Karlsruher Institut für Technologie

Module Handbook
Materials Science and Engineering Bachelor 2017 (Bachelor of Science (B.Sc.))

SPO 2017

Summer term 2022

Date: 30/05/2022

KIT DEPARTMENT OF MECHANICAL ENGINEERING

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1 Field of study structure

Mandatory	
Orientation Exam *This field will not influence the calculated grade of its parent.*	
Bachelor's Thesis	15 CR
Fundamentals in Engineering Sciences	44 CR
Fundamentals in Natural Sciences	32 CR
Fundamentals in Materials Science	75 CR
Complementary Subject	8 CR
Interdisciplinary Qualifications	6 CR
Voluntary	
Master's Transfer Account *This field will not influence the calculated grade of its parent.*	

1.1 Orientation Exam

Mandatory		
M-MACH-100304	Orientation Exam	0 CR

1.2 Bachelor's Thesis

Credits
15

Mandatory		
M-MACH-103837	Bachelor's Thesis	15 CR

1.3 Fundamentals in Engineering Sciences

Credits
44

Mandatory		
M-MACH-100279	Engineering Mechanics I	7 CR
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1.4 Fundamentals in Natural Sciences

Credits
32

Mandatory		
M-PHYS-100283	Experimental Physics	16 CR
M-CHEMBIO-101115	Organic Chemistry for Engineers *First usage possible from 10/1/2019.*	5 CR
M-CHEMBIO-100285	Inorganic Chemistry	11 CR

1.5 Fundamentals in Materials Science

Credits
75

Mandatory		
M-CHEMBIO-100300	Rheology	6 CR
M-ETIT-100293	Passive Devices	5 CR
M-MACH-100287	Materials Physics and Metals	14 CR
M-MACH-100291	Structural Materials	6 CR
M-MACH-100294	Materials Processing Technology	6 CR
M-MACH-100296	Modelling and Simulation	5 CR
M-MACH-103767	Ceramics	11 CR
M-ETIT-103813	Electronic Properties of Solids	5 CR
M-CHEMBIO-100299	Applied Chemistry	5 CR
M-MACH-103840	Informatics	6 CR
M-CHEMBIO-100289	Polymers	6 CR

1.6 Complementary Subject

Credits
8

Mandatory		
M-MACH-103746	Elective Module	8 CR

1.7 Interdisciplinary Qualifications

Credits
6

Mandatory		
M-MACH-103765	Key Competences	6 CR

1.8 Master's 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-MACH-103710	Thermodynamics	6 CR
M-MACH-103711	Kinetics	6 CR
M-MACH-103712	Simulation	6 CR
M-MACH-103713	Properties	6 CR
M-MACH-103714	Materials Characterization	6 CR

Modelled Conditions
The following conditions have to be fulfilled:

1. You need to have earned at least 120 credits in the following fields:
    - Bachelor's Thesis
    - Complementary Subject
    - Fundamentals in Engineering Sciences
    - Fundamentals in Materials Science
    - Fundamentals in Natural Sciences
    - Interdisciplinary Qualifications

2 Modules

M 2.1 Module: Advanced Mathematics I [M-MATH-100280]

Responsible: Prof. Dr. Roland Griesmaier
Organisation: KIT Department of Mathematics
Part of: Fundamentals in Engineering 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 2.2 Module: Advanced Mathematics II [M-MATH-100281]

Responsible: Prof. Dr. Roland Griesmaier
Organisation: KIT Department of Mathematics
Part of: Fundamentals in Engineering 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 2.3 Module: Advanced Mathematics III [M-MATH-100282]

Responsible: Prof. Dr. Roland Griesmaier
Organisation: KIT Department of Mathematics
Part of: Fundamentals in Engineering 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 2.4 Module: Applied Chemistry (Ch_ABC_BSc_AWC) [M-CHEMBIO-100299]

Responsible: Dr. Nico Dingenouts
Organisation: KIT Department of Chemistry and Biosciences
Part of: Fundamentals in Materials Science

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

Mandatory			
T-CHEMBIO-100302	Applied Chemistry	5 CR	

M 2.5 Module: Bachelor's Thesis [M-MACH-103837]

Responsible: Prof. Dr.-Ing. Martin Heilmaier
Organisation: KIT Department of Mechanical Engineering
Part of: Bachelor's Thesis

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
15	Grade to a tenth	Each term	1 term	German	3	4

Mandatory			
T-MACH-107761	Bachelor's Thesis	12 CR	Heilmaier
T-MACH-107762	Presentation	3 CR	Heilmaier

Competence Certificate
The module Bachelor Thesis consists of a written bachelor thesis and an oral presentation of a scientific subject chosen by the student himself/herself or given by the supervisor. The bachelor thesis is designed to show that the student is able to deal with a problem of his/her subject area in an independent manner and within the given period of time using scientific methods.
The work load of the bachelor thesis corresponds to 12 ECTS. The maximal processing time of the bachelor thesis takes four months.
The date of issue of the subject has to be fixed by the supervisor and the student and to be put on record at the examination board. The subject of the bachelor thesis may be only returned once and only within the first month of processing time.
On a reasoned request of the student, the examination board can extend the processing time by up to one month. If the bachelor thesis is not completed in time, this examination is "failed" (5,0), unless the student is not responsible.
The bachelor thesis is to be evaluated by not less than a professor or a senior scientist according to § 14 Abs. 3 Ziff. 1 KITG or habilitated members of the KIT Department of Mechanical Engineering and another examiner. Generally, one of the two examiners is the person who has assigned the thesis.

If the examiners do not agree, the bachelor thesis is graded by the examination board within this assessment; another expert can be appointed too. The bachelor thesis has to be graded within a period of six weeks after the submission.
The colloquium presentation must be held within 4 weeks after the submission of the bachelor thesis. The presentation should last around 20 minutes, corresponds to 3 ECTS, and is followed by a scientific discussion with the present expert audience.

Prerequisites
The requirement for admission to the bachelor thesis module are 140 ECTS. As to exceptions, the examination board decides on a request of the student (see § 14 (1) SPO).

Modeled Conditions
The following conditions have to be fulfilled:

1. You need to have earned at least 140 credits in the following fields:
   - Complementary Subject
   - Fundamentals in Engineering Sciences
   - Fundamentals in Materials Science
   - Fundamentals in Natural Sciences
   - Interdisciplinary Qualifications

Competence Goal
The student is able to work independently on a defined, subject-relevant theme based on scientific criteria within a given period of time. The student is able to do research, to analyze information, to abstract as well as collect and recognize basic principles and regularities on the basis of less structured information. He/she overviews a question, is able to choose scientific methods and techniques, and use them to solve the question or to identify other potentials. In general, this will be carried out in consideration of social and/or ethical aspects.

The student can interpret, evaluate, and if needed plot the results obtained. He/she is able to clearly structure a scientific work and (a) to communicate it in written form using technical terminology as well as (b) to present it in oral form and discuss it with experts.

Content
The student shall be allowed to make suggestions for the topic of his/her bachelor thesis. The topic is set by the supervisor of the thesis in accordance with § 14 (3) SPO.

Workload
The workload for the preparation and presentation of the bachelor thesis is about 450 hours.

M 2.6 Module: Ceramics [M-MACH-103767]

Organisation: KIT Department of Mechanical Engineering
Part of: Fundamentals in Materials Science

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

Mandatory			
T-MACH-100287	Introduction to Ceramics	6 CR	Hoffmann
T-MACH-100289	Experimental Lab Course, Part B *This item will not influence the grade calculation of this parent.*	3 CR	Gorr, Oberacker, Seifert
T-MACH-100290	Seminar in Materials Science *This item will not influence the grade calculation of this parent.*	2 CR	Gruber, Wagner

Competence Certificate
oral exam and certificate

Prerequisites
None

M 2.7 Module: Continuum Mechanics [M-MACH-105180]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Prof. Dr.-Ing. Bettina Frohnapfel

Organisation:

Part of: Fundamentals in Engineering Sciences (Usage from 10/1/2019)

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

Mandatory			
T-MACH-110377	Continuum Mechanics of Solids and Fluids	4 CR	Böhlke, Frohnapfel
T-MACH-110333	Tutorial Continuum Mechanics of Solids and Fluids	1 CR	Böhlke, Frohnapfel

Competence Certificate
written exam, 90 min. The tutorials T-MACH-110333 are prerequisites to the exam.

Prerequisites
none

Competence Goal
After having finished this module the students can list principles of continuum mechanics of solids and fluids. They can apply methods of tensor calculus and analysis in the framework of Continuum Mechanics for concrete examples and name numerical concepts for solving problems in modelling solids and/or fluids. Moreover, the students are able to solve problems in modelling solids and/or fluids using commercial software codes.

Content
This module aims to teach students the theoretical and practical aspects of continuum mechanics of solids and liquids. At the beginning there is an introduction to tensor calculus and kinematics. Then the balance equations of mechanics and thermodynamics are treated. The module gives an overview of the material theory of solids and fluids. This also includes the field equations for solids and fluids. Beyond thermomechanical couplings, the module imparts knowledge in dimensional analysis.

Annotation
none

Workload
1. Attendance lecture and tutorials: 15 * 2 h + 15* 2 h = 60 h
2. Preparation and recap of lecture and tutorials: 15 * 3 h = 45 h
3. Exam preparation and presence during exam: 45 h

Recommendation
none

Learning type
Lecture, tutorial, consultation hours

Literature
see containded bricks

M 2.8 Module: Elective Module [M-MACH-103746]

Responsible: Dr. Patric Gruber
Organisation: KIT Department of Mechanical Engineering
Part of: Complementary Subject

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

Compulsary Elective Studies (Election: at least 8 credits)			
T-WIWI-102819	Business Administration: Finance and Accounting	4 CR	Ruckes, Uhrig-Homburg, Wouters
T-WIWI-102818	Business Administration: Production Economics and Marketing	4 CR	Fichtner, Klarmann, Lützkendorf, Ruckes, Schultmann
T-WIWI-102817	Business Administration: Strategic Management and Information Engineering and Management	3 CR	Nieken, Ruckes
T-CIWVT-103113	Biology for Engineers I	5 CR	Syldatk
T-CIWVT-103333	Biology for Engineers II	5 CR	Syldatk
T-MACH-102172	Bionics for Engineers and Natural Scientists	4 CR	Hölscher
T-MACH-100535	Introduction into Mechatronics	6 CR	Böhland, Reischl
T-ETIT-109078	Electromagnetical Fields	6 CR	Doppelbauer
T-ETIT-100533	Electrical Engineering for Business Engineers, Part I	3 CR	Menesklou
T-ETIT-100534	Electrical Engineering for Business Engineers, Part II	5 CR	Menesklou
T-MACH-104745	Basics in Measurement and Control Systems	8 CR	Stiller
T-MACH-110378	Mathematical Methods in Micromechanics	5 CR	Böhlke
T-MACH-110379	Tutorial Mathematical Methods in Micromechanics	1 CR	Böhlke
T-MACH-110375	Mathematical Methods in Continuum Mechanics	4 CR	Böhlke
T-MACH-110376	Tutorial Mathematical Methods in Continuum Mechanics	2 CR	Böhlke
T-MACH-110364	Mechanical Design Basics I, Tutorial	1 CR	Matthiesen
T-MACH-110365	Mechanical Design Basics II, Tutorial	1 CR	Matthiesen
T-MACH-110363	Mechanical Design Basics I and II	6 CR	Matthiesen
T-MACH-105208	Machines and Processes	8 CR	Bauer, Kubach, Maas, Pritz
T-MACH-105232	Machines and Processes, Prerequisite	0 CR	Bauer, Kubach, Maas, Pritz
T-CIWVT-101886	Mechanical Processing	6 CR	Dittler
T-PHYS-103629	Modern Physics	6 CR	Pilawa
T-PHYS-102323	Modern Physics for Computer Scientists	9 CR	Gieseke, Mühlleitner
T-MATH-102242	Numerical Mathematics for Students of Computer Science	6 CR	Rieder, Weiß, Wieners
T-CHEMBIO-100301	Physical Chemistry I	8 CR	
T-CHEMBIO-100538	Physical Chemistry II	7 CR	Klopper
T-MACH-100530	Physics for Engineers	5 CR	Dienwiebel, Gumbsch, Nesterov-Müller, Weygand
T-MACH-102126	Control Engineering and System Dynamics	5 CR	Stiller
T-MACH-105207	Fluid Mechanics 1&2	8 CR	Frohnapfel
T-MACH-100531	Systematic Materials Selection	4 CR	Dietrich, Schulze
T-MACH-100299	Engineering Mechanics III	5 CR	Seemann
T-WIWI-102708	Economics I: Microeconomics	5 CR	Puppe, Reiß
T-WIWI-102709	Economics II: Macroeconomics	5 CR	Wigger

Competence Certificate
Oral or written exams according to the choice. The success control is indicated in the description of each course.

Prerequisites
None

Competence Goal
The courses in the Elective module serve the comprehensive, in-depth examination of basics in selected areas of engineering and natural sciences.

Content
see detailed description of the content of the elective courses.

Workload
The work load results from the sum of work loads of the chosen courses.

Learning type
lectures, excercises

level 3

M 2.9 Module: Electronic Properties of Solids [M-ETIT-103813]

Responsible: apl. Prof. Dr. Alexander Colsmann
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: Fundamentals in Materials Science

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

Mandatory			
T-ETIT-107698	Electronic Properties of Solids	5 CR	Colsmann

Prerequisites
none

M 2.10 Module: Engineering Mechanics I [M-MACH-100279]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Dr.-Ing. Tom-Alexander Langhoff

Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals in Engineering Sciences

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

Mandatory			
T-MACH-100282	Engineering Mechanics I	7 CR	Böhlke, Langhoff
T-MACH-100528	Tutorial Engineering Mechanics I *This item will not influence the grade calculation of this parent.*	0 CR	Böhlke, Langhoff

Competence Certificate
written exam, 90 minutes; graded;

prerequisites EM I (see T-MACH-100528 "Engineering Mechanics I (Tutorial)"): they consist of solving problems of the work sheets in four categories: written mandatory homework, written homework, computational homework, colloquia.

The course T-MACH-100528 is passed if all mandatory written homework problems are passed and if in the other three categories (written homework problems, computational homework problems, colloquia) in total at most three attestations have been finally not passed, at most one in each of the three categories.

Successful participation in this course allows for registration to the Exam "Engineering Mechanics I" (see T-MACH-100282)

Prerequisites
none

Competence Goal
The students can

- perform the basic mathematical computations of vector calculus and differential and integral calculus applied to mechanical systems in engineering.
- analyse, based on the notion of force, different equilibrium systems, e.g. plane and spatial force systems on rigid bodies.
- master the computation of internal forces and moment for planar and spatial systems.
- in addition to the axion of equilibrium effectively apply the principle of virtual displacements
- analyse the stability of equilibrium configurations
- compute center of line, area, volume and mass for homogeneous and inhomogeneous bodies in 1D, 2D and 3D
- analyse the statics of undeformable ropes
- compute systems with static friction
- compute the internal forces and moments in the framework of statics of straight bars using linear elastic and linear thermo-elastic constitutive relations

Content
basics of vector calculus, force systems, statics of rigid bodies, internal forces and moments in bars and beams, center of gravity, center of mass, work, energy, principle of virtual work, elastostatics of tension-compression-bars, statics of undeformable ropes, friction

Annotation
none

Workload
regular attendance: 21,5 hours
self-study: 188,5 hours

Recommendation
none

Learning type
Lectures, Tutorials, Lab course groups, attestation of solved worksheets, colloquiua, consultation hours (optional)

Literature
is given in the lecture "Engineering Mechanics I"

Base for
Engineering Mechanics II

M 2.11 Module: Engineering Mechanics II [M-MACH-100284]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Dr.-Ing. Tom-Alexander Langhoff

Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals in Engineering Sciences

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

Mandatory			
T-MACH-100283	Engineering Mechanics II	6 CR	Böhlke, Langhoff
T-MACH-100284	Tutorial Engineering Mechanics II *This item will not influence the grade calculation of this parent.*	0 CR	Böhlke, Langhoff

Competence Certificate
written exam, 90 minutes; graded;

prerequisites EM II (see T-MACH-100284 "Engineering Mechanics II (Tutorial)"): they consist of solving problems of the work sheets in four categories: written mandatory homework, written homework, computational homework, colloquia.

The course T-MACH-100284 "Engineering Mechanics II (Tutorial)") is passed if all mandatory written homework problems are passed and if in the other three categories (written homework problems, computational homework problems, colloquia) in total at most two attestations have been finally not passed, at most one in each of the three categories.

Successful participation in this course allows for registration to the Exam "Engineering Mechanics II" (see T-MACH-100283)

Prerequisites
None

Competence Goal
The students can

- assess stress and strain distributions for the basic load cases within the framework of linear elasticity and linear thermoelasticity
- compute and evaluate 3D stress and strain states
- apply the principle of virtual displacements
- apply energy methods and evaluate approximate solutions
- evaluate the stability of equilibrium positions
- solve worksheet problems to topics of the lecture using the computer algebra system MAPLE

Content
bending; shear; torsion; stress and strain state in 3D; Hooke's law in 3D; elasticity theors in 3D; energy methods in elastostatics; approximation methods; stability

Annotation
none

Workload
regular attendance: 21,5 hours
self-study: 158,5 hours

Recommendation
none

Learning type
Lectures, Tutorials, Lab course groups, attestation of solved work sheets, colloquiua, consultation hours (optional)

Literature
is announced in the lecture "Engineering Mechanics II"

M 2.12 Module: Experimental Physics [M-PHYS-100283]

Responsible: Prof. Dr. Thomas Schimmel
Organisation: KIT Department of Physics
Part of: Fundamentals in Natural Sciences

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

Mandatory			
T-PHYS-100278	Experimental Physics	16 CR	Pilawa, Schimmel

Competence Certificate
The grade of the module is determined by a written exam.

Prerequisites
none

M 2.13 Module: Informatics [M-MACH-103840]

Responsible: Dr. Daniel Weygand
Organisation: KIT Department of Mechanical Engineering
Part of: Fundamentals in Materials Science

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

Mandatory			
T-MACH-107786	Informatics for Materials Science	6 CR	Weygand

Prerequisites
None

M 2.14 Module: Inorganic Chemistry [M-CHEMBIO-100285]

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

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

Mandatory			
T-CHEMBIO-100279	General and Inorganic Chemistry	5 CR	
T-CHEMBIO-100280	Inorganic Chemistry Laboratory Course *This item will not influence the grade calculation of this parent.*	6 CR	

Prerequisites
None

M 2.15 Module: Key Competences [M-MACH-103765]

Responsible: Prof. Dr.-Ing. Martin Heilmaier
Organisation: KIT Department of Mechanical Engineering
Part of: Interdisciplinary Qualifications

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

Competence Certificate
Certificate

Prerequisites
None

Competence Goal
After completing the module "Key Competences", students can:

- define and coordinate work steps, projects and goals, proceed systematically and purposefully, set priorities, identify insignificance and assess the feasibility of a task,
- apply the principles of safeguarding good scientific practice,
- describe and apply methods for planning a specific task under given conditions in a goal-oriented and resource-oriented manner,
- describe methods for scientific research and selection of subject information according to pre-established quality criteria and apply them to given problems,
- professionally evaluate the quality of a reference,
- discuss empirical methods and apply them to selected examples,
- present technical information in a clear, legible and convincingly argued manner in various forms (e.g. poster, exposé, abstract) in writing and visualize it graphically (e.g. design drawings, flowcharts),
- present and defend technical content in a convincing and appealing way
- work in a heterogeneous team in a task-oriented manner, manage and solve conflicts on their own and take responsibility for themselves and others,
- communicate constructively in a team in a goal-oriented and interpersonal manner, represent one's own interests, reflect and take into account the interests of others in their own words, and successfully form the course of the conversation.

Content
The module "Key Competences" form freely selectable courses from the offer of the KIT-House of Competence (HoC), the KIT Language Center (SPZ) and the Center for Applied Cultural Science and Studium Generale (ZAK) with a total of at least 6 credits. Upon request, the Examination Board may approve further courses as elective subjects in the module "Key Competences".

Workload
The work load results from the sum of work loads of the chosen courses.

M 2.16 Module: Kinetics [M-MACH-103711]

Responsible: Prof. Dr. Hans Jürgen Seifert
Organisation: KIT Department of Mechanical Engineering

Part of: Master's Transfer Account

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

Election notes
The module can be passed either in English or in German. The selection is set by the combined allocation of the corresponding courses in English or in German including all associated assessments. The courses in English and in German are mutually exclusive. The preparatory courses (“exercises“) are compulsory and are a prerequisite for the superordinate course in the same teaching language.

Compulsory Elective Subjects (Election: 2 items as well as 6 credits)			
T-MACH-107632	Exercises for Solid State Reactions and Kinetics of Phase Transformations	2 CR	Franke, Seifert
T-MACH-107667	Solid State Reactions and Kinetics of Phase	4 CR	Franke, Seifert
T-MACH-110926	Exercises for Solid State Reactions and Kinetics of Phase Transformations	2 CR	Franke, Gorr, Seifert
T-MACH-110927	Solid State Reactions and Kinetics of Phase	4 CR	Gorr, Seifert

Competence Certificate
The assessment consists of a certificate and an oral exam (about 30 minutes).

Prerequisites
none

Competence Goal
The students acquire knowledge about:

- diffusion mechanisms
- Fick’s laws
- basic solutions of the diffusion equation
- evaluation of diffusion experiments
- interdiffusion processes
- the thermodynamic factor
- parabolic growth of layers
- formation of pearlite
- microstructural transformations according to the models of Avrami and Johnson-Mehl
- TTT diagrams

Content
1. Crystal Defects and Mechanisms of Diffusion
2. Microscopic Description of Diffusion
3. Phenomenological Treatment
4. Diffusion Coefficients
5. Diffusion Problems; Analytical Solutions
6. Diffusion with Phase Transformation
7. Kinetics of Microstructural Transformations
8. Diffusion at Surfaces, Grain Boundaries and Dislocations
9. Numerical treatment of diffusion controlled phase transformations

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

Annotation
The participation in Exercises for Solid State Reactions and Kinetics of Phase Transformations is obligatory.

Workload
The workload for the module “Kinetics” is 180 h per semester and consists of the presence during the lectures (21 h) and tutorials (12 h) as well as self-study for the lecture (99 h) and for the tutorials (48 h).

Recommendation
- Basic course in materials science and engineering
- Basic course in mathematics
- physics or physical chemistry

Knowledge of the course "Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria" (Seifert).

Learning type
Lectures (Obligatory)
Tutorials (Obligatory)

Literature
1. J. Crank, „The Mathematics of Diffusion“, 2nd Ed., Clarendon Press, Oxford, 1975.
2. J. Philibert, „Atom Movements“, Les Éditions de Physique, Les Ulis, 1991.
3. D.A. Porter, K.E. Easterling, M.Y. Sherif, „Phase Transformations in Metals and Alloys“, 3rd edition, CRS Press, 2009.
4. H. Mehrer, „Diffusion in Solids“, Springer, Berlin, 2007.

M 2.17 Module: Materials Characterization [M-MACH-103714]

Responsible: Prof. Dr.-Ing. Martin Heilmaier
Organisation: KIT Department of Mechanical Engineering
Part of: Master's Transfer Account

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

Election notes
The module can be passed either in English or in German. The selection is set by the combined allocation of the corresponding courses in English or in German including all associated assessments. The courses in English and in German are mutually exclusive. The preparatory courses (“exercises“) are compulsory and are a prerequisite for the superordinate course in the same teaching language.

Compulsory Elective Subjects (Election: 2 items as well as 6 credits)			
T-MACH-107684	Materials Characterization	4 CR	Gibmeier, Schneider
T-MACH-107685	Exercises for Materials Characterization	2 CR	Gibmeier, Schneider
T-MACH-110946	Materials Characterization	4 CR	Gibmeier, Schneider
T-MACH-110945	Exercises for Materials Characterization	2 CR	Gibmeier, Schneider

Competence Certificate
The assessment consists of a certificate and an oral exam (about 25 minutes).

Prerequisites
none

Competence Goal
The students have fundamental knowledge about methods of material analysis. They have a basic understanding to transfer this fundamental knowledge on problems in engineering science. Furthermore, the students have the ability to describe technical material by its microscopic and submicroscopic structure.

Content
The following methods will be introduced within this module:

- microscopic methods: optical microscopy, electron microscopy (SEM/TEM), atomic force microscopy
- material and microstructure analyses by means of X-ray, neutron and electron beams
- analysis methods at SEM/TEM (e.g. EELS)
- spectroscopic methods (e.g. EDS / WDS)

Workload
The workload for the module “Materials Characterization” is 180 h per semester and consists of the presence during the lectures (21 h) and tutorials (12 h) as well as self-study for the lecture (99 h) and for the tutorials (48 h).

Learning type
Lectures (Obligatory)
Tutorials (Obligatory)

Literature
Lecture notes (will be provided at the beginning of the lecture).

Literature will be announced at the beginning of the lecture.

M 2.18 Module: Materials Physics and Metals [M-MACH-100287]

Responsible: Prof. Dr.-Ing. Martin Heilmaier
Prof. Dr. Oliver Kraft

Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals in Materials Science

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

Mandatory			
T-MACH-100285	Materials Physics and Metals	12 CR	Heilmaier, Pundt
T-MACH-100286	Experimental Lab Course, Part A *This item will not influence the grade calculation of this parent.*	2 CR	Heilmaier

Competence Certificate
oral exam and certificate

M 2.19 Module: Materials Processing Technology [M-MACH-100294]

Responsible: Dr. Joachim Binder
Dr.-Ing. Wilfried Liebig
Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals in Materials Science

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

Mandatory			
T-MACH-100295	Materials Processing Technology	6 CR	Binder, Liebig

Competence Certificate
Oral exam (lecture + lab course), approx. 25 min, lab course "materials Processing" has to be finished successfully.

Prerequisites
None

Competence Goal
The students are able to name the different materials processing techniques, can describe their basic principles and allocate them to the different classes of materials processing methods.

They can choose specific processing techniques based on given problems and consider constraints derived from their basic knowledge in materials science.

The students are able to carry out simple experiments with lab scale equipment. They can correlate the processing parameters with resulting material properties by analyzing the materials using adequate testing methods which have to be chosen, evaluated and documented suitable to the problems given.

Content
Introduction

Classification of processing technologies, Processing selection

Polymers:

Raw materials, materials laws and models, rheology, moulding, forming, joining

Ceramics:

raw materials, powder synthesis, additives, moulding and forming of glass, moulding, abrasive techniques, changing properties, final processing

metals:

raw materials, materials processing, moulding, forming, cutting, joining

semiconductors:

raw materials, moulding, changing properties

Summary

Annotation
Lecture: lecture notes, slides + beamer, blackboard

Lab course: experimental equipment, paper, pencil, lab course notes, calculator

Workload
The workload for the lecture “materials processing technology” is 180 h per semester and consists of the presence during the lectures (36 h) including tutorials, presence during the lab course (12 h), preparation and rework time at home (72 h) and preparation time for the oral exam (60 h).

Learning type
Lectures (Obligatory)
Tutorials (Obligatory)
Lab Course (Obligatory)

Literature
Presentation slides and additional lecture notes are handed out during the lecture, additional literature recommendations given

M 2.20 Module: Modelling and Simulation [M-MACH-100296]

Responsible: Prof. Dr. Britta Nestler
Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals in Materials Science

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

Mandatory			
T-MACH-100300	Modelling and Simulation	5 CR	Gumbsch, Nestler

Competence Certificate
written examination: 90 minutes

Competence Goal
The student can

- explain the basic algorithms and numerical methods which are beside other applications relevant for materials simulations.
- describe and apply numerical solution methods for partial differential equations and dynamical systems
- apply numerical methods to solve heat and mass diffusion problems which can also be used to model microstructure formation processes
- has experiences in how to implement and program the introduced numerical methods from an integrated computer lab.

Content
The course gives an introduction to modelling and simulation techniques.
The following topics are included:

- splines, interpolation methods, Taylor series
- finite difference method
- dynamical systems
- numerics of partial differential equations
- mass and heat diffusion
- microstructure simulation
- parallel and adaptive algorithms
- high performance computing
- practical exercises

Workload
regular attendance: 22,5 hours lecture, 11,5 hours exercises
self-study: 116 hours

Recommendation
preliminary knowlegde in mathematics, physics and materials science

M 2.21 Module: Organic Chemistry for Engineers (CIW-CHEM-04) [M-CHEMBIO-101115]

Responsible: Prof. Dr. Michael Meier
Organisation: KIT Department of Chemistry and Biosciences
Part of: Fundamentals in Natural Sciences (Usage from 10/1/2019)

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 2.22 Module: Orientation Exam [M-MACH-100304]

Organisation: University
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-MACH-100285	Materials Physics and Metals	12 CR	Heilmaier, Pundt

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

Annotation
For students who are or were enrolled in a degree program in the summer semester 2020, winter semester 2020/2021, summer semester 2021, or winter semester 2021/2022, the deadline for taking the orientation exam has been extended by one semester in each case (section 32 (5 a), sentence 1 LHG).
This means that the deadline has been extended for
- students enrolled in one of the above semesters in the same program by one semester;
- students enrolled in two of the above semesters in the same program by two semesters;
- students enrolled in three or more of the above semesters in the same program by a maximum of three semesters.

M 2.23 Module: Passive Devices [M-ETIT-100293]

Responsible: apl. Prof. Dr. Alexander Colsmann
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: Fundamentals in Materials Science

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

Mandatory			
T-ETIT-100292	Passive Components	5 CR	Colsmann

Prerequisites
none

M 2.24 Module: Polymers [M-CHEMBIO-100289]

Responsible: Prof. Dr. Manfred Wilhelm
Organisation: KIT Department of Chemistry and Biosciences
Part of: Fundamentals in Materials Science

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

Mandatory			
T-CHEMBIO-100294	Polymers	6 CR	

Prerequisites
None

M 2.25 Module: Production Operations Management [M-MACH-100297]

Responsible: Prof. Dr.-Ing. Kai Furmans
Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals in Engineering Sciences

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

Mandatory			
T-MACH-100304	Production Operations Management	3 CR	Furmans, Lanza, Schultmann
T-MACH-108734	Production Operations Management-Project	2 CR	Furmans, Lanza

Competence Certificate
The success control takes place in the form of partial examinations in the individual courses of the module. These are a written exam (duration: 90 minutes) and a different type of examination. The module grade is made up of the grades of the courses in the module weighted by credit points.

Prerequisites
none

Competence Goal
If you successfully passed this course you will be able to:

- state the relevant technical terms of business administration, logistics and production engineering
- describe the interrelation between these technical terms
- describe the most important decision problems qualitatively and quantitatively
- apply the appropriate decision models to solve the respective decision problems
- critically evaluate the results and draw appropriate conclusions
- extend the learned methods and models by researching on you own

Content
The institutes alternate with each cycle. Basic skills about the planning and operation of a production plant are taught. The lecture covers the basics of operations and supply chain management as well as business management basics in accounting, investment calculation and legal forms.

Annotation
It is a joint module of the Institute of Materials Handling and Logistics (IFL) and the Institute of Production Science (WBK).

For the Bachelor's program Mechanical Engineering the module (including all brick details, exams and courses) is offered in German.

For the Bachelor's program Mechanical Engineering (International) the module (including all brick details, exams and courses) is offered in English.

Workload
Attendance time: 42 hours,

Self-study: 108 hours

Learning type

1. Lectures (Obligatory)
2. Tutorials (Obligatory)
3. Group work (Obligatory)
4. Oral defense of the group work (Obligatory)

M 2.26 Module: Properties [M-MACH-103713]

Responsible: Dr. Patric Gruber
Prof. Dr. Christoph Kirchlechner
Organisation: KIT Department of Mechanical Engineering
Part of: Master's Transfer Account

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each term	1 term	German/English	4	3

Election notes
The module can be passed either in English or in German. The selection is set by the combined allocation of the corresponding courses in English or in German including all associated assessments. The courses in English and in German are mutually exclusive. The preparatory courses (“exercises“) are compulsory and are a prerequisite for the superordinate course in the same teaching language.

Compulsory Elective Subjects (Election: 2 items as well as 6 credits)			
T-MACH-107683	Exercises for Microstructure-Property-Relationships	2 CR	Gruber, Kirchlechner
T-MACH-107604	Microstructure-Property-Relationships	4 CR	Gruber, Kirchlechner
T-MACH-110930	Exercises for Microstructure-Property-Relationships	2 CR	Gruber, Kirchlechner
T-MACH-110931	Microstructure-Property-Relationships	4 CR	Gruber, Kirchlechner

Competence Certificate
The assessment consists of a certificate and an oral exam (about 30 minutes).

Prerequisites
None

Competence Goal
The students fundamentally understand the interrelation between the microstructure and the properties of a material. This interrelation will be elaborated for mechanical properties (elasticity, plasticity, fracture, fatigue, creep) as well as functional properties (conductivity, magnetic properties) for all material classes, respectively. The students are able to phenomenological describe the material properties, to explain the underlying physical mechanisms and to understand how the properties can be specifically modified by the microstructure of the material. In the other way they are able to deduce the mechanical and functional properties of a material on the basis of its microstructure

Content
The following microstructure-property-relationships will be discussed for all material classes:

- Elasticity and plasticity
- Fracture mechanics
- Fatigue
- Creep
- Electrical conductivity: Metallic conductors, semiconductors, superconductors, conductive polymers
- Magnetic properties und materials

In addition to the phenomenological description and physical explanation of the material properties an overview on the corresponding experimental techniques will be given.

Workload
The workload for the module “Properties” is 180 h per semester and consists of the presence during the lectures (33 h) and tutorials (12 h) as well as self-study for the lecture (87 h) and for the tutorials (48 h).

Learning type
Lectures (Obligatory)
Tutorials (Obligatory)

M 2.27 Module: Rheology [M-CHEMBIO-100300]

Responsible: Prof. Dr. Manfred Wilhelm
Organisation: KIT Department of Chemistry and Biosciences
Part of: Fundamentals in Materials Science

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

Mandatory			
T-CHEMBIO-100303	Introduction to Rheology	6 CR	

M 2.28 Module: Simulation [M-MACH-103712]

Responsible: Prof. Dr. Peter Gumbsch
Organisation: KIT Department of Mechanical Engineering
Part of: Master's Transfer Account

Credits	Grading scale	Recurrence	Duration	Language	Level	Version
6	Grade to a tenth	Each summer term	1 term	German/English	4	3

Election notes
The module can be passed either in English or in German. The selection is set by the combined allocation of the corresponding courses in English or in German including all associated assessments. The courses in English and in German are mutually exclusive. The preparatory courses (“exercises“) are compulsory and are a prerequisite for the superordinate course in the same teaching language.

Compulsory Elective Subjects (Election: 2 items as well as 6 credits)			
T-MACH-107671	Exercises for Applied Materials Simulation	2 CR	Gumbsch, Schneider
T-MACH-105527	Applied Materials Simulation	4 CR	Gumbsch, Schneider
T-MACH-110928	Exercises for Applied Materials Simulation	2 CR	Gumbsch, Schneider
T-MACH-110929	Applied Materials Simulation	4 CR	Gumbsch, Schneider

Competence Certificate
The assessment consists of a certificate and an oral exam (about 30 minutes).

Prerequisites
None

Competence Goal
The student can

- define different numerical methods and distinguish their range of application
- approach issues by applying the finite element method and discuss the processes and results
- understand complex processes of metal forming and crash simulation and discuss the structural and material behavior
- define and apply the physical fundamentals of particle-based simulation techniques to applications of materials science
- illustrate the range of application of atomistic simulation methods
- name and discuss the possibilities and challenges of simulation approaches on different scales

Content
The modul introduces a general overview of different numerical methods and their range of application in materials science and engineering. A basic introduction to numerial methods is given and their application in different fields and scales is shown and discussed. Based on theoretical as well as practical aspects, the opportunities and challenges of numerical materials simulation is evaluated.

Workload
The workload for the modul “Simulation” is 180 h per semester and consists of the presence during the lectures (33 h) and tutorials (12 h) as well as self-study for the lecture (87 h) and for the tutorials (48 h).

Learning type
lecture, exercise

M 2.29 Module: Structural Materials [M-MACH-100291]

Responsible: Dr. Karl-Heinz Lang
Organisation: KIT Department of Mechanical Engineering

Part of: Fundamentals in Materials Science

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

Mandatory			
T-MACH-100293	Structural Materials	6 CR	Guth

Competence Certificate
oral exam about 25 minutes

M 2.30 Module: Thermodynamics [M-MACH-103710]

Responsible: Prof. Dr. Hans Jürgen Seifert
Organisation: KIT Department of Mechanical Engineering

Part of: Master's Transfer Account

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

Election notes
The module can be passed either in English or in German. The selection is set by the combined allocation of the corresponding courses in English or in German including all associated assessments. The courses in English and in German are mutually exclusive. The preparatory courses (“exercises“) are compulsory and are a prerequisite for the superordinate course in the same teaching language

Compulsory Elective Subjects (Election: 2 items as well as 6 credits)			
T-MACH-107669	Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria	2 CR	Seifert
T-MACH-107670	Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria	4 CR	Franke, Seifert
T-MACH-110924	Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria	2 CR	Seifert
T-MACH-110925	Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria	4 CR	Franke, Seifert

Competence Certificate
The assessment consists of a certificate and an oral exam (about 30 minutes).

Prerequisites
none

Competence Goal
The students know about the constitution (heterogeneous equilibria, phase diagrams) of binary, ternary and multi-component materials systems. They are able to analyze the thermodynamic properties of single and multiphase materials and their reactions with gas and liquid phases, respectively. The can apply the learned relationships to questions of production, joining, and applications of engineering materials (metallic alloy, technical ceramics, composites).

Content
1. Binary phase diagrams
2. Ternary phase diagrams
- Complete solubility
- Eutectic systems
- Peritectic systems
- Systems with transition reactions
- Systems with intermetallic phases
3. Thermodynamics of solution phases
4. Materials reactions involving pure condensed phases and a gaseous phase
5. Reaction equilibria in systems containing components in condensed solutions
6. Thermodynamics of multicomponent multiphase materials systems
7. Calculation of Phase Diagrams (CALPHAD)

Module grade calculation
- The module grade is equal to the grade of the oral exam

Annotation
The participation in Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria is obligatory.

Workload
The workload for the module “Thermodynamics” is 180 h per semester and consists of the presence during the lectures (21 h) and tutorials (12 h) as well as self-study for the lecture (99 h) and for the tutorials (48 h).

Recommendation
- Basic course in materials science and engineering
- Basic Course in mathematics
- physics or physical chemistry

Knowledge of the course "Solid State Reactions and Kinetics of Phase Transformations" (P. Franke).

Learning type
Lectures (Obligatory)
Tutorials (Obligatory)

Literature
1. Phase Equilibria, Phase Diagrams and Phase Transformations, Their Thermodynamic Basis; M. Hillert, University Press, Cambridge (2007)

2. Introduction to the Thermodynamics of Materials; D.R. Gaskell, Taylor & Francis (2008)

3 Courses

T 3.1 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-MACH-100304 - 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 21/22	0131000	Höhere Mathematik I für die Fachrichtung Maschinenbau, Geodäsie, Materialwissenschaft und Werkstofftechnik	4 SWS	Lecture /	Griesmaier
WT 21/22	0131200	Höhere Mathematik I für die Fachrichtungen Chemieingenieurwesen, Verfahrenstechnik, Bioingenieurwesen und MIT	4 SWS	Lecture /	Griesmaier

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

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 3.2 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 2022	0180800	Höhere Mathematik II für die Fachrichtungen Maschinenbau, Geodäsie, Materialwissenschaft und Werkstofftechnik	4 SWS	Lecture	Arens
ST 2022	0181000	Höhere Mathematik II für die Fachrichtungen Chemieingenieurwesen, Verfahrenstechnik, Bioingenieurwesen und MIT	4 SWS	Lecture	Arens

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 3.3 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 21/22	0131400	Höhere Mathematik III für die Fachrichtungen Maschinenbau, Chemieingenieurwesen, Verfahrenstechnik, Bioingenieurwesen und das Lehramt Maschinenbau	4 SWS	Lecture /	Hettlich

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

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 3.4 Course: Applied Chemistry [T-CHEMBIO-100302]

Organisation: KIT Department of Chemistry and Biosciences
Part of: M-CHEMBIO-100299 - Applied Chemistry

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

T 3.5 Course: Applied Materials Simulation [T-MACH-105527]

Responsible: Prof. Dr. Peter Gumbsch
Dr.-Ing. Johannes Schneider

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103712 - Simulation

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	3

Events					
ST 2022	2182614	Applied Materials Simulation	4 SWS	Lecture / Practice (/	Gumbsch, Schulz

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

Competence Certificate
oral exam ca. 30 minutes

no tools or reference materials

Prerequisites
The successful participation in Übungen zu Angewandte Werkstoffsimulation is the condition for the admittance to the oral exam in Angewandte Werkstoffsimulation.

T-MACH-110928 – Exercises for Applied Materials Simulation has not been started.

T-MACH-110929 – Applied Materials Modelling has not been started.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-107671 - Exercises for Applied Materials Simulation must have been passed.
2. The course T-MACH-110929 - Applied Materials Simulation must not have been started.
3. The course T-MACH-110928 - Exercises for Applied Materials Simulation must not have been started.

T 3.6 Course: Applied Materials Simulation [T-MACH-110929]

Responsible: Prof. Dr. Peter Gumbsch
Dr.-Ing. Johannes Schneider

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103712 - Simulation

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2022	2182616	Applied Materials Simulation	4 SWS	Lecture / Practice (/	Schulz, Gumbsch

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

Competence Certificate
oral exam ca. 30 minutes

no tools or reference materials

Prerequisites
The successful participation in Exercises for Applied Materials Simulation is the condition for the admittance to the oral exam in Applied Materials Simulation.

T-MACH-107671 – Übungen zu Angewandte Werkstoffsimulation has not been started.

T-MACH-105527 – Angewandte Werkstoffsimulation has not been started.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110928 - Exercises for Applied Materials Simulation must have been passed.
2. The course T-MACH-105527 - Applied Materials Simulation must not have been started.
3. The course T-MACH-107671 - Exercises for Applied Materials Simulation must not have been started.

T 3.7 Course: Bachelor's Thesis [T-MACH-107761]

Responsible: Prof. Dr.-Ing. Martin Heilmaier
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-103837 - Bachelor's Thesis

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

Competence Certificate
The bachelor thesis is designed to show that the student is able to deal with a problem of his/her subject area in an independent manner and within the given period of time using scientific methods.

The work load of the bachelor thesis corresponds to 12 ECTS. The maximal processing time of the bachelor thesis takes four months. The date of issue of the subject has to be fixed by the supervisor and the student and to be put on record at the examination board. The subject of the bachelor thesis may be only returned once and only within the first month of processing time.

On a reasoned request of the student, the examination board can extend the processing time by up to one month. If the bachelor thesis is not completed in time, this examination is "failed" (5,0), unless the student is not responsible.

The bachelor thesis is to be evaluated by not less than a professor or a senior scientist according to § 14 Abs. 3 Ziff. 1 KITG or habilitated members of the KIT Department of Mechanical Engineering and another examiner. Generally, one of the two examiners is the person who has assigned the thesis. If the examiners do not agree, the bachelor thesis is graded by the examination board within this assessment; another expert can be appointed too. The bachelor thesis has to be graded within a period of six weeks after the submission.

Prerequisites
The requirement for admission to the bachelor thesis module are 140 ECTS. As to exceptions, the examination board decides on a request of the student (see § 14 (1) SPO).

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

Submission deadline	4 months
Maximum extension period	1 months
Correction period	6 weeks

Annotation
The workload for the preparation of the bachelor thesis is about 360 hours.

T 3.8 Course: Basics in Measurement and Control Systems [T-MACH-104745]

Responsible: Prof. Dr.-Ing. Christoph Stiller
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103746 - Elective Module

Type	Credits	Grading scale	Recurrence	Version
Written examination	8	Grade to a third	Each winter term	3

Events					
WT 21/22	2137301	Measurement and Control Systems	3 SWS	Lecture / 🗣	Stiller
WT 21/22	2137302	Measurement and Control Systems (Tutorial)	1 SWS	Practice / 🗣	Stiller, Fischer, Le Large
WT 21/22	3137020	Measurement and Control Systems	3 SWS	Lecture / 🗣	Stiller
WT 21/22	3137021	Measurement and Control Systems (Tutorial)	1 SWS	Practice / 🗣	Stiller, Le Large, Fischer

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

Competence Certificate
written exam

2,5 hours

Prerequisites
Either "Basics in Measurement and Control Systems“ or "Control Engineering and System Dynamics“ can be chosen within the Focal Course.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-102126 - Control Engineering and System Dynamics must not have been started.

T 3.9 Course: Biology for Engineers I [T-CIWVT-103113]

Responsible: Prof. Dr. Christoph Syldatk
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-MACH-103746 - Elective Module

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

Events					
WT 21/22	22405	Biology for Engineers I	4 SWS	Lecture /	Neumann, Gottwald

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

Competence Certificate
This module is successfully completed by a written exam of 180 min (according to § 4 Abs. 2 SPO).

Prerequisites
None

T 3.10 Course: Biology for Engineers II [T-CIWVT-103333]

Responsible: Prof. Dr. Christoph Syldatk
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-MACH-103746 - Elective Module

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

Events					
WT 21/22	22407	Biology for Engineers II - Microbiology	2 SWS	Lecture /	Syldatk
ST 2022	22406	Biology for Engeneers II	2 SWS	Lecture /	Rudat

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

Prerequisites
None

T 3.11 Course: Bionics for Engineers and Natural Scientists [T-MACH-102172]

Responsible: apl. Prof. Dr. Hendrik Hölscher
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103746 - Elective Module

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Competence Certificate
written or oral exam

Prerequisites
none

T 3.12 Course: Business Administration: Finance and Accounting [T-WIWI-102819]

Responsible: Prof. Dr. Martin Ruckes
Prof. Dr. Marliese Uhrig-Homburg
Prof. Dr. Marcus Wouters

Organisation: KIT Department of Economics and Management

Part of: M-MACH-103746 - Elective Module

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each winter term	1

Events					
WT 21/22	2610029		2 SWS	Tutorial (	Strych

Competence Certificate
The assessment consists of a written exam (90 min.) according to Section 4(2), 1 of the examination regulation.

The assessment takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

T 3.13 Course: Business Administration: Production Economics and Marketing [T-WIWI-102818]

Responsible: Prof. Dr. Wolf Fichtner
Prof. Dr. Martin Klarmann
Prof. Dr.-Ing. Thomas Lützkendorf
Prof. Dr. Martin Ruckes
Prof. Dr. Frank Schultmann

Organisation: KIT Department of Economics and Management

Part of: M-MACH-103746 - Elective Module

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	1

Competence Certificate
The assessment consists of a written exam (90 minutes) according to Section 4(2), 1 of the examination regulation.

Prerequisites
None

T 3.14 Course: Business Administration: Strategic Management and Information Engineering and Management [T-WIWI-102817]

Responsible: Prof. Dr. Petra Nieken
Prof. Dr. Martin Ruckes
Organisation: KIT Department of Economics and Management
Part of: M-MACH-103746 - Elective Module

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Competence Certificate
The assessment consists of a written exam (90 min.) according to Section 4(2), 1 of the examination regulation.

The assessment takes place in every semester. Re-examinations are offered at every ordinary examination date.

Prerequisites
None

T 3.15 Course: Continuum Mechanics of Solids and Fluids [T-MACH-110377]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Prof. Dr.-Ing. Bettina Frohnapfel
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105180 - Continuum Mechanics

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	4	Grade to a third	Each winter term	1 terms	2

Events					
WT 21/22	2161252	Continuum mechanics of solids and fluids	2 SWS	Lecture /	Böhlke, Frohnapfel

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

Competence Certificate
Written examination (90 min). Additives as announced

Prerequisites
passing the corresponding "Tutorial Continuum Mechanics of Solids and Fluids" (T-MACH-110333)

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110333 - Tutorial Continuum Mechanics of Solids and Fluids must have been passed.

Annotation
Due to capacity reasons it is possible that not all students of this course can be admitted to the computer tutorials. Students of the bachelor's degree program in mechanical engineering who have chosen the Major Field Continuum Mechanics (SP-Nr 13) and students of the bachelor's degree program in material science and material technology will be admitted to the computer tutorials in any case.
If additional places are available in the computer tutorials for this course, these will be allocated according to the BSc average grade.

T 3.16 Course: Control Engineering and System Dynamics [T-MACH-102126]

Responsible: Prof. Dr.-Ing. Christoph Stiller
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103746 - Elective Module

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

Events					
ST 2022	2138332	Control Engineering and System Dynamics	2 SWS	Lecture / 🗣	Stiller
ST 2022	2138333	Exercises on control engineering and system dynamics	1 SWS	Practice / 🗣	Stiller, Fischer, Le Large

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

Competence Certificate
written exam

Prerequisites
Either "Basics in Measurement and Control Systems“ or "Control Engineering and System Dynamics“ can be chosen within the Focal Course.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-104745 - Basics in Measurement and Control Systems must not have been started.

T 3.17 Course: Economics I: Microeconomics [T-WIWI-102708]

Responsible: Prof. Dr. Clemens Puppe
Prof. Dr. Johannes Philipp Reiß

Organisation: KIT Department of Economics and Management

Part of: M-MACH-103746 - Elective Module

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

Events					
WT 21/22	2610012	Economics I: Microeconomics	3 SWS	Lecture /	Puppe, Kretz

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

Competence Certificate
The assessment consists of a written exam (120 min) following §4, Abs. 2, 1 of the examination regulation.

The main exam takes place subsequent to the lectur. The re-examination is offered at the same examination period. As a rule, only repeating candidates are entitled for taking place the re-examination. For a detailed description on the exam regulations see the information of the respective chair.

Prerequisites
None

T 3.18 Course: Economics II: Macroeconomics [T-WIWI-102709]

Responsible: Prof. Dr. Berthold Wigger
Organisation: KIT Department of Economics and Management
Part of: M-MACH-103746 - Elective Module

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

Events					
ST 2022	2600014	Economics II: Macroeconomics	4 SWS	Lecture	Wigger
ST 2022	2660015	Economics II : Macroeconomics, Tutorial	2 SWS	Tutorial (	Schmelzer, Setio, Herberholz

Competence Certificate
Depending on further pandemic developments, the examination will be offered either as a 120-minute written examination (written examination according to SPO § 4 Abs. 2, Pkt. 1) or as an open-book examination (alternative exam assessment according to SPO § 4 Abs. 2, Pkt. 3).

Prerequisites
None

T 3.19 Course: Electrical Engineering for Business Engineers, Part I [T-ETIT-100533]

Responsible: Dr. Wolfgang Menesklou
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-103746 - Elective Module

Type	Credits	Grading scale	Recurrence	Version
Written examination	3	Grade to a third	Each winter term	1

Events					
WT 21/22	2304223	Electrical Engineering for Business Engineers, Part I	2 SWS	Lecture /	Menesklou
WT 21/22	2304225	Electrical Engineering for Business Engineers, Part I (Exercise to 2304223)	2 SWS	Practice /	Menesklou

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

T 3.20 Course: Electrical Engineering for Business Engineers, Part II [T-ETIT-100534]

Responsible: Dr. Wolfgang Menesklou
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-103746 - Elective Module

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

Events					
ST 2022	2304224	Elektrotechnik II für Wirtschaftsingenieure	3 SWS	Lecture / 🗣	Menesklou

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

T 3.21 Course: Electromagnetical Fields [T-ETIT-109078]

Responsible: Prof. Dr. Martin Doppelbauer
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-MACH-103746 - Elective Module

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

Events					
ST 2022	2306004	Electromagnetical Fields	2 SWS	Lecture /	Doppelbauer
ST 2022	2306005	Practice to 2306004 Electromagnetic fields	2 SWS	Practice /	Menger, Kesten
ST 2022	2306006	Tutorium zu 2306004 Elektromagnetische Felder		/	Doppelbauer

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

Prerequisites
none

T 3.22 Course: Electronic Properties of Solids [T-ETIT-107698]

Responsible: apl. Prof. Dr. Alexander Colsmann
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-103813 - Electronic Properties of Solids

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

Events					
ST 2022	2313758	Elektronische Eigenschaften von Festkörpern für Materialwissenschaften	2 SWS	Lecture / 🗣	Colsmann, Röhm
ST 2022	2313759	Übungen zu 2313758 Elektronische Eigenschaften von Festkörpern für Materialwissenschaften	1 SWS	Practice / 🗣	Colsmann, Röhm

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

Prerequisites
see information of institute

T 3.23 Course: Engineering Mechanics I [T-MACH-100282]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Dr.-Ing. Tom-Alexander Langhoff

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-100279 - Engineering Mechanics I

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

Events					
WT 21/22	2161245	Engineering Mechanics I	3 SWS	Lecture /	Böhlke
WT 21/22	3161010	Engineering Mechanics I (Lecture)	3 SWS	Lecture /	Langhoff, Pallicity, Böhlke

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

Competence Certificate
written exam, 90 min, graded

Prerequisites
successful participation in "Engineering Mechanics I (Tutorial)" (see T-MACH-100528)

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-100528 - Tutorial Engineering Mechanics I must have been passed.

T 3.24 Course: Engineering Mechanics II [T-MACH-100283]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Dr.-Ing. Tom-Alexander Langhoff

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-100284 - Engineering Mechanics II

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each summer term	2

Events					
ST 2022	2162250	Engineering Mechanics II	3 SWS	Lecture /	Böhlke, Langhoff
ST 2022	3162010	Engineering Mechanics II (Lecture)	3 SWS	Lecture /	Langhoff

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

Competence Certificate
written exam, 90 min, graded

Prerequisites
successful participation in "Engineering Mechanics II (Tutorial)" (see T-MACH-100284)

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-100284 - Tutorial Engineering Mechanics II must have been passed.

T 3.25 Course: Engineering Mechanics III [T-MACH-100299]

Responsible: Prof. Dr.-Ing. Wolfgang Seemann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103746 - Elective Module

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

Events					
WT 21/22	2161203	Engineering Mechanics III	2 SWS	Lecture /	Proppe

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

Competence Certificate
written exam (90 min)

Prerequisites
none

T 3.26 Course: Exercises for Applied Materials Simulation [T-MACH-107671]

Responsible: Prof. Dr. Peter Gumbsch
Dr.-Ing. Johannes Schneider
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-103712 - Simulation

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	2	pass/fail	Each summer term	3

Events					
ST 2022	2182614	Applied Materials Simulation	4 SWS	Lecture / Practice (/	Gumbsch, Schulz

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

Competence Certificate
successful solving of all exercises

Prerequisites
T-MACH-110928 – Exercises for Applied Materials Simulation has not been started

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110928 - Exercises for Applied Materials Simulation must not have been started.

T 3.27 Course: Exercises for Applied Materials Simulation [T-MACH-110928]

Responsible: Prof. Dr. Peter Gumbsch
Dr.-Ing. Johannes Schneider
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-103712 - Simulation

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

Events					
ST 2022	2182616	Applied Materials Simulation	4 SWS	Lecture / Practice (/	Schulz, Gumbsch

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

Competence Certificate
successful solving of all exercises

Prerequisites
T-MACH-107671 – Übungen zu Angewandte Werkstoffsimulation has not been started

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-107671 - Exercises for Applied Materials Simulation must not have been started.

T 3.28 Course: Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria [T-MACH-110924]

Responsible: Prof. Dr. Hans Jürgen Seifert
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103710 - Thermodynamics

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

Events					
ST 2022	2194721	Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria	1 SWS	Practice / 🗣	Seifert, Franke

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

Competence Certificate
successful solving of all exercises

Prerequisites
T-MACH-107669 Übungen zu Thermodynamische Grundlagen / Heterogene Gleichgewichte has not been started

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-107669 - Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria must not have been started.

T 3.29 Course: Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria [T-MACH-107669]

Responsible: Prof. Dr. Hans Jürgen Seifert
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103710 - Thermodynamics

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	2	pass/fail	Each winter term	4

Events					
WT 21/22	2193005	Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria	1 SWS	Practice /	Seifert, Ziebert

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

Competence Certificate
successful solving of all exercises

Prerequisites
T-MACH-110924 – Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria has not been started

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110924 - Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria must not have been started.

T 3.30 Course: Exercises for Materials Characterization [T-MACH-110945]

Responsible: Dr.-Ing. Jens Gibmeier
Prof. Dr. Reinhard Schneider
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-103714 - Materials Characterization

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

Events					
WT 21/22	2173432	Tutorials and Lab Courses for "Materials Characterization"	1 SWS	Practice /	Gibmeier

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

Competence Certificate
Regular attendance

Prerequisites
T-MACH-107685 – Übungen zu Werkstoffanalytik has not been started

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-107685 - Exercises for Materials Characterization must not have been started.

T 3.31 Course: Exercises for Materials Characterization [T-MACH-107685]

Responsible: Dr.-Ing. Jens Gibmeier
Prof. Dr. Reinhard Schneider
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-103714 - Materials Characterization

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	2	pass/fail	Each summer term	4

Events					
ST 2022	2174586	Materials Characterization	2 SWS	Lecture /	Schneider, Gibmeier

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

Competence Certificate
Regular attendance

Prerequisites
T-MACH-110945 – Exercises for Materials Characterization has not been started

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110945 - Exercises for Materials Characterization must not have been started.

T 3.32 Course: Exercises for Microstructure-Property-Relationships [T-MACH-107683]

Responsible: Dr. Patric Gruber
Prof. Dr. Christoph Kirchlechner
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-103713 - Properties

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	2	pass/fail	Each summer term	3

Events					
ST 2022	2178125	Exercices in Microstructure-Property-Relationships	1 SWS	Practice / 🗣	Kirchlechner, Wagner, Gruber

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

Competence Certificate
Successful participation in a final colloquium

Prerequisites
T-MACH-110930 – Exercises for Microstructure-Properties-Relationships has not been started

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110930 - Exercises for Microstructure-Property-Relationships must not have been started.

T 3.33 Course: Exercises for Microstructure-Property-Relationships [T-MACH-110930]

Responsible: Dr. Patric Gruber
Prof. Dr. Christoph Kirchlechner
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-103713 - Properties

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

Events					
WT 21/22	2177021	Exercises in Microstructure-Property-Relationships	1 SWS	Practice /	Kirchlechner, Wagner, Gruber

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

Competence Certificate
Successful participation in a final colloquium

Prerequisites
T-MACH-107683 – Übungen zu Gefüge-Eigenschafts-Beziehungen has not been started

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-107683 - Exercises for Microstructure-Property-Relationships must not have been started.

T 3.34 Course: Exercises for Solid State Reactions and Kinetics of Phase Transformations [T-MACH-110926]

Responsible: Dr. Peter Franke
Prof. Dr.-Ing. Bronislava Gorr
Prof. Dr. Hans Jürgen Seifert

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103711 - Kinetics

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

Events					
ST 2022	2194723	Exercises for Solid State Reactions and Kinetics of Phase Transformations, Corrosion	1 SWS	Practice /	Gorr, Martini

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

Competence Certificate
successful processing of exercises

Prerequisites
T-MACH-107632 – Übungen zu Festkörperreaktionen / Kinetik von Phasenumwandlungen, Korrosion has not been started

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-107632 - Exercises for Solid State Reactions and Kinetics of Phase Transformations must not have been started.

T 3.35 Course: Exercises for Solid State Reactions and Kinetics of Phase Transformations [T-MACH-107632]

Responsible: Dr. Peter Franke
Prof. Dr. Hans Jürgen Seifert
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103711 - Kinetics

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	2	pass/fail	Each winter term	4

Events					
WT 21/22	2193004	Exercises for Solid State Reactions and Kinetics of Phase Transformations	1 SWS	Practice /	Franke, Ziebert

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

Competence Certificate
successful processing of exercises

Prerequisites
T-MACH-110926 – Exercises for Solid State Reactions and Kinetics of Phase Transformations has not been started

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110926 - Exercises for Solid State Reactions and Kinetics of Phase Transformations must not have been started.

T 3.36 Course: Experimental Lab Course, Part A [T-MACH-100286]

Responsible: Prof. Dr.-Ing. Martin Heilmaier
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-100287 - Materials Physics and Metals

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

Events					
WT 21/22	2174578	Experimental Lab Course, Part A	3 SWS	Practical course /	Heilmaier, Kauffmann
ST 2022	2174578	Experimental Lab Course, Part A		Practical course /	Heilmaier, Kauffmann

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

Competence Certificate
Oral colloquium at the beginning of each topic; certificate of successful attendance.

Prerequisites
none

T 3.37 Course: Experimental Lab Course, Part B [T-MACH-100289]

Responsible: Prof. Dr.-Ing. Bronislava Gorr
Dr.-Ing. Rainer Oberacker
Prof. Dr. Hans Jürgen Seifert

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103767 - Ceramics

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	3	pass/fail	Each winter term	2

Events					
WT 21/22	2193101	Experimental Lab Course, Part B	2 SWS	Practical course /	Gorr, Martini, Wagner

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

Competence Certificate
Performing of experiments in frame of internship

Interview about state of knowledge

Report and summarizing of experimental and theoretical contents

Prerequisites
none

T 3.38 Course: Experimental Physics [T-PHYS-100278]

Responsible: apl. Prof. Dr. Bernd Pilawa
Prof. Dr. Thomas Schimmel
Organisation: KIT Department of Physics
Part of: M-PHYS-100283 - Experimental Physics

Type	Credits	Grading scale	Recurrence	Version
Written examination	16	Grade to a third	Each term	1

Events					
WT 21/22	4040011	Experimentalphysik A für die Studiengänge Elektrotechnik, Chemie, Biologie, Chemische Biologie, Geodäsie und Geoinformatik, Angewandte Geowissenschaften, Geoökologie, technische Volkswirtschaftslehre, Materialwissenschaften, Lehramt Chemie, NWT Lehramt, Lebensmittelchemie, Materialwissenschaft und Werkstofftechnik (MWT) und Diplom-Ingenieurpädagogik	4 SWS	Lecture	Schimmel
WT 21/22	4040112	Übungen zur Experimentalphysik A für die Studiengänge Chemie, Biologie, Chemische Biologie, Geodäsie und Geoinformatik, Angewandte Geowissenschaften, Geoökologie, technische Volkswirtschaftslehre, Lehramt Chemie, NWT Lehramt, Lebensmittelchemie, Materialwissenschaft und Werkstofftechnik (MWT) und Diplom-Ingenieurpädagogik	2 SWS	Practice	Schimmel, Wertz
ST 2022	4040021	Experimentalphysik B für die Studiengänge Chemie, Biologie, Chemische Biologie, Geodäsie und Geoinformatik, Angewandte Geowissenschaften, Geoökologie, Technische Volkswirtschaftslehre, Materialwissenschaften, Lehramt Chemie, NWT, Lehramt, Lebensmittelchemie, Materialwissenschaft und Werkstofftechnik (MWT) und Diplom-Ingenieurpädagogik	4 SWS	Lecture / 🗣	Pilawa
ST 2022	4040122	Übungen zur Experimentalphysik B für die Studiengänge Chemie, Biologie, Chemische Biologie, Geodäsie und Geoinformatik, Angewandte Geowissenschaften, Geoökologie, Technische Volkswirtschaftslehre, Materialwissenschaften, Lehramt Chemie, NWT, Lehramt, Lebensmittelchemie, Materialwissenschaft und Werkstofftechnik (MWT) und Diplom-Ingenieurpädagogik	2 SWS	Practice / 🗣	Pilawa, Wertz, NN

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

Competence Certificate
Written exam (usually about 180 min)

Prerequisites
None

T 3.39 Course: Fluid Mechanics 1&2 [T-MACH-105207]

Responsible: Prof. Dr.-Ing. Bettina Frohnapfel
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103746 - Elective Module

Type	Credits	Grading scale	Recurrence	Version
Written examination	8	Grade to a third	Each summer term	2

Events					
WT 21/22	2153512	Fluid Mechanics II	3 SWS	Lecture / Practice (/	Frohnapfel
WT 21/22	3153511	Fluid Mechanics II	3 SWS	Lecture / Practice (/	Frohnapfel
ST 2022	2154512	Fluid Mechanics I	3 SWS	Lecture / Practice (/	Frohnapfel
ST 2022	3154510	Fluid Mechanics I	3 SWS	Lecture / Practice (/	Frohnapfel

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

Competence Certificate
written exam 3 hours

Prerequisites
none

T 3.40 Course: Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria [T-MACH-107670]

Responsible: Dr. Peter Franke
Prof. Dr. Hans Jürgen Seifert

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103710 - Thermodynamics

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	4

Events					
WT 21/22	2193002	Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria	2 SWS	Lecture /	Seifert

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

Competence Certificate
Oral examination (about 30 min)

Prerequisites
The successful participation in Übungen zu Thermodynamische Grundlagen / Heterogene Gleichgewichte is the condition for the admittance to the oral exam in Thermodynamische Grundlagen / Heterogene Gleichgewicht.

T-MACH-110924 – Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria has not been started.

T-MACH-110925 – Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria has not been started.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-107669 - Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria must have been passed.
2. The course T-MACH-110925 - Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria must not have been started.
3. The course T-MACH-110924 - Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria must not have been started.

Recommendation
Bacic course in materials science and engineering

Basic course in mathematics

physics or physical chemistry

T 3.41 Course: Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria [T-MACH-110925]

Responsible: Dr. Peter Franke
Prof. Dr. Hans Jürgen Seifert

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103710 - Thermodynamics

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2022	2194720	Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria	2 SWS	Lecture / 🗣	Seifert, Franke

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

Competence Certificate
Oral examination (about 30 min)

Prerequisites
The successful participation in Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria is the condition for the admittance to the oral exam in Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria.

T-MACH-107669 – Übungen zu Thermodynamische Grundlagen / Heterogene Gleichgewichte has not been started.

T-MACH-107670 – Thermodynamische Grundlagen / Heterogene Gleichgewichte has not been started.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-107670 - Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria must not have been started.
2. The course T-MACH-110924 - Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria must have been passed.
3. The course T-MACH-107669 - Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria must not have been started.

Recommendation
Basic course in materials science and engineering

Basic course in mathematics

physics or physical chemistry

T 3.42 Course: General and Inorganic Chemistry [T-CHEMBIO-100279]

Organisation: KIT Department of Chemistry and Biosciences
Part of: M-CHEMBIO-100285 - Inorganic Chemistry

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

Prerequisites
none

T 3.43 Course: Informatics for Materials Science [T-MACH-107786]

Responsible: Dr. Daniel Weygand
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103840 - Informatics

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

Prerequisites
none

T 3.44 Course: Inorganic Chemistry Laboratory Course [T-CHEMBIO-100280]

Organisation: KIT Department of Chemistry and Biosciences
Part of: M-CHEMBIO-100285 - Inorganic Chemistry

Type	Credits	Grading scale	Version
Completed coursework (practical)	6	pass/fail	1

T 3.45 Course: Introduction into Mechatronics [T-MACH-100535]

Responsible: Moritz Böhland
apl. Prof. Dr. Markus Reischl

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103746 - Elective Module

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each winter term	2

Events					
WT 21/22	2105011	Introduction into Mechatronics	3 SWS	Lecture /	Reischl, Böhland

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

Competence Certificate
Oral exam (Duration: 2h)

Prerequisites
none

T 3.46 Course: Introduction to Ceramics [T-MACH-100287]

Responsible: Prof. Dr. Michael Hoffmann
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103767 - Ceramics

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

Events					
WT 21/22	2125757	Introduction to Ceramics	3 SWS	Lecture /	Hoffmann

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

Competence Certificate
The assessment consists of an oral exam (30 min) taking place at a specific date.

The re-examination is offered at a specific date.

Prerequisites
None

T 3.47 Course: Introduction to Rheology [T-CHEMBIO-100303]

Organisation: KIT Department of Chemistry and Biosciences
Part of: M-CHEMBIO-100300 - Rheology

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

T 3.48 Course: Machines and Processes [T-MACH-105208]

Responsible: Prof. Dr.-Ing. Hans-Jörg Bauer
Dr.-Ing. Heiko Kubach
Prof. Dr. Ulrich Maas
Dr. Balazs Pritz

Organisation: KIT Department of Mechanical Engineering

Institute of Thermal Turbomachinery

Part of: M-MACH-103746 - Elective Module

Type	Credits	Grading scale	Recurrence	Version
Written examination	8	Grade to a third	Each term	2

Events					
WT 21/22	2185000	Machines and Processes	4 SWS	Lecture / Practice (/	Bauer, Kubach, Maas, Pritz
ST 2022	3134140	Machines and Processes	4 SWS	Lecture / Practice (/	Bauer, Maas, Kubach, Pritz

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

Competence Certificate
written exam (duration: 120 min)

Prerequisites
Taking part at the exam is possible only when lab course has been successfully completed

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-105232 - Machines and Processes, Prerequisite must have been passed.

T 3.49 Course: Machines and Processes, Prerequisite [T-MACH-105232]

Responsible: Prof. Dr.-Ing. Hans-Jörg Bauer
Dr.-Ing. Heiko Kubach
Prof. Dr. Ulrich Maas
Dr. Balazs Pritz

Organisation: KIT Department of Mechanical Engineering

Institute of Thermal Turbomachinery

Part of: M-MACH-103746 - Elective Module

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

Events					
WT 21/22	2187000	Machines and Processes	1 SWS	Practical course / 🗣	Bauer, Kubach, Pritz, Schmidt, Bykov
ST 2022	2187000	Machines and Processes (Lab Course)	1 SWS	Practical course / 🗣	Bauer, Kubach, Maas, Pritz

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

Competence Certificate
successful completed training course

Prerequisites
none

T 3.50 Course: Materials Characterization [T-MACH-110946]

Responsible: Dr.-Ing. Jens Gibmeier
Prof. Dr. Reinhard Schneider
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-103714 - Materials Characterization

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 21/22	2173431	Materials Characterization	2 SWS	Lecture /	Schneider, Gibmeier

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

Competence Certificate
Oral exam, about 25 minutes

Prerequisites
Successful participation in Exercises for Materials Characterization is the condition for the admittance to the oral exam in Materials Characterization.

T-MACH-107685 – Übungen zu Werkstoffanalytik has not been started.

T-MACH-107684 – Werkstoffanalytik has not been started.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110945 - Exercises for Materials Characterization must have been passed.
2. The course T-MACH-107685 - Exercises for Materials Characterization must not have been started.
3. The course T-MACH-107684 - Materials Characterization must not have been started.

T 3.51 Course: Materials Characterization [T-MACH-107684]

Responsible: Dr.-Ing. Jens Gibmeier
Prof. Dr. Reinhard Schneider
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-103714 - Materials Characterization

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	4

Events					
ST 2022	2174586	Materials Characterization	2 SWS	Lecture /	Schneider, Gibmeier

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

Competence Certificate
Oral exam, about 25 minutes

Prerequisites
Successful participation in Übungen zu Werkstoffanalytik is the condition for the admittance to the oral exam in Werkstoffanalytik.

T-MACH-110945 – Exercises for Materials Characterization has not been started.

T-MACH-110946 – Materials Characterization has not been started.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-107685 - Exercises for Materials Characterization must have been passed.
2. The course T-MACH-110945 - Exercises for Materials Characterization must not have been started.
3. The course T-MACH-110946 - Materials Characterization must not have been started.

T 3.52 Course: Materials Physics and Metals [T-MACH-100285]

Responsible: Prof. Dr.-Ing. Martin Heilmaier
Prof. Dr. Astrid Pundt

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-100287 - Materials Physics and Metals
M-MACH-100304 - Orientation Exam

Type	Credits	Grading scale	Recurrence	Version
Oral examination	12	Grade to a third	Each winter term	2

Events					
WT 21/22	2177010	Materials Physics	3 SWS	Lecture /	Gruber
ST 2022	2174598	Metals	4 SWS	Lecture /	Pundt, Kauffmann
ST 2022	2174599	Exercises in Metals	1 SWS	Practice /	Pundt, Kauffmann

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

Competence Certificate
Oral exam, about 45 minutes

Prerequisites
none

T 3.53 Course: Materials Processing Technology [T-MACH-100295]

Responsible: Dr. Joachim Binder
Dr.-Ing. Wilfried Liebig

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-100294 - Materials Processing Technology

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each winter term	2

Events					
WT 21/22	2173540	Materials Processing Technology	3 SWS	Lecture / Practice (/	Liebig, Binder

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

Competence Certificate
Oral exam (lecture + lab course), approx. 25 min, lab course "Materials Processing" has to be finished successfully.

Prerequisites
Lab course "Materials Processing" has to be passed successfully in advance.

Annotation
Lecture: lecture notes, slides + beamer, blackboard

lab course: experimental equipment, paper, pencil, lab course notes, calculator

T 3.54 Course: Mathematical Methods in Continuum Mechanics [T-MACH-110375]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103746 - Elective Module

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	4	Grade to a third	Each winter term	1 terms	1

Events					
WT 21/22	2161254	Mathematical Methods in Continuum Mechanics	2 SWS	Lecture /	Böhlke

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

Competence Certificate
written exam (90 min). Additives as announced.

Prerequisites
Passing the Tutorial to Mathematical Methods of Continuum Mechanics (T-MACH-110376)

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110376 - Tutorial Mathematical Methods in Continuum Mechanics must have been passed.

T 3.55 Course: Mathematical Methods in Micromechanics [T-MACH-110378]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-103746 - Elective Module

Type	Credits	Grading scale	Recurrence	Expansion	Version
Written examination	5	Grade to a third	Each summer term	1 terms	2

Events					
ST 2022	2162280	Mathematical Methods in Micromechanics	2 SWS	Lecture /	Böhlke, Kehrer

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

Competence Certificate
written exam (180 min). Additives as announced.

prerequisite to registration to the exam: Passing the tutorial to Mathematical Methods in Micromechanics (T-MACH-110379)

Prerequisites
Passing the tutorial to Mathematical Methods in Micromechanics (T-MACH-110379)

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110379 - Tutorial Mathematical Methods in Micromechanics must have been passed.

T 3.56 Course: Mechanical Design Basics I and II [T-MACH-110363]

Responsible: Prof. Dr.-Ing. Sven Matthiesen
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103746 - Elective Module

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

Events					
WT 21/22	2145131	Mechanical Design Basics I	2 SWS	Lecture / 🗣	Albers, Matthiesen
ST 2022	2146131	Mechanical Design Basics II	2 SWS	Lecture / 🗣	Albers, Matthiesen

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

Competence Certificate
Written Exam (90min) on the topics of MKLGI and MKLGII.

Prerequisites
The bricks "T-MACH-110364 - Mechanical Design Basics I, Tutorial" and "T-MACH-110365 - Mechanical Design Basics II, Tutorial" must be passed successfully.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110364 - Mechanical Design Basics I, Tutorial must have been passed.
2. The course T-MACH-110365 - Mechanical Design Basics II, Tutorial must have been passed.

T 3.57 Course: Mechanical Design Basics I, Tutorial [T-MACH-110364]

Responsible: Prof. Dr.-Ing. Sven Matthiesen
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103746 - Elective Module

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

Events					
WT 21/22	2145132	Tutorials Mechanical Design Basics I	1 SWS	Practice / 🗣	Albers, Matthiesen, Mitarbeiter

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

Competence Certificate
To pass the preliminary work, attendance at 3 workshop sessions of the MKL1 transmission workshop and the passing of a colloquium at the beginning of each workshop are prerequisites.

Prerequisites
None

T 3.58 Course: Mechanical Design Basics II, Tutorial [T-MACH-110365]

Responsible: Prof. Dr.-Ing. Sven Matthiesen
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103746 - Elective Module

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

Events					
ST 2022	2146132	Tutorials Mechanical Design Basics II	2 SWS	Practice / 🗣	Albers, Matthiesen, Mitarbeiter

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

Competence Certificate
CIW/ VT/ IP-M/ WiING / MATH/ MWT: For passing the prerequisite it is necessary that a design task is successfully completed as a technical hand drawing

MIT: To pass the preliminary examination, attendance at workshop sessions and a colloquium at the beginning of each workshop are required.

NWT:

For students of the subject area NwT, the creation of a teaching video for the teaching of a technical system must be completed instead as a preliminary examination.

Prerequisites
None

T 3.59 Course: Mechanical Processing [T-CIWVT-101886]

Responsible: Prof. Dr.-Ing. Achim Dittler
Organisation: KIT Department of Chemical and Process Engineering
Part of: M-MACH-103746 - Elective Module

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

Events					
WT 21/22	22901	Grundlagen der Mechanischen Verfahrenstechnik (Bach.)	2 SWS	Lecture /	Dittler
WT 21/22	22902	Übung zu 22901 Mechanische Verfahrenstechnik (Bach.)	2 SWS	Practice /	Dittler, und Mitarbeiter

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

Prerequisites
none

T 3.60 Course: Microstructure-Property-Relationships [T-MACH-110931]

Responsible: Dr. Patric Gruber
Prof. Dr. Christoph Kirchlechner
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-103713 - Properties

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	1

Events					
WT 21/22	2177020	Microstructure-Property-Relationships	3 SWS	Lecture /	Kirchlechner, Gruber

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

Competence Certificate
Oral examination (about 30 min)

Prerequisites
The successful participation in Exercises for Microstructure-Properties-Relationships is the condition for the admittance to the oral exam in Microstructure-Properties-Relationships.

T-MACH-107683 - Übungen zu Gefüge-Eigenschafts-Beziehungen has not been started.

T-MACH-107604 - Gefüge-Eigenschafts-Beziehungen has not been started.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-110930 - Exercises for Microstructure-Property-Relationships must have been passed.
2. The course T-MACH-107683 - Exercises for Microstructure-Property-Relationships must not have been started.
3. The course T-MACH-107604 - Microstructure-Property-Relationships must not have been started.

T 3.61 Course: Microstructure-Property-Relationships [T-MACH-107604]

Responsible: Dr. Patric Gruber
Prof. Dr. Christoph Kirchlechner
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-103713 - Properties

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	3

Events					
ST 2022	2178124	Microstructure-Property-Relationships	3 SWS	Lecture / 🗣	Kirchlechner, Gruber

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

Competence Certificate
Oral examination (about 30 min)

Prerequisites
The successful participation in Übungen zu Gefüge-Eigenschafts-Beziehungen is the condition for the admittance to the oral exam in Gefüge-Eigenschafts-Beziehungen.

T-MACH-110930 - Exercises for Microstructure-Properties-Relationships has not been started.

T-MACH-110931 - Microstructure-Properties-Relationships has not been started.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-107683 - Exercises for Microstructure-Property-Relationships must have been passed.
2. The course T-MACH-110930 - Exercises for Microstructure-Property-Relationships must not have been started.
3. The course T-MACH-110931 - Microstructure-Property-Relationships must not have been started.

T 3.62 Course: Modelling and Simulation [T-MACH-100300]

Responsible: Prof. Dr. Peter Gumbsch
Prof. Dr. Britta Nestler

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-100296 - Modelling and Simulation

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

Events					
WT 21/22	2183703	Numerical methods and simulation techniques	3 SWS	Lecture / Practice (/	Nestler
ST 2022	2183703	Modelling and Simulation	2+1 SWS	Lecture / Practice (/	Nestler, August

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

Competence Certificate
Written exam, 90 min

Prerequisites
none

Recommendation
preliminary knowlegde in mathematics, physics and materials science

T 3.63 Course: Modern Physics [T-PHYS-103629]

Responsible: apl. Prof. Dr. Bernd Pilawa
Organisation: KIT Department of Physics
Part of: M-MACH-103746 - Elective Module

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

Events					
WT 21/22	4044011	KSOP - Modern Physics	4 SWS	Lecture /	Pilawa
WT 21/22	4044012	KSOP - Exercises to Modern Physics	2 SWS	Practice	Pilawa, Bieling

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

Competence Certificate
Written exam (usually about 180 min)

Prerequisites
none

T 3.64 Course: Modern Physics for Computer Scientists [T-PHYS-102323]

Responsible: Dr. Stefan Gieseke
Prof. Dr. Milada Margarete Mühlleitner
Organisation: KIT Department of Physics
Part of: M-MACH-103746 - Elective Module

Type	Credits	Grading scale	Version
Written examination	9	Grade to a third	1

Events					
ST 2022	4040451	Moderne Physik für Informatiker	4 SWS	Lecture /	Gieseke
ST 2022	4040452	Übungen zu Moderne Physik für Informatiker	2 SWS	Practice /	Gieseke, NN

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

Prerequisites
The module Experimental Physics has to be passed.

Modeled Conditions
The following conditions have to be fulfilled:

1. The module M-PHYS-100283 - Experimental Physics must have been passed.

T 3.65 Course: Numerical Mathematics for Students of Computer Science [T-MATH-102242]

Responsible: Prof. Dr. Andreas Rieder
Dr. Daniel Weiß
Prof. Dr. Christian Wieners

Organisation: KIT Department of Mathematics

Part of: M-MACH-103746 - Elective Module

Type	Credits	Grading scale	Recurrence	Version
Written examination	6	Grade to a third	Each term	3

Events					
ST 2022	0187400	Numerische Mathematik für die Fachrichtungen Informatik und Ingenieurwesen	2 SWS	Lecture	Weiß
ST 2022	0187500	Übungen zu 0187400	1 SWS	Practice	Weiß

Prerequisites
None

T 3.66 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 2022	5142	Organische Chemie für CIW/VT und BIW	2 SWS	Lecture / 🗣	Levkin
ST 2022	5143	Übungen zu Organische Chemie für CIW/VT und BIW	2 SWS	Practice / 🗣	Levkin

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

Prerequisites
acc. to module catalogue

T 3.67 Course: Passive Components [T-ETIT-100292]

Responsible: apl. Prof. Dr. Alexander Colsmann
Organisation: KIT Department of Electrical Engineering and Information Technology
Part of: M-ETIT-100293 - Passive Devices

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

Events					
WT 21/22	2304206	Passive Devices	2 SWS	Lecture / 🗣	Colsmann, Röhm, Menesklou
WT 21/22	2304208	Passive Devices (Exercise to 2304206)	1 SWS	Practice / 🗣	Colsmann, Röhm

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

Prerequisites
none

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-100531 - Systematic Materials Selection must not have been started.

T 3.68 Course: Physical Chemistry I [T-CHEMBIO-100301]

Organisation: KIT Department of Chemistry and Biosciences
Part of: M-MACH-103746 - Elective Module

Type	Credits	Grading scale	Recurrence	Version
Written examination	8	Grade to a third	Each winter term	2

Events					
WT 21/22	5206	Physikalische Chemie I	4 SWS	Lecture /	Schuster, Kappes

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

T 3.69 Course: Physical Chemistry II [T-CHEMBIO-100538]

Responsible: Prof. Dr. Willem Klopper
Organisation: KIT Department of Chemistry and Biosciences
Part of: M-MACH-103746 - Elective Module

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

T 3.70 Course: Physics for Engineers [T-MACH-100530]

Responsible: Prof. Dr. Martin Dienwiebel
Prof. Dr. Peter Gumbsch
apl. Prof. Dr. Alexander Nesterov-Müller
Dr. Daniel Weygand

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103746 - Elective Module

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

Events					
ST 2022	2142890	Physics for Engineers	4 SWS	Lecture / Practice (/ 🗣	Weygand, Dienwiebel, Nesterov-Müller, Gumbsch

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

Competence Certificate
written exam 90 min

Prerequisites
none

T 3.71 Course: Polymers [T-CHEMBIO-100294]

Organisation: KIT Department of Chemistry and Biosciences
Part of: M-CHEMBIO-100289 - Polymers

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

Events					
WT 21/22	5501	Chemie und Physik der Makromoleküle I	2 SWS	Lecture /	Wilhelm, Dingenouts
ST 2022	5501	Chemie und Physik der Makromoleküle II	2 SWS	Lecture /	Dingenouts, Wilhelm

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

T 3.72 Course: Presentation [T-MACH-107762]

Responsible: Prof. Dr.-Ing. Martin Heilmaier
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-103837 - Bachelor's Thesis

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	3	pass/fail	Each term	2

Competence Certificate
The colloquium presentation must be held within 6 weeks after the submission of the bachelor thesis. The presentation should last around 20 minutes followed by a scientific discussion with the present expert audience. The students should show that they are able to independently present and discuss the content of their bachelor thesis according to scientific criteria.

Prerequisites
Bachelor Thesis has been started

Annotation
The workload for the presentation of the bachelor thesis is about 90 hours.

T 3.73 Course: Production Operations Management [T-MACH-100304]

Responsible: Prof. Dr.-Ing. Kai Furmans
Prof. Dr.-Ing. Gisela Lanza
Prof. Dr. Frank Schultmann

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-100297 - Production Operations Management

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

Events					
WT 21/22	2110085	Production Operations Management	3 SWS	Lecture / Practice (/	Furmans, Lanza

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

Competence Certificate
written exam (duration: 180 min)

Prerequisites
T-MACH-108734 - Production Operations Management-Project must have been completed successfully.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-108734 - Production Operations Management-Project must have been passed.

T 3.74 Course: Production Operations Management-Project [T-MACH-108734]

Responsible: Prof. Dr.-Ing. Kai Furmans
Prof. Dr.-Ing. Gisela Lanza

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-100297 - Production Operations Management

Type	Credits	Grading scale	Recurrence	Version
Examination of another type	2	Grade to a third	Each winter term	1

Events					
WT 21/22	2110086	Production Operations Management-Project	1 SWS	Project (P / 🖳)	Furmans, Lanza

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

Competence Certificate
Assignments during the semester consisting of solving and presenting case studies, whereof:

- 70% assessment of the case study as group work
- 30% evaluation of the defense of the case studies as an individual grade

Prerequisites
none

T 3.75 Course: Seminar in Materials Science [T-MACH-100290]

Responsible: Dr. Patric Gruber
Dr. rer. nat. Stefan Wagner
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103767 - Ceramics

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

Events					
ST 2022	2178450	Seminar in Materials Science	2 SWS	Seminar / 🗣	Gruber, Wagner

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

Competence Certificate
Attendance on all seminars

Preparation of an oral talk (meeting with mentor)

Presentation of oral talk

Prerequisites
Materials Physics, Metals, basics in Ceramics

T 3.76 Course: Solid State Reactions and Kinetics of Phase [T-MACH-110927]

Responsible: Prof. Dr.-Ing. Bronislava Gorr
Prof. Dr. Hans Jürgen Seifert

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103711 - Kinetics

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each summer term	1

Events					
ST 2022	2194722	Solid State Reactions and Kinetics of Phase Transformations, Corrosion	2 SWS	Lecture / 🗣	Gorr

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

Competence Certificate
oral examination (about 30 min)

Prerequisites
The successful participation in Exercises for Solid State Reactions and Kinetics of Phase Transformations is the condition for the admittance to the oral exam in Solid State Reactions and Kinetics of Phase.

T-MACH-107632 – Übungen zu Festkörperreaktionen / Kinetik von Phasenumwandlungen, Korrosion has not been started.

T-MACH-107667 – Festkörperreaktionen / Kinetik von Phasenumwandlungen, Korrosion has not been started.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-107667 - Solid State Reactions and Kinetics of Phase must not have been started.
2. The course T-MACH-110926 - Exercises for Solid State Reactions and Kinetics of Phase Transformations must have been passed.
3. The course T-MACH-107632 - Exercises for Solid State Reactions and Kinetics of Phase Transformations must not have been started.

Recommendation
Bacic course in materials science and engineering

Basic course in mathematics

physical chemistry

T 3.77 Course: Solid State Reactions and Kinetics of Phase [T-MACH-107667]

Responsible: Dr. Peter Franke
Prof. Dr. Hans Jürgen Seifert
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103711 - Kinetics

Type	Credits	Grading scale	Recurrence	Version
Oral examination	4	Grade to a third	Each winter term	4

Events					
WT 21/22	2193003	Solid State Reactions and Kinetics of Phase Transformations	2 SWS	Lecture /	Franke

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

Competence Certificate
oral examination (about 30 min)

Prerequisites
The successful participation in Übungen zu Festkörperreaktionen / Kinetik von Phasenumwandlungen, Korrosion is the condition for the admittance to the oral exam in Festkörperreaktionen / Kinetik von Phasenumwandlungen, Korrosion.

T-MACH-110926 – Exercises for Solid State Reactions and Kinetics of Phase Transformations has not been started.

T-MACH-110927 – Solid State Reactions and Kinetics of Phase has not been started.

Modeled Conditions
The following conditions have to be fulfilled:

1. The course T-MACH-107632 - Exercises for Solid State Reactions and Kinetics of Phase Transformations must have been passed.
2. The course T-MACH-110927 - Solid State Reactions and Kinetics of Phase must not have been started.
3. The course T-MACH-110926 - Exercises for Solid State Reactions and Kinetics of Phase Transformations must not have been started.

Recommendation
Bacic course in materials science and engineering

Basic course in mathematics

physical chemistry

T 3.78 Course: Structural Materials [T-MACH-100293]

Responsible: Dr.-Ing. Stefan Guth
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-100291 - Structural Materials

Type	Credits	Grading scale	Recurrence	Version
Oral examination	6	Grade to a third	Each summer term	2

Events					
ST 2022	2174580	Structural Materials	4 SWS	Lecture / Practice (/	Guth

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

Competence Certificate
Oral exam, about 25 minutes

Prerequisites
none

T 3.79 Course: Systematic Materials Selection [T-MACH-100531]

Responsible: Dr.-Ing. Stefan Dietrich
Prof. Dr.-Ing. Volker Schulze

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-103746 - Elective Module

Type	Credits	Grading scale	Recurrence	Version
Written examination	4	Grade to a third	Each summer term	4

Events					
ST 2022	2174576	Systematic Materials Selection	3 SWS	Lecture /	Dietrich
ST 2022	2174577	Excercises in Systematic Materials Selection	1 SWS	Practice /	Dietrich, Mitarbeiter

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

Competence Certificate
The assessment is carried out as a written exam of 2 h.

Prerequisites
The module M-MACH-100287 - Materialphysik und Metalle (Materials Physics and Metals) must be passed.

Modeled Conditions
The following conditions have to be fulfilled:

1. The module M-MACH-100287 - Materials Physics and Metals must have been passed.

Recommendation
Basic knowledge in materials science, mechanics and mechanical design due to the lecture Materials Science I/II.

T 3.80 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-MATH-100280 - Advanced Mathematics I

Type	Credits	Grading scale	Recurrence	Version
Completed coursework (written)	0	pass/fail	Each winter term	2

Events					
WT 21/22	0131100	Übungen zu 0131000	2 SWS	Practice /	Griesmaier
WT 21/22	0131300	Übungen zu 0131200	2 SWS	Practice /	Griesmaier

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

Competence Certificate
Learning assessment is carried out by written assigments (pre-requesite). Exact requirements will be communicated in the lectures.

Prerequisites
None.

T 3.81 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 2022	0180900	Übungen zu 0180800	2 SWS	Practice	Arens
ST 2022	0181100	Übungen zu 0181000	2 SWS	Practice	Arens

Competence Certificate
Learning assessment is carried out by written assigments (pre-requesite). Exact requirements will be communicated in the lectures.

Prerequisites
None.

T 3.82 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 21/22	0131500	Übungen zu 0131400	2 SWS	Practice /	Hettlich

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

Competence Certificate
Learning assessment is carried out by written assigments (pre-requesite). Exact requirements will be communicated in the lectures.

Prerequisites
None.

T 3.83 Course: Tutorial Continuum Mechanics of Solids and Fluids [T-MACH-110333]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Prof. Dr.-Ing. Bettina Frohnapfel
Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-105180 - Continuum Mechanics

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

Events					
WT 21/22	2161253	Tutorial Continuum mechanics of solids and fluids	1 SWS	Practice /	Dyck, Karl, Böhlke

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

Competence Certificate
Successfully passing the Tutorial is a prerequisite for taking part in the exam "Continuum Mechanics of Solids and Fluids" (T-MACH-110377).

For students of Mechanical Engineering (BSc) that have chosen the Major Field "Continuum Mechanics" and for students of Material Science and Material Technology (BSc) the prerequisites consist of successfully solving the written homework sheets as well as the computational homework sheets during the associated computer tutorials.

For students of Mechanical Engineering that have chosen a different Major Field of students from different fields of study the prerequisites consist of successfully solving only the written homework sheets.

Prerequisites
None

Annotation
Due to capacity reasons it is possible that not all students of this course can be admitted to the computer tutorials. Students of the bachelor's degree program in mechanical engineering who have chosen the Major Field Continuum Mechanics (SP-Nr 13) and students of the bachelor's degree program in material science and material technology will be admitted to the computer tutorials in any case.
If additional places are available in the computer tutorials for this course, these will be allocated according to the BSc average grade.

T 3.84 Course: Tutorial Engineering Mechanics I [T-MACH-100528]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Dr.-Ing. Tom-Alexander Langhoff

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-100279 - Engineering Mechanics I

Type	Credits	Grading scale	Recurrence	Version
Completed coursework	0	pass/fail	Each winter term	2

Events					
WT 21/22	2161246	Tutorial Engineering Mechanics I	2 SWS	Practice /	Dyck, Gajek, Böhlke
WT 21/22	3161011	Engineering Mechanics I (Tutorial)	2 SWS	Practice /	Kehrer, Görthofer, Langhoff

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

Competence Certificate
Attestations have to be achieved in the following four categories: mandatory written homework problems, written homework problems, computational homework problems, colloquia.

This course is passed if all mandatory written homework problems are passed and if in the other three categories (written homework problems, computational homework problems, colloquia) in total at most three attestations have been finally not passed, at most one in each of the three categories.

Succesful participation in this course allows for registration to the Exam "Engineering Mechanics I" (see T-MACH-100282)

Prerequisites
None

T 3.85 Course: Tutorial Engineering Mechanics II [T-MACH-100284]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Dr.-Ing. Tom-Alexander Langhoff

Organisation: KIT Department of Mechanical Engineering

Part of: M-MACH-100284 - Engineering Mechanics II

Type	Credits	Grading scale	Recurrence	Version
Completed coursework (written)	0	pass/fail	Each summer term	2

Events					
ST 2022	2162251	Tutorial Engineering Mechanics II	2 SWS	Practice /	Dyck, Sterr, Böhlke
ST 2022	3162011	Engineering Mechanics II (Tutorial)	2 SWS	Practice /	Kehrer, Görthofer, Langhoff

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

Competence Certificate
Attestations have to be achieved in the following four categories: mandatory written homework problems, written homework problems, computational homework problems, colloquia.

This course is passed if all mandatory written homework problems are passed and if in the other three categories (written homework problems, computational homework problems, colloquia) in total at most two attestations have been finally not passed, at most one in each of the three categories.

Succesful participation in this course allows for registration to the Exam "Engineering Mechanics II" (see T-MACH-100283)

Prerequisites
None

T 3.86 Course: Tutorial Mathematical Methods in Continuum Mechanics [T-MACH-110376]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-103746 - Elective Module

Type	Credits	Grading scale	Recurrence	Expansion	Version
Completed coursework	2	pass/fail	Each winter term	1 terms	2

Events					
WT 21/22	2161255	Tutorial Mathematical Methods in Confinuum Mechanics	2 SWS	Practice /	Gajek, Sterr, Böhlke

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

Competence Certificate
successfully solving the homework sheets. Details are announced in the first lecture.

Prerequisites
None

T 3.87 Course: Tutorial Mathematical Methods in Micromechanics [T-MACH-110379]

Responsible: Prof. Dr.-Ing. Thomas Böhlke
Organisation: KIT Department of Mechanical Engineering
Part of: M-MACH-103746 - Elective Module

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

Competence Certificate
Successfully solving the homework sheets. Details are given in the first lecture.