Module Catalogue
for the Subject
Technology of Functional Materials
as a Bachelor’s with 1 major
with the degree "Bachelor of Science"
(180 ECTS credits)

Examination regulations version: 2010
Responsible: Faculty of Chemistry and Pharmacy
Contents

The subject is divided into

Content and Objectives of the Programme

Abbreviations used, Conventions, Notes, In accordance with

Compulsory Courses

Experimental Chemistry, General and analytical laboratory course for engineering students
Fundamentals of Engineering Mechanics
Mathematics 3 for students of Physics and Engineering
Introduction to Physics Part 1 for students of Physics Related Minor Subjects
Introduction to Physics Part 2 for students of Physics Related Minor Subjects
Physics Laboratory Course for students of Physics Related Minor Subjects
Bachelor Thesis’ Colloquium
Mathematics 1 for students of Technology of Functional Materials
Physical Chemistry for engineering students (lecture and laboratory course)
Basics of Electronics 1
Basics of Electronics 2
Computer-based Construction and Assembly (CAD/CAM)
Laboratory Course on Engineering (mechanical and electrical engineering)
Laboratory course on Physical Technology of Material Synthesis
Modern Analytical Methods (lecture and laboratory course)
Mathematics 2 for students of Technology of Functional Materials
Organic Chemistry for engineering students (lecture and laboratory course)
Molecular Materials (lecture and laboratory course)
Introduction to the Physics of Functional Materials
Technology of Composite Materials (lecture and laboratory course)

Compulsory Electives

Introduction to computer science of all faculties
Data bases
Basics of NanostructureTechnology
Ordinary Differential Equations
Programming course for Chemistry Majors
Functional Biomaterials for students of Technology of Functional Materials. Lectures, laboratory course
Chemically and biologically inspired Nanotechnology for Materials Synthesis
Biochemistry for Engineering Majors
Introduction to Functional Analysis
Numerical Mathematics 1
Numerical Mathematics 2
Programming course for students of Mathematics and other subjects
Computer-oriented Mathematics
Analysis of Geomaterials
Economic Geology
Stratigraphy and Earth History
Petroleum
Geochemistry and Geohydrology
Rock Identification under the Microscope

Thesis

Bachelor’s Thesis

Subject-specific Key Skills

Materials Science 1 (Basic Introduction)
Materials Science 2 (The Major Material Groups)
The subject is divided into

<table>
<thead>
<tr>
<th>section / sub-section</th>
<th>ECTS credits</th>
<th>starting page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compulsory Courses</td>
<td>143</td>
<td>6</td>
</tr>
<tr>
<td>Compulsory Electives</td>
<td>5</td>
<td>29</td>
</tr>
<tr>
<td>Thesis</td>
<td>12</td>
<td>49</td>
</tr>
<tr>
<td>Subject-specific Key Skills</td>
<td>10</td>
<td>51</td>
</tr>
</tbody>
</table>
Content and Objectives of the Programme

The Bachelor of Science program (Technology of) Functional Materials at the faculty of Chemistry and Pharmacy prepares students for research and development occupations of both a scientific and a practical nature in the field of materials and natural sciences. Students learn the basic methodical principles of scientific work. The study program’s interdisciplinary focus enables students to obtain extensive fundamental knowledge of the fields of chemistry, physics and mathematics. In addition, they acquire expert knowledge of the following engineering and natural sciences subjects: electronics, engineering mechanics, materials science, molecular materials, and compound materials. Close cooperation with the Fraunhofer Institute for Silicate Research ISC, Würzburg-Schweinfurt University of Applied Sciences, the Bavarian Center for Applied Energy Research and the SKZ plastics center guarantees an interdisciplinary education. Thanks to this, students are introduced to multifaceted topics relating to modern functional materials. By means of their bachelor’s thesis, students show that they have the ability to act largely independently to solve a specific, time-limited experimental or theoretical assignment of engineering or natural sciences tasks. The results of the bachelor’s thesis are presented and defended in a colloquium. The Bachelor of Science degree qualifies students for an occupation of both a scientific and a practical nature in the field of materials and natural sciences in general and of functional materials in particular. However, this generally requires a further qualification to be acquired either through practical experience in industry or through a consecutive master’s degree.
Abbreviations used

Course types: \( E = \) field trip, \( K = \) colloquium, \( O = \) conversatorium, \( P = \) placement/lab course, \( R = \) project, \( S = \) seminar, \( T = \) tutorial, \( Ü = \) exercise, \( V = \) lecture

Term: \( SS = \) summer semester, \( WS = \) winter semester

Methods of grading: \( NUM = \) numerical grade, \( B/NB = \) (not) successfully completed

Regulations: \( (L)ASPO = \) general academic and examination regulations (for teaching-degree programmes), \( FSB = \) subject-specific provisions, \( SFB = \) list of modules

Other: \( A = \) thesis, \( LV = \) course(s), \( PL = \) assessment(s), \( TN = \) participants, \( VL = \) prerequisite(s)

Conventions

Unless otherwise stated, courses and assessments will be held in German, assessments will be offered every semester and modules are not creditable for bonus.

Notes

Should there be the option to choose between several methods of assessment, the lecturer will agree with the module coordinator on the method of assessment to be used in the current semester by two weeks after the start of the course at the latest and will communicate this in the customary manner.

Should the module comprise more than one graded assessment, all assessments will be equally weighted, unless otherwise stated below.

Should the assessment comprise several individual assessments, successful completion of the module will require successful completion of all individual assessments.

In accordance with

the general regulations governing the degree subject described in this module catalogue:

\[ \text{ASPO2007} \]

associated official publications (FSB (subject-specific provisions)/SFB (list of modules)):

\[ 29\text{-Apr-2010 (2010-22)} \]

This module handbook seeks to render, as accurately as possible, the data that is of statutory relevance according to the examination regulations of the degree subject. However, only the FSB (subject-specific provisions) and SFB (list of modules) in their officially published versions shall be legally binding. In the case of doubt, the provisions on, in particular, module assessments specified in the FSB/SFB shall prevail.
Compulsory Courses

(143 ECTS credits)
Module title | Abbreviation
---|---
Experimental Chemistry, General and analytical laboratory course for engineering students | 08-IAC-062-m01

Module coordinator | Module offered by
lecturer of lecture "Experimentalchemie“ (Experimental Chemistry) | Institute of Inorganic Chemistry

ECTS | Method of grading | Only after succ. compl. of module(s)
---|---|---
10 | numerical grade | --

Duration | Module level | Other prerequisites
1 semester | undergraduate | --

Contents

German contents available but not translated yet.


Intended learning outcomes

German intended learning outcomes available but not translated yet.


Courses

This module comprises 2 module components. Information on courses will be listed separately for each module component.

- 08-IAC-1-062: V (no information on SWS (weekly contact hours) and course language available)
- 08-IAC-2-062: P (no information on SWS (weekly contact hours) and course language available)

Method of assessment

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component 08-IAC-1-062: Experimental Chemistry
- 5 ECTS, Method of grading: numerical grade
- written examination (approx. 90 minutes)

Assessment in module component 08-IAC-2-062: General and analytical Chemistry Lab for engineering students
- 5 ECTS, Method of grading: (not) successfully completed
- Vortestate (pre-experiment exams, approx. 15 minutes each), assessment of practical performance, Nachtestate (post-experiment exams, approx. 15 minutes each)

Allocation of places

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### Additional information

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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<tr>
<th>Module title</th>
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<tbody>
<tr>
<td>Dean of the Faculty of Mechanical Engineering at the University of Applied Sciences Würzburg-Schweinfurt</td>
<td>University of Applied Sciences Würzburg- Schweinfurt (FHWS)</td>
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<th>Other prerequisites</th>
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<tr>
<td>1 semester</td>
<td>undergraduate</td>
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**Contents**
Basics of statistics, strength of materials and dynamics.

**Intended learning outcomes**
The students have methodological competencies in determining forces and stress resultants, in calculating tensions and deformations and in dimensioning components.

**Courses** (type, number of weekly contact hours, language — if other than German)
V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment** (type, scope, language — if other than German, examination offered — If not every semester, information on whether module is creditable for bonus)
written examination (90 minutes)

**Allocation of places**
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**Additional information**
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**Referred to in LPO I** (examination regulations for teaching-degree programmes)
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<td>Mathematics 3 for students of Physics and Engineering</td>
<td>11-MP13-062-m01</td>
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<tr>
<td>Managing Director of the Institute of Theoretical Physics and Astrophysics</td>
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<tr>
<td>1 semester</td>
<td>undergraduate</td>
<td>Admission prerequisite to assessment: successful completion of approx. 50% of exercises. Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.</td>
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</table>

Contents

Ordinary and partial differential equations in Physics.

Intended learning outcomes

The students have basic mathematical knowledge of dynamic equations and solution methods for common and partial differential equations.

Courses

(V + Ü (no information on SWS (weekly contact hours) and course language available))

Method of assessment

(written examination (approx. 120 minutes))

Allocation of places

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Additional information

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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<table>
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<tr>
<td>Introduction to Physics Part 1 for students of Physics Related Minor Subjects</td>
<td>11-ENNF1-062-m01</td>
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**Module coordinator**
Managing Director of the Institute of Applied Physics

**Module offered by**
Faculty of Physics and Astronomy

**ECTS**
- 7

**Method of grading**
- numerical grade
- Only after succ. compl. of module(s)

**Duration**
- 1 semester

**Module level**
- undergraduate

**Other prerequisites**
- --

**Contents**
Mechanics, vibration theory, thermodynamics.

**Intended learning outcomes**
The students have basic knowledge of physics for engineering students.

**Courses**
- V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**
- written examination (approx. 120 minutes)

**Allocation of places**
Only as part of pool of general key skills (ASQ): 20 places. Places will be allocated by lot.

**Additional information**
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**Referred to in LPO I**
(examination regulations for teaching-degree programmes)
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<tr>
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<td>Faculty of Physics and Astronomy</td>
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<td>1 semester</td>
<td>undergraduate</td>
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**Contents**

Science of electricity, magnetism, optics, Atomic Physics.

**Intended learning outcomes**

The students have basic knowledge of physics for engineering students.

**Courses**

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

written examination (approx. 120 minutes)

**Allocation of places**

Only as part of pool of general key skills (ASQ): 20 places. Places will be allocated by lot.

**Additional information**

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**Referred to in LPO I**

(examination regulations for teaching-degree programmes)

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<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physics Laboratory Course for students of Physics Related Minor Subjects</td>
<td>11-PNNF-062-m01</td>
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<td>Faculty of Physics and Astronomy</td>
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<th>Other prerequisites</th>
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</table>

**Contents**

Mechanics, vibration theory, thermodynamics, optics, X-rays, nuclear magnetic resonance, Atomic and Nuclear Physics.

**Intended learning outcomes**

The students know the principles of Physics.

**Courses**

P (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

a) oral test (approx. 15 minutes) during experiment and b) ungraded written examination (approx. 90 minutes)

**Allocation of places**

Only as part of pool of general key skills (ASQ): 15 places. Places will be allocated by lot.

**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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</thead>
<tbody>
<tr>
<td>Bachelor Thesis’ Colloquium</td>
<td>08-BKOLL-062-m01</td>
</tr>
</tbody>
</table>

**Module coordinator**
Dean of Studies Funktionswerkstoffe (Functional Materials)
Chair of Chemical Technology of Material Synthesis

**ECTS**
3

**Method of grading**
numerical grade

**Duration**
1 semester

**Module level**
undergraduate

**Other prerequisites**
--

**Contents**
German contents available but not translated yet.


**Intended learning outcomes**
The student is able to defend the results of her/his Bachelor’s Thesis in a scientific discussion.

**Courses**
K (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**
final colloquium (60 minutes)

**Allocation of places**
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**Additional information**
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**Referred to in LPO I** (examination regulations for teaching-degree programmes)
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<table>
<thead>
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<tbody>
<tr>
<td>Mathematics 1 for students of Technology of Functional Materials</td>
<td>10-M-TFU1-091-m01</td>
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<td>Dean of Studies Mathematik (Mathematics)</td>
<td>Institute of Mathematics</td>
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</table>

**Contents**

Fundamentals on numbers and functions, sequences and series, differential and integral calculus in one variable, vector spaces, simple differential equations.

**Intended learning outcomes**

The student gets acquainted with fundamental concepts of mathematics. He/She learns to apply these methods to simple problems in natural and engineering sciences, in particular in the technology of functional materials, and is able to interpret the results.

**Courses** (type, number of weekly contact hours, language — if other than German)

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 90 minutes)

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Physical Chemistry for engineering students (lecture and laboratory course)</td>
<td>08-IPC-091-m01</td>
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<td>lab course supervisor &quot;Physikalische Chemie für Studierende der Ingenieurwissenschaften, Praktikum&quot;</td>
<td>Institute of Physical and Theoretical Chemistry</td>
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</table>

**Contents**

This module will provide students with an overview of physical chemistry. Furthermore, in a lab course it introduces the basics techniques of physical chemistry.

**Intended learning outcomes**

German intended learning outcomes available but not translated yet.


**Courses**

This module comprises 3 module components. Information on courses will be listed separately for each module component.

- 08-IPC-2-062: V + Ü (no information on SWS (weekly contact hours) and course language available)
- 08-IPC-1-091: V + Ü (no information on SWS (weekly contact hours) and course language available)
- 08-IPC-3-091: P (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

**Assessment in module component 08-IPC-2-062: Physical Chemistry 2 (basics of quantum mechanics and spectroscopy) for engineering students Physical Chemistry 2 (basics of quantum mechanics and spectroscopy) for engineering students**

- 8 ECTS, Method of grading: numerical grade
- written examination (approx. 90 minutes)

**Assessment in module component 08-IPC-1-091: Physical Chemistry 1 (thermodynamics, electrochemistry) for engineering students Physical Chemistry 1 (thermodynamics, electrochemistry) for engineering students**

- 5 ECTS, Method of grading: numerical grade
- written examination (approx. 90 minutes)

**Assessment in module component 08-IPC-3-091: Physical Chemistry for engineering students, laboratory course**

- 5 ECTS, Method of grading: (not) successfully completed
- Vortestate (pre-experiment exams, approx. 15 minutes each), assessment of practical performance, Nachtestate (post-experiment exams, approx. 15 minutes each)

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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<table>
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<td>Basics of Electronics 1</td>
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<tr>
<td>Dean of the Faculty of Electrical Engineering at the University of Applied Sciences Würzburg-Schweinfurt</td>
<td>University of Applied Sciences Würzburg-Schweinfurt (FHWS)</td>
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<td>1 semester</td>
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**Contents**

Theoretical and practical principles of science of electricity, passive linear networks, principles of semiconductors.

**Intended learning outcomes**

The students have basic knowledge of theoretical and practical science of electricity, especially of passive linear networks and semiconductors.

**Courses** (type, number of weekly contact hours, language — if other than German)

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (60 minutes)

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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<td>Dean of the Faculty of Electrical Engineering at the University of Applied Sciences Würzburg-Schweinfurt</td>
<td>University of Applied Sciences Würzburg-Schweinfurt (FHWS)</td>
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**Contents**

Theoretical and practical principles of the components of electrical engineering, basic circuits, basic elements of digital technology, combinatorial circuits and sequential circuits.

**Intended learning outcomes**

The students have theoretical and practical knowledge of the components of electrical engineering, basic circuits, basic elements of digital technology, combinatorial circuits and sequential circuits.

**Courses**

(V + Ü (no information on SWS (weekly contact hours) and course language available))

**Method of assessment**

written examination (60 minutes)

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer-based Construction and Assembly (CAD/CAM)</td>
<td>99-CA-091-m01</td>
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</tbody>
</table>

**Module coordinator**
Dean of the Faculty of Mechanical Engineering at the University of Applied Sciences Würzburg-Schweinfurt

**Module offered by**
University of Applied Sciences Würzburg-Schweinfurt (FHWS)

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
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</thead>
<tbody>
<tr>
<td>6</td>
<td>numerical grade</td>
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</tbody>
</table>

**Duration**
1 semester

**Module level**
undergraduate

**Other prerequisites**
--

**Contents**
Comprehensive view of the process of product development, including the corresponding specialist subjects based on a selected example.

**Intended learning outcomes**
The students have professional and methodological competencies in the development of products with a focus on construction (CAD), calculation (CAE) and production (CAM), including prototyping and product validation.

**Courses**
V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**
written examination (90 minutes)

**Allocation of places**
--

**Additional information**
--

**Referred to in LPO I**
(examination regulations for teaching-degree programmes)

--
### Module Catalogue for the Subject
Technology of Functional Materials
Bachelor’s with 1 major, 180 ECTS credits

<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory Course on Engineering (mechanical and electrical engineering)</td>
<td>99-IP-091-m01</td>
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<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
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<tbody>
<tr>
<td>Deans of the Faculties of Electrical Engineering and Mechanical Engineering at the University of Applied Sciences Würzburg-Schweinfurt</td>
<td>University of Applied Sciences Würzburg-Schweinfurt (FHWS)</td>
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<table>
<thead>
<tr>
<th>Duration</th>
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<th>Other prerequisites</th>
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</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</tbody>
</table>

### Contents
Engineering laboratory and internship experiments.

### Intended learning outcomes
The students have practical experiences in applying engineering methods in electrical and mechanical engineering.

### Courses
(no information on SWS (weekly contact hours) and course language available)

### Method of assessment
(no information on SWS (weekly contact hours) and course language available)

- placement report / fieldwork report / report on practical training / report on practical course / project report / report on technical course (approx. 15 to 30 pages)

### Allocation of places
--

### Additional information
--

### Referred to in LPO I
(examination regulations for teaching-degree programmes)
--
## Module Catalogue for the Subject Technology of Functional Materials

### Bachelor's with 1 major, 180 ECTS credits

<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Laboratory course on Physical Technology of Material Synthesis</td>
<td>11-PPT-091-m01</td>
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### Module coordinator

<table>
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</table>

### Module offered by

Managing Director of the Institute of Applied Physics  
Faculty of Physics and Astronomy

### ECTS

5

### Method of grading

Only after successfully completed

### Duration

1 semester

### Module level

undergraduate

### Other prerequisites

--

### Contents

Growth and coating procedures, methods of characterisation and exemplary structuring technologies.

### Intended learning outcomes

The students have knowledge of the practical basics of material characterisation and physical technology for material synthesis.

### Courses

P (no information on SWS (weekly contact hours) and course language available)

### Method of assessment

a) Preparing the experiment will be considered successfully completed if an oral test (duration: approx. 15 minutes) prior to the experiment is passed.  
b) Performing and evaluating the experiment will be considered successfully completed if a Testat (exam) is passed. An experiment log (approx. 8 pages) is to be prepared. Each component of the assessment (a and b) can be repeated once in the respective semester. Only if both components of the assessment have been successfully completed in the same semester will the module component be considered successfully completed.

### Allocation of places

--

### Additional information

--

### Referred to in LPO I

(examination regulations for teaching-degree programmes)

--
Module title
Modern Analytical Methods (lecture and laboratory course)

Abbreviation
08-MAM-091-m01

Module coordinator
Dean of Studies Funktionswerkstoffe (Functional Materials)

Module offered by
Chair of Chemical Technology of Material Synthesis

ECTS
5

Method of grading
numerical grade

Only after succ. compl. of module(s)
--

Duration
1 semester

Module level
undergraduate

Other prerequisites
--

Contents
German contents available but not translated yet.

Analytische Grundlagen, Gravimetrische Verfahren, Titrationen, Chromatographie, Spektroskopische Methoden (UV-VIS, IR, Raman, Emission, Fluoreszenz, NMR etc.), Oberflächen-Analytik, Struktur-Analytik.

Intended learning outcomes
German intended learning outcomes available but not translated yet.

Der/Die Studierende verfügt über Kenntnisse der modernen Analytik.

Courses
This module comprises 2 module components. Information on courses will be listed separately for each module component.

- 08-MAM-1-091: V (no information on SWS (weekly contact hours) and course language available)
- 08-MAM-2-091: P (no information on SWS (weekly contact hours) and course language available)

Method of assessment
Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component 08-MAM-1-091: Modern Analytics

- 3 ECTS, Method of grading: numerical grade
- written examination (60 minutes)

Assessment in module component 08-MAM-2-091: Modern Analytics (practical course)

- 2 ECTS, Method of grading: (not) successfully completed
- Vortestate (pre-experiment exams, approx. 15 minutes each), logs (approx. 5 pages each), Nachtestate (post-experiment exams, approx. 15 minutes)

Allocation of places
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Additional information
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Referred to in LPO I (examination regulations for teaching-degree programmes)
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<table>
<thead>
<tr>
<th>Module title</th>
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<tbody>
<tr>
<td>Mathematics 2 for students of Technology of Functional Materials</td>
<td>10-M-TFU2-101-m01</td>
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<th>Module coordinator</th>
<th>Module offered by</th>
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<tbody>
<tr>
<td>Dean of Studies Mathematik (Mathematics)</td>
<td>Institute of Mathematics</td>
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<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</tbody>
</table>

**Contents**

Linear maps and systems of linear equations, matrix calculus, eigenvalue theory, differential and integral calculus in several variables, differential equations, Fourier analysis.

**Intended learning outcomes**

The student gets acquainted with fundamental concepts of advanced mathematics. He/She learns to apply these methods to problems in natural and engineering sciences, in particular in the technology of functional materials, and is able to interpret the results.

**Courses**

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

written examination (approx. 90 minutes)

**Allocation of places**

--

**Additional information**

--

**Referred to in LPO I**

(examination regulations for teaching-degree programmes)

--
Module title: Organic Chemistry for engineering students (lecture and laboratory course)
Abbreviation: 08-IOC-101-m01

Module coordinator: lab course supervisor "Organisch-chemisches Praktikum für Studierende der Ingenieurwissenschaften"
Module offered by: Institute of Organic Chemistry

ECTS: 12
Method of grading: numerical grade
Only after succ. compl. of module(s): --
Duration: 1 semester
Module level: undergraduate
Other prerequisites: By way of exception, additional prerequisites are listed in the section on assessments.

Contents
This module will provide students with an overview of organic chemistry. Furthermore, in a lab course it introduces the basics techniques of organic chemistry.

Intended learning outcomes
German intended learning outcomes available but not translated yet.


Courses
This module comprises 3 module components. Information on courses will be listed separately for each module component.

- 08-IOC-2-101: V + Ü (no information on SWS (weekly contact hours) and course language available)
- 08-IOC-3-101: P (no information on SWS (weekly contact hours) and course language available)
- 08-OC1-1-092: V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment
This module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component 08-IOC-2-101: Organic Chemistry - Laboratory course for students of engineering Organic Chemistry - Laboratory course for students of engineering
- 5 ECTS, Method of grading: numerical grade
- a) 1 to 3 written examinations (1 written examination: 90 minutes; 2 written examinations: 60 or 90 minutes each; 3 written examinations: 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)

Assessment in module component 08-IOC-3-101: Tutorial on the Organic Chemistry for students of engineering Tutorial on the Organic Chemistry for students of engineering
- 2 ECTS, Method of grading: (not) successfully completed
- Vortestate (pre-experiment exams, approx. 15 minutes each), assessment of practical performance, Nachtestate (post-experiment exams, approx. 15 minutes each)

Assessment in module component 08-OC1-1-092: Organic Chemistry 1 Organic Chemistry 1
- 5 ECTS, Method of grading: numerical grade
- a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: 60 or 90 minutes each; 3 written examinations: 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)
- Other prerequisites: Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence).
<table>
<thead>
<tr>
<th>Allocation of places</th>
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<table>
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<tr>
<th>Additional information</th>
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<tr>
<th>Referred to in LPO I (examination regulations for teaching-degree programmes)</th>
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</thead>
<tbody>
<tr>
<td>§ 62 (1) 2. Chemie &quot;Organische und Bioorganische Chemie&quot;</td>
</tr>
</tbody>
</table>
Module title
Molecular Materials (lecture and laboratory course)

Abbreviation
08-CT-101-m01

Module coordinator
Dean of Studies Funktionswerkstoffe (Functional Materials)

Module offered by
Chair of Chemical Technology of Material Synthesis

ECTS
10

Method of grading
numerical grade

Duration
1 semester

Module level
undergraduate

Other prerequisites
--

Contents
The module imparts the theoretical and practical fundamentals of molecular and soft materials.

Intended learning outcomes
German intended learning outcomes available but not translated yet.

Der/Die Studierende verfügt über Kenntnisse der molekularen und weichen Materialien und kann diese auf wissensschaftliche Fragestellungen anwenden.

Courses
This module comprises 2 module components. Information on courses will be listed separately for each module component.

- 08-CT-1-101: V + Ü (no information on SWS (weekly contact hours) and course language available)
- 08-CT-2-101: P (no information on SWS (weekly contact hours) and course language available)

Method of assessment
Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

Assessment in module component 08-CT-1-101: Molecular Materials (Lecture)

- 5 ECTS, Method of grading: numerical grade
- presentation (approx. 30 minutes) and a) 1 to 3 written examinations (1 written examination: 90 minutes; 2 written examinations: 60 or 90 minutes each; 3 written examinations: 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)

Assessment in module component 08-CT-2-101: Principles of Inorganic Chemistry for Mathematics Majors

- 5 ECTS, Method of grading: (not) successfully completed
- Vortestate (pre-experiment exams, approx. 15 minutes each), logs (approx. 5 pages each), Nachtestate (post-experiment exams, approx. 15 minutes)

Allocation of places
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Additional information
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Referred to in LPO I (examination regulations for teaching-degree programmes)

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<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Introduction to the Physics of Functional Materials</td>
<td>11-TMS-101-m01</td>
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</table>

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
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</thead>
<tbody>
<tr>
<td>Managing Director of the Institute of Applied Physics</td>
<td>Faculty of Physics and Astronomy</td>
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<td>1 semester</td>
<td>undergraduate</td>
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</tbody>
</table>

**Contents**

Theoretical and practical principles of physical material properties and semiconductor process technology, dielectrics, metals and oxides. Principles of structuring technology, growth and coating procedures.

**Intended learning outcomes**

The students have knowledge of the theoretical and practical principles of physical material properties and technology for material synthesis.

**Courses** (type, number of weekly contact hours, language — if other than German)

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment** (type, scope, language — if other than German, examination offered — If not every semester, information on whether module is creditable for bonus)

written examination (approx. 120 minutes)

**Allocation of places**

--

**Additional information**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--
### Module Catalogue for the Subject Technology of Functional Materials

**Bachelor's with 1 major, 180 ECTS credits**

<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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</thead>
<tbody>
<tr>
<td>Technology of Composite Materials (lecture and laboratory course)</td>
<td>03-TV-101-m01</td>
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<tbody>
<tr>
<td>holder of the Chair of Functional Materials in Medicine and Dentistry</td>
<td>Faculty of Medicine</td>
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</table>

### Contents

Theoretical and practical fundamental knowledge of the fabrication and evaluation of composite respectively sandwich materials.

### Intended learning outcomes

Students have developed a knowledge of the theoretical and practical foundations of the fabrication and evaluation of sandwich materials.

### Courses (type, number of weekly contact hours, language — if other than German)

This module comprises 2 module components. Information on courses will be listed separately for each module component.

- 03-TV-1-091: V (no information on SWS (weekly contact hours) and course language available)
- 03-TV-2-101: P (no information on SWS (weekly contact hours) and course language available)

### Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

**Assessment in module component 03-TV-1-091: Technology of Composite Materials**

- 3 ECTS, Method of grading: numerical grade
- written examination (60 minutes)

**Assessment in module component 03-TV-2-101: Technology of Composite Materials, laboratory course**

- 2 ECTS, Method of grading: (not) successfully completed
- oral examination (approx. 15 minutes) and logs (approx. 5 pages each)

### Allocation of places

--

### Additional information

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--
Compulsory Electives

(5 ECTS credits)
<table>
<thead>
<tr>
<th>Module title</th>
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<tbody>
<tr>
<td>Introduction to computer science of all faculties</td>
<td>10-I-EPIN-062-m01</td>
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</tbody>
</table>

**Module coordinator**
Dean of Studies Informatik (Computer Science)

**Module offered by**
Institute of Computer Science

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</tbody>
</table>

**Duration**
1 semester

**Module level**
undergraduate

**Other prerequisites**
--

**Contents**
Representation of information and web sites (HTML, XML, EBNF), databases, programming (Java).

**Intended learning outcomes**
The students possess a basic knowledge about the representation of information and websites (HTML, XML, EBNF), databases and programming in Java.

**Courses**
V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**
written examination (50 minutes) or oral examination (one candidate each: 20 minutes, groups of 2: 25 minutes, groups of 3: 25 minutes)

**Allocation of places**
--

**Additional information**
--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)
--
### Module Catalogue for the Subject Technology of Functional Materials
Bachelor’s with 1 major, 180 ECTS credits

<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Data bases</td>
<td>10-I-DB-072-m01</td>
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</table>

**Module coordinator**
Dean of Studies Informatik (Computer Science)

**Module offered by**
Institute of Computer Science

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<td>1 semester</td>
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</table>

**Contents**
Relational algebra and complex SQL statements; database planning and normal forms; xml data modelling; transaction management.

**Intended learning outcomes**
The students possess a knowledge about database modelling and queries in SQL, transactions as well as easy data modelling in XML.

**Courses**
V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**
written examination (50 minutes) or oral examination (one candidate each: 15 minutes, groups of 2: 20 minutes, groups of 3: 25 minutes)

**Allocation of places**
--

**Additional information**
--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)
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<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Basics of Nanostructure Technology</td>
<td>11-N1-072-m01</td>
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</table>

**Contents**

Principles of producing, characterising and applying nanostructures.

**Intended learning outcomes**

The students have knowledge of the fundamental properties, technologies, characterising methods and functions of nanostructures.

**Courses**

<table>
<thead>
<tr>
<th>(type, number of weekly contact hours, language — if other than German)</th>
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<tbody>
<tr>
<td>V + S (no information on SWS (weekly contact hours) and course language available)</td>
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</table>

**Method of assessment**

(type, scope, language — if other than German, examination offered — If not every semester, information on whether module is creditable for bonus)

written examination (approx. 90 minutes)

**Allocation of places**

--

**Additional information**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--
## Module title
Ordinary Differential Equations

### Abbreviation
10-M-ODE-082-m01

<table>
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<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Ordinary Differential Equations</td>
<td>10-M-ODE-082-m01</td>
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</table>

### Module coordinator
Dean of Studies Mathematik (Mathematics)

### Module offered by
Institute of Mathematics

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</table>

### Duration
1 semester

### Module level
undergraduate

### Other prerequisites
Certain prerequisites must be met to qualify for admission to assessment. The lecturer will inform students about the respective details at the beginning of the course. Registration for the course will be considered a declaration of will to seek admission to assessment. If students have obtained the qualification for admission to assessment over the course of the semester, the lecturer will put their registration for assessment into effect. Students who meet all prerequisites will be admitted to assessment in the current or in the subsequent semester. For assessment at a later date, students will have to obtain the qualification for admission to assessment anew.

## Contents
Existence and uniqueness theorem, continuous dependance of solutions on initial values, systems of linear differential equations, matrix exponential series, linear differential equations of higher order.

## Intended learning outcomes
The student is acquainted with the fundamental concepts and methods of the theory of ordinary differential equations. He/she is able to apply these methods to practical problems.

### Courses
(type, number of weekly contact hours, language — if other than German)

<table>
<thead>
<tr>
<th>V + Ü (no information on SWS (weekly contact hours) and course language available)</th>
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</table>

### Method of assessment
(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English if agreed upon with the examiner

### Allocation of places
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### Additional information
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### Referred to in LPO I (examination regulations for teaching-degree programmes)
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<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Programming course for Chemistry Majors</td>
<td>08-PKC-092-m01</td>
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<tr>
<td>lecturer of lecture &quot;Programmierkurs für Chemiker&quot;</td>
<td>Institute of Physical and Theoretical Chemistry</td>
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<tbody>
<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</table>

**Contents**

The module introduces students to the basics of a programming language and gives applications to problems related to chemistry.

**Intended learning outcomes**

German intended learning outcomes available but not translated yet.

Die Studierenden können einfach Grundlagen der Programmiersprache beschreiben und auf chemierelevante Probleme anwenden.

**Courses**

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

practical examination: completion of programming exercises and oral description of algorithms used (length/expenditure of time as specified at the beginning of the course)

**Allocation of places**

--

**Additional information**

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--
# Module: Functional Biomaterials for students of Technology of Functional Materials

**Module title:** Lectures, laboratory course

**Abbreviation:** 03-TF-FBM-101-m01

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<tbody>
<tr>
<td>holder of the Chair of Functional Materials in Medicine and Dentistry</td>
<td>Faculty of Medicine</td>
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**ECTS** | **Method of grading** | **Duration** | **Module level** | **Other prerequisites** |
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<td>1 semester</td>
<td>undergraduate</td>
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**Contents**

Fundamental principles and specific knowledge for working in natural sciences in the field of biomaterials with surface modification and characterisation.

**Intended learning outcomes**

Students have developed an advanced knowledge in the field of biomaterials for use in implants.

**Courses**

(V + P: no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

Placement report / fieldwork report / report on practical training / report on practical course / project report / report on technical course (approx. 10 pages) and written examination (approx. 60 minutes)

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
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<td>Chemically and biologically inspired Nanotechnology for Materials Synthesis</td>
<td>08-NT-101-m01</td>
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<td>holder of the Chair of Chemical Technology of Material Synthesis</td>
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<tr>
<td>1 semester</td>
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</table>

### Contents

German contents available but not translated yet.

Das Modul gibt eine Einführung in die Synthesemethoden der Sol-Gel Chemie und behandelt die zur Charakterisierung der erzeugten Materialien verwendeten Analyseverfahren. Es beinhaltet Grundprinzipien der Biomineralisation und gibt anhand von Beispielen eine Einführung in die biologisch inspirierte Materialsynthese.

### Intended learning outcomes

German intended learning outcomes available but not translated yet.

Der/Die Studierende verfügt über vertiefte Kenntnisse in den Bereichen der Sol-Gel Chemie und der Biomineralisation.

### Courses

This module comprises 2 module components. Information on courses will be listed separately for each module component.

- 08-NT-1-101: V (no information on SWS (weekly contact hours) and course language available)
- 08-NT-2-101: V (no information on SWS (weekly contact hours) and course language available)

### Method of assessment

Assessment in this module comprises the assessments in the individual module components as specified below. Unless stated otherwise, successful completion of the module will require successful completion of all individual assessments.

**Assessment in module component 08-NT-1-101: Chemically and biologically inspired Nanotechnology for Materials Synthesis**

- 2 ECTS, Method of grading: numerical grade
- oral examination (approx. 15 minutes)

**Assessment in module component 08-NT-2-101: From Biomineralisation to biologically inspired Materials Synthesis**

- 3 ECTS, Method of grading: numerical grade
- oral examination (approx. 20 minutes)

### Allocation of places

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### Additional information

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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<th>Abbreviation</th>
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<td>Biochemistry for Engineering Majors</td>
<td>08-BC-TF-082-m01</td>
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**Module coordinator**
holder of the Chair of Biochemistry

**Module offered by**
Chair of Biochemistry

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</table>

**Duration**
1 semester

**Module level**
undergraduate

**Other prerequisites**

**Contents**
The module imparts the basic knowledge of biochemistry by lectures and in-depth tutorials.

**Intended learning outcomes**
German intended learning outcomes available but not translated yet.

Der/Die Studierende verfügt über Grundlagenkenntnisse der Biochemie. Er/Sie ist in der Lage, die grundlegenden biochemischen Prozesse in zellulären Systemen zu beschreiben.

**Courses**
V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**
written examination (60 minutes)

**Allocation of places**
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**Additional information**
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**Referred to in LPO I**
(examination regulations for teaching-degree programmes)
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<td>Introduction to Functional Analysis</td>
<td>10-M-FAN-072-m01</td>
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### Contents

Banach spaces and Hilbert spaces, bounded operators, principles of functional analysis.

### Intended learning outcomes

The student knows the fundamental concepts and methods of functional analysis as well as the pertinent proof methods, is able to apply methods from linear algebra and analysis to functional analysis, and realises the broad applicability of the theory to other branches of mathematics.

### Courses

| V + Ü (no information on SWS (weekly contact hours) and course language available) |

### Method of assessment

written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English if agreed upon with the examiner

### Allocation of places

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### Additional information

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### Referred to in LPO I

§ 73 (1) 1. Mathematik Analysis
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**Contents**

Solution of systems of linear equations and curve fitting problems, nonlinear equations and systems of equations, interpolation with polynomials, splines and trigonometric functions, numerical integration.

**Intended learning outcomes**

The student is acquainted with the fundamental concepts and methods in numerical mathematics, applies them to practical problems and knows about their typical fields of application.

**Courses** (type, number of weekly contact hours, language — if other than German)

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

Written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)

Language of assessment: German, English if agreed upon with the examiner

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

§ 73 (1) 5. Mathematik Angewandte Mathematik
### Module Catalogue for the Subject Technology of Functional Materials
Bachelor's with 1 major, 180 ECTS credits

<table>
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</table>

### Contents
Solution methods and applications for eigenvalue problems, linear programming, initial value problems for ordinary differential equations, boundary value problems.

### Intended learning outcomes
The student is able to draw a distinction between the different concepts of numerical mathematics and knows about their advantages and limitations concerning the possibilities of application in different fields of natural and engineering sciences and economics.

### Courses
**V + Ü** (no information on SWS (weekly contact hours) and course language available)

### Method of assessment
**written examination (approx. 90 minutes); if announced by the lecturer, the written examination can be replaced by an oral examination of one candidate each (approx. 20 minutes) or an oral examination in groups (groups of 2, approx. 30 minutes)**

Language of assessment: German, English if agreed upon with the examiner

### Allocation of places
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### Additional information
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### Referred to in LPO I
(examination regulations for teaching-degree programmes)

§ 73 (1) 5. Mathematik Angewandte Mathematik

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Bachelor's with 1 major Technology of Functional Materials (2010)

JMU Würzburg • generated 17-Sep-2019 • exam. reg. data record

Bachelor (180 ECTS) Technologie der Funktionswerkstoffe - 2010

page 40 / 53
### Module Catalogue for the Subject

**Technology of Functional Materials**

Bachelor’s with 1 major, 180 ECTS credits

<table>
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<td>Programming course for students of Mathematics and other subjects</td>
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<td>Admission prerequisite to assessment: regular attendance (attendance monitored, a maximum of one incident of unexcused absence).</td>
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</table>

### Contents

Basics of a modern programming language (e.g. C or Fortran) taking into account the particular needs in mathematics.

### Intended learning outcomes

The student is able to work independently on small programming exercises and standard programming problems in mathematics.

### Courses

(project, number of weekly contact hours, language — if other than German)

P (no information on SWS (weekly contact hours) and course language available)

### Method of assessment

(project in the form of programming exercises (as specified at the beginning of the course)

Language of assessment: German, English if agreed upon with the examiner

### Allocation of places

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### Additional information

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### Referred to in LPO I

(examination regulations for teaching-degree programmes)

§ 73 (1) 5. Mathematik Angewandte Mathematik
### Module title
**Computeroriented Mathematics**

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### Module coordinator
Dean of Studies Mathematik (Mathematics)

### Module offered by
Institute of Mathematics

### ECTS
3

### Method of grading
Only after succ. compl. of module(s)

### Duration
1 semester

### Module level
undergraduate

### Other prerequisites
Admission prerequisite to assessment: regular attendance of exercises (attendance monitored, a maximum of one incident of unexcused absence).

### Contents
Introduction to modern mathematical software for symbolic computation (e.g., Mathematica or Maple) and numerical computation (e.g., Matlab) to supplement the basic modules in analysis and linear algebra (10-M-ANA or 10-M-ANL) and 10-M-LNA). Computer-based solution of problems in linear algebra, geometry, analysis, in particular differential and integral calculus; visualisation of functions.

### Intended learning outcomes
The student learns the use of advanced modern mathematical software packages, and is able to assess their fields of application to solve mathematical problems.

### Courses
V + Ü (no information on SWS (weekly contact hours) and course language available)

### Method of assessment
project in the form of programming exercises (as specified at the beginning of the course)

Assessment offered: once a year, summer semester

Language of assessment: German, English if agreed upon with the examiner

### Allocation of places
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### Additional information
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### Referred to in LPO I
( examination regulations for teaching-degree programmes)

§ 73 (1) 5. Mathematik Angewandte Mathematik
### Module title
Analysis of Geomaterials

### Abbreviation
09-AG-102-m01

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</table>

### Contents
Principles of modern methods in order to determine mineralogical, elementary and isotopic composition of minerals and rocks, e.g. x-ray diffractometry, x-ray fluorescence spectrometry, microprobe-analytics, mass spectrometry. As far as possible, practical tutorials/demonstrations will be conducted, next to the explanation of theoretical functionality, in the respective labs.

### Intended learning outcomes
Students possess the basic knowledge of common analytical methods in order to determine the chemical and isotopic composition of minerals and rocks.

### Courses
(V + Ü (no information on SWS (weekly contact hours) and course language available)

### Method of assessment
written or oral examination of one candidate each or presentation (30 minutes each)

### Allocation of places
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### Additional information
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### Referred to in LPO I
(examination regulations for teaching-degree programmes)
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<tr>
<td>holder of the Professorship of Geodynamics and Geomaterials Research</td>
<td>Institute of Geography and Geology</td>
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<tr>
<td>1 semester</td>
<td>undergraduate</td>
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</table>

**Contents**
Exploitation and use of mineral resources are essential economic geographic parameters, which, among others, influence the economic, political and social relations between nations strongly. Main topics of this module component are fundamental economic geological principles, a simple classification of deposit types according to genetic aspects and the evaluation of mineral deposits. For chosen and current examples, students will acquire a view on the availability and world market situation of essential mineral resources.

**Intended learning outcomes**
Students possess the basic knowledge of economic geological analysis of selected mineral raw materials.

**Courses**
(type, number of weekly contact hours, language — if other than German)
S (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**
(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)
written or oral examination of one candidate each or presentation (30 minutes each)

**Allocation of places**
--

**Additional information**
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**Referred to in LPO I** (examination regulations for teaching-degree programmes)
--
# Module: Stratigraphy and Earth History

**Module title:** Stratigraphy and Earth History  
**Abbreviation:** 09-SE-102-m01

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<tr>
<td>holder of the Professorship of Geodynamics and Geomaterials Research</td>
<td>Institute of Geography and Geology</td>
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<tbody>
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<td>1 semester</td>
<td>undergraduate</td>
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</table>

## Contents

Students will get an overview of the Earth’s continuous development over the past 4.6 billion years, genesis, composition and change of the resulting deposits and their evidence concerning former environmental conditions, the development of life and the related possibility of a relative ageing of stratigraphic deposits, the composition of "stratigraphy" and plate tectonic development as well as an introduction to the absolute age dating.

## Intended learning outcomes

Students possess the required basics of the Earth’s history, stratigraphic methods and age dating of rocks.

**Courses** (type, number of weekly contact hours, language — if other than German)

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written or oral examination of one candidate each or presentation (30 minutes each)

## Allocation of places

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## Additional information

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## Referred to in LPO I (examination regulations for teaching-degree programmes)

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**Contents**

The course provides an insight into the formation and change of crystalline, i.e. igneous and metamorphic rocks, which make up a significant part of the modern Earth's crust and Earth's surface. Further, the connection between the rock formation (petrogenesis) and the geodynamical processes of the planet Earth, which change constantly, will be made. This includes an introduction to modern methods in order to quantify information, which are contained in rocks, about pressure, temperature and point of time of the rock formation. Next to theoretical considerations, practical observations on thin sections of rocks under the polarisation microscope will be of great importance.

**Intended learning outcomes**

Students possess the basic knowledge of igneous and metamorphic Petrology.

**Courses**  (type, number of weekly contact hours, language — if other than German)

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**  (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written or oral examination of one candidate each or presentation (30 minutes each)

**Allocation of places**

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**Additional information**

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**Referred to in LPO I**  (examination regulations for teaching-degree programmes)

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Module title | Abbreviation
--- | ---
Geochemistry and Geohydrology | 09-GW-102-m01

Module coordinator | Module offered by
holder of the Chair of Geodynamics and Geomaterials Research | Institute of Geography and Geology

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Contents

The course "Geochemistry and Hydrologic Balance" deals with different geochemical systems, particularly in the area of the Earth’s upper crust, geochemical processes that leads to changes in rocks and rearrangement of elements or element groups as well as the respective transport mechanisms. The main focus will be on aquatic processes and thus, also on common hydrogeological aspects like water cycle, water storage and problems concerning the water contamination.

Intended learning outcomes

Students possess fundamental knowledge of geochemical and hydrological processes, particularly in the Earth's upper crust, which is the basis of further studies in the area of environmental sciences and hydrogeology.

Courses

(type, number of weekly contact hours, language — if other than German)

V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment

(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written or oral examination of one candidate each or presentation (30 minutes each)

Allocation of places

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Additional information

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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<td>Rock Identification under the Microscope</td>
<td>09-GM-102-m01</td>
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**Contents**

Guidance on microscopy of minerals and thin slices of rocks with the polarising microscope. In order to use a transmitted light microscope, students learn the ropes of crystal-optical principles. On this basis, the most important rock forming groups of minerals will be elucidated by their typical optical features in the thin section.

**Intended learning outcomes**

Students dispose over the required knowledge concerning the identification of the most important rock-forming minerals under the polarisation microscope. This module provides students with crucial basics of advanced studies of Petrology and Crystalline Geology.

**Courses** (type, number of weekly contact hours, language — if other than German)

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written or oral examination of one candidate each (30 minutes each)

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

--
Thesis
(12 ECTS credits)
Module title | Abbreviation
---|---
Bachelor's Thesis | 08-BT-062-m01

Module coordinator | Module offered by
Dean of Studies Funktionswerkstoffe (Functional Materials) | Chair of Chemical Technology of Material Synthesis

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<td>Registration for assessment on a continuous basis as agreed upon with supervisor.</td>
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</table>

Contents

The module enables the processing of a defined problem within a specified period by applying the scientific methods learned in the course of study.

Intended learning outcomes

The student has the ability to deal with a defined problem/issue using scientific methods and to document the results.

Courses (type, number of weekly contact hours, language — if other than German)

no courses assigned

Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written thesis

Language of assessment: German or English

Allocation of places

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Additional information

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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Subject-specific Key Skills
(10 ECTS credits)
Module title | Abbreviation
---|---
Materials Science 1 (Basic Introduction) | 08-FS1-101-m01

Module coordinator | Module offered by
---|---
Dean of Studies Funktionswerkstoffe (Functional Materials) | Chair of Chemical Technology of Material Synthesis

ECTS | Method of grading | Other prerequisites
---|---|---
5 | numerical grade | --

Duration | Module level | Other prerequisites
---|---|---
1 semester | undergraduate | --

Contents

German contents available but not translated yet.

Das Modul vermittelt die grundlegenden Beziehungen zwischen chemischer Bindung, Struktur, Gefüge und Eigenschaften von Werkstoffen.

Intended learning outcomes

German intended learning outcomes available but not translated yet.

Der/Die Studierende verfügt über Kenntnisse der grundlegenden Beziehungen zwischen chemischer Bindung, Struktur, Gefüge und Eigenschaften von Werkstoffen und kann diese auf wissenschaftliche Fragestellungen anwenden.

Courses

(type, number of weekly contact hours, language — if other than German)

V + Ü (no information on SWS (weekly contact hours) and course language available)

Method of assessment

(type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus)

written examination (90 minutes)

Allocation of places

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Additional information

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Referred to in LPO I (examination regulations for teaching-degree programmes)

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### Module Catalogue for the Subject Technology of Functional Materials

**Bachelor’s with 1 major, 180 ECTS credits**

<table>
<thead>
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<tbody>
<tr>
<td>Materials Science 2 (The Major Material Groups)</td>
<td>08-FS2-101-m01</td>
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**Contents**

This module deals with production and properties of the most important materials groups.

**Intended learning outcomes**

The students possess comprehensive knowledge about fabrication and properties of the major classes of materials and are able to apply this to scientific problems.

**Courses**

V + Ü (no information on SWS (weekly contact hours) and course language available)

**Method of assessment**

written examination (approx. 90 minutes)

**Allocation of places**

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**Additional information**

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**Referred to in LPO I** (examination regulations for teaching-degree programmes)

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