Verfahrenstechnik	2 SWS	Practice / 💻	Wehinger, und Mitarbeitende
ST 2025	2220012	Revision Course for the Chemical Process Engineering Exam	2 SWS	Practice / 💻	Wehinger, und Mitarbeitende
Exams					
WT 24/25	7210101	Chemical Process Engineering			Wehinger
ST 2025	7210101	Chemical Process Engineering			Wehinger

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a written examination lasting 120 minutes.

Prerequisites
None

T 5.19 Course: Chemical Reaction Engineering - Exam [T-CIWVT-113695]

Responsible: Prof. Dr.-Ing. Gregor Wehinger
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106825 - Chemical Reaction Engineering

Type	Credits	Grading scale	Version
Oral examination	6	Grade to a third	1

Events					
WT 24/25	2220020	Chemical Process Engineering II	2 SWS	Lecture / 🗣	Wehinger
WT 24/25	2220021	Exercises on 2220020 Chemical Process Engineering II	1 SWS	Practice / 🗣	Wehinger

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.20 Course: Chemical Reaction Engineering - Project Work [T-CIWVT-113696]

Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106825 - Chemical Reaction Engineering

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	6	Grade to a third	Each summer term	1

Events					
ST 2025	2220023	Chemical Reaction Engineering - Project Work	3 SWS	Project (P / 🗣	Wehinger
Exams					
ST 2025	7220021	Chemical Reaction Engineering - Project Work			Wehinger

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.21 Course: Circular Economy - Oral Exam [T-CIWVT-112172]

Responsible: Prof. Dr.-Ing. Dieter Stapf
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-105995 - Circular Economy

Type	Credits	Grading scale	Recurrence	Version
Oral examination	8	Grade to a third	Each winter term	1

Events					
WT 24/25	2232220	Circular Economy	2 SWS	Lecture / 🗣	Stapf
WT 24/25	2232221	Exercises on 2232220 Circular Economy	1 SWS	Practice / 🗣	Stapf
Exams					
ST 2025	7232220	Circular Economy - Oral Exam			Stapf

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The learning control is an oral examination on lectures, exercises and case studies, duration approx. 30 minutes.

Prerequisites
None.

T 5.22 Course: Circular Economy - Project Work [T-CIWVT-112173]

Responsible: Prof. Dr.-Ing. Dieter Stapf
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-105995 - Circular Economy

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each summer term	1

Events					
ST 2025	2232222	Circular Economy - Project Work	2 SWS	Project (P / 🗣	Stapf, und Mitarbeitende
Exams					
WT 24/25	7231004	Circular Economy - Project Work			Stapf

Legend: 🖥 Online, Blended (On-Site/Online), 🗣 On-Site, × Cancelled

Competence Certificate
Learning control is an examination of another type. The following partial aspects are included in the grading: Term paper and presentation.

Prerequisites
None.

T 5.23 Course: Computational Fluid Dynamics [T-CIWVT-106035]

Responsible: Prof. Dr.-Ing. Hermann Nirschl
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each term	1

Events					
WT 24/25	2245020	Computational Fluid Dynamics	2 SWS	Lecture / 🗣	Nirschl, und Mitarbeitende
WT 24/25	2245021	Exercises for 2245020 Computational Fluid Dynamics	1 SWS	Practice / 🗣	Nirschl, und Mitarbeitende
Exams					
WT 24/25	7291020	Computational Fluid Dynamics			Nirschl
ST 2025	7291932	Computational Fluid Dynamics			Nirschl

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a written examination lasting 90 minutes.

Prerequisites
None

T 5.24 Course: Control Engineering and System Dynamics [T-CIWVT-112787]

Responsible: Prof. Dr.-Ing. Thomas Meurer
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106308 - Control Engineering and System Dynamics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	1

Events					
ST 2025	2243010	Control Engineering and System Dynamics	2 SWS	Lecture / 🗣	Meurer
ST 2025	2243011	Exercises on Control Engineering and System Dynamics	1 SWS	Practice / 🗣	Meurer, und Mitarbeiter
ST 2025	2243012	Tutorium zu Regelungstechnik und Systemdynamik	1 SWS	Tutorial (/ 🗣	Meurer, und Mitarbeitende
Exams					
WT 24/25	7294000	Control Engineering and System Dynamics			Meurer
ST 2025	7243010	Control Engineering and System Dynamics			Meurer

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.25 Course: Data-Driven Modeling with Python [T-CIWVT-113190]

Responsible: Dr.-Ing. Frank Rhein
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106534 - Data-Driven Modeling with Python

Type	Credits	Grading scale	Version
Completed coursework	3	pass/fail	1

Events					
WT 24/25	2245320	Data-Driven Modeling with Python	2 SWS	Lecture / 🗣	Rhein
Exams					
WT 24/25	7291320	Data-Driven Modeling with Python - Project			Rhein

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.26 Course: Electrochemical Energy Technologies [T-ETIT-111352]

Responsible: Prof. Dr.-Ing. Ulrike Krewer
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-105690 - Electrochemical Energy Technologies

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	1

Events					
WT 24/25	2304236	Electrochemical Energy Technologies	2 SWS	Lecture / 🗣	Krewer
WT 24/25	2304237	Exercise for 2304236 Electrochemical Energy Technologies	1 SWS	Practice / 🗣	Pauer
Exams					
WT 24/25	7300002	Electrochemical Energy Technologies			Krewer
ST 2025	7300009	Electrochemical Energy Technologies			Krewer

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Type of Examination: Written exam
Duration of Examination: approx. 120 minutes

Prerequisites
none

T 5.27 Course: Elementary Physics [T-PHYS-101577]

Responsible: Prof. Dr. Wolfgang Wernsdorfer
Organisation: KIT Department of Physics
Part of: M-PHYS-100993 - Elementary Physics

Type	Credits	Grading scale	Version
Written examination	7	Grade to a third	1

Events					
WT 24/25	4040321	Physikalische Grundlagen für die Studiengänge Chemie- und Bioingenieurwesen sowie Verfahrenstechnik	4 SWS	Lecture / 🗣	Wernsdorfer
WT 24/25	4040322	Übungen zu Physikalische Grundlagen für die Studiengänge Chemie- und Bioingenieurwesen sowie Verfahrenstechnik	2 SWS	Practice / 🗣	Wernsdorfer, Reisinger
Exams					
WT 24/25	7800108	Elementary Physics			Wernsdorfer
ST 2025	7800108	Elementary Physics			Wernsdorfer

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written exam (usually about 180 min)

T 5.28 Course: Energy and Environmental Engineering [T-CIWVT-108254]

Responsible: Prof. Dr. Reinhard Rauch
Prof. Dr.-Ing. Dimosthenis Trimis

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101145 - Energy and Environmental Engineering

Type	Credits	Grading scale	Version
Written examination	8	Grade to a third	1

Events					
WT 24/25	2231150	Processes for the Production of Chemical Energy Carriers	2 SWS	Lecture / 🗣	Rauch
WT 24/25	2232050	Fundamentals of High Temperature Energy Conversion	2 SWS	Lecture / 🗣	Trimis
Exams					
WT 24/25	7230500-1	Energy and Environmental Engineering			Rauch, Trimis
ST 2025	7230500	Energy and Environmental Engineering			Trimis, Rauch

Legend: 📱 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a written examination lasting 120 minutes.

Prerequisites
None

T 5.29 Course: Energy and Environmental Engineering Project Work [T-CIWVT-103527]

Responsible: Prof. Dr. Reinhard Rauch
Prof. Dr.-Ing. Dimosthenis Trimis

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101145 - Energy and Environmental Engineering

Type	Credits	Grading scale	Version
Examination of another type	4	Grade to a third	1

Events					
ST 2025	2231151	Projektarbeit im Profilfach Energie- und Umwelttechnik	3 SWS	Project (P / 🗣)	Rauch, Trimis, Scheiff
Exams					
WT 24/25	7230501	Energy and Environmental Engineering Project Work			Rauch, Trimis

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The learning control is an examination of another type; project work.

Prerequisites
None

T 5.30 Course: Energy Process Engineering [T-CIWVT-101889]

Responsible: Dr. Frederik Scheiff
Prof. Dr. Oliver Thomas Stein

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101136 - Energy Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each term	1

Events					
WT 24/25	2232110	Energy Process Engineering	2 SWS	Lecture / 🗣	Stein, Scheiff
WT 24/25	2232111	Exercises on 2232110 Energy Process Engineering	1 SWS	Practice / 🗣	Stein, Scheiff, und Mitarbeitende
Exams					
WT 24/25	7232110	Energy Process Engineering			Stein, Scheiff
ST 2025	7232110	Energy Process Engineering			Scheiff, Stein

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a written examination lasting 150 minutes.

Prerequisites
None

T 5.31 Course: Engineering Mechanics: Dynamics [T-CIWVT-106290]

Responsible: TT-Prof. Dr. Christoph Klahn
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101128 - Engineering Mechanics: Dynamics

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Each winter term	1

Events					
WT 24/25	2241010	Engineering Mechanics: Dynamics	2 SWS	Lecture / 🗣	Klahn
WT 24/25	2241011	Exercises on 2241010 Engineering Mechanics: Dynamics	2 SWS	Practice / 🗣	Klahn, Rentschler
WT 24/25	2241012	Tutorial on 2241010 Engineering Mechanics: Dynamics	1 SWS	Tutorial (/ 🗣	Klahn
Exams					
WT 24/25	7210201	Engineering Mechanics: Dynamics			Klahn

Legend: 📱 Online, 🌐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The learning control is a completed coursework: 3 of 4 exercises have to be passed.

T 5.32 Course: Engineering Mechanics: Dynamics, Exam [T-CIWVT-101877]

Responsible: TT-Prof. Dr. Christoph Klahn
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101128 - Engineering Mechanics: Dynamics

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each term	2

Events					
WT 24/25	2241010	Engineering Mechanics: Dynamics	2 SWS	Lecture / 🗣	Klahn
WT 24/25	2241011	Exercises on 2241010 Engineering Mechanics: Dynamics	2 SWS	Practice / 🗣	Klahn, Rentschler
WT 24/25	2241012	Tutorial on 2241010 Engineering Mechanics: Dynamics	1 SWS	Tutorial (/ 🗣	Klahn
Exams					
WT 24/25	7210200	Engineering Mechanics: Dynamics, Exam			Klahn
ST 2025	7210200	Engineering Mechanics: Dynamics, Exam			Klahn

Legend: 📱 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learming control is a written examination lasting 120 minutes.

Prerequisites
Prerequisite: 3 of 4 exercises have to be passed.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-CIWVT-106290 - Engineering Mechanics: Dynamics must have been passed.

T 5.33 Course: Engineering Mechanics: Statics and Strength of Materials [T-CIWVT-103687]

Responsible: Dr.-Ing. Bernhard Hochstein
Dr.-Ing. Claude Oelschlaeger
Prof. Dr. Norbert Willenbacher

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-104006 - Engineering Mechanics: Statics and Strength of Materials

Type	Credits	Grading scale	Recurrence	Version
Written examination	10	Grade to a third	Each term	2

Events					
WT 24/25	2242210	Engineering Mechanics: Statics	2 SWS	Lecture /	Willenbacher, Hochstein, Oelschlaeger
WT 24/25	2242211	Exercises on 2242210 Engineering Mechanics: Statics	2 SWS	Practice /	Oelschlaeger, Hochstein, und Mitarbeitende
ST 2025	2242220	Engineering Mechanics: Strength of Materials	2 SWS	Lecture /	Oelschlaeger
ST 2025	2242221	Exercises on 2242220 Engineering Mechanics: Strength of Materials	2 SWS	Practice /	Oelschlaeger, Hochstein, und Mitarbeitende
ST 2025	2242222	Seminar zur Technischen Mechanik – Festigkeitslehre	2 SWS	Seminar /	Oelschlaeger, Hochstein, und Mitarbeitende
Exams					
WT 24/25	7290002	Engineering Mechanics: Statics and Strength of Materials			Hochstein, Oelschlaeger
ST 2025	7290002	Engineering Mechanics: Statics and Strength of Materials			Hochstein, Oelschlaeger

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Prerequisites
none

T 5.34 Course: Ethics [T-CIWVT-112373]

Responsible: Prof. Dr. Dr. Rafaela Hillerbrand
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101149 - Ethics and Global Material Cycles

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	2	pass/fail	Each summer term	1

Events					
ST 2025	2231160	Ethics and Global Material Cycles	2 SWS	Lecture / 🗣	Hillerbrand, Rauch
Exams					
ST 2025	7230001	Ethics			Hillerbrand

Legend: 💻 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None.

T 5.35 Course: Examination Material Science I & II [T-MACH-105148]

Responsible: Dr.-Ing. Johannes Schneider
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-102567 - Material Science and Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	9	Grade to a third	Each winter term	1

Events					
WT 24/25	2181555	Materials Science and Engineering I for ciw, vt, MIT	4 SWS	Lecture / Practice (/ 🗣	Schneider
ST 2025	2182562	Materials Science and Engineering II for ciw, vt, mit	4 SWS	Lecture / Practice (/ 🗣	Schneider
Exams					
WT 24/25	76-T-MACH-105148	Examination Material Science I, II			Schneider
ST 2025	76-T-MACH-105148	Examination Material Science I & II			Schneider

Legend: 🖥 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
oral; 30 to 40 minutes

No tools and reference tools are allowed!

Prerequisites
none

Workload
270 hours

T 5.36 Course: Excercises: Membrane Technologies [T-CIWVT-113235]

Responsible: Prof. Dr. Harald Horn
Dr.-Ing. Florencia Saravia

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	1	pass/fail	Each summer term	1

Events					
ST 2025	2233011	Membrane Technologies in Water Treatment - Excercises	1 SWS	Practice /	Horn, Saravia, und Mitarbeitende
Exams					
ST 2025	7233011	Excercises for Membrane Technologies			Horn, Saravia

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Learning control is a completed coursework: Submission of exercises, membrane design and short presentation (5 minutes, group work).

T 5.37 Course: Exercises Process Development and Scale-up [T-CIWVT-111005]

Responsible: Prof. Dr.-Ing. Jörg Sauer
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101153 - Process Development and Scale-up

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Each winter term	1

Exams			
WT 24/25	7200027	Exercises Process Development and Scale-up	Sauer

T 5.38 Course: Fluiddynamics, Exam [T-CIWVT-101882]

Responsible: Prof. Dr.-Ing. Hermann Nirschl
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101131 - Fluiddynamics

Type	Credits	Grading scale	Version
Written examination	5	Grade to a third	1

Events					
ST 2025	2245010	Fluiddynamics	2 SWS	Lecture / 🗣	Nirschl
ST 2025	2245011	Fluiddynamics - Exercises	2 SWS	Practice / 🗣	Nirschl
Exams					
WT 24/25	7291944	Fluiddynamics			Nirschl
ST 2025	7291944	Fluiddynamics			Nirschl

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a written examination lasting 120 minutes.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-CIWVT-101904 - Fluiddynamics, Tutorial must have been passed.

T 5.39 Course: Fluiddynamics, Tutorial [T-CIWVT-101904]

Responsible: Prof. Dr.-Ing. Hermann Nirschl
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101131 - Fluiddynamics

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Each summer term	1

Events					
ST 2025	2245010	Fluiddynamics	2 SWS	Lecture / 🗣	Nirschl
ST 2025	2245011	Fluiddynamics - Exercises	2 SWS	Practice / 🗣	Nirschl
Exams					
WT 24/25	7291943	Fluiddynamics, Tutorial			Nirschl
ST 2025	7291943	Fluiddynamics, Tutorial			Nirschl

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a completed coursework.

T 5.40 Course: Food Biotechnology [T-CIWVT-101898]

Responsible: Dr.-Ing. Nico Leister
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101126 - Food Biotechnology

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each winter term	2

Events					
WT 24/25	2211020	Food Biotechnology	2 SWS	Lecture / ✕	N. N.
WT 24/25	2211021	Exercises on 2211020 Food Biotechnology	2 SWS	Practice / ✕	N. N.
Exams					
WT 24/25	7220006	Food Biotechnology			Leister
ST 2025	7220006	Food Biotechnology			Leister

Legend: Online, Blended (On-Site/Online), On-Site, ✕ Cancelled

Competence Certificate
This module is sucessfully completed by a written exam of 120 min (according to § 4 Abs. 2 Nr. 1 SPO.

Prerequisites
The Pre-Condition must be passed.

Workload
150 hours

T 5.41 Course: Food Technology [T-CIWVT-103528]

Responsible: Dr.-Ing. Nico Leister
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101148 - Food Technology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	5	Grade to a third	Each summer term	3

Events					
WT 24/25	2211040	Einführung in das Profilfach Lebensmitteltechnologie	2 SWS	Lecture / 🗣	Leister, und Mitarbeitende
WT 24/25	2211041		1 SWS	Project (P / 🗣	Leister, und Mitarbeitende
ST 2025	2211043	Exkursion im Profilfach Lebensmitteltechnologie	1 SWS	Excursion (E / 🗣	Leister, und Mitarbeitende
Exams					
WT 24/25	7220010	Food Technology			Leister

Legend: 🖥 Online, 🖥🗣 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None.

T 5.42 Course: Food Technology Project Work [T-CIWVT-103529]

Responsible: Dr.-Ing. Nico Leister
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101148 - Food Technology

Type	Credits	Grading scale	Version
Examination of another type	7	Grade to a third	1

Events					
ST 2025	2211041	Projektarbeit im Profilfach Lebensmitteltechnologie	4 SWS	Project (P / 🗣	Leister, und Mitarbeitende
Exams					
WT 24/25	7220011	Food Technology Project Work			Leister

Legend: 💻 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a projekt work/ examination of another type.

Prerequisites
None

T 5.43 Course: Formulation and Characterisation of Energy Materials - Exam [T-CIWVT-113478]

Responsible: Dr.-Ing. Claude Oelschlaeger
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106700 - Formulation and Characterisation of Energy Materials

Type	Credits	Grading scale	Version
Oral examination	8	Grade to a third	1

Events					
WT 24/25	2242025	Formulation and Characterization of Energy Materials	3 SWS	Lecture / 🗣	Willenbacher, Hochstein, Oelschlaeger
WT 24/25	2242026	Exercises on 2242025 Formulation and Characterization of Energy Materials	1 SWS	Practice / 🗣	Willenbacher, Oelschlaeger, und Mitarbeitende
Exams					
ST 2025	7242025	Formulation and Characterisation of Energy Materials - Exam			Oelschlaeger

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.44 Course: Formulation and Characterisation of Energy Materials - Project Work [T-CIWVT-113479]

Responsible: Dr.-Ing. Claude Oelschlaeger
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106700 - Formulation and Characterisation of Energy Materials

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each summer term	1

Exams			
ST 2025	7242026	Formulation and Characterisation of Energy Materials - Project Work	Oelschlaeger

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-CIWVT-113478 - Formulation and Characterisation of Energy Materials - Exam must have been passed.

T 5.45 Course: Fundamentals of Heat and Mass Transfer [T-CIWVT-101883]

Responsible: Dr.-Ing. Benjamin Dietrich
Prof. Dr.-Ing. Thomas Wetzel

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101132 - Fundamentals of Heat and Mass Transfer

Type	Credits	Grading scale	Recurrence	Version
Written examination	7	Grade to a third	Each term	1

Events					
ST 2025	2260030	Heat and Mass Transfer	3 SWS	Lecture / 🗣	Wetzel, Dietrich
ST 2025	2260031	Heat and Mass Transfer - Exercises	2 SWS	Practice / 🗣	Wetzel, Dietrich, und Mitarbeitende
Exams					
WT 24/25	7280001	Fundamentals of Heat and Mass Transfer			Wetzel, Dietrich
ST 2025	7280001	Fundamentals of Heat and Mass Transfer			Wetzel, Dietrich

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a written examination lasting 180 minutes.

Prerequisites
None

T 5.46 Course: Fundamentals of Refrigeration, Oral Examination [T-CIWVT-109117]

Responsible: Prof. Dr.-Ing. Steffen Grohmann
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-104457 - Fundamentals of Refrigeration

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each summer term	3

Events					
WT 24/25	2250110	Refrigeration A	2 SWS	Lecture /	Grohmann
WT 24/25	2250111	Refrigeration A - Exercises	1 SWS	Practice /	Grohmann, und Mitarbeitende
Exams					
WT 24/25	7250110	Fundamentals of Refrigeration, oral examination			Grohmann
ST 2025	7200005	Fundamentals of Refrigeration, oral examination			Grohmann

Legend: Online, Blended (On-Site/Online), On-Site, Cancelled

Competence Certificate
Learning Control is an oral examination about the lecture "Grundlagen der Kältetechnik" lasting approx. 30 minutes.

Prerequisites
Projects Work

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-CIWVT-109118 - Fundamentals of Refrigeration, Project Work must have been started.

T 5.47 Course: Fundamentals of Refrigeration, Project Work [T-CIWVT-109118]

Responsible: Prof. Dr.-Ing. Steffen Grohmann
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-104457 - Fundamentals of Refrigeration

Type	Credits	Grading scale	Version
Examination of another type	6	Grade to a third	1

Events					
ST 2025	2250112	Fundamentals of Refrigeration - Project Work	2 SWS	Practice / 🗣	Grohmann
Exams					
WT 24/25	7250112	Fundamentals of Refrigeration, Project Work			Grohmann
ST 2025	7200006	Fundamentals of Refrigeration, Project Work			Grohmann

Legend: 🖥 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a completed coursework: groupwork, project presentation.

Prerequisites
None

T 5.48 Course: General and Inorganic Chemistry [T-CHEMBIO-101866]

Responsible: Prof. Dr. Mario Ruben
Organisation: KIT Department of Chemistry and Biosciences
Part of: M-CHEMBIO-101117 - General and Inorganic Chemistry
M-CIWVT-100874 - Orientation Exam

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	1

Events					
WT 24/25	5004	Allgemeine und Anorganische Chemie (für Studierende des Chemieingenieurwesens)	3 SWS	Lecture /	Behrens
WT 24/25	5005	Seminar zur Vorlesung Allgemeine und Anorganische Chemie (für Studierende des Chemieingenieurwesens)	2 SWS	Seminar /	Scheiba
Exams					
WT 24/25	7100003	General and Inorganic Chemistry			Anson, Behrens, Ruben
WT 24/25	7100004	General and Inorganic Chemistry			Ruben, Anson, Behrens

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

T 5.49 Course: Global Material Cycles [T-CIWVT-112372]

Responsible: Prof. Dr. Reinhard Rauch
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101149 - Ethics and Global Material Cycles

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	1	pass/fail	Each summer term	1

Events					
ST 2025	2231160	Ethics and Global Material Cycles	2 SWS	Lecture / 🗣	Hillerbrand, Rauch
Exams					
WT 24/25	7230000	Ethics and Global Material Cycles			Rauch
ST 2025	7230000	Global Material Cycles			Rauch

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None.

T 5.50 Course: Industrial Business Administration [T-WIWI-100796]

Responsible: Prof. Dr. Wolf Fichtner
Organisation: KIT Department of Economics and Management
Part of: M-WIWI-100528 - Industrial Business Administration

Type	Credits	Grading scale	Recurrence	Version
Completed coursework (written)	3	pass/fail	Each winter term	1

Events					
WT 24/25	2581040	Industrial Business Administration	2 SWS	Lecture / 🗣	Fichtner
Exams					
WT 24/25	7981040	Industrial Business Administration			Fichtner
ST 2025	7981040	Industrial Business Administration			Fichtner

Legend: 🖥 Online, 🖥🗣 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The assessment of this course is a ungraded written examination (60 min).

Prerequisites
None

T 5.51 Course: Industrial Organic Chemistry [T-CIWVT-101890]

Responsible: Prof. Dr. Reinhard Rauch
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101137 - Industrial Organic Chemistry

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each term	1

Events					
WT 24/25	2231140	Industrial Organic Chemistry	3 SWS	Lecture / 🗣	Rauch
WT 24/25	2231141	Exercises on 2231140 Industrial Organic Chemistry	1 SWS	Practice / 🗣	Rauch
Exams					
WT 24/25	7223703	Industrial Organic Chemistry			Rauch
ST 2025	7223703	Industrial Organic Chemistry			Rauch

Legend: 📱 Online, 💮 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a written examination lasting 120 minutes.

Prerequisites
None

Modeled Conditions
The following conditions have to be fulfilled:

1. The module M-CHEMBIO-101115 - Organic Chemistry for Engineers must have been started.

T 5.52 Course: Initial Exam Process Technology and Plant Design [T-CIWVT-106149]

Responsible: Dr. Frederik Scheiff
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading scale	Recurrence	Version
Completed coursework (written)	0	pass/fail	Each winter term	1

Events					
WT 24/25	2231010	Process Technology and Plant Design I	2 SWS	Lecture /	Scheiff, Bajohr
WT 24/25	2231012	Practical Course Process Technology and Plant Design	1 SWS	Practical course /	Scheiff, und Mitarbeitende
Exams					
WT 24/25	7230100				Scheiff
WT 24/25	7230100-2	Initial Exam Process Technology and Plant Design			Scheiff

Legend: Online, Blended (On-Site/Online), On-Site, × Cancelled

Competence Certificate
Completed coursework; ungraded exam

Prerequisites
None

T 5.53 Course: Intensification of Bioprocesses - Written Exam [T-CIWVT-112998]

Responsible: Prof. Dr.-Ing. Dirk Holtmann
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106444 - Intensification of Bioprocesses

Type	Credits	Grading scale	Version
Written examination	6	Grade to a third	1

Exams			
ST 2025	7212050-WP	Intensification of Bioprocesses - Written Exam	Holtmann

T 5.54 Course: Internship [T-CIWVT-106036]

Responsible: Dr.-Ing. Siegfried Bajohr
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading scale	Version
Completed coursework	14	pass/fail	1

Exams			
WT 24/25	7200000	Internship	Bajohr

T 5.55 Course: Introduction into Bioengineering [T-CIWVT-113018]

Responsible: Prof. Dr.-Ing. Alexander Grünberger
Prof. Dr.-Ing. Dirk Holtmann
Prof. Dr. Jürgen Hubbuch
Dr.-Ing. Ulrike van der Schaaf

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-106433 - Introduction into Bioengineering

Type	Credits	Grading scale	Version
Written examination	5	Grade to a third	1

Events					
ST 2025	2210010	Introduction into Bioengineering	4 SWS	Lecture / 🗣	Grünberger, Holtmann, Hubbuch, van der Schaaf
Exams					
WT 24/25	7210010	Introduction into Bioengineering			Grünberger, Holtmann, Hubbuch, van der Schaaf
ST 2025	7210010	Introduction into Bioengineering			Grünberger, Holtmann, Hubbuch, van der Schaaf

Legend: 🖥 Online, 🛠 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

T 5.56 Course: Introduction to Informatics and Algorithmic Mathematics - Exam [T-MATH-102250]

Responsible: Prof. Dr. Willy Dörfler
PD Dr. Mathias Krause
Organisation: KIT Department of Mathematics
Part of: M-CIWVT-101956 - Computational Methods

Type	Credits	Grading scale	Version
Written examination	5	Grade to a third	1

Events					
WT 24/25	0101100	Einstieg in die Informatik und algorithmische Mathematik	2 SWS	Lecture / 🗣	Dörfler
WT 24/25	0101200	Übungen zu 0101100	2 SWS	Practice / 🗣	Dörfler
WT 24/25	0101300	Rechnerpraktikum zu 0101100	2 SWS	Practical course	Dörfler
ST 2025	0150700	Einstieg in die Informatik und Algorithmische Mathematik (für Bio- und Chemie-Ingenieurwesen)	2 SWS	Lecture	Krause, Karch, Doll
ST 2025	0150800	Übungen zu 0150700	1 SWS	Practice	Krause, Karch, Doll
ST 2025	0150900	Praktikum zu 0150700	2 SWS	Practical course	Krause, Karch, Doll
Exams					
WT 24/25	7700003_02	Introduction to Informatics and Algorithmic Mathematics - Post-Exam (C++)			Dörfler
ST 2025	7700003_01	Introduction to Informatics and Algorithmic Mathematics - C++-Exam			Krause

Legend: 🖥 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.57 Course: Kinetics and Catalysis [T-CIWVT-106032]

Responsible: Prof. Dr.-Ing. Gregor Wehinger
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each term	1

Events					
ST 2025	2220030	Kinetics and Catalysis	2 SWS	Lecture / 🗣	Wehinger
ST 2025	2220031	Kinetics and Catalysis - Exercises	1 SWS	Practice / 🗣	Wehinger, und Mitarbeitende
Exams					
WT 24/25	7210102	Kinetics and Catalysis			Wehinger
ST 2025	7210102	Kinetics and Catalysis			Wehinger

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a written examination lasting 60 minutes.

Prerequisites
None

T 5.58 Course: Laboratory Course: Electrochemical Energy Technologies [T-ETIT-111376]

Responsible: Dr. Philipp Röse
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-105703 - Laboratory Course: Electrochemical Energy Technologies

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	5	Grade to a third	Each summer term	1

Events					
ST 2025	2304303	Laboratory Electrochemical Energy Technologies	3 SWS	Practical course / 🗣	Röse
Exams					
ST 2025	7300022	Laboratory course: Electrochemical Energy Technologies			Röse

Legend: 💻 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The examination consists of a different kind of graded assessment including four experiments. The overall impression is rated. To pass the module, all experiments must be successfully completed. In case of failure, the laboratory course has to be repeated completely.

Attendance at the safety briefing and participation in an entry colloquium is mandatory (ungraded).

Prerequisites
The prerequisite for admission to the module is that students have successfully passed the module “M-ETIT-105690 – Electrochemical Energy Technologies”.

T 5.59 Course: Laboratory Work Process Machines [T-CIWVT-101903]

Responsible: Dr.-Ing. Marco Gleiß
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101139 - Process Machines

Type	Credits	Grading scale	Recurrence	Version
Completed coursework (practical)	5	pass/fail	Each winter term	4

Events					
WT 24/25	2200300	Practical Course Process Machines	3 SWS	Practical course / 🗣	Gleiß, Dietrich, Enders, Grohmann, Harth, Meyer, Nirschl, Stapf, van der Schaaf, Wetzel, Willenbacher, Zeiner, und Mitarbeitende
Exams					
WT 24/25	7291999	Laboratory Work Process Machines			Gleiß

Legend: 💻 Online, 🔀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
Written Exam "Organic Chemistry" must be passed.

Modeled Conditions
The following conditions have to be fulfilled:

1. The module M-CHEMBIO-101115 - Organic Chemistry for Engineers must have been passed.
2. The module M-CHEMBIO-101116 - Practical Course in Organic Chemistry for Chemical Engineers must not have been started.

T 5.60 Course: Laboratory Work: General Chemistry [T-CIWVT-113117]

Responsible: Prof. Dr. Harald Horn
Stephanie West
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106500 - Basic Practical Course

Type	Credits	Grading scale	Recurrence	Version
Completed coursework (practical)	2	pass/fail	Each winter term	1

Events					
WT 24/25	2200350	Safety Instruction and Introduction to Practical Courses 1st Semester BIW und CIW	1 SWS	Lecture / 🗣	Sinanis, Dietrich, West, und Mitarbeitende
WT 24/25	2233060	Basic Practical Course - Part I: General Chemistry	2 SWS	Practical course / 🗣	Horn, West
Exams					
WT 24/25	7233060	Laboratory Work: General Chemistry			Horn

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-CHEMBIO-101866 - General and Inorganic Chemistry must have been passed.

T 5.61 Course: Mechanical Design A [T-MACH-112984]

Responsible: Prof. Dr.-Ing. Tobias Düser
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106527 - Mechanical Design A

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	7	Grade to a third	Each winter term	1 terms	2

Events					
WT 24/25	2145170	Mechanical Design A	3 SWS	Lecture / 🗣	Matthiesen, Düser
WT 24/25	2145194	Tutorial for Mechanical Design A	1 SWS	Practice / 🗣	Matthiesen, Düser
Exams					
WT 24/25	76-T-MACH-112984	Mechanical Design A			Matthiesen, Düser
ST 2025	76T-MACH-112984	Mechanical Design A			Matthiesen, Düser

Legend: 💻 Online, 🌐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written exam with a duration of 90 Minutes

Prerequisites
Admission to the exam only with succesful completion of Workshop Mechanical Design A (T-MACH-112981)

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-112981 - Mechanical Design A, Workshop must have been passed.

Recommendation
None

Annotation
Students are familiar with the basic machine elements of technical systems and are able to analyze them in a system context

Workload
210 hours

T 5.62 Course: Mechanical Design A, Workshop [T-MACH-112981]

Responsible: Prof. Dr.-Ing. Tobias Düser
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106527 - Mechanical Design A

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	2	pass/fail	Each winter term	1 terms	2

Events					
WT 24/25	2145171	Mechanical Design A - Workshop	1 SWS	Practical course / 🗣	Matthiesen, Düser
Exams					
WT 24/25	76-T-MACH-112981	Mechanical Design A, Workshop			Düser, Matthiesen
ST 2025	76-T-MACH-112981	Mechanical Design A, Workshop			Düser, Matthiesen

Legend: 💻 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Concomitant to the lecture, a workshop with 3 workshop sessions takes place over the semester. During the workshop the students are divided into groups and their mechanical design knowledge will be tested during a colloquium at the beginning of every single workshop session. The attendance is mandatory and will be controlled.

The pass of the colloquia and the process of the workshop task are required for the successful participation.

Prerequisites
None

Recommendation
None

Annotation
None

Workload
60 hours

T 5.63 Course: Mechanical Design B and C [T-MACH-112985]

Responsible: Prof. Dr.-Ing. Tobias Düser
Prof. Dr.-Ing. Sven Matthiesen

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106528 - Mechanical Design B-C

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	6	Grade to a third	Each summer term	2 terms	1

Events					
WT 24/25	2145140	Mechanical Design C	2 SWS	Lecture / 🗣	Matthiesen, Düser
WT 24/25	2145141	Tutorials Mechanical Design C	1 SWS	Practice / 🗣	Matthiesen, Düser
WT 24/25	2145142	Workshop 'Mechanical Design C'	1.5 SWS	Practical course / 🗣	Matthiesen, Düser
ST 2025	2146200	Mechanical Design B	2 SWS	Lecture / 🗣	Matthiesen, Düser
ST 2025	2146201	Exercises for Mechanical Design B	1 SWS	Practice / 🗣	Matthiesen, Düser
Exams					
WT 24/25	76-T-MACH-112985	Mechanical Design B & C			Matthiesen, Düser
ST 2025	76-T-MACH-112985	Mechanical Design B & C			Matthiesen, Düser

Legend: 🖥 Online, 🌀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Written exam consisting of a written & design part (total 240 minutes)

Prerequisites
Admission to the exam only with succesful completion of Workshop Mechanical Design B (T-MACH-112982) AND Workshop Mechanical Design C (T-MACH-112983)

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-112983 - Mechanical Design C, Workshop must have been passed.
2. The course T-MACH-112982 - Mechanical Design B, Workshop must have been passed.

Recommendation
None

Annotation
None

Workload
180 hours

T 5.64 Course: Mechanical Design B, Workshop [T-MACH-112982]

Responsible: Prof. Dr.-Ing. Sven Matthiesen
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106528 - Mechanical Design B-C

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	3	pass/fail	Each summer term	1 terms	1

Events					
ST 2025	2146202	Workshop of Mechanical Design B	2 SWS	Practical course / 🗣	Matthiesen, Düser
Exams					
ST 2025	76-T-MACH-112982	Mechanical Design B, Workshop			Matthiesen, Düser

Legend: 🖥 Online, 🌀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Concomitant to the lecture, a workshop with 3 workshop sessions takes place over the semester. During the workshop the students are divided into groups and their mechanical design knowledge will be tested during a colloquium at the beginning of every single workshop session. The attendance is mandatory and will be controlled.

A CAD task from the area of mechanical design must be processed. This will be approved within an examination.

The pass of the colloquia and the process of the workshop task are required for the successful participation.

Prerequisites
None

Recommendation
None

Annotation
None

Workload
90 hours

T 5.65 Course: Mechanical Design C, Workshop [T-MACH-112983]

Responsible: Prof. Dr.-Ing. Sven Matthiesen
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-106528 - Mechanical Design B-C

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	3	pass/fail	Each winter term	1 terms	1

Events					
WT 24/25	2145142	Workshop 'Mechanical Design C'	1.5 SWS	Practical course / 🗣	Matthiesen, Düser
Exams					
WT 24/25	76-T-MACH-112983	Mechanical Design C, Workshop			Düser, Matthiesen

Legend: 💻 Online, Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Concomitant to the lecture, a workshop with 3 workshop sessions takes place over the semester. During the workshop the students are divided into groups and their mechanical design knowledge will be tested during a colloquium at the beginning of every single workshop session. The attendance is mandatory and will be controlled.

A CAD task from the area of mechanical design must be processed. This will be approved within an examination.

The pass of the colloquia and the process of the workshop task are required for the successful participation.

Prerequisites
None

Recommendation
None

Annotation
None

Workload
90 hours

T 5.66 Course: Mechanical Processing [T-CIWVT-101886]

Responsible: Prof. Dr.-Ing. Achim Dittler
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101135 - Mechanical Processing

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each term	1

Events					
WT 24/25	2244010	Mechanical Processing	2 SWS	Lecture / 🗣	Dittler
WT 24/25	2244011	Exercises on 2244010 Mechanical Processing	2 SWS	Practice / 🗣	Dittler, und Mitarbeitende
Exams					
WT 24/25	7244010	Mechanical Processing			Dittler
ST 2025	7244010	Mechanical Processing			Dittler

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a written examination lasting 120 minutes.

Prerequisites
None

T 5.67 Course: Mechanical Separation Technology Exam [T-CIWVT-103448]

Responsible: Dr.-Ing. Marco Gleiß
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101147 - Mechanical Separation Technology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	8	Grade to a third	Each summer term	1

Events					
WT 24/25	2245230	Mechanical Separation Technology	3 SWS	Lecture / 🗣	Gleiß
WT 24/25	2245231	Exercises for 2245230 Mechanical Separation Technology	1 SWS	Practice / 🗣	Gleiß
Exams					
WT 24/25	7291231	Mechanical Separation Technology Exam			Gleiß

Legend: 🖥 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is an oral examination lasting approx. 30 minutes.

Prerequisites
None

T 5.68 Course: Mechanical Separation Technology Project Work [T-CIWVT-103452]

Responsible: Dr.-Ing. Marco Gleiß
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101147 - Mechanical Separation Technology

Type	Credits	Grading scale	Version
Examination of another type	4	Grade to a third	1

Events					
ST 2025	2245232	Project Work for Profile Subject Mechanical Separation Techniques	1 SWS	Practice / 🗣	Gleiß, und Mitarbeitende
Exams					
WT 24/25	7291300	Mechanical Separation Technology Project Work			Gleiß

Legend: 💻 Online, 🌐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a project work; examination of another type.

Prerequisites
none

T 5.69 Course: Membrane Technologies in Water Treatment [T-CIWVT-113236]

Responsible: Prof. Dr. Harald Horn
Dr.-Ing. Florencia Saravia
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading scale	Recurrence	Version
Written examination	5	Grade to a third	Each summer term	1

Events					
ST 2025	2233010	Membrane Technologies in Water Treatment	2 SWS	Lecture / 🗣	Horn, Saravia
ST 2025	2233011	Membrane Technologies in Water Treatment - Excercises	1 SWS	Practice / 🏵	Horn, Saravia, und Mitarbeitende
Exams					
WT 24/25	7232605	Membrane Technologies in Water Treatment			Horn, Saravia
ST 2025	7233010	Membrane Technologies in Water Treatment			Horn, Saravia

Legend: 💻 Online, 🏵 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is an written examination lasting 90 minutes.

Prerequisites
Prerequisite: Submission of exercises, membrane design and short presentation (5 minutes, group work).

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-CIWVT-113235 - Excercises: Membrane Technologies must have been passed.

T 5.70 Course: Micro Process Engineering [T-CIWVT-103667]

Responsible: Prof. Dr.-Ing. Roland Dittmeyer
Prof. Dr.-Ing. Peter Pfeifer

Organisation: KIT Department of Chemical and Process Engineering

Part of: M-CIWVT-101154 - Micro Process Engineering

Type	Credits	Grading scale	Version
Examination of another type	5	Grade to a third	1

Events					
ST 2025	2220221	Micro Process Engineering - Project Work	2 SWS	Practice / 🗣	Dittmeyer, Pfeifer, und Mitarbeitende
Exams					
ST 2025	7210202	Micro Process Engineering			Pfeifer

Legend: 📱 Online, 🌀 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Die Erfolgskontrolle ist eine Prüfungsleistung anderer Art (Projektarbeit) nach § 4 Abs. 2 Nr. 3 der SPO Bachelor Chemieingenieurwesen und Verfahrenstechnik 2015. Es werden die praktische Mitarbeit, der schriftliche Bericht sowie die mündliche Präsentation der Ergebnisse individuell bewertet.

Prerequisites
None

T 5.71 Course: Micro Process Engineering [T-CIWVT-103666]

Responsible: Prof. Dr.-Ing. Peter Pfeifer
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101154 - Micro Process Engineering

Type	Credits	Grading scale	Recurrence	Version
Oral examination	7	Grade to a third	Each summer term	1

Events					
WT 24/25	2220220	Design of Micro Reactors	4 SWS	Lecture / Practice (/ 🗣	Pfeifer
Exams					
ST 2025	7210201	Micro Process Engineering			Pfeifer

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Die Erfolgskontrolle ist eine mündliche Einzelprüfung nach § 4 Abs. 2 Nr. 2 der SPO Bachelor Chemieingenieurwesen und Verfahrenstechnik 2015 im Umfang von ca. 25 Minuten zu Lehrveranstaltung "Auslegung von Mikroreaktoren".

Prerequisites
None

T 5.72 Course: Organic Chemistry for Engineers [T-CHEMBIO-101865]

Responsible: Prof. Dr. Michael Meier
Organisation: KIT Department of Chemistry and Biosciences
Part of: M-CHEMBIO-101115 - Organic Chemistry for Engineers

Type	Credits	Grading scale	Version
Written examination	5	Grade to a third	2

Events					
ST 2025	5142	Organische Chemie für CIW/VT und BIW	2 SWS	Lecture / 🗣	Levkin
ST 2025	5143	Übungen zu Organische Chemie für CIW/VT und BIW	2 SWS	Practice / 🗣	Levkin
Exams					
ST 2025	7100017	Organic Chemistry for CIW, BIW, VT und MWT			Levkin, Podlech
ST 2025	7100029	Organic Chemistry for CIW, BIW, VT und MWT, second exam			Levkin, Podlech

Legend: 💻 Online, 💠 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
acc. to module description

T 5.73 Course: Particle Technology Exam [T-CIWVT-106028]

Responsible: Prof. Dr.-Ing. Achim Dittler
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading scale	Version
Written examination	6	Grade to a third	1

Events					
ST 2025	2244030	Particle Technology	2 SWS	Lecture / 🗣	Dittler
ST 2025	2244031	Particle Technology - Exercises	1 SWS	Practice / 🗣	Dittler, und Mitarbeitende
Exams					
WT 24/25	7244030	Particle Technology Exam			Dittler
ST 2025	7244030	Particle Technology Exam			Dittler

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a written examination lasting 120 minutes.

Prerequisites
None

T 5.74 Course: Practical Course in Organic Chemistry for Chemical Engineers [T-CHEMBIO-101868]

Responsible: Dr. Andreas Rapp
Organisation: KIT Department of Chemistry and Biosciences
Part of: M-CHEMBIO-101116 - Practical Course in Organic Chemistry for Chemical Engineers

Type	Credits	Grading scale	Version
Completed coursework (practical)	5	pass/fail	1

Events					
WT 24/25	5123	Organisch-Chemisches Praktikum für Studierende des Chemie- und Bioingenieurwesens		Practical course / 🗣	Mitarbeiter, Rapp, Meier
Exams					
WT 24/25	7100018	Practical Course in Organic Chemistry for Chemical Engineers			Rapp

Legend: 🖳 Online, 🌼 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Modeled Conditions

The following conditions have to be fulfilled:

1. The module M-CHEMBIO-101115 - Organic Chemistry for Engineers must have been passed.

T 5.75 Course: Practical Course Process Technology and Plant Design [T-CIWVT-106148]

Responsible: Dr. Frederik Scheiff
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading scale	Recurrence	Version
Completed coursework (practical)	0	pass/fail	Each winter term	1

Events					
WT 24/25	2231012	Practical Course Process Technology and Plant Design	1 SWS	Practical course / 🗣	Scheiff, und Mitarbeitende
Exams					
WT 24/25	7230101	practical course Process Technology and Plant Design			Scheiff

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Compleded coursework/ practical course

Prerequisites
Ungraded exam

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-CIWVT-106149 - Initial Exam Process Technology and Plant Design must have been passed.

T 5.76 Course: Practical Course: Process Engineering [T-CIWVT-113118]

Responsible: Dr. Sokratis Sinanis
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-106500 - Basic Practical Course

Type	Credits	Grading scale	Recurrence	Version
Completed coursework (practical)	4	pass/fail	Each summer term	1

Events					
WT 24/25	2200350	Safety Instruction and Introduction to Practical Courses 1st Semester BIW und CIW	1 SWS	Lecture / 🗣	Sinanis, Dietrich, West, und Mitarbeitende
ST 2025	2200305	Basic Practical Course - Part II: Process Engineering	3 SWS	Practical course / 🗣	Bajohr, Dietrich, Hochstein, Horn, Meyer, Müller, Sinanis, West, Wetzel, Zeiner, und Mitarbeitende
Exams					
ST 2025	7200305	Practical Course: Process Engineering			Sinanis

Legend: 💻 Online, 🎲 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-CHEMBIO-101866 - General and Inorganic Chemistry must have been passed.

T 5.77 Course: Process Development and Scale-up [T-CIWVT-103530]

Responsible: Prof. Dr.-Ing. Jörg Sauer
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101153 - Process Development and Scale-up

Type	Credits	Grading scale	Recurrence	Version
Oral examination	8	Grade to a third	Each summer term	2

Events					
WT 24/25	2231310	Process Development and Scale-Up	2 SWS	Lecture / 🗣	Sauer
WT 24/25	2231311	Exercises on 2231310 Process Development and Scale-Up	2 SWS	Practice / 🗣	Sauer, und Mitarbeitende
Exams					
ST 2025	7200025	Process Development and Scale-up			Sauer

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-CIWVT-111005 - Exercises Process Development and Scale-up must have been passed.

T 5.78 Course: Process Development and Scale-up Project Work [T-CIWVT-103556]

Responsible: Prof. Dr.-Ing. Jörg Sauer
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101153 - Process Development and Scale-up

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	4	Grade to a third	Each summer term	1

Events					
ST 2025	2231312	Project Work in the Profile Course "Process Development and Scale-up"	2 SWS	Project (P / 🗣	Sauer, und Mitarbeitende
ST 2025	2231313	Presentation Profile Course "Process Development and Scale-up"		Others (sons / 🗣	Sauer
Exams					
ST 2025	7200026	Process Development and Scale-up Project Work			Sauer

Legend: 📱 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is an examination of another type: Project work.

Prerequisites
None.

T 5.79 Course: Process Technology and Plant Design Written Exam [T-CIWVT-106150]

Responsible: Dr. Frederik Scheiff
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading scale	Recurrence	Version
Written examination	8	Grade to a third	Each term	1

Events					
WT 24/25	2231010	Process Technology and Plant Design I	2 SWS	Lecture / 🗣	Scheiff, Bajohr
WT 24/25	2231012	Practical Course Process Technology and Plant Design	1 SWS	Practical course / 🗣	Scheiff, und Mitarbeitende
ST 2025	2231011	Process Technology and Plant Design II	3 SWS	Lecture / 🗣	Scheiff, Bajohr
Exams					
WT 24/25	7230102	Process Technology and Plant Design Written Exam			Scheiff
ST 2025	7230102	Process Technology and Plant Design Written Exam			Scheiff

Legend: 🖥 Online, 🌸 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a written examination lasting 180 minutes.

Prerequisites
None

T 5.80 Course: SmartMentoring - Group Management [T-CIWVT-111761]

Responsible: Dr.-Ing. Barbara Freudig
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-105848 - SmartMentoring

Type	Credits	Grading scale	Version
Completed coursework	2	pass/fail	1

Exams			
WT 24/25	72000001	SmartMentoring - Group Management	

T 5.81 Course: Thermal Process Engineering [T-CIWVT-101885]

Responsible: Prof. Dr.-Ing. Tim Zeiner
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101134 - Thermal Process Engineering

Type	Credits	Grading scale	Version
Written examination	6	Grade to a third	1

Events					
WT 24/25	2260110	Fluid Separation Processes	2 SWS	Lecture / 🗣	Zeiner
WT 24/25	2260111	Exercises for 2260110 Thermal Process Engineering	2 SWS	Practice / 🗣	Zeiner, und Mitarbeitende
Exams					
WT 24/25	7280002	Thermal Process Engineering			Zeiner
ST 2025	7280002	Thermal Process Engineering			Zeiner

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

T 5.82 Course: Thermal Process Engineering II [T-CIWVT-114107]

Responsible: Prof. Dr.-Ing. Tim Zeiner
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading scale	Version
Written examination	6	Grade to a third	1

Events					
ST 2025	2260150	Thermal Process Engineering II	2 SWS	Lecture / 🗣	Zeiner
ST 2025	2260151	Thermal Process Engineering - Exercises	2 SWS	Practice / 🗣	Zeiner, und Mitarbeitende
Exams					
ST 2025	7260150	Thermal Process Engineering II (previously Thermal Transport Processes)			Zeiner

Legend: 💻 Online, 🌐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None.

T 5.83 Course: Thermodynamics I, Exam [T-CIWVT-101879]

Responsible: Prof. Dr. Sabine Enders
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101129 - Thermodynamics I

Type	Credits	Grading scale	Version
Written examination	7	Grade to a third	1

Events					
WT 24/25	2250010	Thermodynamics I	3 SWS	Lecture / 🗣	Enders
WT 24/25	2250011	Thermodynamics I - Exercises	2 SWS	Practice / 🗣	Enders, und Mitarbeitende
WT 24/25	2250022	Tutorial Thermodynamics I and II	2 SWS	Tutorial (/ 🗣	Enders, und Mitarbeitende
Exams					
WT 24/25	7200002	Thermodynamics I Exam			Enders
ST 2025	7200002	Thermodynamics I Exam			Enders

Legend: 🖥 Online, 🖥🗣 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a written examination lastin 120 minutes.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-CIWVT-101878 - Thermodynamics I, Tutorial must have been passed.

T 5.84 Course: Thermodynamics I, Tutorial [T-CIWVT-101878]

Responsible: Prof. Dr. Sabine Enders
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101129 - Thermodynamics I

Type	Credits	Grading scale	Version
Completed coursework	0	pass/fail	1

Events					
WT 24/25	2250010	Thermodynamics I	3 SWS	Lecture / 🗣	Enders
WT 24/25	2250011	Thermodynamics I - Exercises	2 SWS	Practice / 🗣	Enders, und Mitarbeitende
WT 24/25	2250022	Tutorial Thermodynamics I and II	2 SWS	Tutorial (/ 🗣	Enders, und Mitarbeitende
Exams					
WT 24/25	7200001	Thermodynamics I, Tutorial			Enders

Legend: 💻 Online, 💠 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Prerequisites
None

T 5.85 Course: Thermodynamics II, Exam [T-CIWVT-101881]

Responsible: Prof. Dr. Sabine Enders
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101130 - Thermodynamics II

Type	Credits	Grading scale	Version
Written examination	7	Grade to a third	1

Events					
ST 2025	2250020	Thermodynamics II	3 SWS	Lecture / 🗣	Enders
ST 2025	2250021	Thermodynamics II - Exercises	2 SWS	Practice / 🗣	Enders, und Mitarbeitende
ST 2025	2250022	Tutorial Thermodynamics I and II	2 SWS	Tutorial (/ 🗣	Enders, und Mitarbeitende
Exams					
WT 24/25	7200004	Thermodynamics II, Exam			Enders
ST 2025	7200004	Thermodynamics II, Exam			Enders

Legend: 💻 Online, 🖧 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a written examination lastin 120 minutes.

Prerequisites
Precondition for participation: 2 of 3 compulsory exercises have to be approved

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-CIWVT-101880 - Thermodynamics II, Tutorial must have been passed.

T 5.86 Course: Thermodynamics II, Tutorial [T-CIWVT-101880]

Responsible: Prof. Dr. Sabine Enders
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101130 - Thermodynamics II

Type	Credits	Grading scale	Version
Completed coursework	0	pass/fail	1

Events					
ST 2025	2250020	Thermodynamics II	3 SWS	Lecture / 🗣	Enders
ST 2025	2250021	Thermodynamics II - Exercises	2 SWS	Practice / 🗣	Enders, und Mitarbeitende
ST 2025	2250022	Tutorial Thermodynamics I and II	2 SWS	Tutorial (/ 🗣	Enders, und Mitarbeitende
Exams					
ST 2025	7200003	Thermodynamics II, Tutorial			Enders

Legend: 📱 Online, 💠 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
The learning control is a completed coursework; prerequisite for the written exam.

Prerequisites
None

T 5.87 Course: Thermodynamics III [T-CIWVT-106033]

Responsible: Prof. Dr. Sabine Enders
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-CIWVT-101992 - Single Results

Type	Credits	Grading scale	Version
Written examination	6	Grade to a third	1

Events					
WT 24/25	2250030	Thermodynamics III	2 SWS	Lecture / 🗣	Enders
WT 24/25	2250031	Thermodynamics III - Exercises	1 SWS	Practice / 🗣	Enders, und Mitarbeitende
Exams					
WT 24/25	7200104	Thermodynamics III			Enders
ST 2025	7200104	Thermodynamics III			Enders

Legend: 💻 Online, 💐 Blended (On-Site/Online), 🗣 On-Site, ✕ Cancelled

Competence Certificate
Learning control is a written examination lasting 90 minutes.

Prerequisites
None

T 5.88 Course: Tutorial Advanced Mathematics I [T-MATH-100525]

Responsible: PD Dr. Tilo Arens
Prof. Dr. Roland Griesmaier
PD Dr. Frank Hettlich

Organisation: KIT Department of Mathematics

Part of: M-CIWVT-100874 - Orientation Exam
M-MATH-100280 - Advanced Mathematics I

Type	Credits	Grading scale	Recurrence	Version
Completed coursework (written)	0	pass/fail	Each winter term	2

Events					
WT 24/25	0131100	Übungen zu 0131000	2 SWS	Practice	Hettlich
WT 24/25	0131300	Übungen zu 0131200	2 SWS	Practice	Hettlich
Exams					
WT 24/25	6700005	Problem Class for Advanced Mathematics I			Arens, Griesmaier, Hettlich

Competence Certificate
Learning assessment is carried out by written assigments (pre-requesite). Exact requirements will be communicated in the lectures.

Prerequisites
None.

T 5.89 Course: Tutorial Advanced Mathematics II [T-MATH-100526]

Responsible: PD Dr. Tilo Arens
Prof. Dr. Roland Griesmaier
PD Dr. Frank Hettlich

Organisation: KIT Department of Mathematics

Part of: M-MATH-100281 - Advanced Mathematics II

Type	Credits	Grading scale	Recurrence	Version
Completed coursework (written)	0	pass/fail	Each summer term	2

Events					
ST 2025	0180900	Übungen zu 0180800	2 SWS	Practice	Arens
ST 2025	0181100	Übungen zu 0181000	2 SWS	Practice	Arens
Exams					
ST 2025	7700024	Problem Class for Advanced Mathematics II			Hettlich, Arens, Griesmaier

Competence Certificate
Learning assessment is carried out by written assigments (pre-requesite). Exact requirements will be communicated in the lectures.

Prerequisites
None.

T 5.90 Course: Tutorial Advanced Mathematics III [T-MATH-100527]

Responsible: PD Dr. Tilo Arens
Prof. Dr. Roland Griesmaier
PD Dr. Frank Hettlich

Organisation: KIT Department of Mathematics

Part of: M-MATH-100282 - Advanced Mathematics III

Type	Credits	Grading scale	Recurrence	Version
Completed coursework (written)	0	pass/fail	Each winter term	2

Events					
WT 24/25	0131500	Übungen zu 0131400	2 SWS	Practice	Griesmaier
Exams					
WT 24/25	6700006	Tutorial Advanced Mathematics III			Arens, Griesmaier, Hettlich

Competence Certificate
Learning assessment is carried out by written assigments (pre-requesite). Exact requirements will be communicated in the lectures.

Prerequisites
None.

Nichtamtliche Lesefassung für die Studien-und Prüfungsordnung für den Bachelorstudiengang Chemieingenieurwesen und Verfahrenstechnik

Nichtamtliche Lesefassung der Studien- und Prüfungsordnung des Karlsruher Instituts für Technologie (KIT) für den Bachelorstudiengang Chemieingenieurwesen und Verfahrenstechnik

Diese Lesefassung berücksichtigt:

- Die Satzung vom 05. August 2015
  (Amtliche Bekanntmachung des KIT Nr. 76 vom 6. August 2015)
- Die Satzung vom 24. Februar 2020
  (Amtliche Bekanntmachung des KIT Nr. 5 vom 26. Februar 2020)

Bei der vorliegenden Version handelt es sich um eine nichtamtliche Lesefassung, in der die oben genannten (Änderungs)- satzungen eingearbeitet sind. Es wird keine Gewähr für die Richtigkeit der nichtamtlichen Lesefassung gegeben. Rechtlich verbindlich sind ausschließlich die in den amtlichen Bekanntmachungen des KIT veröffentlichten Studien-und Prüfungsordnungen.

Auf den Seiten der Universitätsverwaltung finden Sie die Amtlichen Bekanntmachungen.

01.10.2020 Prof. Dr.-Ing. Achim Dittler, Studiendekan

Nichtamtliche Lesefassung für die Studien-und Prüfungsordnung für den Bachelorstudiengang Chemieingenieurwesen und Verfahrenstechnik

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Präambel

Das KIT hat sich im Rahmen der Umsetzung des Bolognaprozesses zum Aufbau eines Europäischen Hochschulraumes zum Ziel gesetzt, dass am Abschluss des Studiums am KIT der Mastergrad stehen soll. Das KIT sieht daher die am KIT angebotenen konsekutiven Bachelor- und Masterstudiengänge als Gesamtkonzept mit konsekutivem Curriculum.

I. Allgemeine Bestimmungen

§ 1 Geltungsbereich

Diese Bachelorprüfungsordnung regelt Studienablauf, Prüfungen und den Abschluss des Studi-ums im Bachelorstudiengang Chemieingenieurwesen und Verfahrenstechnik am KIT.

§ 2 Ziel des Studiums, Akademischer Grad

(1) Im Bachelorstudium sollen die wissenschaftlichen Grundlagen und die Methodenkompetenz der Fachwissenschaften vermittelt werden. Ziel des Studiums ist die Fähigkeit, einen konsekutiven Masterstudiengang erfolgreich absolvieren zu können sowie das erworbene Wissen berufsfeldbezogen anwenden zu können.

(2) Aufgrund der bestandenen Bachelorprüfung wird der akademische Grad „Bachelor of Science (B.Sc.)“ für den Bachelorstudiengang Chemieingenieurwesen und Verfahrenstechnik verliehen.

§ 3 Regelstudienzeit, Studienaufbau, Leistungspunkte

(1) Der Studiengang nimmt teil am Programm „Studienmodelle individueller Geschwindigkeit“.

Die Studierenden haben im Rahmen der dortigen Kapazitäten und Regelungen bis einschließlich drittem Fachsemester Zugang zu den Veranstaltungen des MINT-Kollegs Baden-Württemberg (im folgenden MINT-Kolleg)

(2) Die Regelstudienzeit beträgt sechs Semester. Bei einer qualifizierten Teilnahme am MINT-Kolleg bleiben bei der Anrechnung auf die Regelstudienzeit bis zu zwei Semester unberücksichtigt. Die konkrete Anzahl der Semester richtet sich nach § 8 Absatz 2 Satz 3 bis 5.

Eine qualifizierte Teilnahme liegt vor, wenn die Studierende Veranstaltungen des MINT-Kollegs für die Dauer von mindestens einem Semester im Umfang von mindestens zwei Fachkursen (Gesamtworkload 10 Semesterwochenstunden) belegt hat. Das MINT-Kolleg stellt hierüber eine Bescheinigung aus.

(3) Das Lehrangebot des Studiengangs ist in Fächer, die Fächer sind in Module, die jeweiligen Module in Lehrveranstaltungen gegliedert. Die Fächer und ihr Umfang werden in § 20 festgelegt. Näheres beschreibt das Modulhandbuch.

(4) Der für das Absolvieren von Lehrveranstaltungen und Modulen vorgesehene Arbeitsaufwand wird in Leistungspunkten (LP) ausgewiesen. Die Maßstäbe für die Zuordnung von Leistungs-punkten entsprechen dem European Credit Transfer System (ECTS). Ein Leistungspunkt entspricht einem Arbeitsaufwand von etwa 30 Zeitstunden. Die Verteilung der Leistungspunkte auf die Semester hat in der Regel gleichmäßig zu erfolgen.

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(5) Der Umfang der für den erfolgreichen Abschluss des Studiums erforderlichen Studien- und Prüfungsleistungen wird in Leistungspunkten gemessen und beträgt insgesamt 180 Leistungs-punkte.

(6) Lehrveranstaltungen können nach vorheriger Ankündigung auch in englischer Sprache angeboten werden, sofern es deutschsprachige Wahlmöglichkeiten gibt.

§ 4 Modulprüfungen, Studien- und Prüfungsleistungen

(1) Die Bachelorprüfung besteht aus Modulprüfungen. Modulprüfungen bestehen aus einer oder mehreren Erfolgskontrollen.

Erfolgskontrollen gliedern sich in Studien- oder Prüfungsleistungen.

(2) Prüfungsleistungen sind:

1. schriftliche Prüfungen,
2. mündliche Prüfungen oder
3. Prüfungsleistungen anderer Art.

(3) Studienleistungen sind schriftliche, mündliche oder praktische Leistungen, die von den Studierenden in der Regel lehrveranstaltungsbegleitend erbracht werden. Die Bachelorprüfung darf nicht mit einer Studienleistung abgeschlossen werden.

(4) Von den Modulprüfungen sollen mindestens 70 % benotet sein.

(5) Bei sich ergänzenden Inhalten können die Modulprüfungen mehrerer Module durch eine auch modulübergreifende Prüfungsleistung (Absatz 2 Nr.1 bis 3) ersetzt werden.

§ 5 Anmeldung und Zulassung zu den Modulprüfungen und Lehrveranstaltungen

(1) Um an den Modulprüfungen teilnehmen zu können, müssen sich die Studierenden online im Studierendenportal zu den jeweiligen Erfolgskontrollen anmelden. In Ausnahmefällen kann eine Anmeldung schriftlich im Studierendenservice oder in einer anderen, vom Studierendenservice autorisierten Einrichtung erfolgen. Für die Erfolgskontrollen können durch die Prüfenden Anmeldefristen festgelegt werden. Die Anmeldung der Bachelorarbeit ist im Modulhandbuch geregelt.

(2) Sofern Wahlmöglichkeiten bestehen, müssen Studierende, um zu einer Prüfung in einem bestimmten Modul zugelassen zu werden, vor der ersten Prüfung in diesem Modul mit der An-meldung zu der Prüfung eine bindende Erklärung über die Wahl des betreffenden Moduls und dessen Zuordnung zu einem Fach abgeben. Wegen eines von dem/der Studierenden nicht zu vertretenden Umstandes kann auf Antrag des/der Studierenden an den Prüfungs-ausschuss die Wahl oder die Zuordnung nachträglich geändert werden. Ein einmal begonnenes Prüfungsverfahren ist zu beenden, d.h. eine erstmals nicht bestandene Prüfung ist zu wiederholen.

(3) Zu einer Erfolgskontrolle ist zuzulassen, wer

1. in den Bachelorstudiengang Chemieingenieurwesen und Verfahrenstechnik am KIT eingeschrieben ist; die Zulassung beurlaubter Studierender ist auf Prüfungsleistungen beschränkt; und
2. nachweist, dass er die im Modulhandbuch für die Zulassung zu einer Erfolgskontrolle festgelegten Voraussetzungen erfüllt und

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3. nachweist, dass er in dem Bachelorstudiengang Chemieingenieurwesen und Verfahrenstechnik den Prüfungsanspruch nicht verloren hat.

(4) Nach Maßgabe von § 30 Abs. 5 LHG kann die Zulassung zu einzelnen Pflichtveranstaltungen beschränkt werden. Der/die Prüfende entscheidet über die Auswahl unter den Studierenden, die sich rechtzeitig bis zu dem von dem/der Prüfenden festgesetzten Termin angemeldet haben unter Berücksichtigung des Studienfortschritts dieser Studierenden und unter Beachtung von § 13 Abs. 1 Satz 1 und 2, sofern ein Abbau des Überhangs durch andere oder zusätzliche Veranstaltungen nicht möglich ist. Für den Fall gleichen Studienfortschritts sind durch die KIT-Fakultäten weitere Kriterien festzulegen. Das Ergebnis wird den Studierenden rechtzeitig bekannt gegeben.

(5) Die Zulassung ist abzulehnen, wenn die in Absatz 3 und 4 genannten Voraussetzungen nicht erfüllt sind.

§ 6 Durchführung von Erfolgskontrollen

(1) Erfolgskontrollen werden studienbegleitend, in der Regel im Verlauf der Vermittlung der Lehrinhalte der einzelnen Module oder zeitnah danach, durchgeführt.

(2) Die Art der Erfolgskontrolle (§ 4 Abs. 2 Nr. 1 bis 3, Abs. 3) wird von der/dem Prüfenden der betreffenden Lehrveranstaltung in Bezug auf die Lerninhalte der Lehrveranstaltung und die Lernziele des Moduls festgelegt. Die Art der Erfolgskontrolle, ihre Häufigkeit, Reihenfolge und Gewichtung sowie gegebenenfalls die Bildung der Modulnote müssen mindestens sechs Wochen vor Vorlesungsbeginn im Modulhandbuch bekannt gemacht werden. Im Einvernehmen von Prüfendem und Studierender bzw. Studierendem können die Art der Prüfungsleistung sowie die Prüfungssprache auch nachträglich geändert werden; im ersten Fall ist jedoch § 4 Abs. 5 zu berücksichtigen. Bei der Prüfungsorganisation sind die Belange Studierender mit Behinderung oder chronischer Erkrankung gemäß § 13 Abs. 1 zu berücksichtigen. § 13 Abs. 1 Satz 3 und 4 gelten entsprechend.

(3) Bei unvertretbar hohem Prüfungsaufwand kann eine schriftlich durchzuführende Prüfungsleistung auch mündlich, oder eine mündlich durchzuführende Prüfungsleistung auch schriftlich abgenommen werden. Diese Änderung muss mindestens sechs Wochen vor der Prüfungsleistung bekannt gegeben werden.

(4) Bei Lehrveranstaltungen in englischer Sprache (§ 3 Abs. 6) können die entsprechenden Erfolgskontrollen in dieser Sprache abgenommen werden. § 6 Abs. 2 gilt entsprechend.

(5) *Schriftliche Prüfungen* (§ 4 Abs. 2 Nr. 1) sind in der Regel von einer/einem Prüfenden nach § 18 Abs. 2 oder 3 zu bewerten. Sofern eine Bewertung durch mehrere Prüfende erfolgt, ergibt sich die Note aus dem arithmetischen Mittel der Einzelbewertungen. Entspricht das arithmetische Mittel keiner der in § 7 Abs. 2 Satz 2 definierten Notenstufen, so ist auf die nächstliegende Notenstufe auf- oder abzurunden. Bei gleichem Abstand ist auf die nächstbessere Notenstufe zu runden. Das Bewertungsverfahren soll sechs Wochen nicht überschreiten. Schriftliche Prüfungen dauern mindestens 60 und höchstens 300 Minuten.

(6) *Mündliche Prüfungen* (§ 4 Abs. 2 Nr. 2) sind von mehreren Prüfenden (Kollegialprüfung) oder von einer/m Prüfenden in Gegenwart einer oder eines Beisitzenden als Gruppen- oder Einzelprüfungen abzunehmen und zu bewerten. Vor der Festsetzung der Note hört die/der Prüfende die anderen an der Kollegialprüfung mitwirkenden Prüfenden an. Mündliche

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Prüfungen dauern in der Regel mindestens 15 Minuten und maximal 60 Minuten pro Studierenden.

Die wesentlichen Gegenstände und Ergebnisse der *mündlichen Prüfung* sind in einem Protokoll festzuhalten. Das Ergebnis der Prüfung ist den Studierenden im Anschluss an die mündliche Prüfung bekannt zu geben.

Studierende, die sich in einem späteren Semester der gleichen Prüfung unterziehen wollen, werden entsprechend den räumlichen Verhältnissen und nach Zustimmung des Prüflings als Zuhörerinnen und Zuhörer bei mündlichen Prüfungen zugelassen. Die Zulassung erstreckt sich nicht auf die Beratung und Bekanntgabe der Prüfungsergebnisse.

(7) Für *Prüfungsleistungen anderer Art* (§ 4 Abs. 2 Nr. 3) sind angemessene Bearbeitungsfristen einzuräumen und Abgabetermine festzulegen. Dabei ist durch die Art der Aufgabenstellung und durch entsprechende Dokumentation sicherzustellen, dass die erbrachte Prüfungsleistung dem/der Studierenden zurechenbar ist. Die wesentlichen Gegenstände und Ergebnisse einer solchen Erfolgskontrolle sind in einem Protokoll festzuhalten.

Bei *mündlich* durchgeführten *Prüfungsleistungen anderer Art* muss neben der/dem Prüfenden ein/e Beisitzende/r anwesend sein, die/der zusätzlich zum/zur Prüfenden das Protokoll zeichnet.

Schriftliche Arbeiten im Rahmen einer *Prüfungsleistung anderer Art* haben dabei die folgende Erklärung zu tragen: „Ich versichere wahrheitsgemäß, die Arbeit selbstständig angefertigt, alle benutzten Hilfsmittel vollständig und genau angegeben und alles kenntlich gemacht zu haben, was aus Arbeiten anderer unverändert oder mit Abänderungen entnommen wurde.“ Trägt die Arbeit diese Erklärung nicht, wird sie nicht angenommen. Die wesentlichen Gegenstände und Ergebnisse der Erfolgskontrolle sind in einem Protokoll festzuhalten.

§ 6 a Erfolgskontrollen im Antwort-Wahl-Verfahren

Das Modulhandbuch regelt, ob und in welchem Umfang Erfolgskontrollen im Wege des *Antwort-Wahl-Verfahrens* abgelegt werden können

§ 6 b Computergestützte Erfolgskontrollen

(1) Erfolgskontrollen können computergestützt durchgeführt werden. Dabei wird die Antwort bzw. Lösung der/des Studierenden elektronisch übermittelt und, sofern möglich, automatisiert ausgewertet. Die Prüfungsinhalte sind von einer/einem Prüfenden zu erstellen.

(2) Vor der computergestützten Erfolgskontrolle hat die/der Prüfende sicherzustellen, dass die elektronischen Daten eindeutig identifiziert und unverwechselbar und dauerhaft den Studierenden zugeordnet werden können. Der störungsfreie Verlauf einer computergestützten Erfolgskontrolle ist durch entsprechende technische und fachliche Betreuung zu gewährleisten. Alle Prüfungsaufgaben müssen während der gesamten Bearbeitungszeit zur Bearbeitung zur Verfügung stehen.

(3) Im Übrigen gelten für die Durchführung von computergestützten Erfolgskontrollen die §§ 6 bzw. 6 a.

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§ 7 Bewertung von Studien- und Prüfungsleistungen

(1) Das Ergebnis einer Prüfungsleistung wird von den jeweiligen Prüfenden in Form einer Note festgesetzt.

(2) Folgende Noten sollen verwendet werden:

sehr gut (very good)	:	hervorragende Leistung
gut (good)	:	eine Leistung, die erheblich über den durchschnittlichen Anforderungen liegt,
befriedigend (satisfactory)	:	eine Leistung, die durchschnittlichen Anforderungen entspricht,
ausreichend (sufficient)	:	eine Leistung, die trotz ihrer Mängel noch den Anforderungen genügt,
nicht ausreichend (failed)	:	eine Leistung, die wegen erheblicher Mängel nicht den Anforderungen genügt.

Zur differenzierten Bewertung einzelner Prüfungsleistungen sind nur folgende Noten zugelassen:

1,0; 1,3	:	sehr gut
1,7; 2,0; 2,3	:	Gut
2,7; 3,0; 3.3	:	Befriedigend
3,7; 4,0	:	Ausreichend
5,0	:	nicht ausreichend

(3) Studienleistungen werden mit „bestanden“ oder mit „nicht bestanden“ gewertet.

(4) Bei der Bildung der gewichteten Durchschnitte der Modulnoten, der Fachnoten und der Gesamtnote wird nur die erste Dezimalstelle hinter dem Komma berücksichtigt; alle weiteren Stellen werden ohne Rundung gestrichen.

(5) Jedes Modul und jede Erfolgskontrolle darf in demselben Studiengang nur einmal gewertet werden.
(6) Eine Prüfungsleistung ist bestanden, wenn die Note mindestens „ausreichend“ (4,0) ist.

(7) Die Modulprüfung ist bestanden, wenn alle erforderlichen Erfolgskontrollen bestanden sind. Die Modulprüfung und die Bildung der Modulnote sollen im Modulhandbuch geregelt werden. Sofern das Modulhandbuch keine Regelung über die Bildung der Modulnote enthält, errechnet sich die Modulnote aus einem nach den Leistungspunkten der einzelnen Teilmodule gewichteter Notendurchschnitt. Die differenzierten Noten (Absatz 2) sind bei der Berechnung der Modulnoten als Ausgangsdaten zu verwenden.

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(8) Die Ergebnisse der Erfolgskontrollen sowie die erworbenen Leistungspunkte werden durch den Studierendenservice des KIT verwaltet.

(9) Die Noten der Module eines Faches gehen in die Fachnote mit einem Gewicht proportional zu den ausgewiesenen Leistungspunkten der Module ein.

(10) Die Gesamtnote der Bachelorprüfung, die Fachnoten und die Modulnoten lauten:

		bis	1,5	=	Sehr gut
von	1,6	bis	2,5	=	gut
von	2,6	bis	3,5	=	befriedigend
von	3,6	bis	4,0	=	ausreichend

§ 8 Orientierungsprüfungen, Verlust des Prüfungsanspruchs

(1) Die Modulprüfungen in den Modulen Höhere Mathematik I und Allgemeine Anorganische Chemie sind bis zum Ende des Prüfungszeitraums des zweiten Fachsemesters abzulegen (Orientierungsprüfungen).

(2) Wer die Orientierungsprüfungen einschließlich etwaiger Wiederholungen bis zum Ende des Prüfungszeitraums des dritten Fachsemesters nicht erfolgreich abgelegt hat, verliert den Prüfungsanspruch im Studiengang, es sei denn, dass die Fristüberschreitung nicht selbst zu vertreten ist; hierüber entscheidet der Prüfungsausschuss auf Antrag der oder des Studierenden. Eine zweite Wiederholung der Orientierungsprüfungen ist ausgeschlossen. Die Fristüberschreitung hat die/der Studierende insbesondere dann nicht zu vertreten, wenn eine qualifizierte Teilnahme am MINT-Kolleg im Sinne von § 3 Abs. 2 vorliegt. Ohne ausdrückliche Genehmigung des Vorsitzenden des Prüfungsausschusses gilt eine Fristüberschreitung von

1. einem Semester als genehmigt, wenn die/der Studierende eine qualifizierte Teilnahme am MINT-Kolleg gemäß § 3 Abs. 2 im Umfang von einem Semester nachweist oder
2. zwei Semestern als genehmigt, wenn die/der Studierende eine qualifizierte Teilnahme am MINT-Kolleg gemäß § 3 Abs. 2 im Umfang von zwei Semestern nachweist.

Als Nachweis gilt die vom MINT-Kolleg gemäß § 3 Abs. 2 auszustellende Bescheinigung, die beim Studierendenservice des KIT einzureichen ist. Im Falle von Nr. 1 kann der Vorsitzende des Prüfungsausschusses auf Antrag der Studierenden die Frist um ein weiteres Semester verlängern, wenn dies aus studienorganisatorischen Gründen für das fristgerechte Ablegen der Orientierungsprüfung erforderlich ist, insbesondere weil die Module, die Bestandteil der Orientierungsprüfung sind, nur einmal jährlich angeboten werden.

(3) Ist die Bachelorprüfung bis zum Ende des Prüfungszeitraums des 12. Fachsemesters einschließlich etwaiger Wiederholungen nicht vollständig abgelegt, so erlischt der Prüfungsanspruch im Studiengang Chemieingenieurwesen und Verfahrenstechnik, es sei denn, dass die Fristüberschreitung nicht selbst zu vertreten ist. Die Entscheidung über eine Fristverlängerung und über Ausnahmen von der Fristregelung trifft der Prüfungsausschuss unter Beachtung der in § 32 Abs. 6 LHG genannten Tätigkeiten auf Antrag des/der

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Studierenden. Der Antrag ist schriftlich in der Regel bis sechs Wochen vor Ablauf der in Satz 1 genannten Studienhöchstdauer zu stellen. Absatz 2 Satz 3 bis 5 gelten entsprechend.

(4) Der Prüfungsanspruch geht auch verloren, wenn eine nach dieser Studien- und Prüfungsordnung erforderliche Studien- oder Prüfungsleistung endgültig nicht bestanden ist.

§ 9 Wiederholung von Erfolgskontrollen, endgültiges Nichtbestehen

(1) Studierende können eine nicht bestandene schriftliche Prüfung (§ 4 Absatz 2 Nr. 1) einmal wiederholen. Wird eine schriftliche Wiederholungsprüfung mit „nicht ausreichend“ (5,0) bewertet, so findet eine mündliche Nachprüfung im zeitlichen Zusammenhang mit dem Termin der nicht bestandenen Prüfung statt. In diesem Falle kann die Note dieser Prüfung nicht besser als „ausreichend“ (4,0) sein.

(2) Studierende können eine nicht bestandene mündliche Prüfung (§ 4 Absatz 2 Nr. 2) einmal wiederholen.

(3) Wiederholungsprüfungen nach Absatz 1 und 2 müssen in Inhalt, Umfang und Form (mündlich oder schriftlich) der ersten entsprechen. Ausnahmen kann der zuständige Prüfungsausschuss auf Antrag zulassen.

(4) Prüfungsleistungen anderer Art (§ 4 Absatz 2 Nr. 3) können einmal wiederholt werden.

(5) Studienleistungen können mehrfach wiederholt werden.

(6) Die Prüfungsleistung ist endgültig nicht bestanden, wenn die mündliche Nachprüfung im Sinne des Absatzes 1 mit „nicht ausreichend“ (5,0) bewertet wurde. Die Prüfungsleistung ist ferner endgültig nicht bestanden, wenn die mündliche Prüfung im Sinne des Absatzes 2 oder die Prüfungsleistung anderer Art gemäß Absatz 4 zweimal mit „nicht bestanden“ bewertet wurde.

(7) Das Modul ist endgültig nicht bestanden, wenn eine für sein Bestehen erforderliche Prüfungsleistung endgültig nicht bestanden ist.

(8) Eine zweite Wiederholung derselben Prüfungsleistung gemäß § 4 Abs. 2 ist nur in Ausnahmefällen auf Antrag des/der Studierenden zulässig („Antrag auf Zweitwiederholung“). Der Antrag ist schriftlich beim Prüfungsausschuss in der Regel bis zwei Monate nach Bekanntgabe der Note zu stellen.

Über den ersten Antrag eines/einer Studierenden auf Zweitwiederholung entscheidet der Prüfungsausschuss, wenn er den Antrag genehmigt. Wenn der Prüfungsausschuss diesen Antrag ablehnt, entscheidet ein Mitglied des Präsidiums. Über weitere Anträge auf Zweitwiederholung entscheidet nach Stellungnahme des Prüfungsausschusses ein Mitglied des Präsidiums. Wird der Antrag genehmigt, hat die Zweitwiederholung spätestens zum übernächsten Prüfungstermin zu erfolgen. Absatz 1 Satz 2 und 3 gelten entsprechend.

(9) Die Wiederholung einer bestandenen Prüfungsleistung ist nicht zulässig.

(10) Die Bachelorarbeit kann bei einer Bewertung mit „nicht ausreichend“ (5,0) einmal wiederholt werden. Eine zweite Wiederholung der Bachelorarbeit ist ausgeschlossen.

§ 10 Abmeldung; Versäumnis, Rücktritt

(1) Studierende können ihre Anmeldung zu *schriftlichen Prüfungen* ohne Angabe von Gründen bis zur Ausgabe der Prüfungsaufgaben widerrufen (Abmeldung). Eine Abmeldung kann online im Studierendenportal bis 24:00 Uhr des Vortages der Prüfung oder in

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begründeten Ausnahmefällen beim Studierendenservice innerhalb der Geschäftszeiten erfolgen. Erfolgt die Abmeldung gegenüber dem/der Prüfenden hat diese/r Sorge zu tragen, dass die Abmeldung im Campus Management System verbucht wird.

(2) Bei *mündlichen Prüfungen* muss die Abmeldung spätestens drei Werktage vor dem betreffenden Prüfungstermin gegenüber dem/der Prüfenden erklärt werden. Der Rücktritt von einer mündlichen Prüfung weniger als drei Werktage vor dem betreffenden Prüfungstermin ist nur unter den Voraussetzungen des Absatzes 5 möglich. Der Rücktritt von mündlichen Nachprüfungen im Sinne von § 9 Abs. 1 ist grundsätzlich nur unter den Voraussetzungen von Absatz 5 möglich.

(3) Die Abmeldung von *Prüfungsleistungen anderer Art* sowie von *Studienleistungen* ist im Modulhandbuch geregelt.

(4) Eine Erfolgskontrolle gilt als mit „nicht ausreichend“ (5,0) bewertet, wenn die Studierenden einen Prüfungstermin ohne triftigen Grund versäumen oder wenn sie nach Beginn der Erfolgskontrolle ohne triftigen Grund von dieser zurücktreten. Dasselbe gilt, wenn die Bachelorarbeit nicht innerhalb der vorgesehenen Bearbeitungszeit erbracht wird, es sei denn, der/die Studierende hat die Fristüberschreitung nicht zu vertreten.

(5) Der für den Rücktritt nach Beginn der Erfolgskontrolle oder das Versäumnis geltend gemachte Grund muss dem Prüfungsausschuss unverzüglich schriftlich angezeigt und glaubhaft gemacht werden. Bei Krankheit des/der Studierenden oder eines allein zu versorgenden Kindes oder pflegebedürftigen Angehörigen kann die Vorlage eines ärztlichen Attestes verlangt werden.

§ 11 Täuschung, Ordnungsverstoß

(1) Versuchen Studierende das Ergebnis ihrer Erfolgskontrolle durch Täuschung oder Benutzung nicht zugelassener Hilfsmittel zu beeinflussen, gilt die betreffende Erfolgskontrolle als mit „nicht ausreichend“ (5,0) bewertet.

(2) Studierende, die den ordnungsgemäßen Ablauf einer Erfolgskontrolle stören, können von der/dem Prüfenden oder der Aufsicht führenden Person von der Fortsetzung der Erfolgskontrolle ausgeschlossen werden. In diesem Fall gilt die betreffende Erfolgskontrolle als mit „nicht ausreichend“ (5,0) bewertet. In schwerwiegenden Fällen kann der Prüfungsausschuss diese Studierenden von der Erbringung weiterer Erfolgskontrollen ausschließen.

(3) Näheres regelt die Allgemeine Satzung des KIT zur Redlichkeit bei Prüfungen und Praktika in der jeweils gültigen Fassung.

§ 12 Mutterschutz, Elternzeit, Wahrnehmung von Familienpflichten

(1) Es gelten die Vorschriften des Gesetzes zum Schutz von Müttern bei der Arbeit, in der Ausbildung und im Studium (Mutterschutzgesetz – MuSchG) in seiner jeweils geltenden Fassung Die Mutterschutzfristen unterbrechen jede Frist nach dieser Prüfungsordnung. Die Dauer des Mutterschutzes wird nicht in die Frist eingerechnet.

(2) Gleichfalls sind die Fristen der Elternzeit nach Maßgabe des jeweils gültigen Gesetzes (Bundeselterngeld- und Elternzeitgesetz - BEEG) auf Antrag zu berücksichtigen. Der/die Studierende muss bis spätestens vier Wochen vor dem Zeitpunkt, von dem an die Elternzeit angetreten werden soll, dem Prüfungsausschuss, unter Beifügung der erforderlichen

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Nachweise schriftlich mitteilen, in welchem Zeitraum die Elternzeit in Anspruch genommen werden soll. Der Prüfungsausschuss hat zu prüfen, ob die gesetzlichen Voraussetzungen vorliegen, die bei einer Arbeitnehmerin bzw. einem Arbeitnehmer den Anspruch auf Elternzeit auslösen würden, und teilt dem/der Studierenden das Ergebnis sowie die neu festgesetzten Prüfungszeiten unverzüglich mit. Die Bearbeitungszeit der Bachelorarbeit kann nicht durch Elternzeit unterbrochen werden. Die gestellte Arbeit gilt als nicht vergeben. Nach Ablauf der Elternzeit erhält der/die Studierende ein neues Thema, das innerhalb der in § 14 festgelegten Bearbeitungszeit zu bearbeiten ist.

(3) Der Prüfungsausschuss entscheidet auf Antrag über die flexible Handhabung von Prüfungsfristen entsprechend den Bestimmungen des Landeshochschulgesetzes, wenn Studierende Familienpflichten wahrzunehmen haben. Absatz 2 Satz 4 bis 6 gelten entsprechend.

§ 13 Studierende mit Behinderung oder chronischer Erkrankung

(1) Bei der Gestaltung und Organisation des Studiums sowie der Prüfungen sind die Belange Studierender mit Behinderung oder chronischer Erkrankung zu berücksichtigen. Insbesondere ist Studierenden mit Behinderung oder chronischer Erkrankung bevorzugter Zugang zu teilnahmebegrenzten Lehrveranstaltungen zu gewähren und die Reihenfolge für das Absolvieren bestimmter Lehrveranstaltungen entsprechend ihrer Bedürfnisse anzupassen. Studierende sind gemäß Bundesgleichstellungsgesetz (BGG) und Sozialgesetzbuch Neuntes Buch (SGB IX) behindert, wenn ihre körperliche Funktion, geistige Fähigkeit oder seelische Gesundheit mit hoher Wahrscheinlichkeit länger als sechs Monate von dem für das Lebensalter typischen Zustand abweichen und daher ihre Teilhabe am Leben in der Gesellschaft beeinträchtigt ist. Der Prüfungsausschuss entscheidet auf Antrag der/des Studierenden über das Vorliegen der Voraussetzungen nach Satz 2 und 3. Die/der Studierende hat die entsprechenden Nachweise vorzulegen.

(2) Weisen Studierende eine Behinderung oder chronische Erkrankung nach und folgt daraus, dass sie nicht in der Lage sind, Erfolgskontrollen ganz oder teilweise in der vorgeschriebenen Zeit oder Form abzulegen, kann der Prüfungsausschuss gestatten, die Erfolgskontrollen in einem anderen Zeitraum oder einer anderen Form zu erbringen. Insbesondere ist behinderten Studierenden zu gestatten, notwendige Hilfsmittel zu benutzen.

(3) Weisen Studierende eine Behinderung oder chronische Erkrankung nach und folgt daraus, dass sie nicht in der Lage sind, die Lehrveranstaltungen regelmäßig zu besuchen oder die gemäß § 20 erforderlichen Studien- und Prüfungsleistungen zu erbringen, kann der Prüfungsausschuss auf Antrag gestatten, dass einzelne Studien- und Prüfungsleistungen nach Ablauf der in dieser Studien- und Prüfungsordnung vorgesehenen Fristen absolviert werden können.

§ 14 Modul Bachelorarbeit

(1) Voraussetzung für die Zulassung zum Modul Bachelorarbeit ist, dass die/der Studierende Modulprüfungen im Umfang von 120 LP erfolgreich abgelegt hat. Über Ausnahmen entscheidet der Prüfungsausschuss auf Antrag der/des Studierenden.

(1a) Dem Modul Bachelorarbeit sind 12 LP zugeordnet. Es besteht aus der Bachelorarbeit und einer Präsentation. Die Präsentation soll innerhalb von vier Wochen nach Abgabe der Arbeit stattfinden.

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(2) Die Bachelorarbeit kann von Hochschullehrer/innen und leitenden Wissenschaftler/innen gemäß § 14 Abs. 3 Ziff. 1 KITG vergeben werden. Darüber hinaus kann der Prüfungsausschuss weitere Prüfende gemäß § 18 Abs. 2 und 3 zur Vergabe des Themas berechtigen. Den Studierenden ist Gelegenheit zu geben, für das Thema Vorschläge zu machen. Soll die Bachelorarbeit außerhalb der KIT-Fakultät für Chemieingenieurwesen und Verfahrenstechnik angefertigt werden, so bedarf dies der Genehmigung durch den Prüfungsausschuss. Die Bachelorarbeit kann auch in Form einer Gruppenarbeit zugelassen werden, wenn der als Prüfungsleistung zu bewertende Beitrag der einzelnen Studierenden aufgrund objektiver Kriterien, die eine eindeutige Abgrenzung ermöglichen, deutlich unterscheidbar ist und die Anforderung nach Absatz 4 erfüllt. In Ausnahmefällen sorgt die/der Vorsitzende des Prüfungsausschusses auf Antrag der oder des Studierenden dafür, dass die/der Studierende innerhalb von vier Wochen ein Thema für die Bachelorarbeit erhält. Die Ausgabe des Themas erfolgt in diesem Fall über die/den Vorsitzende/n des Prüfungsausschusses.

(3) Thema, Aufgabenstellung und Umfang der Bachelorarbeit sind von dem Betreuer bzw. der Betreuerin so zu begrenzen, dass sie mit dem in Absatz 4 festgelegten Arbeitsaufwand bearbeitet werden kann.

(4) Die Bachelorarbeit soll zeigen, dass die Studierenden in der Lage sind, ein Problem aus ihrem Studienfach selbstständig und in begrenzter Zeit nach wissenschaftlichen Methoden zu bearbeiten. Der Umfang der Bachelorarbeit entspricht 12 Leistungspunkten. Die maximale Bearbeitungsdauer beträgt vier Monate. Thema und Aufgabenstellung sind an den vorgesehenen Umfang anzupassen. Der Prüfungsausschuss legt fest, in welchen Sprachen die Bachelorarbeit geschrieben werden kann. Auf Antrag des Studierenden kann der/die Prüfende genehmigen, dass die Bachelorarbeit in einer anderen Sprache als Deutsch geschrieben wird.

(5) Bei der Abgabe der Bachelorarbeit haben die Studierenden schriftlich zu versichern, dass sie die Arbeit selbstständig verfasst und keine anderen als die angegebenen Quellen und Hilfsmittel benutzt haben, die wörtlich oder inhaltlich übernommenen Stellen als solche kenntlich gemacht und die Satzung des KIT zur Sicherung guter wissenschaftlicher Praxis in der jeweils gültigen Fassung beachtet haben. Wenn diese Erklärung nicht enthalten ist, wird die Arbeit nicht angenommen. Die Erklärung kann wie folgt lauten: „Ich versichere wahrheitsgemäß, die Arbeit selbstständig verfasst, alle benutzten Hilfsmittel vollständig und genau angegeben und alles kenntlich gemacht zu haben, was aus Arbeiten anderer unverändert oder mit Abänderungen entnommen wurde sowie die Satzung des KIT zur Sicherung guter wissenschaftlicher Praxis in der jeweils gültigen Fassung beachtet zu haben.“ Bei Abgabe einer unwahren Versicherung wird die Bachelorarbeit mit „nicht ausreichend“ (5,0) bewertet.

(6) Der Zeitpunkt der Ausgabe des Themas der Bachelorarbeit ist durch die Betreuerin/den Betreuer und die/den Studierenden festzuhalten und dies beim Prüfungsausschuss aktenkundig zu machen. Der Zeitpunkt der Abgabe der Bachelorarbeit ist durch den/die Prüfende/n beim Prüfungsausschuss aktenkundig zu machen. Das Thema kann nur einmal und nur innerhalb des ersten Monats der Bearbeitungszeit zurückgegeben werden. Macht der oder die Studierende einen triftigen Grund geltend, kann der Prüfungsausschuss die in Absatz 3 festgelegte Bearbeitungszeit auf Antrag der oder des Studierenden um höchstens einen Monat verlängern. Wird die Bachelorarbeit nicht fristgerecht abgeliefert, gilt sie als mit

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„nicht ausreichend“ (5,0) bewertet, es sei denn, dass die Studierenden dieses Versäumnis nicht zu vertreten haben.

(7) Die Bachelorarbeit wird von mindestens einem/einer Hochschullehrer/in oder einem/einer leitenden Wissenschaftler/in gemäß § 14 abs. 3 Ziff. 1 KITG und einem/einer weiteren Prüfenden bewertet. In der Regel ist eine/r der Prüfenden die Person, die die Arbeit gemäß Absatz 2 vergeben hat. Bei nicht übereinstimmender Beurteilung dieser beiden Personen setzt der Prüfungsausschuss im Rahmen der Bewertung dieser beiden Personen die Note der Bachelorarbeit fest; er kann auch einen weiteren Gutachter bestellen. Die Bewertung hat innerhalb von sechs Wochen nach Abgabe der Bachelorarbeit zu erfolgen.

§ 15 Zusatzleistungen

(1) Es können auch weitere Leistungspunkte (Zusatzleistungen) im Umfang von höchstens 30 LP aus dem Gesamtangebot des KIT erworben werden. § 3 und § 4 der Prüfungsordnung bleiben davon unberührt. Diese Zusatzleistungen gehen nicht in die Festsetzung der Gesamt- und Modulnoten ein. Die bei der Festlegung der Modulnote nicht berücksichtigten LP werden als Zusatzleistungen im Transcript of Records aufgeführt und als Zusatzleistungen gekennzeichnet. Auf Antrag der/des Studierenden werden die Zusatzleistungen in das Bachelorzeugnis aufgenommen und als Zusatzleistungen gekennzeichnet. Zusatzleistungen werden mit den nach § 7 vorgesehenen Noten gelistet.

(2) Die Studierenden haben bereits bei der Anmeldung zu einer Prüfung in einem Modul diese als Zusatzleistung zu deklarieren.

§ 15 a Mastervorzug

Studierende, die im Bachelorstudium bereits mindestens 120 LP erworben haben, können zusätzlich zu den in § 15 Abs. 1 genannten Zusatzleistungen Leistungspunkte aus einem konsekutiven Masterstudiengang am KIT im Umfang von höchstens 30 LP erwerben (Mastervorzugsleistungen). § 3 und § 4 der Prüfungsordnung bleiben davon unberührt. Die Mastervorzugsleistungen gehen nicht in die Festsetzung der Gesamt-, Fach- und Modulnoten ein. Sie werden im Transcript of Records aufgeführt und als solche gekennzeichnet sowie mit den nach § 7 vorgesehenen Noten gelistet. § 15 Absatz 2 gilt entsprechend.

§ 16 Überfachliche Qualifikationen

Neben der Vermittlung von fachlichen Qualifikationen ist der Auf- und Ausbau überfachlicher Qualifikationen im Umfang von mindestens 6 LP Bestandteil eines Bachelorstudiums. Überfachliche Qualifikationen können additiv oder integrativ vermittelt werden.

§ 17 Prüfungsausschuss

(1) Für den Bachelorstudiengang Chemieingenieurwesen und Verfahrenstechnik wird ein Prüfungsausschuss gebildet. Er besteht aus vier stimmberechtigten Mitgliedern: drei Hochschullehrer/innen / leitenden Wissenschaftler/innen gemäß § 14 Abs. 3 Ziff. 1 KITG / Privatdozentinnen bzw. -dozenten, akademischen Mitarbeiterinnen und Mitarbeiter nach § 52 LHG / wissenschaftlichen Mitarbeiter/innen gemäß § 14 Abs. 3 Ziff. 2 KITG und einer bzw. einem Studierenden mit beratender Stimme. Im Falle der Einrichtung eines gemeinsamen Prüfungsausschusses für den Bachelor- und den Masterstudiengang Chemieingenieurwesen und Verfahrenstechnik erhöht sich die Anzahl der Studierenden auf zwei Mitglieder mit beratender Stimme, wobei je eine bzw. einer dieser Beiden aus dem Bachelor- und aus dem

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Masterstudiengang stammt. Die Amtszeit der nichtstudentischen Mitglieder beträgt zwei Jahre, die des studentischen Mitglieds ein Jahr.

(2) Die/der Vorsitzende, ihre/sein Stellvertreter/in, die weiteren Mitglieder des Prüfungsausschusses sowie deren Stellvertreter/innen werden von dem KIT-Fakultätsrat bestellt, die akademischen Mitarbeiter/innen nach § 52 LHG, die wissenschaftlichen Mitarbeiter gemäß § 14 Abs. 3 Ziff. 2 KITG und die Studierenden auf Vorschlag der Mitglieder der jeweiligen Gruppe; Wiederbestellung ist möglich. Die/der Vorsitzende und deren/dessen Stellvertreter/in müssen Hochschullehrer/innen oder leitende Wissenschaftler/innen § 14 Abs. 3 Ziff. 1 KITG sein. Die/der Vorsitzende des Prüfungsausschusses nimmt die laufenden Geschäfte wahr und wird durch das jeweilige Prüfungssekretariat unterstützt.

(3) Der Prüfungsausschuss achtet auf die Einhaltung der Bestimmungen dieser Studien- und Prüfungsordnung und fällt die Entscheidungen in Prüfungsangelegenheiten. Er entscheidet über die Anerkennung von Studienzeiten sowie Studien- und Prüfungsleistungen und trifft die Feststellung gemäß § 19 Absatz 1 Satz 1. Er berichtet der KIT-Fakultät regelmäßig über die Entwicklung der Prüfungs- und Studienzeiten, einschließlich der Bearbeitungszeiten für die Bachelorarbeiten und die Verteilung der Modul- und Gesamtnoten. Er ist zuständig für Anregungen zur Reform der Studien- und Prüfungsordnung und zu Modulbeschreibungen. Der Prüfungsausschuss entscheidet mit der Mehrheit seiner Stimmen. Bei Stimmengleichheit entscheidet der Vorsitzende des Prüfungsausschusses.

(4) Der Prüfungsausschuss kann die Erledigung seiner Aufgaben für alle Regelfälle auf die/den Vorsitzende/n des Prüfungsausschusses übertragen. In dringenden Angelegenheiten, deren Erledigung nicht bis zu der nächsten Sitzung des Prüfungsausschusses warten kann, entscheidet die/der Vorsitzende des Prüfungsausschusses.

(5) Die Mitglieder des Prüfungsausschusses haben das Recht, der Abnahme von Prüfungen beizuwohnen. Die Mitglieder des Prüfungsausschusses, die Prüfenden und die Beisitzenden unterliegen der Verschwiegenheit. Sofern sie nicht im öffentlichen Dienst stehen, sind sie durch die/den Vorsitzende/n zur Verschwiegenheit zu verpflichten.

(6) In Angelegenheiten des Prüfungsausschusses, die eine an einer anderen KIT-Fakultät zu absolvierende Prüfungsleistung betreffen, ist auf Antrag eines Mitgliedes des Prüfungsausschusses eine fachlich zuständige und von der betroffenen KIT-Fakultät zu nennende prüfungsberechtigte Person hinzuzuziehen.

(7) Belastende Entscheidungen des Prüfungsausschusses sind schriftlich mitzuteilen. Sie sind zu begründen und mit einer Rechtsbehelfsbelehrung zu versehen. Vor einer Entscheidung ist Gelegenheit zur Äußerung zu geben. Widersprüche gegen Entscheidungen des Prüfungsausschusses sind innerhalb eines Monats nach Zugang der Entscheidung schriftlich oder zur Niederschrift beim Präsidium des KIT einzulegen.

§ 18 Prüfende und Beisitzende

(1) Der Prüfungsausschuss bestellt die Prüfenden. Er kann die Bestellung der/dem Vorsitzenden übertragen.

(2) Prüfende sind Hochschullehrer/innen sowie leitende Wissenschaftler/innen gemäß § 14 Abs. 3 Ziff. 1 KITG, habilitierte Mitglieder und akademische Mitarbeiter/innen gemäß § 52 LHG, welche der KIT-Fakultät angehören und denen die Prüfungsbefugnis übertragen

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wurde; desgleichen kann wissenschaftlichen Mitarbeitern gemäß § 14 Abs. 3 Ziff. 2 KITG die Prüfungsbefugnis übertragen werden. Bestellt werden darf nur, wer mindestens die dem jeweiligen Prüfungsgegenstand entsprechende fachwissenschaftliche Qualifikation erworben hat.

(3) Soweit Lehrveranstaltungen von anderen als den unter Absatz 2 genannten Personen durchgeführt werden, sollen diese zu Prüfenden bestellt werden, sofern sie die gemäß Absatz 2 Satz 2 vorausgesetzte Qualifikation nachweisen können.

(4) Die Beisitzenden werden durch die Prüfenden benannt. Zu Beisitzenden darf nur bestellt werden, wer einen akademischen Abschluss in einem Studiengang der KIT-Fakultät Chemieingenieurwesen und Verfahrenstechnik oder einen gleichwertigen akademischen Abschluss erworben hat.

§ 19 Anerkennung von Studien- und Prüfungsleistungen, Studienzeiten

(1) Studien- und Prüfungsleistungen sowie Studienzeiten, die in Studiengängen an staatlichen oder staatlich anerkannten Hochschulen und Berufsakademien der Bundesrepublik Deutschland oder an ausländischen staatlichen oder staatlich anerkannten Hochschulen erbracht wurden, werden auf Antrag der Studierenden anerkannt, sofern hinsichtlich der erworbenen Kompetenzen kein wesentlicher Unterschied zu den Leistungen oder Abschlüssen besteht, die ersetzt werden sollen. Dabei ist kein schematischer Vergleich, sondern eine Gesamtbetrachtung vorzunehmen. Bezüglich des Umfangs einer zur Anerkennung vorgelegten Studienleistung (Anrechnung) werden die Grundsätze des ECTS herangezogen.

(2) Die Studierenden haben die für die Anerkennung erforderlichen Unterlagen vorzulegen. Studierende, die neu in den Bachelorstudiengang Chemieingenieurwesen und Verfahrenstechnik immatrikuliert wurden, haben den Antrag mit den für die Anerkennung erforderlichen Unterlagen innerhalb eines Semesters nach Immatrikulation zu stellen. Bei Unterlagen, die nicht in deutscher oder englischer Sprache vorliegen, kann eine amtlich beglaubigte Übersetzung verlangt werden. Die Beweislast dafür, dass der Antrag die Voraussetzungen für die Anerkennung nicht erfüllt, liegt beim Prüfungsausschuss.

(3) Werden Leistungen angerechnet, die nicht am KIT erbracht wurden, werden sie im Zeugnis als „anerkannt“ ausgewiesen. Liegen Noten vor, werden die Noten, soweit die Notensysteme vergleichbar sind, übernommen und in die Berechnung der Modulnoten und der Gesamtnote einbezogen. Sind die Notensysteme nicht vergleichbar, können die Noten umgerechnet werden. Liegen keine Noten vor, wird der Vermerk „bestanden“ aufgenommen.

(4) Bei der Anerkennung von Studien- und Prüfungsleistungen, die außerhalb der Bundesrepublik Deutschland erbracht wurden, sind die von der Kultusministerkonferenz und der Hochschulrektorenkonferenz gebilligten Äquivalenzvereinbarungen sowie Absprachen im Rahmen der Hochschulpartnerschaften zu beachten.

(5) Außerhalb des Hochschulsystems erworbene Kenntnisse und Fähigkeiten werden angerechnet, wenn sie nach Inhalt und Niveau den Studien- und Prüfungsleistungen gleichwertig sind, die ersetzt werden sollen und die Institution, in der die Kenntnisse und Fähigkeiten erworben wurden, ein genormtes Qualitätssicherungssystem hat. Die Anrechnung kann in Teilen versagt werden, wenn mehr als 50 Prozent des Hochschulstudiums ersetzt werden soll.

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(6) Zuständig für Anerkennung und Anrechnung ist der Prüfungsausschuss. Im Rahmen der Feststellung, ob ein wesentlicher Unterschied im Sinne des Absatz 1 vorliegt, sind die zuständigen Fachvertreter/innen zu hören. Der Prüfungsausschuss entscheidet in Abhängigkeit von Art und Umfang der anzurechnenden Studien- und Prüfungsleistungen über die Einstufung in ein höheres Fachsemester.

II. Bachelorprüfung

§ 20 Umfang und Art der Bachelorprüfung

(1) Die Bachelorprüfung besteht aus den Modulprüfungen nach Absatz 2 und 3 sowie dem Modul Bachelorarbeit (§ 14).

(2) Es sind Modulprüfungen in folgenden Pflichtfächern abzulegen:

1. Fach: Mathematisch - Naturwissenschaftliche Grundlagen
   Modul(e) im Umfang von 47 LP,
2. Fach: Ingenieurwissenschaftliche Grundlagen
   Modul(e) im Umfang von 38 LP,
3. Fach: Thermodynamik und Transportprozesse
   Modul(e) im Umfang von 26 LP,
4. Fach: Verfahrenstechnische Grundlagen
   Modul(e) im Umfang von 18 LP,
5. Fach: Wahlpflichtfächer
   Modul(e) im Umfang von 10 LP,
6. Fach: Praktika
   Modul(e) im Umfang von 11 LP,
7. Fach: Profilfach
   Module im Umfang von 12 LP
8. Fach: Überfachliche Qualifikationen
   im Umfang von mindestens 6 LP gemäß § 16.

Die Festlegung der zur Auswahl stehenden Module und deren Fachzuordnung werden im Modulhandbuch getroffen.

§ 21 Bestehen der Bachelorprüfung, Bildung der Gesamtnote

(1) Die Bachelorprüfung ist bestanden, wenn alle in § 20 genannten Modulprüfungen mindestens mit „ausreichend“ bewertet wurden.

(2) Die Gesamtnote der Bachelorprüfung errechnet sich als ein mit Leistungspunkten gewichteter Notendurchschnitt der Fachnoten sowie des Moduls Bachelorarbeit.

Dabei wird die Note des Moduls Bachelorarbeit mit dem doppelten Gewicht der Noten der übrigen Fächer berücksichtigt.

(3) Haben Studierende die Bachelorarbeit mit der Note 1,0 und die Bachelorprüfung mit einem Durchschnitt von 1,2 oder besser abgeschlossen, so wird das Prädikat „mit Auszeichnung“ (with distinction) verliehen.

§ 22 Bachelorzeugnis, Bachelorurkunde, Diploma Supplement und Transcript of Records

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(1) Über die Bachelorprüfung werden nach Bewertung der letzten Prüfungsleistung eine Bachelorurkunde und ein Zeugnis erstellt. Die Ausfertigung von Bachelorurkunde und Zeugnis soll nicht später als drei Monate nach Ablegen der letzten Prüfungsleistung erfolgen. Bachelorurkunde und Bachelorzeugnis werden in deutscher und englischer Sprache ausgestellt. Bachelorurkunde und Zeugnis tragen das Datum der erfolgreichen Erbringung der letzten Prüfungsleistung. Diese Dokumente werden den Studierenden zusammen ausgehändigt. In der Bachelorurkunde wird die Verleihung des akademischen Bachelorgrades beurkundet. Die Bachelorurkunde wird von dem Präsidenten und der KIT-Dekanin/ dem KIT-Dekan der KIT-Fakultät unterzeichnet und mit dem Siegel des KIT versehen.

(2) Das Zeugnis enthält die Fach- und Modulnoten sowie die den Modulen und Fächern zugeordnete Leistungspunkte und die Gesamtnote. Sofern gemäß § 7 Abs. 2 Satz 2 eine differenzierte Bewertung einzelner Prüfungsleitungen vorgenommen wurde, wird auf dem Zeugnis auch die entsprechende Dezimalnote ausgewiesen; § 7 Abs. 4 bleibt unberührt. Das Zeugnis ist von der KIT-Dekanin/dem KIT-Dekan der KIT-Fakultät und von der/dem Vorsitzenden des Prüfungsausschusses zu unterzeichnen.

(3) Mit dem Zeugnis erhalten die Studierenden ein Diploma Supplement in deutscher und englischer Sprache, das den Vorgaben des jeweils gültigen ECTS Users‘ Guide entspricht, sowie ein Transcript of Records in deutscher und englischer Sprache.

(4) Das Transcript of Records enthält in strukturierter Form alle erbrachten Studien- und Prüfungsleistungen. Dies beinhaltet alle Fächer und Fachnoten samt den zugeordneten Leistungspunkten, die dem jeweiligen Fach zugeordneten Module mit den Modulnoten und zugeordneten Leistungspunkten sowie die den Modulen zugeordneten Erfolgskontrollen samt Noten und zugeordneten Leistungspunkten. Absatz 2 Satz 2 gilt entsprechend. Aus dem Transcript of Records soll die Zugehörigkeit von Lehrveranstaltungen zu den einzelnen Modulen deutlich erkennbar sein. Angerechnete Studien- und Prüfungsleistungen sind im Transcript of Records aufzunehmen. Alle Zusatzleistungen werden im Transcript of Records aufgeführt.

(5) Die Bachelorurkunde, das Bachelorzeugnis und das Diploma Supplement einschließlich des Transcript of Records werden vom Studierendenservice des KIT ausgestellt.

III. Schlussbestimmungen

§ 23 Bescheinigung von Prüfungsleistungen

Haben Studierende die Bachelorprüfung endgültig nicht bestanden, wird ihnen auf Antrag und gegen Vorlage der Exmatrikulationsbescheinigung eine schriftliche Bescheinigung ausgestellt, die die erbrachten Studien- und Prüfungsleistungen und deren Noten enthält und erkennen lässt, dass die Prüfung insgesamt nicht bestanden ist. Dasselbe gilt, wenn der Prüfungsanspruch erloschen ist.

§ 24 Aberkennung des Bachelorgrades

(1) Haben Studierende bei einer Prüfungsleistung getäuscht und wird diese Tatsache nach der Aushändigung des Zeugnisses bekannt, so können die Noten der Modulprüfungen, bei denen getäuscht wurde, berichtigt werden. Gegebenenfalls kann die Modulprüfung für „nicht ausreichend“ (5,0) und die Bachelorprüfung für „nicht bestanden“ erklärt werden.

(2) Waren die Voraussetzungen für die Zulassung zu einer Prüfung nicht erfüllt, ohne dass Studierende darüber täuschen wollte, und wird diese Tatsache erst nach Aushändigung des Zeugnisses bekannt, wird dieser Mangel durch das Bestehen der Prüfung geheilt. Hat

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die/der Studierende die Zulassung vorsätzlich zu Unrecht erwirkt, so kann die Modulprüfung für „nicht ausreichend“ (5,0) und die Bachelorprüfung für „nicht bestanden“ erklärt werden.

(3) Vor einer Entscheidung des Prüfungsausschusses ist Gelegenheit zur Äußerung zu geben.

(4) Das unrichtige Zeugnis ist zu entziehen und gegebenenfalls ein neues zu erteilen. Mit dem unrichtigen Zeugnis ist auch die Bachelorurkunde einzuziehen, wenn die Bachelorprüfung aufgrund einer Täuschung für „nicht bestanden“ erklärt wurde.

(5) Eine Entscheidung nach Absatz 1 und Absatz 2 Satz 2 ist nach einer Frist von fünf Jahren ab dem Datum des Zeugnisses ausgeschlossen.

(6) Die Aberkennung des akademischen Grades richtet sich nach § 36 Abs. 7 LHG.

§ 25 Einsicht in die Prüfungsakten

(1) Nach Abschluss der Bachelorprüfung wird den Studierenden auf Antrag innerhalb eines Jahres Einsicht in das Prüfungsexemplar ihrer Bachelorarbeit, die darauf bezogenen Gutachten und in die Prüfungsprotokolle gewährt.

(2) Für die Einsichtnahme in die schriftlichen Modulprüfungen, schriftlichen Modulteilprüfungen bzw. Prüfungsprotokolle gilt eine Frist von einem Monat nach Bekanntgabe des Prüfungsergebnisses.

(3) Der/die Prüfende bestimmt Ort und Zeit der Einsichtnahme.

(4) Prüfungsunterlagen sind mindestens fünf Jahre aufzubewahren.

§ 26 Inkrafttreten, Übergangsvorschriften

[(1) Inkrafttreten, Übergangsvorschriften sind den o. g. Amtliche Bekanntmachungen des KIT zu entnehmen.]

(2) Gleichzeitig tritt die Studien- und Prüfungsordnung des KIT für den Bachelorstudiengang Chemieingenieurwesen und Verfahrenstechnik vom 27. September 2012 (Amtliche Bekanntmachung des KIT Nr. 55 vom 27. September 2012), zuletzt geändert durch Satzung vom 27. März 2014 (Amtliche Bekanntmachung des KIT Nr. 19 vom 28. März 2014), außer Kraft.

(3) Studierende, die auf Grundlage der Studien- und Prüfungsordnung für den Bachelorstudiengang Chemieingenieurwesen und Verfahrenstechnik vom 27. September 2012 (Amtliche Bekanntmachung des KIT Nr. 55 vom 27. September 2012), zuletzt geändert durch Satzung vom 27. März 2014 (Amtliche Bekanntmachung des KIT Nr. 19 vom 28. März 2014), ihr Studium am KIT aufgenommen haben, können Prüfungen auf Grundlage dieser Studien- und Prüfungsordnung letztmalig am 30. September 2022 ablegen.

[(4), (5) Übergangsvorschriften sind der Amtliche Bekanntmachung des KIT Nr. 5 vom 26. Februar 2020 zu entnehmen.]

(6) Die Studien- und Prüfungsordnung der Universität Karlsruhe (TH) für den Bachelorstudiengang Chemieingenieurwesen und Verfahrenstechnik vom 05. August 2009 (Amtliche Bekanntmachung der Universität Karlsruhe vom 05. August 2009, Nr. 69) geändert durch Satzung zur Änderung der Studien- und Prüfungsordnung des Universität Karlsruhe (TH) für den Bachelorstudiengang Chemieingenieurwesen und Verfahrenstechnik vom 14. April 2011 (Amtliche Bekanntmachung vom 14. April 2011, Nr. 15) tritt außer Kraft.“

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(7) Die Prüfungsordnung der Universität Karlsruhe (TH) für den Diplomstudiengang Chemieingenieurwesen und Verfahrenstechnik vom 21. Mai 1999 (Amtliche Bekanntmachung der Universität Karlsruhe (TH) Nr. 9 vom 6. Oktober 1999) in der Fassung der fünften Änderungssatzung vom 17. Dezember 2007 (Amtliche Bekanntmachung der Universität Karlsruhe (TH) Nr. 69 vom 20. Dezember 2007) bleibt außer Kraft.

Studierende, die auf Grundlage der Prüfungsordnung der Universität Karlsruhe (TH) für den Diplomstudiengang Chemieingenieurwesen und Verfahrenstechnik vom 21. Mai 1999 (Amtliche Bekanntmachung der Universität Karlsruhe (TH) Nr. 9 vom 6. Oktober 1999) in der Fassung der fünften Änderungssatzung vom 17. Dezember 2007 (Amtliche Bekanntmachung der Universität Karlsruhe (TH) Nr. 69 vom 20. Dezember 2007) ihr Studium an der Universität Karlsruhe (TH) aufgenommen haben, können die Diplomprüfung einschließlich etwaiger Wiederholungen letztmalig zum 30.09.2022 ablegen.

[Ende des Dokuments]

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