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### Module description
**Solid State and Materials Chemistry**

### Module code
MatWiss-MG 01

### Faculty/Subject/Department
Faculty 08/Chemistry

### Associated degree course(s)/Semester taken
Chemistry MSc, Advanced Materials MSc

### Module coordinator
Cf. German Version

### Module guidance
Cf. German Version

### Lecturers
Cf. German Version

### Prerequisites
None

### Learning outcomes
Students shall:
- have advanced knowledge of concepts for the description of chemical and physical properties of modern materials;
- have knowledge of relationships between structures and properties of solids;
- have an overview of methods applied for materials characterisation;
- have gathered experience with challenging preparation techniques for the modelling of modern materials;
- have mastered aspects of occupational safety.

### Module content
- Synthesis, structure and properties of selected cluster compounds
- Introduction to chemistry of sol-gel (“soft chemistry”; chimie douce)
- Selected chapters of solid-state chemistry and advanced materials
- Laboratory in preparative inorganic materials chemistry

### Form(s) of instruction
- Lecture (1 hour/week)
- Seminar (0.7 hours/week)
- Laboratory (2.7 hours/week)

### Total workload in hours
<table>
<thead>
<tr>
<th>Activity</th>
<th>Contact hrs</th>
<th>Preparation/revision</th>
<th>Total hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
<td>15 weeks, 1 hr/week</td>
<td>15 hrs</td>
<td></td>
</tr>
<tr>
<td>Laboratory</td>
<td>10 days, 4 hrs/day</td>
<td>40 hrs</td>
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</tr>
<tr>
<td>Seminar</td>
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<tr>
<td>Written examination</td>
<td>2 hrs</td>
<td>20 hrs</td>
<td></td>
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</tbody>
</table>

**Σ 180 hrs**

### Method(s) of assessment and contribution to final mark
- Written or oral examination (60%, Prerequisites for examination: completion of all Reports and seminar talk)
- Oral presentation (40%)

### Credit points
6 ECTS credits

### Frequency, duration
Winter semester; 1 semester

### Language of instruction
* see separate list of current semester

### Intake capacity/Form of registration
40/Internet

### Date
* see separate list of current semester

### Reading list
* see separate list of current semester
## Module description

**Module code**  
MatWiss-MG 02

**Faculty/Subject/Department**  
Faculty 08/Chemistry

**Associated degree course(s)/Semester taken**  
Chemistry MSc, Advanced Materials MSc/1st or 2nd semester

**Module coordinator**  
Cf. German Version

**Module guidance**  
Cf. German Version

**Lecturers**  
Cf. German Version

**Prerequisites**  
None

### Learning outcomes

Students shall:
- be familiar with the most important concepts of physical solid-state chemistry of volume;
- master the most important chemical methods for the regulation of materials properties;
- be able to evaluate the chemical stability of the most common materials under different conditions;
- be able to deal independently with the materials selection for a given problem.

### Module content

- Phase diagrams and phase stability
- Stoichiometric control
- Control of properties through composition and microstructure
- Solid state kinetics
- Main fields of application of most important classes of materials

### Form(s) of instruction

- Lecture (1 hour/week)
- Seminar (2 hours/week)
- Project (0.3 hours/week)

### Total workload in hours

<table>
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<tr>
<th>Form</th>
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<tr>
<td></td>
<td>Preparation/revision 1 hr/contact hr 15 hrs</td>
</tr>
<tr>
<td>Seminar</td>
<td>Contact hrs 14 days, 2 hrs/day 28 hrs</td>
</tr>
<tr>
<td></td>
<td>Preparation/revision 0.5 hr/contact hr 14 hrs</td>
</tr>
<tr>
<td>Project “Materials Properties”</td>
<td>Group work 6 weeks, 7hrs/week 42 hrs</td>
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<tr>
<td></td>
<td>Discussions with lecturers 5 weeks, 1hr/week 5 hrs</td>
</tr>
<tr>
<td></td>
<td>Preparation of written component 30 hrs</td>
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<td></td>
<td>Preparation of presentation 11 hrs</td>
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<tr>
<td></td>
<td>Preparation for written examination 18 hrs</td>
</tr>
<tr>
<td></td>
<td>Written examination (following the lecture) 2 hrs</td>
</tr>
<tr>
<td></td>
<td>Σ 180 hrs</td>
</tr>
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### Method(s) of assessment and contribution to final mark

- Written examination (60%; 50% of problems given in examination must be solved in order to pass the examination)
- Presentation of written component (seminar paper, 40%)

### Credit points

6 ECTS credits

### Frequency, duration

Winter semester and summer semester; 1 semester

### Language of instruction

* see separate list of current semester

### Intake capacity/Form of registration

40/Internet

### Date

* see separate list of current semester

### Reading list

* see separate list of current semester
### Module Description

**Physics of Semiconductors 1**

<table>
<thead>
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<th>Module code</th>
<th>MatWiss-MG 03</th>
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<tbody>
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<td>Faculty 07/Physics</td>
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<td>Cf. German Version</td>
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<td>Lecturers</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>None</td>
</tr>
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</table>

### Learning Outcomes

- Students shall:
  - Have knowledge of fundamental physical properties of semiconductor materials and have necessary mathematical and technical understanding;
  - be acquainted with concepts of modern semiconductor physics;
  - be able to apply fundamental concepts of semiconductor physics;
  - have proven the acquired knowledge through independent exercises;
  - be able to plan and undertake a scientific project and to document and present the results in an appropriate manner.

### Module Content

- Fundamental properties of semiconductors, multi-element semiconductors
- Concepts of energy band structures, defects and doping
- Optical properties of semiconductors
- Photoconductivity and creation of photons in semiconductors
- Characteristics of surfaces and boundaries
- Presentation techniques

### Form(s) of Instruction

- Lecture (1 hour/week)
- Project work (4 hour/week)

A theoretical transfer of knowledge is always followed by a concrete application of the knowledge by students.

### Total Workload in Hours

At the beginning:

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Contact hrs 5 weeks, 3 hrs/week 15 hrs</th>
<th>Preparation/revision 1 hr/contact hr 15 hrs</th>
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Followed by: Project work “Materials Properties”

<table>
<thead>
<tr>
<th>Group work</th>
<th>Contact hrs 6 weeks, 7hrs/week 42 hrs</th>
<th>Discussions with lecturers 5 weeks, 1hr/week 5 hrs</th>
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<tbody>
<tr>
<td>Preparation of written report</td>
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<td>Preparation of presentation</td>
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<td>Presentation</td>
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Accompanied by:

<table>
<thead>
<tr>
<th>Seminar</th>
<th>Contact hrs 15 days, 2 hrs/day 30 hrs</th>
<th>Preparation/revision 1 hr/day 15 hrs</th>
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</thead>
<tbody>
<tr>
<td>Written examination</td>
<td>Preparation 15 hrs</td>
<td></td>
</tr>
<tr>
<td>Written examination</td>
<td>2 hrs</td>
<td></td>
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</table>

\[ \Sigma 180 \text{ hrs} \]

### Method(s) of Assessment and Contribution to Final Mark

- Written examination (60%)
- Presentation (Project work) (40%)

(50% mark in both the written examination and presentation)

### Credit Points

6 ECTS credits

### Frequency, Duration

Winter semester and summer semester; 1 semester

### Language of Instruction

* see separate list of current semester

### Intake Capacity/Forms of Registration

40/Internet

### Date

* see separate list of current semester

### Reading List

* see separate list of current semester
<table>
<thead>
<tr>
<th>Module description</th>
<th>Electronic Components and Circuit Technology</th>
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<tbody>
<tr>
<td>Module code</td>
<td>MatWiss-MG 04</td>
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<tr>
<td>Faculty/Subject/Department</td>
<td>Faculty 07/Physics</td>
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<td>Physics MSc, Physics L3, Advanced Materials MSc/1st semester</td>
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<tr>
<td>Module coordinator</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Module guidance</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>None</td>
</tr>
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</table>
| Learning outcomes | Students shall:  
• understand the mechanics and properties of electronic components;  
• master the fundamentals of analogue and digital circuit technology;  
• develop simple basic circuits and understand more complex circuit systems;  
• have gathered experience with circuit configuration and analysis in the field using practical examples. |
| Module content    | • Passive and active components, construction forms  
• Analysis of linear networks  
• Analogue and digital circuit technology  
• Circuit design and layout  
• Microprocessors and concepts of memories  
• Practical tests for analogue and digital circuit design and simulation |
| Form(s) of instruction | Lecture (2 hours/week)  
Laboratory (3 hours/week) |
| Total workload in hours | Lecture:  
Contact hrs 15 weeks, 2 hrs/week 30 hrs  
Preparation/revision 1.5 hrs/contact hr 45 hrs  
Laboratory:  
Contact hrs 10 days, 4 hrs/day 40 hrs  
Preparation/revision 2 hrs/laboratory day 20 hrs  
Reports 4.5 hrs/laboratory day 45 hrs  
\( \Sigma 180 \) hrs |
| Method(s) of assessment and contribution to final mark | • Reports |
| Credit points     | 6 ECTS credits                              |
| Frequency, duration | Winter semester; 1 semester |
| Language of instruction | German                                   |
| Intake capacity/Form of registration | 30/Internet                              |
| Date              | * see separate list of current semester |
| Reading list      | * see separate list of current semester |
### Module Description: Modern Concepts of Inorganic Chemistry

<table>
<thead>
<tr>
<th>Module code</th>
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<tbody>
<tr>
<td>Faculty/Subject/Department</td>
<td>Faculty 08/Chemistry</td>
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<tr>
<td>Associated degree course(s)/Semester taken</td>
<td>Chemistry MSc, Advanced Materials MSc/ from 1st semester</td>
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<td>Module coordinator</td>
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<td>Module guidance</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>None</td>
</tr>
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</table>

#### Learning outcomes
- have knowledge of the modern concepts of inorganic chemistry;
- have knowledge of the interrelationships between synthesis, structure and properties of selected inorganic bonds;
- have an overview of the methods necessary for characterisation.

#### Module content
- Modern concepts of inorganic chemistry (e.g. synthesis under extraordinary circumstances: microwave radiation, under high pressure, in supercritical fluids, sonochemistry)
- Self-organisation of matter
- Surface finishing
- Hybrid materials

#### Form(s) of instruction
- Lecture (1 hour/week)
- Seminar (1.3 hours/week)

#### Total workload in hours
- Lecture:
  - Contact hrs: 15 weeks, 1 hr/week 15 hrs
  - Preparation/revision: 1 h/contact hr 15 hrs
- Seminar:
  - Contact hrs: 10 days, 2 hrs/day 20 hrs
  - Preparation/revision: 1 hr/contact hr 20 hrs
  - Preparation seminar presentation: 88 hrs
- Written examination:
  - Preparation: 20 hrs
  - Written examination: 2 hrs
- Σ 180 hrs

#### Method(s) of assessment and contribution to final mark
- Written or oral examination (60%) (Prerequisites for examination: completion of seminar presentation)
- Oral presentation (40%)

#### Credit points
- 6 ECTS credits

#### Frequency, duration
- Winter semester;
- 1 semester

#### Intake capacity/Form of registration
- * see separate list of current semester

#### Date
- * see separate list of current semester

#### Reading list
- * see separate list of current semester
Module description | Solid State Physical Chemistry 2
--- | ---
Module code | MatWiss-MG 07
Faculty/Subject/Department | Faculty 08/Chemistry
Associated degree course(s)/Semester taken | Chemistry MSc, Advanced Materials MSc/1st or 2nd semester
Module coordinator | Cf. German Version
Module guidance | Cf. German Version
Lecturers | Cf. German Version
Prerequisites | MatWiss-MG 02
Learning outcomes
Students shall:
• have knowledge of the most important concepts of physical chemistry of surfaces;
• master the most important methods for controlling surface properties;
• be able to evaluate the stability of the most common surfaces under different circumstances;
• be able to work independently on issues related to surfaces within a given topic.
Module content
• Surface structure
• Reactive surfaces
• Production processes
• Main fields of application of Surface Science
Form(s) of instruction
• Lecture (1 hour/week)
• Seminar (2 hour/week)
• Project work (0.3 hours/week)
Total workload in hours
Lecture:
Contact hrs 5 weeks, 3 hrs/week 15 hrs
Preparation/revision 1 hr/contact hr 15 hrs
Seminar:
Contact hrs 14 days, 2 hrs/day 28 hrs
Preparation/revision 0.5 hr/contact hr 14 hrs
Project work "Materials Properties"
Group work 6 weeks, 7 hrs/week 42 hrs
Discussions with lecturers 5 weeks, 1 hr/week 5 hrs
Preparation of written component 30 hrs
Preparation of presentation 11 hrs
Written examination
Preparation 18 hrs
Written examination (following the lecture) 2 hrs
Σ 180 hrs
Method(s) of assessment and contribution to final mark
• Written examination (60%; 50% of examination questions must be successfully solved in order to pass the written examination)
• Written and oral presentation (40%)
Credit points | 6 ECTS credits
Frequency, duration | Winter semester and summer semester; 1 semester
Language of instruction | * see separate list of current semester
Intake capacity/Form of registration | 40/Internet
Date | * see separate list of current semester
Reading list | * see separate list of current semester
<table>
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<tr>
<th>Module description</th>
<th>Physics of Semiconductors 2</th>
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<tbody>
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<td>Module code</td>
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<tr>
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<td>Associated degree course(s)/Semester taken</td>
<td>Physics MSc, Advanced Materials MSc/2nd semester</td>
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<td>Module coordinator</td>
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<td>Module guidance</td>
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<tr>
<td>Lecturers</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>MatWiss-MG 03</td>
</tr>
</tbody>
</table>

**Learning outcomes**

Students shall:
- have in-depth knowledge of the concepts of modern semiconductor physics;
- understand the particularities of low-dimensional semiconductors and can determine their influence on materials properties;
- apply concepts of semiconductor physics;
- plan and undertake an extensive scientific project, document the results in a report and present the results in an appropriate manner.

**Module content**

- Semiconductor statistics
- Charge and energy transport, diffusion of charge carriers, scattering processes
- Quantum effects within charge carrier transports, Quantum Hall effect
- Unipolar and bipolar components
- Light emitters and solar cells
- Materials preparation and realisation of components

**Form(s) of instruction**

- Lecture (1 hour/week)
- Project (4 hours/week)
- Lessons in theory are followed by practical applications.

**Total workload in hours**

At the beginning:
- Lecture
  - Contact hrs: 5 weeks, 3 hrs/week 15 hrs
  - Preparation/revision: 1 hr/contact hr 15 hrs
- Followed by: Project on “Materials Properties”
- Group work
  - Contact hrs: 6 weeks, 7 hrs/week 42 hrs
  - Discussions with lecturers: 5 weeks, 1 hr/week 5 hrs
  - Preparation of written component: 30 hrs
  - Preparation of presentation: 10 hrs
  - Presentation: 1 hr
- Accompanied by:
  - Seminar
    - Contact hrs: 15 days, 2 hrs/day 30 hrs
    - Preparation/revision: 1 hr/contact hr 15 hrs
  - Written examination
    - Preparation: 15 hrs
    - Written examination: 2 hrs

\[ \Sigma = 180 \text{ hrs} \]

**Method(s) of assessment and contribution to final mark**

- Written examination (60%)
- Presentation (Project) (40%)

(50% mark in both the written examination and presentation)

**Credit points**

6 ECTS credits

**Frequency, duration**

Winter semester and summer semester; 1 semester

**Language of instruction**

* see separate list of current semester

**Intake capacity/Form of registration**

40/Internet

**Date**

* see separate list of current semester

**Reading list**

* see separate list of current semester
### Module Description: Solid State and Molecular Electronics

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<th>Faculty 07/Physics</th>
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<tbody>
<tr>
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<td>Physics MSc, Physics L3, Advanced Materials MSc/2nd semester</td>
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<tr>
<td>Module coordinator</td>
<td>Cf. German Version</td>
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<tr>
<td>Module guidance</td>
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<td>Lecturers</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>MatWiss-MG 04</td>
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</table>

**Learning Outcomes**

Students shall:
- understand the physical fundamentals and operating principles of essential semiconductor components;
- be able to identify differences in the characteristics of solids and of molecular materials;
- discuss the effects of smaller components in highly integrated circuits;
- be familiar with innovative components and their practical applications;
- have a theoretical understanding of the fundamental characteristics of components.

**Module Content**

- Fundamentals of semiconductor electronics: conduction mechanisms in metals and semiconductors
- P-n transition, diode and transistor characteristics
- Fundamentals and applications of magneto-electronic components
- Microelectronics: miniaturisation and integration
- Molecular electronics: properties and functionality of nanoscale components

**Form(s) of Instruction**

- Lecture (2 hours/week)
- Seminar (2 hours/week)

**Total Workload in Hours**

<table>
<thead>
<tr>
<th>Lecture</th>
<th>Contact hrs</th>
<th>15 weeks, 2 hrs/week</th>
<th>30 hrs</th>
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<td></td>
<td>Preparation/revision</td>
<td>1.5 hrs/contact hr</td>
<td>45 hrs</td>
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<td>Seminar</td>
<td>Contact hrs</td>
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<td>30 hrs</td>
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<tr>
<td></td>
<td>Preparation/revision</td>
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<td>Preparation seminar presentation</td>
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</tr>
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<td></td>
<td>Σ</td>
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**Method(s) of Assessment and Contribution to Final Mark**

Seminar presentation

**Credit Points**

6 ECTS credits

**Frequency, Duration**

Summer semester; 1 semester

**Language of Instruction**

German

**Intake Capacity/Form of Registration**

30/Internet

**Date**

* see separate list of current semester

**Reading List**

* see separate list of current semester
**Module description**: Fundamentals of Solid State Theory

**Module code**: MatWiss-MG 11

**Faculty/Subject/Department**: Faculty 07/Physics

**Associated degree course(s)/Semester taken**: Physics MSc, Advanced Materials MSc/ 1st semester

**Module coordinator**: Cf. German Version

**Module guidance**: Cf. German Version

**Lecturers**: Cf. German Version

**Prerequisites**: None

**Learning outcomes**: The students shall master the theoretical fundamentals necessary for the treatment of solids from a quantum-mechanical point of view.

**Module content**:
- Properties of the Schrödinger equation
- 1D Problems
- Wave packets
- 2nd quantisation
- Fermions and bosons
- Pauli equation
- Scattering theory
- Critical behaviour

**Form(s) of instruction**:
- Lecture (4 hours/week)
- Tutorials (1 hour/week)
- Computer practice (2 hours/week)

**Total workload in hours**:
- Lecture: Contact hrs 15 weeks, 4 hrs/week 60 hrs
  Revision 0.5 hrs/contact hr 30 hrs
- Tutorials: Contact hrs 15 weeks, 1 hr/week 15 hrs
  Homework 15 weeks, 3 hrs/week 45 hrs
  Computer practice 15 weeks, 2 hrs/week 30 hrs
  Σ 180 hrs

**Method(s) of assessment and contribution to final mark**:
- Tutorial problem sets (30%),
- Written examination or oral examination (70%; 50% of examination problems must be successfully solved)

**Credit points**: 6 ECTS credits

**Frequency, duration**: Winter semester; 1 semester

**Language of instruction**: * see separate list of current semester

**Intake capacity/Form of registration**: 20/Internet

**Date**: * see separate list of current semester

**Reading list**: * see separate list of current semester
### Module description
| Solid State Theory |

### Module code
| MatWiss-MG 12 |

### Faculty/Subject/Department
| Faculty 07/Physics |

### Associated degree course(s)/Semester taken
| Physics MSc, Advanced Materials MSc |

### Module coordinator
| Cf. German Version |

### Module guidance
| Cf. German Version |

### Lecturers
| Cf. German Version |

### Prerequisites
| None |

### Learning outcomes
Students shall master the theories and models necessary for an understanding of solids.

### Module content
- Crystal structures and symmetries
- Reciprocal lattice
- Phonons
- Heat conduction
- Electron structure
- Band structure methods (tight-binding, fast free electrons, density functional theory)
- Magnetisation
- Electronic transport (ballistic, diffuse)

### Form(s) of instruction
- Lecture (4 hours/week)
- Tutorials (1 hour/week)
- Computer practice (2 hours/week)

### Total workload in hours

| Lecture | Contact hrs 15 weeks, 4 hrs/week 60 hrs
| Revision 0.5 hrs/contact hr 30 hrs
| Tutorials | Contact hrs 15 weeks, 1 hr/week 15 hrs
| Homework 15 weeks, 3 hrs/week 45 hrs
| Computer practice 15 weeks, 2 hrs/week 30 hrs
| Σ 180 hrs |

### Method(s) of assessment and contribution to final mark
- Tutorial problem sets (30%), Written examination or oral examination (70%)
- 50% of examination problems must be successfully solved

### Credit points
| 6 ECTS credits |

### Frequency, duration
| Winter semester and summer semester; 1 semester |

### Language of instruction
| * see separate list of current semester |

### Intake capacity/Form of registration
| 20/Internet |

### Date
| * see separate list of current semester |

### Reading list
<p>| * see separate list of current semester |</p>
<table>
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<tr>
<th><strong>Module description</strong></th>
<th>Inorganic Chemistry, Advanced Synthesis, and Characterisation</th>
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<td>Faculty 08/Chemistry</td>
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<td><strong>Lecturers</strong></td>
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</tr>
<tr>
<td><strong>Prerequisites</strong></td>
<td>MatWiss-MG 01, MatWiss-MG 06</td>
</tr>
</tbody>
</table>

**Learning outcomes**
- The course presents different aspects of synthesis, characterisation and reactivity of bonds in inorganic chemistry.
- Students shall gather practical experience in dealing with such substances and be able to apply the acquired knowledge to the synthesis of new bonds.

**Module content**
- Synthesis and characterisation of metal-organic and simple Werner complexes, as well as model substances for metalloproteins
- Introduction to the chemistry and synthesis of nanomaterials
- In-depth knowledge of chemistry of sol-gels ("soft chemistry"; chimie douce)
- Working techniques under inert conditions (Schlenk technique, "glovebags")
- Methods of characterisation: Spectroscopy, diffractometry, electrochemistry, electron microscopy, "stopped-flow" measurement

**Form(s) of instruction**
- Laboratory (6.4 hours/week)
- Seminar (1.3 hours/week)

**Total workload in hours**
- **Laboratory**
  - Contact hrs: 2 * 12 days, 4 hrs/day = 96 hrs
  - Preparation/revision: 2 hrs/laboratory day = 48 hrs
  - Reports: 2 hrs/laboratory day = 48 hrs

- **Seminar**
  - Contact hrs: 2 * 10 days, 1 hr/day = 20 hrs
  - Preparation/revision: 2 hrs/contact hr = 40 hrs
  - Preparation seminar presentation: 48 hrs

  \[ \Sigma = 300 \text{ hrs} \]

**Method(s) of assessment and contribution to final mark**
- Oral presentation (50%)
- Reports (50%)

**Credit points**
- 10 ECTS credits

**Frequency, duration**
- Winter semester; 1 semester

**Language of instruction**
* see separate list of current semester

**Intake capacity/Form of registration**
- 18/Internet

**Date**
* see separate list of current semester

**Reading list**
* see separate list of current semester
<table>
<thead>
<tr>
<th>Module description</th>
<th>Physical Chemistry of Nanosystems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>MatWiss-MV 02</td>
</tr>
<tr>
<td>Faculty/Subject/Department</td>
<td>Faculty 08/Chemistry</td>
</tr>
<tr>
<td>Associated degree course(s)/Semester taken</td>
<td>Chemistry BSc, Advanced Materials BSc/ from 3rd semester</td>
</tr>
<tr>
<td>Module coordinator</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Module guidance</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>MatWiss-MG 02, MatWiss-MG 07</td>
</tr>
</tbody>
</table>

**Learning outcomes**

Students shall:
- have knowledge of the essential aspects of synthesis, characterisation and properties of nanosystems important in materials technology;
- be able to apply common methods of characterisation and analysis of new nanoscale materials.

**Module content**

- Physicochemical methods of preparation: self assembling, nanolithography etc.
- Nanoparticles and clusters, multilayer systems, quantum wires, and dots
- Nanomechanics and nanotribology, quantum size effect, thermodynamics of nanoscale systems

**Form(s) of instruction**

- Lecture (2 hours/week)
- Seminar (2 hours/week)
- Laboratory (2.7 hours/week)

**Total workload in hours**

<table>
<thead>
<tr>
<th>Form</th>
<th>Lecture</th>
<th>Seminar</th>
<th>Laboratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact hrs</td>
<td>15 weeks, 2 hrs/week</td>
<td>15 weeks, 2 hrs/week</td>
<td>2 weeks, 20hrs/ week</td>
</tr>
<tr>
<td>Preparation/revision</td>
<td>3 hrs/contact hr</td>
<td>1 hr/contact hr</td>
<td>40 hrs</td>
</tr>
</tbody>
</table>

**Method(s) of assessment and contribution to final mark**

- Oral presentation (50%)
- Report (50%)

**Credit points**

10 ECTS credits

**Frequency, duration**

Winter semester; 1 semester

**Language of instruction**

* see separate list of current semester

**Intake capacity/Form of registration**

40/Internet

**Date**

* see separate list of current semester

**Reading list**

* see separate list of current semester
<table>
<thead>
<tr>
<th>Module description</th>
<th>Characterisation of Semiconductors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>MatWiss-MV 03</td>
</tr>
<tr>
<td>Faculty/Subject/Department</td>
<td>Faculty 07/Physics</td>
</tr>
<tr>
<td>Associated degree course(s)/Semester taken</td>
<td>Physics MSc, Advanced Materials MSc from 3rd semester</td>
</tr>
<tr>
<td>Module coordinator</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Module guidance</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>MatWiss-MG 03, MatWiss-MG 08</td>
</tr>
</tbody>
</table>

**Learning outcomes**

Students shall:
- gain in-depth knowledge of the characterisation methods for semiconductor technology;
- be able to produce new materials, modify them in a controlled manner, and develop concepts for technical applications.

**Module content**

- Spectroscopy with x-rays, positron annihilation
- Trap spectroscopy, measurement methods using capacitance
- Magnetic resonance technology
- Optical characterisation from UV to IR
- Luminescence spectroscopy

**Form(s) of instruction**

- Lecture (2 hours/week)
- Seminar (2 hours/week)
- Laboratory (3 hours/week)

**Total workload in hours**

- Lecture
  - Contact hrs: 15 weeks, 2 hrs/week: 30 hrs
  - Preparation/revision: 1 hr/contact hr: 30 hrs
- Laboratory
  - Contact hrs: 15 weeks, 10hrs/week: 150 hrs
  - Preparation: 0.2 hrs/contact hr: 30 hrs
  - Report: 20 hrs
- Seminar
  - Contact hrs: 15 weeks: 30 hrs
  - Preparation of presentation: 10 hrs
  - Σ: 300 hrs

**Method(s) of assessment and contribution to final mark**

- Oral presentation (50%)
- Report (50%)

**Credit points**

- 10 ECTS credits

**Frequency, duration**

- Winter semester and summer semester; 1 semester

**Language of instruction**

- * see separate list of current semester

**Intake capacity/Form of registration**

- 40/Internet

**Date**

- * see separate list of current semester

**Reading list**

- * see separate list of current semester
### Module description: Modern Technologies of Conducting and Dielectric Materials

**Module code**: MatWiss-MV 04

**Faculty/Subject/Department**: Faculty 07/Physics

**Associated degree course(s)/Semester taken**: Physics MSc, Physics L3, Advanced Materials MSc/3rd semester

**Module coordinator**: Cf. German Version

**Module guidance**: Cf. German Version

**Lecturers**: Cf. German Version

**Prerequisites**: MatWiss-MG 04, MatWiss-MG 09

**Learning outcomes**: Students shall:
- master state-of-the-art methods of preparation, measurement, characterisation, structural composition, modelling and technical application of metallic, semiconducting, and insulating materials;
- integrate technical development criteria into scientific problems;
- document scientific experiments in a clear and comprehensible manner;
- present a subject area related to a specific context logically and coherently and discuss it in front of a group.

**Module content**:
- Preparation of layers, characterisation, composition, and technical application of functional structures
- Modern methods of signal acquisition and processing, data evaluation, and numerical modelling

**Form(s) of instruction**:
- Lecture (2 hours/week)
- Seminar (1 hour/week)
- Laboratory (8 hours/week)

**Total workload in hours**

**Lecture**
- Contact hrs 15 weeks, 2 hrs/week 30 hrs
- Preparation/revision 2 hrs/contact hr 60 hrs

**Seminar**
- Contact hrs 10 weeks/1hr/week 10 hrs
- Preparation/revision 2 hrs/contact hr 20 hrs
- Preparation of presentation 24 hrs

**Laboratory**
- Contact hrs 12 days, 5 hrs/day 60 hrs
- Preparation 3 hrs/laboratory day 36 hrs
- Reports 5 hrs/laboratory day 60 hrs
- Σ 300 hrs

**Method(s) of assessment and contribution to final mark**
- Oral presentation (20%)
- Reports (80%)

**Credit points**: 10 ECTS credits

**Frequency, duration**: Winter semester; 1 semester

**Language of instruction**: * see separate list of current semester

**Intake capacity/Form of registration**: 30/Internet

**Date**: * see separate list of current semester

**Reading list**: * see separate list of current semester
Module description | Laboratory: Inorganic Chemistry
---|---
Module code | MatWiss-MS01
Faculty/Subject/Department | Faculty 08/Chemistry/Inorganic Chemistry
Associated degree course(s)/Semester taken | Chemistry MSc, Advanced Materials MSc/ 3rd semester
Module coordinator | Cf. German Version
Module guidance | Cf. German Version
Prerequisites | Basic science modules in inorganic molecular and solid state chemistry
Learning outcomes | Students shall:
  • be familiarised with the most important production and characterisation methods for new inorganic nanostructures or new complex chemical bonds;
  • develop their own solutions for problems within the subject area of inorganic chemistry.
Module content | Synthesis and characterisation of new inorganic nanostructures or new complex chemical or metal-organic bonds at a research level; Comparison of synthesis concepts and characterisation strategies
Form(s) of instruction | Practical tutorial (20 days, 3 hrs/day)
  Seminar (15 days, 1 hr/day)
Total workload in hours | Practical tutorial
  Contact hrs | 60 hrs
  Preparation/revision | 30 hrs
  Autonomous work | 30 hrs
  Examination incl. preparation | 30 hrs
  Seminar
  Contact hrs | 15 hrs
  Preparation/revision | 30 hrs
  Autonomous work | 40 hrs
  Examination incl. preparation | 55 hrs
  Σ | 300 hrs
Method(s) of assessment and contribution to final mark | Oral presentation (50%)
  Written report (50%)
Exam prerequisites | None
As original assessment method, if required each module-component can be retaken separately.
Form of module retake examination | Credit points | 10 ECTS credits
Frequency, duration | Annual, Winter semester;
  1 semester
Language of instruction | German
Intake capacity/Form of registration | 12/Internet
Date | See course catalogue
Reading list | See notice board
Module description | Physical Chemistry Project
---|---
Module code | MatWiss-MS 02
Faculty/Subject/Department | Faculty 08/Chemistry
Associated degree course(s)/Semester taken | Chemistry MSc, Advanced Materials MSc/
from 3rd semester
Module coordinator | Cf. German Version
Module guidance | Cf. German Version
Lecturers | Cf. German Version
Prerequisites | MatWiss-MG 02, MatWiss-MG 07
Learning outcomes | Students shall master scientific methods and techniques in order to be in a position to solve modern problems in physical chemistry in a project-oriented manner.
Module content | • Changing research problems within physical chemistry
• Development of experimental and theoretical concepts of physical chemistry
• Preparation of a scientific work schedule
• Evaluation of financial and personnel expenditures
• Classification of research project within current literature
• The written report shall be as complex and as of high a standard as a research proposal to the DFG (German Research Foundation)
Form(s) of instruction | • Tutorial (5.3 hours/week)
• Project work (0.7 hours/week)
Total workload in hours | 
| Tutorial | Contact hrs 4 weeks, 20hrs/week 80 hrs
| Project work | Discussions with lecturers 5 weeks, 2 hrs/week 10 hrs
| | Literature review, provision of information 120 hrs
| | Presentation/discussion (including preparation) 40 hrs
| | Written report 50 hrs
| Σ 300 hrs
Method(s) of assessment and contribution to final mark | • Written presentation (50%)
• Oral presentation (50%)
Credit points | 10 ECTS credits
Frequency, duration | Winter semester and summer semester; 1 semester
Language of instruction | * see separate list of current semester
Intake capacity/Form of registration | 10/Internet
Date | * see separate list of current semester
Reading list | * see separate list of current semester

Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.
<table>
<thead>
<tr>
<th>Module description</th>
<th>Multi-functional Semiconducting Thin Films</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>MatWiss-MS 03</td>
</tr>
<tr>
<td>Faculty/Subject/Department</td>
<td>Faculty 07/Physics</td>
</tr>
<tr>
<td>Associated degree course(s)/Semester taken</td>
<td>Physics MSc, Advanced Materials MSc/ from 3rd semester</td>
</tr>
<tr>
<td>Module coordinator</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Module guidance</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>MatWiss-MG 03, MatWiss-MG 08</td>
</tr>
</tbody>
</table>

**Learning outcomes**

Students shall:

- master the most important concepts for the production of functional, semiconducting thin films;
- have knowledge of the fundamentals of plasmas and plasma-supported deposition methods;
- have knowledge of physicochemical methods of epitaxy;
- master the fundamental characterisation methods for thin films.

**Module content**

- Fundamentals of synthesis and characterisation of functional, semiconducting thin films
- Introduction to plasma processes and plasma diagnostics
- Diagnostics of layer growth
- Applications of semiconducting, functional materials

**Form(s) of instruction**

- Laboratory (6 hours/week)
- Seminar (2 hours/week)

**Total workload in hours**

<table>
<thead>
<tr>
<th>Laboratory</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact hrs</td>
<td>20 days, 3 hrs/day</td>
</tr>
<tr>
<td>Preparation/revision</td>
<td>2 hrs/day of training</td>
</tr>
<tr>
<td>Reports</td>
<td>3 hrs/day of training</td>
</tr>
<tr>
<td>Literature review</td>
<td>40 hrs</td>
</tr>
<tr>
<td>Final report</td>
<td>55 hrs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Seminar</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact hrs</td>
<td>15 days, 1 hr/day</td>
</tr>
<tr>
<td>Presentation</td>
<td>30 hrs</td>
</tr>
</tbody>
</table>

**Method(s) of assessment and contribution to final mark**

- Oral presentation (50%)
- Written presentation (final report, 50%)

(All reports must be completed before the final report)

**Credit points**

10 ECTS credits

**Frequency, duration**

Winter semester and summer semester; 1 semester

**Language of instruction**

* see separate list of current semester

**Intake capacity/Form of registration**

40/Internet

**Date**

* see separate list of current semester

**Reading list**

* see separate list of current semester
### Module description

**Applied Material Physics**

**Module code**
MatWiss-MS 04

**Faculty/Subject/Department**
Faculty 07/Physics

**Associated degree course(s)/Semester taken**
Physics MSc, Physics L3, Advanced Materials MSc/3rd semester

**Module coordinator**
Cf. German Version

**Module guidance**
Cf. German Version

**Lecturers**
Cf. German Version

**Prerequisites**
MatWiss-MG 04, MatWiss-MG 09

**Learning outcomes**
Students shall:
- master advanced laboratory work in terms of good laboratory practice;
- have knowledge of the modern methods for the preparation and characterisation of materials;
- be able to determine and analyse physicochemical properties of materials;
- discuss the significance of material properties for technical applications;
- identify the interrelationships between practical work and the underlying theories;
- document scientific experiments in a clear and comprehensible manner;
- present their results, related to a specific context, in a clear and comprehensible manner and be able to discuss the results in front of a group.

**Module content**
- Preparation of layers, micro- and nanostructuring
- Surface analysis, measuring probes and their physical operating principles
- Influence of varied conditions (composition, pressure, temperature) on material properties
- Composition of functional structures, technical applications of oxidic, molecular and hybrid materials

**Form(s) of instruction**
- Laboratory (16 hours/week)
- Seminar (1 hour/week)

**Total workload in hours**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Contact hrs</th>
<th>Preparation/revision</th>
<th>Preparation of a seminar presentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory</td>
<td>15 weeks, 4 days/4hrs/day</td>
<td>2 hrs/day</td>
<td>15 hrs</td>
</tr>
<tr>
<td>Seminar</td>
<td>15 weeks, 1 hr/day</td>
<td>15 hrs</td>
<td></td>
</tr>
<tr>
<td><strong>Σ</strong></td>
<td></td>
<td></td>
<td><strong>300 hrs</strong></td>
</tr>
</tbody>
</table>

**Method(s) of assessment and contribution to final mark**
- Report (80%)
- Oral presentation (20%)

**Credit points**
10 ECTS credits

**Frequency, duration**
Winter semester;
1 semester

**Language of instruction**
* see separate list of current semester

**Intake capacity/Form of registration**
6/Internet

**Date**
* see separate list of current semester

**Reading list**
* see separate list of current semester
## Module description

<table>
<thead>
<tr>
<th>Theoretical Materials Research Project</th>
</tr>
</thead>
</table>

### Module code
- MatWiss-MS 05

### Faculty/Subject/Department
- Faculty 07/Physics

### Associated degree course(s)/Semester taken
- Physics MSc, Advanced Materials MSc/
  - from 3rd semester

### Module coordinator
- Cf. German Version

### Module guidance
- Cf. German Version

### Lecturers
- Cf. German Version

### Prerequisites
- MatWiss-MG 11, MatWiss-MG 12

### Learning outcomes
- Students shall:
  - apply modern models and theories related to a specific materials system;
  - have worked on and competently given a presentation on a clearly defined area of theoretical solid-state physics.

### Module content
- Changing research problems from theoretical Advanced Materials
- Development of theoretical concepts
- Classification of research project within current literature
- Preparation of a scientific work schedule
- Evaluation of financial and personnel expenditures
- The written report shall be as complex and as of high a standard as a research proposal to the DFG (German Research Foundation)

### Form(s) of instruction
- Laboratory (6 hours/week)
- Seminar (2 hours/week)

### Total workload in hours

<table>
<thead>
<tr>
<th>Computer laboratory</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact hrs 20 days, 3 hrs/day 60 hrs</td>
</tr>
<tr>
<td>Preparation/revision 2hrs/laboratory day 40 hrs</td>
</tr>
<tr>
<td>Reports 3 hrs/laboratory day 60 hrs</td>
</tr>
<tr>
<td>Literature review 40 hrs</td>
</tr>
<tr>
<td>Final report 55 hrs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Seminar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact hrs 15 days, 1 hr/day 15 hrs</td>
</tr>
<tr>
<td>Preparation of presentation 30 hrs</td>
</tr>
<tr>
<td>Σ 300 hrs</td>
</tr>
</tbody>
</table>

### Method(s) of assessment and contribution to final mark
- Oral presentation (50%)
- Written presentation (final report, 50%)

(All reports must be completed before the final report.)

### Credit points
- 10 ECTS credits

### Frequency, duration
- Winter semester and summer semester;
  - 1 semester

### Language of instruction
- * see separate list of current semester

### Intake capacity/Form of registration
- 40/Internet

### Date
- * see separate list of current semester

### Reading list
- * see separate list of current semester
<table>
<thead>
<tr>
<th>Module description</th>
<th>Master's Dissertation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>MatWiss-MSc 06</td>
</tr>
<tr>
<td>Faculty/Subject/Department</td>
<td>Faculty 07/Physics and Faculty 08/Chemistry</td>
</tr>
<tr>
<td>Associated degree course(s)/Semester taken</td>
<td>Advanced Materials MSc/ 4th semester</td>
</tr>
<tr>
<td>Module coordinator</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Module guidance</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>All remaining modules of the master’s programme</td>
</tr>
</tbody>
</table>

**Learning outcomes**

Students shall:
- have the competence to work on a concrete problem from an area of functional materials in Advanced Materials by applying scientific methods, and be able to present, discuss, and defend their results.

**Module content**

- Draft of a work schedule
- Familiarisation with literature
- Acquisition of measuring and evaluation techniques, implementation and evaluation of these techniques, discussion of results
- Writing of dissertation

**Form(s) of instruction**

- Full-day blocks of classes on scientific research in scientific teams

**Total workload in hours**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructions on scientific research</td>
<td>1 hr/day</td>
</tr>
<tr>
<td>Literature review</td>
<td>1 h/day</td>
</tr>
<tr>
<td>Scientific work on subject</td>
<td>6 hrs/day</td>
</tr>
<tr>
<td>Writing of dissertation</td>
<td>104 hrs</td>
</tr>
<tr>
<td>Presentation of results</td>
<td>5 hrs</td>
</tr>
<tr>
<td>Preparation for final examination</td>
<td>1 hr</td>
</tr>
<tr>
<td>Final oral examination</td>
<td></td>
</tr>
<tr>
<td><strong>Σ</strong></td>
<td>900 hrs</td>
</tr>
</tbody>
</table>

**Method(s) of assessment and contribution to final mark**

Written presentation of dissertation

**Credit points**

30 ECTS credits

**Frequency, duration**

Summer semester; 1 semester

**Language of instruction**

* see separate list of current semester

**Intake capacity/Form of registration**

30/Internet

**Date**

* see separate list of current semester

**Reading list**

* see separate list of current semester
# Module description

**Business Formation and Management**

<table>
<thead>
<tr>
<th>Module code</th>
<th>MatWiss-MW 01</th>
</tr>
</thead>
</table>

## Faculty/Subject/Department

FH Gießen-Friedberg

## Associated degree course(s)/Semester taken

Physics MSc, Chemistry MSc, Advanced Materials MSc/1st semester

## Module coordinator

Cf. German Version

## Module guidance

Cf. German Version

## Lecturers

Cf. German Version

## Prerequisites

None

## Learning outcomes

- be acquainted with the prerequisites of successful business formation and management;
- have specialist knowledge of the fundamentals of business studies in order to be able to assume responsible positions within a company;
- have knowledge of fundamental management methods;
- have fundamental knowledge of the prerequisites for successfully beginning a professional career in self-employment;
- gain practical experience related to the previously acquired theoretical fundamentals.

## Module content

- Business studies compendium (theoretical fundamentals for business formation and management)
- Project; with possible alternative thematic priorities:
  - Innovation management
  - Planning of the formation of a company
  - Development of a company
  - Leadership of employees

## Form(s) of instruction

- Lecture (1 hour/week) and supervised teamwork (5 hours/week)
  A lesson in theory is always followed by a concrete practical application by students of the theoretical principle(s) learned.
  In addition, students practice fundamental soft skills through teamwork and learning-by-doing (1 hour/week).

## Total workload in hours

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture</td>
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</tr>
<tr>
<td>Preparation/revision</td>
<td>4 hrs</td>
</tr>
<tr>
<td>Project work</td>
<td>4 hrs</td>
</tr>
<tr>
<td>Group work</td>
<td>80 hrs</td>
</tr>
<tr>
<td>Discussions with lecturers</td>
<td>10 hrs</td>
</tr>
<tr>
<td>Composition of written component</td>
<td>45 hrs</td>
</tr>
<tr>
<td>Preparations</td>
<td>20 hrs</td>
</tr>
<tr>
<td>Presentations</td>
<td>5 hrs</td>
</tr>
<tr>
<td><strong>Σ</strong></td>
<td><strong>180 hrs</strong></td>
</tr>
</tbody>
</table>

## Method(s) of assessment and contribution to final mark

- Written presentation (60%)
- Oral presentation (40%)

## Credit points

6 ECTS credits

## Frequency, duration

Winter semester; 1 semester

## Language of instruction

German

## Intake capacity/Form of registration

25 students per semester maximum

## Date

* see separate list of current semester

## Reading list

* see separate list of current semester
## Module description

**Learning by Teaching (MSc degree course)**

<table>
<thead>
<tr>
<th>Module description</th>
<th>Learning by Teaching (MSc degree course)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module code</td>
<td>MatWiss-MW 02</td>
</tr>
<tr>
<td>Faculty/Subject/Department</td>
<td>Faculty 07 Physics, Faculty 08 Chemistry</td>
</tr>
<tr>
<td>Associated degree course(s)/Semester taken</td>
<td>Physics MSc, Advanced Materials MSc, Chemistry MSc/1st semester</td>
</tr>
<tr>
<td>Module coordinator</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Module guidance</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Cf. German Version</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>None</td>
</tr>
</tbody>
</table>

**Learning outcomes**

Students shall, in a teaching project, be able to:

- supervise younger students from the degree course “Bachelor Advanced Materials” in tutorials and laboratories under the guidance of and in consultation with the responsible professors;
- explain chemical and physical interrelationships;
- practically apply teaching methods;
- apply simple methods of evaluation;
- critically challenge the applied methods.

**Module content**

- Supervision, under the guidance of a professor, of students from the degree courses “Chemistry BSc”, “Physics BSc”, “Advanced Materials BSc” in tutorials or laboratories
- Teaching of basic knowledge (autonomous revision and broadening of contents)
- Didactical methods, analysis of students’ success
- Evaluation through questionnaires and their analysis, review of applied methods

**Form(s) of instruction**

- Teaching project

**Total workload in hours**

<table>
<thead>
<tr>
<th>Contact hrs with professor</th>
<th>30 hrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact hrs with students</td>
<td>30 hrs</td>
</tr>
<tr>
<td>Preparation of tutorials (laboratories)</td>
<td>30 hrs</td>
</tr>
<tr>
<td>Correction of homework (reports)</td>
<td>60 hrs</td>
</tr>
<tr>
<td>Composition of a questionnaire</td>
<td>10 hrs</td>
</tr>
<tr>
<td>Evaluation and written report</td>
<td>20 hrs</td>
</tr>
<tr>
<td>Σ</td>
<td>180 hrs</td>
</tr>
</tbody>
</table>

**Method(s) of assessment and contribution to final mark**

- Report
- Evaluation by students

**Credit points**

6 ECTS credits

**Frequency, duration**

Winter semester;
1 semester

**Language of instruction**

German

**Intake capacity/Form of registration**

20 students per semester maximum

**Date**

* see separate list of current semester

**Reading list**

* see separate list of current semester

Please note that only the German version of the modules is official and legally binding. The English version is for informative purposes only.