# Table Of Contents

1. **Field of study structure** .................................................................................................................. 5  
   1.1. Orientation Exam .......................................................................................................................... 5  
   1.2. Bachelor's Thesis ......................................................................................................................... 5  
   1.3. Fundamentals in Engineering Sciences ....................................................................................... 5  
   1.4. Fundamentals in Natural Sciences ............................................................................................... 5  
   1.5. Fundamentals in Materials Science ............................................................................................. 6  
   1.6. Complementary Subject ............................................................................................................... 6  
   1.7. Interdisciplinary Qualifications ................................................................................................. 6  
   1.8. Master's Transfer Account .......................................................................................................... 6  

2. **Modules** ........................................................................................................................................... 7  
   2.1. Advanced Mathematics I - M-MATH-100280 .............................................................................. 7  
   2.2. Advanced Mathematics II - M-MATH-100281 ............................................................................. 8  
   2.3. Advanced Mathematics III - M-MATH-100282 .......................................................................... 9  
   2.4. Applied Chemistry [Ch_ABC_BSc_AWC] - M-CHEMBIO-100299 ........................................... 10  
   2.5. Bachelor's Thesis - M-MACH-103837 ....................................................................................... 11  
   2.6. Ceramics - M-MACH-103767 .................................................................................................... 12  
   2.7. Continuum Mechanics - M-MACH-105180 ................................................................................. 13  
   2.8. Elective Module - M-MACH-103746 ........................................................................................... 14  
   2.9. Electronic Properties of Solids - M-ETIT-103813 ....................................................................... 16  
   2.10. Engineering Mechanics I - M-MACH-100279 ......................................................................... 17  
   2.11. Engineering Mechanics II - M-MACH-100284 ........................................................................ 19  
   2.12. Experimental Physics - M-PHYS-100283 ............................................................................... 20  
   2.13. Informatics - M-MACH-103840 ............................................................................................... 21  
   2.15. Key Competences - M-MACH-103765 .................................................................................... 23  
   2.16. Kinetics - M-MACH-103711 .................................................................................................... 24  
   2.17. Materials Characterization - M-MACH-103714 ........................................................................ 26  
   2.18. Materials Physics and Metals - M-MACH-100287 ................................................................. 27  
   2.19. Materials Processing Technology - M-MACH-100294 ............................................................ 28  
   2.20. Modelling and Simulation - M-MACH-100296 ....................................................................... 29  
   2.22. Orientation Exam - M-MACH-100304 ..................................................................................... 31  
   2.23. Passive Devices - M-ETIT-100293 ........................................................................................... 32  
   2.24. Polymers - M-CHEMBIO-100289 ........................................................................................... 33  
   2.25. Production Operations Management - M-MACH-100297 ....................................................... 34  
   2.27. Rheology - M-CHEMBIO-100300 ............................................................................................ 36  
   2.28. Simulation - M-MACH-103712 ............................................................................................... 37  
   2.29. Structural Materials - M-MACH-100291 .................................................................................. 38  
   2.30. Thermodynamics - M-MACH-103710 ...................................................................................... 39  

3. **Courses** ............................................................................................................................................ 41  
   3.1. Advanced Mathematics I - T-MATH-100275 ............................................................................. 41  
   3.2. Advanced Mathematics II - T-MATH-100276 .......................................................................... 42  
   3.3. Advanced Mathematics III - T-MATH-100277 ......................................................................... 43  
   3.4. Applied Chemistry - T-CHEMBIO-100302 .............................................................................. 44  
   3.5. Applied Materials Simulation - T-MACH-105527 .................................................................... 45  
   3.6. Applied Materials Simulation - T-MACH-110929 .................................................................... 46  
   3.7. Bachelor's Thesis - T-MACH-107761 ......................................................................................... 47  
   3.8. Basics in Measurement and Control Systems - T-MACH-104745 .......................................... 48  
   3.9. Biology for Engineers I - T-CIWVT-103113 ............................................................................. 49  
   3.10. Biology for Engineers II - T-CIWVT-103333 ......................................................................... 50  
   3.11. Bionics for Engineers and Natural Scientists - T-MACH-102172 ....................................... 51  
   3.15. Continuum Mechanics of Solids and Fluids - T-MACH-110377 ........................................... 55  
   3.16. Control Engineering and System Dynamics - T-MACH-102126 .......................................... 56  
   3.17. Economics I: Microeconomics - T-WIWI-102708 .................................................................. 57  
   3.18. Economics II: Macroeconomics - T-WIWI-102709 ............................................................... 58

---

Materials Science and Engineering Bachelor 2017 (Bachelor of Science (B.Sc.))
Module Handbook as of 30/05/2022
### Table Of Contents

- 3.20. Electrical Engineering for Business Engineers, Part II - T-ETIT-100534 ................................................................. 60
- 3.27. Exercises for Applied Materials Simulation - T-MACH-110928 ................................................................. 67
- 3.28. Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria - T-MACH-110924 ............. 68
- 3.29. Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria - T-MACH-107669 ............. 69
- 3.30. Exercises for Materials Characterization - T-MACH-110945 ................................................................................... 70
- 3.31. Exercises for Materials Characterization - T-MACH-107685 ................................................................................... 71
- 3.32. Exercises for Microstructure-Property-Relationships - T-MACH-107683 ................................................................ 72
- 3.33. Exercises for Microstructure-Property-Relationships - T-MACH-110930 ................................................................. 73
- 3.34. Exercises for Solid State Reactions and Kinetics of Phase Transformations - T-MACH-110926 ........................ 74
- 3.35. Exercises for Solid State Reactions and Kinetics of Phase Transformations - T-MACH-107632 ........................ 75
- 3.36. Experimental Lab Course, Part A - T-MACH-100286 ............................................................................................ 76
- 3.37. Experimental Lab Course, Part B - T-MACH-100289 ............................................................................................ 77
- 3.38. Experimental Physics - T-PHYS-100278 .................................................................................................................. 78
- 3.39. Fluid Mechanics 1&2 - T-MACH-105207 .................................................................................................................. 80
- 3.40. Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria - T-MACH-107670 ................... 81
- 3.41. Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria - T-MACH-110925 ................... 82
- 3.42. General and Inorganic Chemistry - T-CHEMBIO-100279 ................................................................................... 83
- 3.43. Informatics for Materials Science - T-MACH-107786 ................................................................................... 84
- 3.44. Inorganic Chemistry Laboratory Course - T-CHEMBIO-100280 ........................................................................... 85
- 3.45. Introduction into Mechatronics - T-MACH-100535 ............................................................................................ 86
- 3.46. Introduction to Ceramics - T-MACH-100287 ............................................................................................ 87
- 3.47. Introduction to Rheology - T-CHEMBIO-100303 ............................................................................................ 88
- 3.48. Machines and Processes - T-MACH-105208 .................................................................................................................. 89
- 3.49. Machines and Processes, Prerequisite - T-MACH-105232 ........................................................................................ 90
- 3.50. Materials Characterization - T-MACH-110946 ............................................................................................ 91
- 3.51. Materials Characterization - T-MACH-107684 ............................................................................................ 92
- 3.52. Materials Physics and Metals - T-MACH-100285 ............................................................................................ 93
- 3.53. Materials Processing Technology - T-MACH-100295 ................................................................................... 94
- 3.54. Mathematical Methods in Continuum Mechanics - T-MACH-110375 ........................................................................... 95
- 3.56. Mechanical Design Basics I and II - T-MACH-110363 ........................................................................................ 97
- 3.57. Mechanical Design Basics I, Tutorial - T-MACH-110364 ................................................................................ 98
- 3.59. Mechanical Processing - T-CWVT-101886 .................................................................................................................. 100
- 3.60. Microstructure-Property-Relationships - T-MACH-110931 ................................................................................ 101
- 3.61. Microstructure-Property-Relationships - T-MACH-107604 ................................................................................ 102
- 3.62. Modelling and Simulation - T-MACH-100300 ............................................................................................ 103
- 3.63. Modern Physics - T-PHYS-103629 .................................................................................................................. 104
- 3.64. Modern Physics for Computer Scientists - T-PHYS-102323 ................................................................................ 105
- 3.66. Organic Chemistry for Engineers - T-CHEMBIO-101865 ................................................................................ 107
- 3.67. Passive Components - T-ETIT-100292 .................................................................................................................. 108
- 3.68. Physical Chemistry I - T-CHEMBIO-100301 .................................................................................................................. 109
- 3.69. Physical Chemistry II - T-CHEMBIO-100538 .................................................................................................................. 110
- 3.70. Physics for Engineers - T-MACH-100530 .................................................................................................................. 111
- 3.71. Polymers - T-CHEMBIO-100294 .................................................................................................................. 112
- 3.72. Presentation - T-MACH-107762 .................................................................................................................. 113
- 3.73. Production Operations Management - T-MACH-100304 ................................................................................ 114
- 3.74. Production Operations Management-Project - T-MACH-108734 ........................................................................... 115
- 3.75. Seminar in Materials Science - T-MACH-100290 ............................................................................................ 116
- 3.76. Solid State Reactions and Kinetics of Phase - T-MACH-110927 ........................................................................... 117
- 3.77. Solid State Reactions and Kinetics of Phase - T-MACH-107667 ................................................................................ 118
- 3.78. Structural Materials - T-MACH-100293 .................................................................................................................. 119
- 3.79. Systematic Materials Selection - T-MACH-100531 ................................................................................ 120
- 3.80. Tutorial Advanced Mathematics I - T-MATH-100525 ................................................................................ 121
<table>
<thead>
<tr>
<th>Tutorial</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.81. Tutorial Advanced Mathematics II - T-MATH-100526</td>
<td>122</td>
</tr>
<tr>
<td>3.82. Tutorial Advanced Mathematics III - T-MATH-100527</td>
<td>123</td>
</tr>
<tr>
<td>3.83. Tutorial Continuum Mechanics of Solids and Fluids - T-MACH-110333</td>
<td>124</td>
</tr>
<tr>
<td>3.84. Tutorial Engineering Mechanics I - T-MACH-100528</td>
<td>125</td>
</tr>
<tr>
<td>3.87. Tutorial Mathematical Methods in Micromechanics - T-MACH-110379</td>
<td>128</td>
</tr>
</tbody>
</table>
### 1 Field of study structure

<table>
<thead>
<tr>
<th>Mandatory</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Orientation Exam</strong>&lt;br&gt;This field will not influence the calculated grade of its parent.</td>
<td></td>
</tr>
<tr>
<td>Bachelor’s Thesis</td>
<td>15 CR</td>
</tr>
<tr>
<td>Fundamentals in Engineering Sciences</td>
<td>44 CR</td>
</tr>
<tr>
<td>Fundamentals in Natural Sciences</td>
<td>32 CR</td>
</tr>
<tr>
<td>Fundamentals in Materials Science</td>
<td>75 CR</td>
</tr>
<tr>
<td>Complementary Subject</td>
<td>8 CR</td>
</tr>
<tr>
<td>Interdisciplinary Qualifications</td>
<td>6 CR</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Voluntary</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master's Transfer Account&lt;br&gt;This field will not influence the calculated grade of its parent.</td>
<td></td>
</tr>
</tbody>
</table>

#### 1.1 Orientation Exam

<table>
<thead>
<tr>
<th>Mandatory</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-MACH-100304 Orientation Exam</td>
<td>0 CR</td>
</tr>
</tbody>
</table>

#### 1.2 Bachelor's Thesis

<table>
<thead>
<tr>
<th>Mandatory</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-MACH-103837 Bachelor's Thesis</td>
<td>15 CR</td>
</tr>
</tbody>
</table>

#### 1.3 Fundamentals in Engineering Sciences

<table>
<thead>
<tr>
<th>Mandatory</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-MACH-100279 Engineering Mechanics I</td>
<td>7 CR</td>
</tr>
<tr>
<td>M-MACH-100284 Engineering Mechanics II</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-MACH-100297 Production Operations Management</td>
<td>5 CR</td>
</tr>
<tr>
<td>M-MATH-100280 Advanced Mathematics I</td>
<td>7 CR</td>
</tr>
<tr>
<td>M-MATH-100281 Advanced Mathematics II</td>
<td>7 CR</td>
</tr>
<tr>
<td>M-MATH-100282 Advanced Mathematics III</td>
<td>7 CR</td>
</tr>
<tr>
<td>M-MACH-105180 Continuum Mechanics&lt;br&gt;First usage possible from 10/1/2019.</td>
<td>5 CR</td>
</tr>
</tbody>
</table>

#### 1.4 Fundamentals in Natural Sciences

<table>
<thead>
<tr>
<th>Mandatory</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-PHYS-100283 Experimental Physics</td>
<td>16 CR</td>
</tr>
<tr>
<td>M-CHEMBIO-101115 Organic Chemistry for Engineers&lt;br&gt;First usage possible from 10/1/2019.</td>
<td>5 CR</td>
</tr>
<tr>
<td>M-CHEMBIO-100285 Inorganic Chemistry</td>
<td>11 CR</td>
</tr>
</tbody>
</table>
### 1.5 Fundamentals in Materials Science

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-CHEMBIO-100300</td>
<td>Rheology</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-ETIT-100293</td>
<td>Passive Devices</td>
<td>5 CR</td>
</tr>
<tr>
<td>M-MACH-100287</td>
<td>Materials Physics and Metals</td>
<td>14 CR</td>
</tr>
<tr>
<td>M-MACH-100291</td>
<td>Structural Materials</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-MACH-100294</td>
<td>Materials Processing Technology</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-MACH-100296</td>
<td>Modelling and Simulation</td>
<td>5 CR</td>
</tr>
<tr>
<td>M-MACH-103767</td>
<td>Ceramics</td>
<td>11 CR</td>
</tr>
<tr>
<td>M-ETIT-103813</td>
<td>Electronic Properties of Solids</td>
<td>5 CR</td>
</tr>
<tr>
<td>M-CHEMBIO-100299</td>
<td>Applied Chemistry</td>
<td>5 CR</td>
</tr>
<tr>
<td>M-MACH-103840</td>
<td>Informatics</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-CHEMBIO-100289</td>
<td>Polymers</td>
<td>6 CR</td>
</tr>
</tbody>
</table>

### 1.6 Complementary Subject

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-MACH-103746</td>
<td>Elective Module</td>
<td>8 CR</td>
</tr>
</tbody>
</table>

### 1.7 Interdisciplinary Qualifications

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-MACH-103765</td>
<td>Key Competences</td>
<td>6 CR</td>
</tr>
</tbody>
</table>

### 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.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>M-MACH-103710</td>
<td>Thermodynamics</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-MACH-103711</td>
<td>Kinetics</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-MACH-103712</td>
<td>Simulation</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-MACH-103713</td>
<td>Properties</td>
<td>6 CR</td>
</tr>
<tr>
<td>M-MACH-103714</td>
<td>Materials Characterization</td>
<td>6 CR</td>
</tr>
</tbody>
</table>

**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

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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Grade to a tenth</td>
<td>1 term</td>
<td>German</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

Mandatory

<table>
<thead>
<tr>
<th>Module</th>
<th>Title</th>
<th>Credits</th>
<th>Grade to a tenth</th>
<th>Lecture</th>
<th>Tutorials</th>
<th>Examinations</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MATH-100275</td>
<td>Advanced Mathematics I</td>
<td>7</td>
<td>CR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T-MATH-100525</td>
<td>Tutorial Advanced Mathematics I</td>
<td>0</td>
<td>CR</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Competence Certificate

Learning assessment is carried by a written examination of length 120 minutes and by homework assignments (pre-requisite). A "pass" result on the pre-requisite 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
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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Grade to a tenth</td>
<td>Each summer term</td>
<td>1 term</td>
<td>German</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

**Mandatory**

- **T-MATH-100276** Advanced Mathematics II
  - 7 CR
  - Arens, Griesmaier, Hettlich

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

**Competence Certificate**

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

**Prerequisites**

none

**Competence Goal**

The students know about the fundamentals of linear algebra. They 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
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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Grade to a tenth</td>
<td>Each winter term</td>
<td>1 term</td>
<td>German</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

**Mandatory**

<table>
<thead>
<tr>
<th>T-MATH-100277</th>
<th>Advanced Mathematics III</th>
<th>7 CR</th>
<th>Arens, Griesmaier, Hettlich</th>
</tr>
</thead>
</table>
| 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-requisite). A "pass" result on the pre-requisite 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.
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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Grade to a tenth</td>
<td>Each summer term</td>
<td>1 term</td>
<td>German</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Mandatory**

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-CHEMBIO-100302</td>
<td>Applied Chemistry</td>
<td>5 CR</td>
</tr>
</tbody>
</table>
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

---

### Mandatory

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>Grade to a tenth</td>
<td>Each term</td>
<td>1 term</td>
<td>German</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

#### T-MACH-107761
Bachelor's Thesis

#### T-MACH-107762
Presentation

---

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

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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Grade to a tenth</td>
<td>Each term</td>
<td>2 terms</td>
<td>German</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Mandatory**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-100287</td>
<td>Introduction to Ceramics</td>
<td>6 CR</td>
<td>Hoffmann</td>
</tr>
</tbody>
</table>
| 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
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)

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Grade to a tenth</td>
<td>Each winter term</td>
<td>1 term</td>
<td>German</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Mandatory**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>CR</th>
<th>Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-110377</td>
<td>Continuum Mechanics of Solids and Fluids</td>
<td>4 CR</td>
<td>Böhlke, Frohnapfel</td>
</tr>
<tr>
<td>T-MACH-110333</td>
<td>Tutorial Continuum Mechanics of Solids and Fluids</td>
<td>1 CR</td>
<td>Böhlke, Frohnapfel</td>
</tr>
</tbody>
</table>

**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: $15 \times 2\ h + 15\ \ast\ 2\ h = 60\ h$
2. Preparation and recap of lecture and tutorials: $15\ \times 3\ h = 45\ h$
3. Exam preparation and presence during exam: $45\ h$

**Recommendation**

none

**Learning type**

Lecture, tutorial, consultation hours

**Literature**

see contained bricks
2.8 Module: Elective Module [M-MACH-103746]

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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Grade to a tenth</td>
<td>Irregular</td>
<td>1 term</td>
<td>German</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

**Compulsary Elective Studies (Election: at least 8 credits)**

- **T-WIWI-102819** Business Administration: Finance and Accounting  
  - CR: 4  
  - Ruckes, Uhrig-Homburg, Wouters

- **T-WIWI-102818** Business Administration: Production Economics and Marketing  
  - CR: 4  
  - Fichtner, Klarmann, Lützkendorf, Ruckes, Schultmann

- **T-WIWI-102817** Business Administration: Strategic Management and Information Engineering and Management  
  - CR: 3  
  - Nieken, Ruckes

- **T-CIWVT-103113** Biology for Engineers I  
  - CR: 5  
  - Syldatk

- **T-CIWVT-103333** Biology for Engineers II  
  - CR: 5  
  - Syldatk

- **T-MACH-102172** Bionics for Engineers and Natural Scientists  
  - CR: 4  
  - Hölscher

- **T-MACH-100535** Introduction into Mechatronics  
  - CR: 6  
  - Böhland, Reischl

- **T-ETIT-109078** Electromagnetical Fields  
  - CR: 6  
  - Doppelbauer

- **T-ETIT-100533** Electrical Engineering for Business Engineers, Part I  
  - CR: 3  
  - Meneskou

- **T-ETIT-100534** Electrical Engineering for Business Engineers, Part II  
  - CR: 5  
  - Meneskou

- **T-MACH-104745** Basics in Measurement and Control Systems  
  - CR: 8  
  - Stiller

- **T-MACH-110378** Mathematical Methods in Micromechanics  
  - CR: 5  
  - Böhlke

- **T-MACH-110379** Tutorial Mathematical Methods in Micromechanics  
  - CR: 1  
  - Böhlke

- **T-MACH-110375** Mathematical Methods in Continuum Mechanics  
  - CR: 4  
  - Böhlke

- **T-MACH-110376** Tutorial Mathematical Methods in Continuum Mechanics  
  - CR: 2  
  - Böhlke

- **T-MACH-110364** Mechanical Design Basics I, Tutorial  
  - CR: 1  
  - Matthiesen

- **T-MACH-110365** Mechanical Design Basics II, Tutorial  
  - CR: 1  
  - Matthiesen

- **T-MACH-110363** Mechanical Design Basics I and II  
  - CR: 6  
  - Matthiesen

- **T-MACH-105208** Machines and Processes  
  - CR: 8  
  - Bauer, Kubach, Maas, Pritz

- **T-MACH-105232** Machines and Processes, Prerequisite  
  - CR: 0  
  - Bauer, Kubach, Maas, Pritz

- **T-CIWVT-101886** Mechanical Processing  
  - CR: 6  
  - Dittler

- **T-PHYS-103629** Modern Physics  
  - CR: 6  
  - Pilawa

- **T-PHYS-102323** Modern Physics for Computer Scientists  
  - CR: 9  
  - Gieseke, Mühlleitner

- **T-MATH-102242** Numerical Mathematics for Students of Computer Science  
  - CR: 6  
  - Rieder, Weiß, Wieners

- **T-CHEMBIO-100301** Physical Chemistry I  
  - CR: 8  
  - Klopper

- **T-CHEMBIO-100538** Physical Chemistry II  
  - CR: 7  
  - Dienwiebel, Gumbsch, Nesterov-Müller, Weygand

- **T-MACH-100530** Physics for Engineers  
  - CR: 5  
  - Stiller

- **T-MACH-102126** Control Engineering and System Dynamics  
  - CR: 5  
  - Frohnnapfel

- **T-MACH-105207** Fluid Mechanics I & II  
  - CR: 8  
  - Dietrich, Schulze

- **T-MACH-100531** Systematic Materials Selection  
  - CR: 4  
  - Seemann

- **T-MACH-100299** Engineering Mechanics III  
  - CR: 5  
  - Puppe, Reiß

- **T-WIWI-102708** Economics I: Microeconomics  
  - CR: 5  
  - Wigger

- **T-WIWI-102709** Economics II: Macroeconomics  
  - CR: 5  
  - 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, exercises
level 3
# 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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Grade to a tenth</td>
<td>Each summer term</td>
<td>1 term</td>
<td>German</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Mandatory**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
<th>Teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-ETIT-107698</td>
<td>Electronic Properties of Solids</td>
<td>5 CR</td>
<td>Colsmann</td>
</tr>
</tbody>
</table>

**Prerequisites**

none
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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>Grade to a tenth</td>
<td>Each winter term</td>
<td>1 term</td>
<td>German</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

Mandatory

<table>
<thead>
<tr>
<th>Module</th>
<th>Course Name</th>
<th>Credits</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-100282</td>
<td>Engineering Mechanics I</td>
<td>7 CR</td>
<td>Böhlke, Langhoff</td>
</tr>
<tr>
<td>T-MACH-100528</td>
<td>Tutorial Engineering Mechanics I</td>
<td>0 CR</td>
<td>Böhlke, Langhoff</td>
</tr>
</tbody>
</table>

This item will not influence the grade calculation of this parent.

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, colloquium, consultation hours (optional)

Literature

is given in the lecture "Engineering Mechanics I"
Base for
Engineering Mechanics II
## 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  

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Grade to a tenth</td>
<td>Each summer term</td>
<td>1 term</td>
<td>German</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

### Mandatory

<table>
<thead>
<tr>
<th>T-MACH-100283</th>
<th>Engineering Mechanics II</th>
<th>6 CR</th>
<th>Böhlke, Langhoff</th>
</tr>
</thead>
</table>
| 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 theorems 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, colloquia, consultation hours (optional)

**Literature**  
is announced in the lecture "Engineering Mechanics II"
2.12 Module: Experimental Physics [M-PHYS-100283]

**Responsible:** Prof. Dr. Thomas Schimmel

**Organisation:** KIT Department of Physics

**Part of:** Fundamentals in Natural Sciences

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>Grade to a tenth</td>
<td>Each winter term</td>
<td>2 terms</td>
<td>German</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Grade to a tenth</td>
<td>Each winter term</td>
<td>1 term</td>
<td>German</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Mandatory**

<table>
<thead>
<tr>
<th>Code</th>
<th>Name</th>
<th>Credits</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-107786</td>
<td>Informatics for Materials Science</td>
<td>6 CR</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Prerequisites**

None
## 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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>Grade to a tenth</td>
<td>Each winter term</td>
<td>2 terms</td>
<td>German</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Mandatory**

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Module Name</th>
<th>CR</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-CHEMBIO-100279</td>
<td>General and Inorganic Chemistry</td>
<td>5 CR</td>
</tr>
<tr>
<td>T-CHEMBIO-100280</td>
<td>Inorganic Chemistry Laboratory Course</td>
<td>6 CR</td>
</tr>
</tbody>
</table>

*This item will not influence the grade calculation of this parent.*

**Prerequisites**

None
Module: Key Competences [M-MACH-103765]

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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>pass/fail</td>
<td>Each term</td>
<td>2 terms</td>
<td>German</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

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.
## 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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Grade to a tenth</td>
<td>Each term</td>
<td>1 term</td>
<td>German/English</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

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

**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  

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-107684</td>
<td>Materials Characterization</td>
<td>4 CR</td>
<td>Gibmeier, Schneider</td>
</tr>
<tr>
<td>T-MACH-107685</td>
<td>Exercises for Materials Characterization</td>
<td>2 CR</td>
<td>Gibmeier, Schneider</td>
</tr>
<tr>
<td>T-MACH-110946</td>
<td>Materials Characterization</td>
<td>4 CR</td>
<td>Gibmeier, Schneider</td>
</tr>
<tr>
<td>T-MACH-110945</td>
<td>Exercises for Materials Characterization</td>
<td>2 CR</td>
<td>Gibmeier, Schneider</td>
</tr>
</tbody>
</table>

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.
### 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

#### Mandatory

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Grade to a tenth</td>
<td>Each term</td>
<td>2 terms</td>
<td>German</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>CR</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-100285</td>
<td>Materials Physics and Metals</td>
<td>12</td>
<td>Heilmaier, Pundt</td>
</tr>
<tr>
<td>T-MACH-100286</td>
<td>Experimental Lab Course, Part A</td>
<td>2</td>
<td>Heilmaier</td>
</tr>
</tbody>
</table>

This item will not influence the grade calculation of this parent.

### Competence Certificate

oral exam and certificate
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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Grade to a tenth</td>
<td>Each winter term</td>
<td>1 term</td>
<td>German</td>
<td>3</td>
<td>3</td>
</tr>
</tbody>
</table>

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

Mandatory

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-100300</td>
<td>Modelling and Simulation</td>
<td>5 CR</td>
</tr>
</tbody>
</table>

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 knowledge in mathematics, physics and materials science
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)

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Grade to a tenth</td>
<td>Each summer term</td>
<td>1 term</td>
<td>German</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Mandatory**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-CHEMBIO-101865</td>
<td>Organic Chemistry for Engineers</td>
<td>5 CR</td>
</tr>
</tbody>
</table>

**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**


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

**Organisation:** University  
**Part of:** Orientation Exam

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>pass/fail</td>
<td>Each term</td>
<td>2 terms</td>
<td>German</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mandatory</th>
<th>Course Title</th>
<th>CR</th>
</tr>
</thead>
</table>
| T-MATH-100275 | Advanced Mathematics I                            | 7 CR  
| T-MACH-100285 | Materials Physics and Metals                     | 12 CR 

**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.
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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Grade to a tenth</td>
<td>Each winter term</td>
<td>1 term</td>
<td>German</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

**Mandatory**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-ETIT-100292</td>
<td>Passive Components</td>
<td>5 CR</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

**Prerequisites**

none
# 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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Grade to a tenth</td>
<td>Each term</td>
<td>2 terms</td>
<td>German</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Mandatory**

| T-CHEMBIO-100294 | Polymers | 6 CR |

**Prerequisites**

None
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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>Grade to a tenth</td>
<td>Each winter term</td>
<td>1 term</td>
<td>German/English</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

**Mandatory**

<table>
<thead>
<tr>
<th>Module Code</th>
<th>Title</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-100304</td>
<td>Production Operations Management</td>
<td>3 CR</td>
<td>Furmans, Lanza, Schultmann</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T-MACH-108734</td>
<td>Production Operations Management-Project</td>
<td>2 CR</td>
<td>Furmans, Lanza</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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 your 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)
Module: Properties [M-MACH-103713]

Responsibility:
Dr. Patric Gruber
Prof. Dr. Christoph Kirchlechner

Organisation:
KIT Department of Mechanical Engineering

Part of:
Master's Transfer Account

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

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Grading</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-107683</td>
<td>Exercises for Microstructure-Property-Relationships</td>
<td>2 CR</td>
<td>Gruber, Kirchlechner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T-MACH-107604</td>
<td>Microstructure-Property-Relationships</td>
<td>4 CR</td>
<td>Gruber, Kirchlechner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T-MACH-110930</td>
<td>Exercises for Microstructure-Property-Relationships</td>
<td>2 CR</td>
<td>Gruber, Kirchlechner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T-MACH-110931</td>
<td>Microstructure-Property-Relationships</td>
<td>4 CR</td>
<td>Gruber, Kirchlechner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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)
# Module: Rheology

**Module Code:** [M-CHEMBIO-100300]

**Responsible:** Prof. Dr. Manfred Wilhelm

**Organisation:** KIT Department of Chemistry and Biosciences

**Part of:** Fundamentals in Materials Science

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Grade to a tenth</td>
<td>Each summer term</td>
<td>1 term</td>
<td>German</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Mandatory**

<table>
<thead>
<tr>
<th>T-CHEMBIO-100303</th>
<th>Introduction to Rheology</th>
<th>6 CR</th>
</tr>
</thead>
</table>
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
- **Credits:** 6
- **Grading scale:** Grade to a tenth
- **Recurrence:** Each summer term
- **Duration:** 1 term
- **Language:** German/English
- **Level:** 4
- **Version:** 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)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Lecturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-107671</td>
<td>Exercises for Applied Materials Simulation</td>
<td>2 CR</td>
<td>Gumbsch, Schneider</td>
</tr>
<tr>
<td>T-MACH-105527</td>
<td>Applied Materials Simulation</td>
<td>4 CR</td>
<td>Gumbsch, Schneider</td>
</tr>
<tr>
<td>T-MACH-110928</td>
<td>Exercises for Applied Materials Simulation</td>
<td>2 CR</td>
<td>Gumbsch, Schneider</td>
</tr>
<tr>
<td>T-MACH-110929</td>
<td>Applied Materials Simulation</td>
<td>4 CR</td>
<td>Gumbsch, Schneider</td>
</tr>
</tbody>
</table>

### 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 module introduces a general overview of different numerical methods and their range of application in materials science and engineering. A basic introduction to numerical 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 module “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
## 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

<table>
<thead>
<tr>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Duration</th>
<th>Language</th>
<th>Level</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Grade to a tenth</td>
<td>Each summer term</td>
<td>1 term</td>
<td>German</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

**Mandatory**

<table>
<thead>
<tr>
<th>T-MACH-100293</th>
<th>Structural Materials</th>
<th>6 CR</th>
<th>Guth</th>
</tr>
</thead>
</table>

**Competence Certificate**  
oral exam about 25 minutes
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:** 6

**Grading scale:** Grade to a tenth

**Recurrence:** Each term

**Duration:** 1 term

**Language:** German/English

**Level:** 4

**Version:** 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)**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-MACH-107669</td>
<td>Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria</td>
<td>2 CR</td>
<td>Seifert</td>
</tr>
<tr>
<td>T-MACH-107670</td>
<td>Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria</td>
<td>4 CR</td>
<td>Franke, Seifert</td>
</tr>
<tr>
<td>T-MACH-110924</td>
<td>Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria</td>
<td>2 CR</td>
<td>Seifert</td>
</tr>
<tr>
<td>T-MACH-110925</td>
<td>Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria</td>
<td>4 CR</td>
<td>Franke, Seifert</td>
</tr>
</tbody>
</table>

**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. They 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
3 Courses

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

**Responsible:** PD Dr. Tilo Arens  
PD 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>7</td>
<td>Grade to a third</td>
<td>Each term</td>
<td>3</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Event</th>
<th>Code</th>
<th>Course Description</th>
<th>SWS</th>
<th>Type</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>0131000</td>
<td>Höhere Mathematik I für die Fachrichtung Maschinenbau, Geodäsie, Materialwissenschaft und Werkstofftechnik</td>
<td>4</td>
<td>Lecture</td>
<td>Griesmaier</td>
</tr>
<tr>
<td>WT 21/22</td>
<td>0131200</td>
<td>Höhere Mathematik I für die Fachrichtungen Chemieingenieurwesen, Verfahrenstechnik, Bioingenieurwesen und MIT</td>
<td>4</td>
<td>Lecture</td>
<td>Griesmaier</td>
</tr>
</tbody>
</table>

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-requisite 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.
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>7</td>
<td>Grade to a third</td>
<td>Each term</td>
<td>2</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>ST 2022</th>
<th>0180800</th>
<th>Höhere Mathematik II für die Fachrichtungen Maschinenbau, Geodäsie, Materialwissenschaft und Werkstofftechnik</th>
<th>4 SWS</th>
<th>Lecture</th>
<th>Arens</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022</td>
<td>0181000</td>
<td>Höhere Mathematik II für die Fachrichtungen Chemieingenieurwesen, Verfahrenstechnik, Bioingenieurwesen und MIT</td>
<td>4 SWS</td>
<td>Lecture</td>
<td>Arens</td>
</tr>
</tbody>
</table>

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

**Prerequisites**
A "pass" result on the pre-requisite 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.
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written exam</td>
<td>7</td>
<td>Grade to a third</td>
<td>Each term</td>
<td>2</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Event Code</th>
<th>Code</th>
<th>Lecture</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>0131400</td>
<td>Lecture</td>
<td>Hettlich</td>
</tr>
<tr>
<td></td>
<td></td>
<td>/ 🖥️</td>
<td></td>
</tr>
</tbody>
</table>

**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-requisite 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.
3.4 Course: Applied Chemistry [T-CHEMBIO-100302]

**Organisation:** KIT Department of Chemistry and Biosciences

**Part of:** M-CHEMBIO-100299 - Applied Chemistry

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>5</td>
<td>Grade to a third</td>
<td>Each term</td>
<td>1</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral examination</td>
<td>4</td>
<td>Grade to a third</td>
<td>Each summer term</td>
<td>3</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Credits</th>
<th>Lecturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022</td>
<td>2182614</td>
<td>4 SWS</td>
<td>Gumbsch, Schulz</td>
</tr>
</tbody>
</table>

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.
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral examination</td>
<td>4</td>
<td>Grade to a third</td>
<td>Each summer term</td>
<td>1</td>
</tr>
</tbody>
</table>

#### Events

<table>
<thead>
<tr>
<th>ST 2022</th>
<th>2182616</th>
<th>Applied Materials Simulation</th>
<th>4 SWS</th>
<th>Lecture / Practice ( / )</th>
<th>Schulz, Gumbsch</th>
</tr>
</thead>
</table>

 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.
### 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 workload 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.
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written exam</td>
<td>8</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>3</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Title</th>
<th>SWS</th>
<th>Type</th>
<th>Lecturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2137301</td>
<td>Measurement and Control Systems</td>
<td>3</td>
<td>Lecture / 🗣</td>
<td>Stiller</td>
</tr>
<tr>
<td>WT 21/22</td>
<td>2137302</td>
<td>Measurement and Control Systems (Tutorial)</td>
<td>1</td>
<td>Practice / 🗣</td>
<td>Stiller, Fischer, Le Large</td>
</tr>
<tr>
<td>WT 21/22</td>
<td>3137020</td>
<td>Measurement and Control Systems</td>
<td>3</td>
<td>Lecture / 🗣</td>
<td>Stiller</td>
</tr>
<tr>
<td>WT 21/22</td>
<td>3137021</td>
<td>Measurement and Control Systems (Tutorial)</td>
<td>1</td>
<td>Practice / 🗣</td>
<td>Stiller, Le Large, Fischer</td>
</tr>
</tbody>
</table>

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.
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>5</td>
<td>Grade to a third</td>
<td>Each term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**  
<table>
<thead>
<tr>
<th>Events</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22 22405 Biology for Engineers I</td>
<td>4 SWS</td>
<td>Lecture / Online</td>
<td>Neumann, Gottwald</td>
<td></td>
</tr>
</tbody>
</table>

*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
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>5</td>
<td>Grade to a third</td>
<td>Each term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>22407</td>
<td>Biology for Engineers II - Microbiology</td>
<td>2 SWS</td>
<td>Lecture / 🖥️</td>
</tr>
<tr>
<td>ST 2022</td>
<td>22406</td>
<td>Biology for Engeneers II</td>
<td>2 SWS</td>
<td>Lecture / 🗣️</td>
</tr>
</tbody>
</table>

**Prerequisites**

None

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral examination</td>
<td>4</td>
<td>Grade to a third</td>
<td>Each summer term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Competence Certificate**

- written or oral exam

**Prerequisites**

- none
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written exam</td>
<td>4</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Events</th>
<th>Credits</th>
<th>Type</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2610029</td>
<td>2 SWS</td>
<td>Tutorial (</td>
<td>Strych</td>
<td></td>
</tr>
</tbody>
</table>

**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
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>4</td>
<td>Grade to a third</td>
<td>Each summer term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Competence Certificate**

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

**Prerequisites**

None
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>3</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>1</td>
</tr>
</tbody>
</table>

**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
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**
Written examination

**Credits**
4

**Grading scale**
Grade to a third

**Recurrence**
Each winter term

**Expansion**
1 terms

**Version**
2

---

<table>
<thead>
<tr>
<th>Events</th>
<th>Credits</th>
<th>Type</th>
<th>Recurrence</th>
<th>Expansion</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2 SWS</td>
<td>Continuum mechanics of solids and fluids</td>
<td>Each winter term</td>
<td>1 terms</td>
<td>4</td>
</tr>
</tbody>
</table>

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.
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>5</td>
<td>Grade to a third</td>
<td>Each summer term</td>
<td>2</td>
</tr>
</tbody>
</table>

| 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.
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>5</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>1</td>
</tr>
</tbody>
</table>

**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 lecture. 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
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>5</td>
<td>Grade to a third</td>
<td>Each summer term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>ST 2022</th>
<th>Course Code</th>
<th>Course Name</th>
<th>SWS</th>
<th>Type</th>
<th>Lecturer(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2600014</td>
<td>Economics II: Macroeconomics</td>
<td>4</td>
<td>Lecture</td>
<td>Wigger</td>
<td></td>
</tr>
<tr>
<td>2660015</td>
<td>Economics II: Macroeconomics, Tutorial</td>
<td>2</td>
<td>Tutorial</td>
<td>Schmelzer, Setio, Herberholz</td>
<td></td>
</tr>
</tbody>
</table>

**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
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>3</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Title</th>
<th>Type</th>
<th>SWS</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2304223</td>
<td>Electrical Engineering for Business Engineers, Part I</td>
<td>Lecture</td>
<td>2</td>
<td>Menesklou</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>WT 21/22</td>
<td>2304225</td>
<td>Electrical Engineering for Business Engineers, Part I (Exercise to 2304223)</td>
<td>Practice</td>
<td>2</td>
<td>Menesklou</td>
</tr>
</tbody>
</table>

Legend: 🗣 Online, 🧩 Blended (On-Site/Online), 🖥 On-Site, ❌ Cancelled
## 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>5</td>
<td>Grade to a third</td>
<td>Each summer term</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Events</th>
<th>Credits</th>
<th>Course Title</th>
<th>Type</th>
<th>Recurrence</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022 2304224</td>
<td>3 SWS</td>
<td>Elektrotechnik II für Wirtschaftsingenieure</td>
<td>Lecture / 🗣</td>
<td>Each summer term</td>
<td>Menesklou</td>
</tr>
</tbody>
</table>

*Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ❌ Cancelled*
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written exam.</td>
<td>6</td>
<td>Grade to a third</td>
<td>Each summer term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
<th>Type</th>
<th>Recurrence</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>2306004</td>
<td>Electromagnetical Fields</td>
<td>2 SWS</td>
<td>Lecture / 📥</td>
<td>Doppelbauer</td>
<td></td>
</tr>
<tr>
<td>2306005</td>
<td>Practice to 2306004 Electromagnetic fields</td>
<td>2 SWS</td>
<td>Practice / 🗣</td>
<td>Menger, Kesten</td>
<td></td>
</tr>
<tr>
<td>2306006</td>
<td>Tutorium zu 2306004 Elektromagnetische Felder</td>
<td>/ 📥</td>
<td>Tutorium / 🗣</td>
<td>Doppelbauer</td>
<td></td>
</tr>
</tbody>
</table>

**Prerequisites**  
none

Legend: 🖥 Online, 📥 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral examination</td>
<td>5</td>
<td>Grade to a third</td>
<td>Each summer term</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Events</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022</td>
<td>2 SWS</td>
<td>Lecture /agoes</td>
<td>Colsmann, Röhm</td>
<td></td>
</tr>
<tr>
<td>2313758</td>
<td></td>
<td>Elektronische Eigenschaften von Festkörpern für Materialwissenschaften</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Events</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022</td>
<td>1 SWS</td>
<td>Practice /agoes</td>
<td>Colsmann, Röhm</td>
<td></td>
</tr>
<tr>
<td>2313759</td>
<td></td>
<td>Übungen zu 2313758 Elektronische Eigenschaften von Festkörpern für Materialwissenschaften</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Prerequisites**  
See information of institute

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written exam</td>
<td>7</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>2</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Course Description</th>
<th>SWS</th>
<th>Type / 🗣️</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2161245</td>
<td>Engineering Mechanics I</td>
<td>3</td>
<td>Lecture / 🗣️</td>
<td>Böhlke</td>
</tr>
<tr>
<td>WT 21/22</td>
<td>3161010</td>
<td>Engineering Mechanics I (Lecture)</td>
<td>3</td>
<td>Lecture / 🗣️</td>
<td>Langhoff, Pallicity, Böhlke</td>
</tr>
</tbody>
</table>

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.
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>6</td>
<td>Grade to a third</td>
<td>Each summer term</td>
<td>2</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Code</th>
<th>Code</th>
<th>Course</th>
<th>SWS</th>
<th>Type</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022</td>
<td>2162250</td>
<td>Engineering Mechanics II</td>
<td>3</td>
<td>Lecture / 🧩</td>
<td>Böhlke, Langhoff</td>
</tr>
<tr>
<td>ST 2022</td>
<td>3162010</td>
<td>Engineering Mechanics II (Lecture)</td>
<td>3</td>
<td>Lecture / 🧩</td>
<td>Langhoff</td>
</tr>
</tbody>
</table>

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.
**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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written exam</td>
<td>5</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>2</td>
</tr>
</tbody>
</table>

**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
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Completed coursework</th>
<th>Credits</th>
<th>2</th>
<th>Grading scale</th>
<th>pass/fail</th>
<th>Recurrence</th>
<th>Each summer term</th>
<th>Version</th>
<th>3</th>
</tr>
</thead>
</table>

**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.
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework</td>
<td>2</td>
<td>pass/fail</td>
<td>Each summer term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022</td>
<td>2182616</td>
<td>Applied Materials Simulation</td>
<td>4 SWS</td>
<td>Lecture / Practice</td>
<td>Schulz, Gumbsch</td>
</tr>
</tbody>
</table>

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.
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework</td>
<td>2</td>
<td>pass/fail</td>
<td>Each summer term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Event</th>
<th>Course Code</th>
<th>Course Name</th>
<th>SWS</th>
<th>Type</th>
<th>Grading</th>
<th>Recurrence</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022</td>
<td>2194721</td>
<td>Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria</td>
<td>1</td>
<td>Practice</td>
<td>pass/fail</td>
<td>Each summer term</td>
<td>Seifert, Franke</td>
</tr>
</tbody>
</table>

**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.
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework</td>
<td>2</td>
<td>pass/fail</td>
<td>Each winter term</td>
<td>4</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Course Title</th>
<th>Type</th>
<th>Credits</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2193005</td>
<td>Exercises for Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria</td>
<td>1 SWS</td>
<td>Practice / 🧩</td>
<td>Seifert, Ziebert</td>
<td></td>
</tr>
</tbody>
</table>

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.
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework</td>
<td>2</td>
<td>pass/fail</td>
<td>Each winter term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Lecture hours</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2173432</td>
<td>Tutorials and Lab Courses for &quot;Materials Characterization&quot;</td>
<td>1 SWS</td>
<td>Practice / 🩳</td>
<td>Gibmeier</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Legend:** 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✗ Canceled

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

3.31

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

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework</td>
<td>2</td>
<td>pass/fail</td>
<td>Each summer term</td>
<td>3</td>
</tr>
</tbody>
</table>

**Events**

| ST 2022 | 2178125 | 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-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.
Course: Exercises for Microstructure-Property-Relationships [T-MACH-110930]

**Responsibility:** Dr. Patric Gruber  
Prof. Dr. Christoph Kirchlechner

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-103713 - Properties

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework</td>
<td>2</td>
<td>pass/fail</td>
<td>Each winter term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Title</th>
<th>SWS</th>
<th>Type</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2177021</td>
<td>Exercises in Microstructure-Property-Relationships</td>
<td>1</td>
<td>Practice / 🧩</td>
<td>Kirchlechner, Wagner, Gruber</td>
</tr>
</tbody>
</table>

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

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

**Organisation:** KIT Department of Mechanical Engineering

**Part of:** M-MACH-103711 - Kinetics

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework</td>
<td>2</td>
<td>pass/fail</td>
<td>Each summer term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Event</th>
<th>Duration</th>
<th>Course Title</th>
<th>Credits</th>
<th>Type</th>
<th>Grade</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022</td>
<td>2194723</td>
<td>Exercises for Solid State Reactions and Kinetics of Phase Transformations, Corrosion</td>
<td>1 SWS</td>
<td>Practice / 🧩</td>
<td>Gorr, Martini</td>
<td></td>
</tr>
</tbody>
</table>

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.
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework</td>
<td>2</td>
<td>pass/fail</td>
<td>Each winter term</td>
<td>4</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22 2193004</td>
<td>Exercises for Solid State Reactions and Kinetics of Phase Transformations</td>
<td>1 SWS</td>
<td>Practice /</td>
<td>Franke, Ziebert</td>
<td></td>
</tr>
</tbody>
</table>

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.
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework</td>
<td>2</td>
<td>pass/fail</td>
<td>Each term</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2174578</td>
<td>Experimental Lab Course, Part A</td>
<td>3 SWS</td>
<td>Practical course / 🧩</td>
<td>Experimental Lab Course, Part A</td>
<td>3 SWS</td>
<td>Practical course / 🧩</td>
<td>Heilmaier, Kauffmann</td>
</tr>
<tr>
<td>ST 2022</td>
<td>2174578</td>
<td>Experimental Lab Course, Part A</td>
<td>3 SWS</td>
<td>Practical course / 🧩</td>
<td>Experimental Lab Course, Part A</td>
<td>3 SWS</td>
<td>Practical course / 🧩</td>
<td>Heilmaier, Kauffmann</td>
</tr>
</tbody>
</table>

**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
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework</td>
<td>3</td>
<td>pass/fail</td>
<td>Each winter term</td>
<td>2</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Course</th>
<th>Credits</th>
<th>Type</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2193101</td>
<td>Experimental Lab Course, Part B</td>
<td>2 SWS</td>
<td>Practical course</td>
<td>Gorr, Martini, Wagner</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>16</td>
<td>Grade to a third</td>
<td>Each term</td>
<td>1</td>
</tr>
</tbody>
</table>

#### Events

<table>
<thead>
<tr>
<th>Term</th>
<th>Lecture Code</th>
<th>Title</th>
<th>Credits</th>
<th>Type</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>4040011</td>
<td>Experimentalphysik A für die Studiengänge Elektrotechnik, Chemie, Biologie, Chemische Biologie, Geodäsi...</td>
<td>4 SWS</td>
<td>Lecture</td>
<td>Schimmel</td>
</tr>
<tr>
<td>WT 21/22</td>
<td>4040112</td>
<td>Übungen zur Experimentalphysik A für die Studiengänge Chemie, Biologie, Chemische Biologie, Geodäsi...</td>
<td>2 SWS</td>
<td>Practice</td>
<td>Schimmel, Wertz</td>
</tr>
<tr>
<td>ST 2022</td>
<td>4040021</td>
<td>Experimentalphysik B für die Studiengänge Chemie, Biologie, Chemische Biologie, Geodäsi...</td>
<td>4 SWS</td>
<td>Lecture</td>
<td>Pilawa</td>
</tr>
<tr>
<td>ST 2022</td>
<td>4040122</td>
<td>Übungen zur Experimentalphysik B für die Studiengänge Chemie, Biologie, Chemische Biologie, Geodäsi...</td>
<td>2 SWS</td>
<td>Practice</td>
<td>Pilawa, Wertz, NN</td>
</tr>
</tbody>
</table>

Legend: 🖥 Online, 💼 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled
Competence Certificate
Written exam (usually about 180 min)

Prerequisites
None
### 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

<table>
<thead>
<tr>
<th>Events</th>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22 2153512</td>
<td>Written examination</td>
<td>3 SWS</td>
<td>Grade to a third</td>
<td>Each summer term</td>
<td>2</td>
</tr>
<tr>
<td>WT 21/22 3153511</td>
<td>Fluid Mechanics II</td>
<td>Lecture / Practice ( Online )</td>
<td>Frohnapfel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ST 2022 2154512</td>
<td>Fluid Mechanics I</td>
<td>Lecture / Practice ( Blended (On-Site/Online) )</td>
<td>Frohnapfel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ST 2022 3154510</td>
<td>Fluid Mechanics I</td>
<td>Lecture / Practice ( On-Site )</td>
<td>Frohnapfel</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Legend:** 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**  
written exam 3 hours

**Prerequisites**  
none
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral examination</td>
<td>4</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>4</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Event</th>
<th>Code</th>
<th>Grade</th>
<th>Title</th>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2193002</td>
<td>2 SWS</td>
<td>Fundamentals in Materials Thermodynamics and Heterogeneous Equilibria</td>
<td>Lecture / 🧩</td>
<td>2</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>4</td>
</tr>
</tbody>
</table>

**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**

Basic course in materials science and engineering  
Basic course in mathematics  
Physics or physical chemistry
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: Oral examination
Credits: 4
Grading scale: Grade to a third
Recurrence: Each summer term
Version: 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
### 3.42 Course: General and Inorganic Chemistry [T-CHEMBIO-100279]

**Organisation:**  
KIT Department of Chemistry and Biosciences

**Part of:**  
M-CHEMBIO-100285 - Inorganic Chemistry

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>5</td>
<td>Grade to a third</td>
<td>1</td>
</tr>
</tbody>
</table>

**Prerequisites**

none
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>6</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Prerequisites**

none
### 3.44 Course: Inorganic Chemistry Laboratory Course [T-CHEMBIO-100280]

<table>
<thead>
<tr>
<th>Organisation:</th>
<th>KIT Department of Chemistry and Biosciences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part of:</td>
<td>M-CHEMBIO-100285 - Inorganic Chemistry</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Completed coursework (practical)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credits</td>
<td>6</td>
</tr>
<tr>
<td>Grading scale</td>
<td>pass/fail</td>
</tr>
<tr>
<td>Version</td>
<td>1</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>6</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>2</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Course</th>
<th>SWS</th>
<th>Type</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2105011</td>
<td>Introduction into Mechatronics</td>
<td>3</td>
<td>Lecture / 🧩</td>
<td>Reischl, Böhland</td>
</tr>
</tbody>
</table>

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

**Competence Certificate**

Oral exam (Duration: 2h)

**Prerequisites**

none
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral exam.</td>
<td>6</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>1</td>
</tr>
</tbody>
</table>

Events

<table>
<thead>
<tr>
<th>WT 21/22</th>
<th>2125757</th>
<th>Introduction to Ceramics</th>
<th>3 SWS</th>
<th>Lecture / 🗣</th>
<th>Hoffmann</th>
</tr>
</thead>
</table>

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

**Organisation:**  KIT Department of Chemistry and Biosciences

**Part of:**  M-CHEMBIO-100300 - Rheology

**Type**  Written examination

**Credits**  6

**Grading scale**  Grade to a third

**Version**  1
### 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

**Part of:** M-MACH-103746 - Elective Module

<table>
<thead>
<tr>
<th>Events</th>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>Written examination</td>
<td>8</td>
<td>Grade to a third</td>
<td>Each term</td>
<td>2</td>
</tr>
<tr>
<td>ST 2022</td>
<td>Machines and Processes</td>
<td>4 SWS</td>
<td>Lecture / Practice (🖥)</td>
<td>Bauer, Kubach, Maas, Pritz</td>
<td></td>
</tr>
<tr>
<td>ST 2022</td>
<td>Machines and Processes</td>
<td>4 SWS</td>
<td>Lecture / Practice (🗣)</td>
<td>Bauer, Maas, Kubach, Pritz</td>
<td></td>
</tr>
</tbody>
</table>

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.
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

**Part of:**  
M-MACH-103746 - Elective Module

<table>
<thead>
<tr>
<th>Events</th>
<th>Schedule</th>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2187000</td>
<td>Completed coursework</td>
<td>0</td>
<td>pass/fail</td>
<td>Each term</td>
<td>1</td>
</tr>
<tr>
<td>ST 2022</td>
<td>2187000</td>
<td>Practical course /</td>
<td>1 SWS</td>
<td>Bauer, Kubach, Pritz, Schmidt, Bykov</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Prerequisites**  
none

**Competence Certificate**  
successful completed training course

**Legend:**  
🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ❌ Cancelled
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral examination</td>
<td>4</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>1</td>
</tr>
</tbody>
</table>

#### Events

<table>
<thead>
<tr>
<th>Setting</th>
<th>Code</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2173431</td>
<td>Materials Characterization</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 SWS</td>
</tr>
</tbody>
</table>

**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.
### 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  

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral examination</td>
<td>4</td>
<td>Grade to a third</td>
<td>Each summer term</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Events</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022</td>
<td>2 SWS</td>
<td>Lecture / 🧩</td>
<td>Schneider, Gibmeier</td>
<td>4</td>
</tr>
</tbody>
</table>

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

**Responsible:** Prof. Dr.-Ing. Martin Heilmann
Prof. Dr. Astrid Pundt

**Organisation:** KIT Department of Mechanical Engineering

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral examination</td>
<td>12</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>2</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Type</th>
<th>SWS</th>
<th>Type / Online</th>
<th>Lecturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2177010</td>
<td>Materials Physics</td>
<td>3</td>
<td>Lecture / 🚦</td>
<td>Gruber</td>
</tr>
<tr>
<td>ST 2022</td>
<td>2174598</td>
<td>Metals</td>
<td>4</td>
<td>Lecture / 🚦</td>
<td>Pundt, Kauffmann</td>
</tr>
<tr>
<td>ST 2022</td>
<td>2174599</td>
<td>Exercises in Metals</td>
<td>1</td>
<td>Practice / 🚦</td>
<td>Pundt, Kauffmann</td>
</tr>
</tbody>
</table>

**Legend:** 🚦 Online, 🚦 Blended (On-Site/Online), 🗣 On-Site, ✗ Cancelled

**Competence Certificate**
Oral exam, about 45 minutes

**Prerequisites**
none
## 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral examination</td>
<td>6</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>2</td>
</tr>
</tbody>
</table>

### 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
### 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

<table>
<thead>
<tr>
<th>Events</th>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Expansion</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>Written examination</td>
<td>4</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>1 terms</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Event Code</th>
<th>Event Type</th>
<th>Course Details</th>
<th>SWS</th>
<th>Type of Event</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>2161254</td>
<td>Lecture</td>
<td>Mathematical Methods in Continuum Mechanics</td>
<td>2 SWS</td>
<td>Lecture / Online</td>
<td>Böhlke</td>
</tr>
</tbody>
</table>

**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.
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Expansion</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>5</td>
<td>Grade to a third</td>
<td>Each summer term</td>
<td>1 terms</td>
<td>2</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>ST 2022</th>
<th>2162280</th>
<th>Mathematical Methods in Micromechanics</th>
<th>2 SWS</th>
<th>Lecture / 🧩</th>
<th>Böhlke, Kehrer</th>
</tr>
</thead>
</table>

**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.
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written exam</td>
<td>6</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Course</th>
<th>SWS</th>
<th>Type</th>
<th>Lecturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2145131</td>
<td>Mechanical Design Basics I</td>
<td>2</td>
<td>Lecture / Online</td>
<td>Albers, Matthiesen</td>
</tr>
<tr>
<td>ST 2022</td>
<td>2146131</td>
<td>Mechanical Design Basics II</td>
<td>2</td>
<td>Lecture / Online</td>
<td>Albers, Matthiesen</td>
</tr>
</tbody>
</table>

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), ⚪ On-Site, ✗ Cancelled

**Competence Certificate**

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

**Prerequisites**


**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.
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Completed coursework</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
<td>pass/fail</td>
<td>Each winter term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

| WT 21/22 | 2145132 | Tutorials Mechanical Design Basics I | 1 SWS | Practice / On-Site | 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
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework</td>
<td>1</td>
<td>pass/fail</td>
<td>Each summer term</td>
<td>1</td>
</tr>
</tbody>
</table>

**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
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>6</td>
<td>Grade to a third</td>
<td>Each term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Code</th>
<th>Lecture/Practice</th>
<th>Description</th>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22 22901</td>
<td>Lecture</td>
<td>Grundlagen der Mechanischen Verfahrenstechnik (Bach.)</td>
<td>2 SWS</td>
<td>Lecture</td>
<td>Each term</td>
<td></td>
</tr>
<tr>
<td>WT 21/22 22902</td>
<td>Practice</td>
<td>Übung zu 22901 Mechanische Verfahrenstechnik (Bach.)</td>
<td>2 SWS</td>
<td>Practice</td>
<td>Each term</td>
<td></td>
</tr>
</tbody>
</table>

**Prerequisites**

none

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral exam</td>
<td>4</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2177020</td>
<td>Microstructure-Property-Relationships</td>
<td>3 SWS</td>
<td>Lecture / 🧩</td>
<td>Kirchlechner, Gruber</td>
</tr>
</tbody>
</table>

**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.
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral examination</td>
<td>4</td>
<td>Grade to a third</td>
<td>Each summer term</td>
<td>3</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>ST 2022</th>
<th>2178124</th>
<th>Microstructure-Property-Relationships</th>
<th>3 SWS</th>
<th>Lecture / 🗣</th>
<th>Kirchlechner, Gruber</th>
</tr>
</thead>
</table>

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-Properties-Relationships must not have been started.
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  

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>5</td>
<td>Grade to a third</td>
<td>Each term</td>
<td>2</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Type</th>
<th>SWS</th>
<th>Lectures / Practice</th>
<th>Teacher</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2183703</td>
<td>Numerical methods and simulation techniques</td>
<td>3 SWS</td>
<td>Lecture / Practice ( / )</td>
<td>Nestler</td>
</tr>
<tr>
<td>ST 2022</td>
<td>2183703</td>
<td>Modelling and Simulation</td>
<td>2+1 SWS</td>
<td>Lecture / Practice ( / )</td>
<td>Nestler, August</td>
</tr>
</tbody>
</table>

**Legend:** 🌐 Online, 📦 Blended (On-Site/Online), 🗣 On-Site, ❌ Cancelled

**Competence Certificate**
Written exam, 90 min

**Prerequisites**
none

**Recommendation**
preliminary knowledge in mathematics, physics and materials science
Course: Modern Physics [T-PHYS-103629]

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>6</td>
<td>Grade to a third</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Events</th>
<th>Credits</th>
<th>Type</th>
<th>Grading scale</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22 4044011</td>
<td>4 SWS</td>
<td>KSOP - Modern Physics</td>
<td>Lecture / 🌐</td>
<td>Pilawa</td>
</tr>
<tr>
<td>WT 21/22 4044012</td>
<td>2 SWS</td>
<td>KSOP - Exercises to Modern Physics</td>
<td>Practice</td>
<td>Pilawa, Bieling</td>
</tr>
</tbody>
</table>

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

**Competence Certificate**
Written exam (usually about 180 min)

**Prerequisites**
none
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>9</td>
<td>Grade to a third</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Title</th>
<th>SWS</th>
<th>Type</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022</td>
<td>4040451</td>
<td>Moderne Physik für Informatiker</td>
<td>4</td>
<td>Lecture</td>
<td>Gieseke</td>
</tr>
<tr>
<td>ST 2022</td>
<td>4040452</td>
<td>Übungen zu Moderne Physik für Informatiker</td>
<td>2</td>
<td>Practice</td>
<td>Gieseke, NN</td>
</tr>
</tbody>
</table>

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.
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>6</td>
<td>Grade to a third</td>
<td>Each term</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Description</th>
<th>SWS</th>
<th>Type</th>
<th>Lecturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022</td>
<td>0187400</td>
<td>Numerische Mathematik für die Fachrichtungen Informatik und Ingenieurwesen</td>
<td>2</td>
<td>Lecture</td>
<td>Weiss</td>
</tr>
<tr>
<td>ST 2022</td>
<td>0187500</td>
<td>Übungen zu 0187400</td>
<td>1</td>
<td>Practice</td>
<td>Weiss</td>
</tr>
</tbody>
</table>

**Prerequisites**  
None
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>5</td>
<td>Grade to a third</td>
<td>2</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Event</th>
<th>ID</th>
<th>Title</th>
<th>SWS</th>
<th>Type</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022</td>
<td>5142</td>
<td>Organische Chemie für CIW/VT und BIW</td>
<td>2</td>
<td>Lecture</td>
<td>Levkin</td>
</tr>
<tr>
<td>ST 2022</td>
<td>5143</td>
<td>Übungen zu Organische Chemie für CIW/VT und BIW</td>
<td>2</td>
<td>Practice</td>
<td>Levkin</td>
</tr>
</tbody>
</table>

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

**Prerequisites**  
acc. to module catalogue
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral examination</td>
<td>5</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>2</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Term</th>
<th>Code</th>
<th>Description</th>
<th>SWS</th>
<th>Type</th>
<th>Profile</th>
<th>Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2304206</td>
<td>Passive Devices</td>
<td>2</td>
<td>Lecture / 🗣️</td>
<td>Colsmann, Röhm, Menesklou</td>
<td></td>
</tr>
<tr>
<td>WT 21/22</td>
<td>2304208</td>
<td>Passive Devices (Exercise to 2304206)</td>
<td>1</td>
<td>Practice / 🗣️</td>
<td>Colsmann, Röhm</td>
<td></td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>8</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>2</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Events</th>
<th>Credits</th>
<th>Type</th>
<th>Lecturer</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>4 SWS</td>
<td>Physikalische Chemie I</td>
<td>Lecture / 🧩 Schuster, Kappes</td>
<td></td>
</tr>
</tbody>
</table>

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗓 On-Site, ❌ Cancelled
### 3.69 Course: Physical Chemistry II [T-CHEMBIO-100538]

<table>
<thead>
<tr>
<th>Responsible</th>
<th>Prof. Dr. Willem Klopper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organisation</td>
<td>KIT Department of Chemistry and Biosciences</td>
</tr>
<tr>
<td>Part of</td>
<td>M-MACH-103746 - Elective Module</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Written examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Credits</td>
<td>7</td>
</tr>
<tr>
<td>Grading scale</td>
<td>Grade to a third</td>
</tr>
<tr>
<td>Recurrence</td>
<td>Each summer term</td>
</tr>
<tr>
<td>Version</td>
<td>2</td>
</tr>
</tbody>
</table>
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>5</td>
<td>Grade to a third</td>
<td>Each summer term</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Events</th>
<th>Credits</th>
<th>Lectures / Practice</th>
<th>Trainers</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022</td>
<td>4 SWS</td>
<td>( / )</td>
<td>Weygand, Dienwiebel, Nesterov-Müller, Gumbsch</td>
</tr>
</tbody>
</table>

**Competence Certificate**  
written exam 90 min

**Prerequisites**  
none
### 3.71 Course: Polymers [T-CHEMBIO-100294]

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>6</td>
<td>Grade to a third</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Type</th>
<th>Credits</th>
<th>Lecture Format</th>
<th>Instructor(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>5501</td>
<td>Lecture</td>
<td>2 SWS</td>
<td>Blended (On-Site/Online)</td>
<td>Wilhelm, Dingenouts</td>
</tr>
<tr>
<td>ST 2022</td>
<td>5501</td>
<td>Lecture</td>
<td>2 SWS</td>
<td>On-Site</td>
<td>Dingenouts, Wilhelm</td>
</tr>
</tbody>
</table>

Legend: 🖥 Online, 🧩 Blended (On-Site/Online), 🗣 On-Site, ❌ Cancelled
### 3.72 Course: Presentation [T-MACH-107762]

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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework</td>
<td>3</td>
<td>pass/fail</td>
<td>Each term</td>
<td>2</td>
</tr>
</tbody>
</table>

**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.
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written exam</td>
<td>3</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>2</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Title</th>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Organisers</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2110085</td>
<td>Production Operations Management</td>
<td>3 SWS</td>
<td>Lecture / Practice ( oldukları)</td>
<td>Furmans, Lanza</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination of another type</td>
<td>2</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Event Code</th>
<th>Event Code</th>
<th>Event Name</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Responsible</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2110086</td>
<td>Production Operations Management-Project</td>
<td>1 SWS</td>
<td>Project (P / 📚)</td>
<td>Each winter term</td>
<td>Furmans, Lanza</td>
</tr>
</tbody>
</table>

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
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Completed coursework</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>pass/fail</td>
<td>Each summer term</td>
<td>2</td>
</tr>
</tbody>
</table>

**Events**

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022</td>
<td>2178450</td>
<td>Seminar in Materials Science</td>
<td>2 SWS</td>
<td>Seminar / 🗣</td>
<td>Gruber, Wagner</td>
</tr>
</tbody>
</table>

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
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral examination</td>
<td>4</td>
<td>Grade to a third</td>
<td>Each summer term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Lecture</th>
<th>Credits</th>
<th>Grade to a third</th>
<th>Recurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022</td>
<td>Lecture / 🗣️ Gorr</td>
<td>2 SWS</td>
<td>Grade to a third</td>
<td>Each summer term</td>
</tr>
</tbody>
</table>

**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-107676 - 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**

Basic course in materials science and engineering  
Basic course in mathematics  
physical chemistry
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral examination</td>
<td>4</td>
<td>Grade to a third</td>
<td>Each winter term</td>
<td>4</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>Events</th>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>Solid State Reactions and Kinetics of Phase Transformations</td>
<td>2 SWS</td>
<td>Lecture / 🧩</td>
<td>Franke</td>
<td></td>
</tr>
</tbody>
</table>

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**

Basic course in materials science and engineering  
Basic course in mathematics  
physical chemistry
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral examination</td>
<td>6</td>
<td>Grade to a third</td>
<td>Each summer term</td>
<td>2</td>
</tr>
</tbody>
</table>

Events

<table>
<thead>
<tr>
<th>Events</th>
<th>Code</th>
<th>Course</th>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022</td>
<td>2174580</td>
<td>Structural Materials</td>
<td>Lecture / Practice</td>
<td>4 SWS</td>
<td>Guth</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Competence Certificate

Oral exam, about 25 minutes

Prerequisites

none
### 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.
# 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework (written)</td>
<td>0</td>
<td>pass/fail</td>
<td>Each winter term</td>
<td>2</td>
</tr>
</tbody>
</table>

## Events

<table>
<thead>
<tr>
<th>Events</th>
<th>Credits</th>
<th>Tutor</th>
<th>SWS</th>
<th>Type</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>0131100</td>
<td>Griesmaier</td>
<td>2</td>
<td>Practice / Online</td>
<td>Griesmaier</td>
</tr>
<tr>
<td>WT 21/22</td>
<td>0131300</td>
<td>Griesmaier</td>
<td>2</td>
<td>Practice / Online</td>
<td>Griesmaier</td>
</tr>
</tbody>
</table>

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

## Competence Certificate

Learning assessment is carried out by written assignments (pre-requisite). Exact requirements will be communicated in the lectures.

## Prerequisites

None.
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework (written)</td>
<td>0</td>
<td>pass/fail</td>
<td>Each summer term</td>
<td>2</td>
</tr>
</tbody>
</table>

**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 assignments (pre-requisite). Exact requirements will be communicated in the lectures.

**Prerequisites**

None.
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework (written)</td>
<td>0</td>
<td>pass/fail</td>
<td>Each winter term</td>
<td>2</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th>WT 21/22</th>
<th>0131500</th>
<th>Übungen zu 0131400</th>
<th>2 SWS</th>
<th>Practice / 🧩</th>
<th>Hettlich</th>
</tr>
</thead>
</table>

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

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

**Prerequisites**
None.
### 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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework</td>
<td>1</td>
<td>pass/fail</td>
<td>Each winter term</td>
<td>1</td>
</tr>
</tbody>
</table>

**Part of:** M-MACH-105180 - Continuum Mechanics

<table>
<thead>
<tr>
<th>Events</th>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>Tutorial Continuum mechanics of solids and fluids</td>
<td>1 SWS</td>
<td>Practice / 🧩</td>
<td>Dyck, Karl, Böhlke</td>
<td></td>
</tr>
</tbody>
</table>

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.
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework</td>
<td>0</td>
<td>pass/fail</td>
<td>Each winter term</td>
<td>2</td>
</tr>
</tbody>
</table>

**Events**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Event Description</th>
<th>SWS</th>
<th>Practice Type</th>
<th>Instructors</th>
</tr>
</thead>
<tbody>
<tr>
<td>WT 21/22</td>
<td>2161246</td>
<td>Tutorial Engineering Mechanics I</td>
<td>2</td>
<td>Practice / 📡</td>
<td>Dyck, Gajek, Böhlke</td>
</tr>
<tr>
<td>WT 21/22</td>
<td>3161011</td>
<td>Engineering Mechanics I (Tutorial)</td>
<td>2</td>
<td>Practice / 📡</td>
<td>Kehrer, Görthofer, Langhoff</td>
</tr>
</tbody>
</table>

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.

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

**Prerequisites**

None
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework (written)</td>
<td>0</td>
<td>pass/fail</td>
<td>Each summer term</td>
<td>2</td>
</tr>
</tbody>
</table>

Events

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ST 2022</td>
<td>2162251</td>
<td>Tutorial Engineering Mechanics II</td>
<td>2 SWS</td>
<td>Practice / 🛠️</td>
</tr>
<tr>
<td>ST 2022</td>
<td>3162011</td>
<td>Engineering Mechanics II (Tutorial)</td>
<td>2 SWS</td>
<td>Practice / 🛠️</td>
</tr>
</tbody>
</table>

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.

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

Prerequisites

None
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
Completed coursework
Credits
2
Grading scale
pass/fail
Recurrence
Each winter term
Expansion
1 terms
Version
2

Events
WT 21/22 2161255 Tutorial Mathematical Methods in Continuum 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
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

<table>
<thead>
<tr>
<th>Type</th>
<th>Credits</th>
<th>Grading scale</th>
<th>Recurrence</th>
<th>Version</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed coursework</td>
<td>1</td>
<td>pass/fail</td>
<td>Each summer term</td>
<td>1</td>
</tr>
</tbody>
</table>

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