Subdivided Module Catalogue for the Subject

Experimental medicine as a Master’s with 1 major with the degree "Master of Science" (120 ECTS credits)

Examination regulations version: 2013
Responsible: Faculty of Medicine
Course of Studies - Contents and Objectives

The Faculty of Medicine at JMU offers a Master of Science (M.Sc.) in Experimental Medicine with a strong emphasis on research. The degree Master of Science offers graduates further professional qualifications as well as extensive research experience. The degree program is suited to students who have completed their studies in Medicine (as their first professional degree) and have a strong interest in fundamental research in the fields of natural sciences and medicine. The degree program allows students to deepen their fundamental knowledge of the natural sciences within the field of Medicine and introduces current methods of biomedical research. The degree program is strongly research oriented and covers current scientific issues in the field of biomedicine as well as experimental approaches and methodological principles within medicine, biology, chemistry, and physics. Through thesis work, students show that they are capable of illustrating and handling a defined issue in the field of experimental medicine from an academic perspective using familiar or modified methods within a given time frame. The Master's examination should confirm the candidate's grasp of biomedical research and his or her ability to independently apply scientific methods. A successfully completed Master's degree qualifies the candidate for admittance to a doctoral program pursuant to the respective and current doctoral program guidelines.
Abbreviations used

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

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

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

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

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

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:

\( \text{ASPO2009} \)

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

\( 15\text{-Jul-2013 (2013-84)} \)

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.
The subject is divided into

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Module title</th>
<th>ECTS credits</th>
<th>Method of grading</th>
<th>page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Compulsory Courses (30 ECTS credits)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03-EM-MVH-092-m01</td>
<td>Microbiology, Virology, Hygiene</td>
<td>5</td>
<td>NUM</td>
<td>8</td>
</tr>
<tr>
<td>03-EM-PA-092-m01</td>
<td>Pathology</td>
<td>5</td>
<td>NUM</td>
<td>12</td>
</tr>
<tr>
<td>03-EM-PT-092-m01</td>
<td>Pharmacology and Toxicology</td>
<td>5</td>
<td>NUM</td>
<td>13</td>
</tr>
<tr>
<td>03-EM-MP-132-m01</td>
<td>Molecular biology methods</td>
<td>15</td>
<td>NUM</td>
<td>9</td>
</tr>
<tr>
<td><strong>Compulsory Electives (60 ECTS credits)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Subfield Practical Experimental Medicine (45 ECTS credits)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03-EM-InIm-132-m01</td>
<td>Infection and Immunity</td>
<td>15</td>
<td>NUM</td>
<td>6</td>
</tr>
<tr>
<td>03-EM-MO-132-m01</td>
<td>Molecular Oncology</td>
<td>15</td>
<td>NUM</td>
<td>10</td>
</tr>
<tr>
<td>03-EM-SFP-132-m01</td>
<td>Structure and Function of Proteins</td>
<td>15</td>
<td>NUM</td>
<td>22</td>
</tr>
<tr>
<td>03-EM-KVB-132-m01</td>
<td>Cardiovascular Biology</td>
<td>15</td>
<td>NUM</td>
<td>7</td>
</tr>
<tr>
<td>03-EM-NBP-132-m01</td>
<td>Neurobiology and Neurophysiology</td>
<td>15</td>
<td>NUM</td>
<td>11</td>
</tr>
<tr>
<td>03-SRM-132-m01</td>
<td>Stem Cells and Regenerative Medicine</td>
<td>15</td>
<td>NUM</td>
<td>21</td>
</tr>
<tr>
<td><strong>Subfield Theoretical Experimental Medicine (15 ECTS credits)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03-EM-Sem1-132-m01</td>
<td>Seminar Infection and Immunity</td>
<td>5</td>
<td>NUM</td>
<td>15</td>
</tr>
<tr>
<td>03-EM-Sem2-132-m01</td>
<td>Seminar Molecular Oncology</td>
<td>5</td>
<td>NUM</td>
<td>17</td>
</tr>
<tr>
<td>03-EM-Sem3-132-m01</td>
<td>Seminar Structure and Function of Proteins</td>
<td>5</td>
<td>NUM</td>
<td>20</td>
</tr>
<tr>
<td>03-EM-Sem4-132-m01</td>
<td>Seminar Cardiovascular Biology</td>
<td>5</td>
<td>NUM</td>
<td>16</td>
</tr>
<tr>
<td>03-EM-Sem5-132-m01</td>
<td>Seminar Neurobiology and Neurophysiology</td>
<td>5</td>
<td>NUM</td>
<td>18</td>
</tr>
<tr>
<td>03-EM-Sem6-132-m01</td>
<td>Seminar Stem Cells and Regenerative Medicine</td>
<td>5</td>
<td>NUM</td>
<td>19</td>
</tr>
<tr>
<td>03-EM-Sem7-132-m01</td>
<td>Seminar Experimental Medical Research Methods</td>
<td>5</td>
<td>NUM</td>
<td>14</td>
</tr>
<tr>
<td><strong>Thesis (30 ECTS credits)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03-EM-MA-132-m01</td>
<td>Final Examination Experimental Medicine</td>
<td>30</td>
<td>NUM</td>
<td>5</td>
</tr>
<tr>
<td>Module title</td>
<td>Abbreviation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------</td>
<td>-----------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Examination Experimental Medicine</td>
<td>03-EM-MA-132-m01</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
</tr>
</thead>
<tbody>
<tr>
<td>chairperson of examination committee of complementary non-degree programme Experimentelle Medizin (Experimental Medicine)</td>
<td>Faculty of Medicine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>numerical grade</td>
<td>--</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>graduate</td>
<td>--</td>
</tr>
</tbody>
</table>

**Contents**

Students conduct a scientific research project, using appropriate methods and adhering to the principles of good scientific practice. They document and discuss their work in a thesis and defend it in a final colloquium.

**Intended learning outcomes**

Students are able to independently carry out scientific work according to the rules of good scientific practice. They are able to document and, where necessary, adjust their research as well as to interpret their findings in a larger context. Students are able to defend their work in front of a professional audience.

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

This module has 2 components; information on courses listed separately for each component.

- 03-EM-MA-2-132: K (no information on language and number of weekly contact hours available)
- 03-EM-MA-1-132: A (no information on language and number of weekly contact hours available)

**Method of assessment** (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)

This module has the following 2 assessment components. Unless stated otherwise, students must pass all of these assessment components to pass the module as a whole.

**Assessment component to module component 03-EM-MA-2-132: Kolloquium zur Masterarbeit**

- 5 ECTS credits, method of grading: numerical grade
- Abschlusskolloquium (approx. 45 minutes)
- Language of assessment: German or English
- Only after succ. compl. of module component(s): Teilmodul 03-EM-MA-2 setzt Bestehen von Teilmodul 03-EM-MA-1 voraus.

**Assessment component to module component 03-EM-MA-1-132: Masterarbeit "Experimentelle Medizin"**

- 25 ECTS credits, method of grading: numerical grade
- written thesis
- Language of assessment: German or English

**Allocation of places**

--

**Additional information**

Additional information listed separately for each module component.

- 03-EM-MA-1-132: Additional information on module duration: 6 months.
- 03-EM-MA-2-132:--

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

--
Module title: Infection and Immunity  
Abbreviation: 03-EM-InIm-132-m01

Module coordinator: Institute of Virology and Immunobiology  
Module offered by: Faculty of Medicine

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>numerical grade</td>
<td>--</td>
</tr>
</tbody>
</table>

Duration: 1 semester  
Module level: graduate  
Other prerequisites: --

Contents:
Students spend 4 to 6 weeks working on their own small, well-defined scientific lab project in the area of infection and immunity and present the results of the laboratory project at the Institute seminar.

Intended learning outcomes:
Participating in clinically-oriented research projects, students gain initial hands-on experience. They reinforce previously acquired lab skills, acquire new lab techniques, and learn how to apply theoretical knowledge in the lab. Students gain expertise in the analysis and presentation of raw data.

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

- 03-EM-InIm-1-132: P (no information on SWS (weekly contact hours) and course language available)
- 03-EM-InIm-2-132: K (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 03-EM-InIm-1-132: Practical Training Infection and Immunity
- 10 ECTS, Method of grading: numerical grade
- term paper (minimum 10 pages, ready-to-publish written summary of results of experiments)
- Language of assessment: German, English

Assessment in module component 03-EM-InIm-2-132: Colloquium Infection and Immunity
- 5 ECTS, Method of grading: numerical grade
- oral presentation and discussion of results of lab course (approx. 15 to 20 minutes)
- Language of assessment: German, English

Allocation of places:
--

Additional information:
--

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

**Module title**

Cardiovascular Biology

**Abbreviation**

03-EM-KVB-132-m01

**Module coordinator**

holder of the Chair of Experimental Biomedicine

**Module offered by**

Faculty of Medicine

**ECTS**

15

**Method of grading**

numerical grade

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

--

**Duration**

1 semester

**Module level**

graduate

**Other prerequisites**

--

### Contents

Students spend 4 to 6 weeks working on their own small, well-defined scientific lab project in the area of cardiovascular biology and present the results of the laboratory project at the Institute seminar.

### Intended learning outcomes

Participating in clinically-oriented research projects, students gain initial hands-on experience. They reinforce previously acquired lab skills, acquire new lab techniques, and learn how to apply theoretical knowledge in the lab. Students gain expertise in the analysis and presentation of raw data.

### Courses

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

- **03-EM-KVB-1-132**: P (no information on SWS (weekly contact hours) and course language available)
- **03-EM-KVB-2-132**: K (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 03-EM-KVB-1-132: Practical Training Cardiovascular Biology**

- 10 ECTS, Method of grading: numerical grade
- term paper (minimum 10 pages, ready-to-publish written summary of results of experiments)
- Language of assessment: German, English

**Assessment in module component 03-EM-KVB-2-132: Colloquium Cardiovascular Biology**

- 5 ECTS, Method of grading: numerical grade
- oral presentation and discussion of results of lab course (approx. 15 to 20 minutes)
- Language of assessment: German, English

### Allocation of places

--

### Additional information

--

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

--

---
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microbiology, Virology, Hygiene</td>
<td>03-EM-MVH-092-m01</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institute of Hygiene and Microbiology</td>
<td>Faculty of Medicine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>numerical grade</td>
<td>--</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>graduate</td>
<td>--</td>
</tr>
</tbody>
</table>

**Contents**

Foundations of clinical and theoretical medicine in microbiology, virology and hygiene with examination of one candidate each.

**Intended learning outcomes**

Students gain a deeper understanding of infection and immunity with a view to research application.

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

V (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 can be chosen to earn a bonus)

oral examination of one candidate each (approx. 25 minutes)

**Allocation of places**

--

**Additional information**

--

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

--
Module title | Abbreviation
---|---
Molecular biology methods | 03-EM-MP-132-m01

Module coordinator | Module offered by
Institute of Hygiene and Microbiology / RVZ | Faculty of Medicine

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

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

Contents

Students complete a four-week, full-time molecular biology basic lab course with a focus on DNA, RNA, bioinformatics, proteins, cell biology, microscopy in theory as well as practical exercises.

Intended learning outcomes

The students have developed a deep knowledge of fundamental analysis/investigative methods of molecular and cell biology. They are able to discuss their results.

Courses (type, 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 (type, scope, language — if other than German, examination offered — if not every semester, information on whether module can be chosen to earn a bonus)
lab course assessment part I: written elaboration of lab reports (approx. 10 to 20 pages); lab course assessment part II: presentation (20 minutes) and/or written examination (30 minutes, including multiple choice questions)

Allocation of places

Additional information

Referred to in LPO I (examination regulations for teaching-degree programmes)
# Module: Molecular Oncology

**Abbreviation:** 03-EM-MO-132-m01

**Module coordinator:** holder of the Chair of Biochemistry and Molecular Biology

**Module offered by:**

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>numerical grade</td>
<td>--</td>
</tr>
</tbody>
</table>

**Duration:** 1 semester

**Module level:** graduate

**Other prerequisites:** --

## Contents

Students spend 4 to 6 weeks working on their own small, well-defined scientific lab project in the area of molecular oncology and present the results of the laboratory project at the Institute seminar.

## Intended learning outcomes

Participating in clinically-oriented research projects, students gain initial hands-on experience. They reinforce previously acquired lab skills, acquire new lab techniques, and learn how to apply theoretical knowledge in the lab. Students gain expertise in the analysis and presentation of raw data.

## Courses

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

- **03-EM-MO-1-132:** P (no information on SWS (weekly contact hours) and course language available)
- **03-EM-MO-2-132:** K (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 03-EM-MO-1-132: Practical Training Molecular Oncology**

- 10 ECTS, Method of grading: numerical grade
- Term paper (minimum 10 pages, ready-to-publish written summary of results of experiments)
- Language of assessment: German, English

**Assessment in module component 03-EM-MO-2-132: Colloquium Molecular Oncology**

- 5 ECTS, Method of grading: numerical grade
- Oral presentation and discussion of results of lab course (approx. 15 to 20 minutes)
- Language of assessment: German, English

## Allocation of places

--

## Additional information

--

**Referred to in LPO I** (examination regulations for teaching-degree programmes)
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neurobiology and Neurophysiology</td>
<td>03-EM-NBP-132-m01</td>
</tr>
</tbody>
</table>

**Module coordinator**
holder of the Chair of Clinical Neurobiology

**Module offered by**
Faculty of Medicine

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>numerical grade</td>
<td>--</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>graduate</td>
<td>--</td>
</tr>
</tbody>
</table>

**Contents**

Students spend 4 to 6 weeks working on their own small, well-defined scientific lab project in the area of neurobiology and neurophysiology and present the results of the laboratory project at the Institute seminar.

**Intended learning outcomes**

Participating in clinically-oriented research projects, students gain initial hands-on experience. They reinforce previously acquired lab skills, acquire new lab techniques, and learn how to apply theoretical knowledge in the lab. Students gain expertise in the analysis and presentation of raw data.

**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-EM-NBP-1-132: P (no information on SWS (weekly contact hours) and course language available)
- 03-EM-NBP-2-132: K (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 can be chosen to earn a 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-EM-NBP-1-132: Practical Training Neurobiology and Neurophysiology**

- 10 ECTS, Method of grading: numerical grade
- Term paper (minimum 10 pages, ready-to-publish written summary of results of experiments)
- Language of assessment: German, English

**Assessment in module component 03-EM-NBP-2-132: Colloquium Neurobiology and Neurophysiology**

- 5 ECTS, Method of grading: numerical grade
- Oral presentation and discussion of results of lab course (approx. 15 to 20 minutes)
- Language of assessment: German, English

**Allocation of places**

--

**Additional information**

--

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

--
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pathology</td>
<td>03-EM-PA-092-m01</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
</tr>
</thead>
<tbody>
<tr>
<td>holder of the Chair of Pathology</td>
<td>Faculty of Medicine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>numerical grade</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>graduate</td>
<td>--</td>
</tr>
</tbody>
</table>

### Contents

Foundations of clinical and theoretical medicine in pathology with examination of one candidate each.

### Intended learning outcomes

Students gain a deeper understanding of pathology with a view to research application.

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

V (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 can be chosen to earn a bonus)

oral examination of one candidate each (approx. 25 minutes)

### Allocation of places

--

### Additional information

--

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

--
### Module title
Pharmacology and Toxicology

### Abbreviation
03-EM-PT-092-m01

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
</tr>
</thead>
<tbody>
<tr>
<td>holder of the Chair of Pharmacology and Toxicology</td>
<td>Faculty of Medicine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>numerical grade</td>
<td>--</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 semester</td>
<td>graduate</td>
<td>--</td>
</tr>
</tbody>
</table>

### Contents
Foundations of clinical and theoretical medicine in pharmacology and toxicology with examination of one candidate each.

### Intended learning outcomes
Students gain a deeper understanding of pharmacology and toxicology with a view to research application.

### Courses
(type, number of weekly contact hours, language — if other than German)
V (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 can be chosen to earn a bonus)
oral examination of one candidate each (approx. 25 minutes)

### Allocation of places
--

### Additional information
--

### Referred to in LPO I
(examination regulations for teaching-degree programmes)
--
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar Experimental Medical Research Methods</td>
<td>03-EM-Sem7-132-m01</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institute of Hygiene and Microbiology</td>
<td>Faculty of Medicine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>numerical grade</td>
<td>--</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>graduate</td>
<td>--</td>
</tr>
</tbody>
</table>

**Contents**

In this module, current problems in the research area of experimental medicine are discussed and specific solutions are taught.

**Intended learning outcomes**

Students have developed the ability to approach, analyse and critically interpret current problems in experimental medicine, taking into account current literature.

**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 can be chosen to earn a bonus)

Presentation (approx. 15 to 20 minutes) and written summary (approx. 1 page)

Language of assessment: German, English

**Allocation of places**

--

**Additional information**

--

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

--
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar Infection and Immunity</td>
<td>03-EM-Sem1-132-m01</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institute of Virology and Immunobiology</td>
<td>Faculty of Medicine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>numerical grade</td>
<td>--</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>graduate</td>
<td>--</td>
</tr>
</tbody>
</table>

**Contents**

Semester-long, integrated scientific seminar in small groups with exercise, discussion and presentations/talks by students, among others on current literature and/or selected special lectures covering the fields of virology and immunobiology.

**Intended learning outcomes**

Advanced insights into the focuses chosen for the in-depth scientific study of the selected specialist area. Students are able to evaluate relevant specific information, to present it in a professional manner and to discuss it with others. Students acquire a critical understanding of the most important theories, principles and methods of individual issues within the subject.

**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 can be chosen to earn a bonus)

presentation (approx. 15 to 20 minutes) and written summary (approx. 1 page)

Language of assessment: German, English

**Allocation of places**

--

**Additional information**

--

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

--
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar Cardiovascular Biology</td>
<td>03-EM-Sem4-132-m01</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
</tr>
</thead>
<tbody>
<tr>
<td>holder of the Chair of Experimental Biomedicine</td>
<td>Faculty of Medicine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>numerical grade</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>graduate</td>
<td></td>
</tr>
</tbody>
</table>

**Contents**

Semester-long, integrated scientific seminar in small groups with exercise, discussion and presentations/talks by students, among others on current literature and/or selected special lectures covering the field of cardiovascular biology.

**Intended learning outcomes**

Advanced insights into the focuses chosen for the in-depth scientific study of the selected specialist area. Students are able to evaluate relevant specific information, to present it in a professional manner and to discuss it with others. Students acquire a critical understanding of the most important theories, principles and methods of individual issues within the subject.

**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 can be chosen to earn a bonus)

presentation (approx. 15 to 20 minutes) and written summary (approx. 1 page)

**Allocation of places**

--

**Additional information**

--

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

--
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar Molecular Oncology</td>
<td>03-EM-Sem2-132-m01</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
</tr>
</thead>
<tbody>
<tr>
<td>holder of the Chair of Biochemistry and Molecular Biology</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>numerical grade</td>
<td>--</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>graduate</td>
<td>--</td>
</tr>
</tbody>
</table>

**Contents**

Semester-long, integrated scientific seminar in small groups with exercise, discussion and presentations/talks by students, among others on current literature and/or selected special lectures covering the field of molecular oncology.

**Intended learning outcomes**

Advanced insights into the focuses chosen for the in-depth scientific study of the selected specialist area. Students are able to evaluate relevant specific information, to present it in a professional manner and to discuss it with others. Students acquire a critical understanding of the most important theories, principles and methods of individual issues within the subject.

**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 can be chosen to earn a bonus)

Presentation (approx. 15 to 20 minutes) and written summary (approx. 1 page)

Language of assessment: German, English

**Allocation of places**

--

**Additional information**

--

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

--
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar Neurobiology and Neurophysiology</td>
<td>03-EM-Sem5-132-m01</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
</tr>
</thead>
<tbody>
<tr>
<td>holder of the Chair of Clinical Neurobiology</td>
<td>Faculty of Medicine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>numerical grade</td>
<td>--</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>graduate</td>
<td>--</td>
</tr>
</tbody>
</table>

**Contents**

Semester-long, integrated scientific seminar in small groups with exercise, discussion and presentations/talks by students, among others on current literature and/or selected special lectures covering the field of neurobiology and neurophysiology.

**Intended learning outcomes**

Advanced insights into the focuses chosen for the in-depth scientific study of the selected specialist area. Students are able to evaluate relevant specific information, to present it in a professional manner and to discuss it with others. Students acquire a critical understanding of the most important theories, principles and methods of individual issues within the subject.

**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 can be chosen to earn a bonus)

- presentation (approx. 15 to 20 minutes) and written summary (approx. 1 page)

**Allocation of places**

--

**Additional information**

--

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

--
### Module title
Seminar Stem Cells and Regenerative Medicine

### Abbreviation
03-EM-Sem6-132-m01

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institute of Medical Radiology and Cell Research (MSZ)</td>
<td>Faculty of Medicine</td>
</tr>
</tbody>
</table>

### ECTS
5

### Method of grading
numerical grade

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

### Duration
1 semester

### Module level
graduate

### Other prerequisites
--

### Contents
In this module, current problems in the research areas of stem cell biology, cellular differentiation and regenerative medicine are discussed and specific solutions are taught.

### Intended learning outcomes
Students have developed the ability to approach, analyse and critically interpret problems in stem cell biology, cellular differentiation and regenerative medicine, taking into account current literature.

### 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 can be chosen to earn a bonus)
presentation (approx. 15 to 20 minutes) and written summary (approx. 1 page)
Language of assessment: German, English

### Allocation of places
--

### Additional information
--

### Referred to in LPO 1
(examination regulations for teaching-degree programmes)
--
### Seminar Structure and Function of Proteins

<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seminar Structure and Function of Proteins</td>
<td>03-EM-Sem3-132-m01</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
</tr>
</thead>
<tbody>
<tr>
<td>holder of the Chair of Structural Biology</td>
<td>Faculty of Medicine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>numerical grade</td>
<td>--</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>graduate</td>
<td>--</td>
</tr>
</tbody>
</table>

### Contents

Semester-long, integrated scientific seminar in small groups with exercise, discussion and presentations/talks by students, among others on current literature and/or selected special lectures covering the field of structure and function of proteins.

### Intended learning outcomes

Advanced insights into the focuses chosen for the in-depth scientific study of the selected specialist area. Students are able to evaluate relevant specific information, to present it in a professional manner and to discuss it with others. Students acquire a critical understanding of the most important theories, principles and methods of individual issues within the subject.

### 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 can be chosen to earn a bonus)

presentation (approx. 15 to 20 minutes) and written summary (approx. 1 page)

### Allocation of places

--

### Additional information

--

### Referred to in LPO I

(examination regulations for teaching-degree programmes)

--
<table>
<thead>
<tr>
<th>Module title</th>
<th>Abbreviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stem Cells and Regenerative Medicine</td>
<td>03-SRM-132-m01</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Module coordinator</th>
<th>Module offered by</th>
</tr>
</thead>
<tbody>
<tr>
<td>Institute of Medical Radiology and Cell Research (MSZ)</td>
<td>Faculty of Medicine</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ECTS</th>
<th>Method of grading</th>
<th>Only after succ. compl. of module(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>numerical grade</td>
<td>--</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Duration</th>
<th>Module level</th>
<th>Other prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 semester</td>
<td>graduate</td>
<td>--</td>
</tr>
</tbody>
</table>

**Contents**

In this module, current problems in the research areas of stem cell biology, cellular differentiation and regenerative medicine are discussed and specific solutions are taught.

**Intended learning outcomes**

Students have developed the ability to approach, analyse and critically interpret problems in stem cell biology, cellular differentiation and regenerative medicine, taking into account current literature.

**Courses**

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

- 03-SRM-1-132: P (no information on SWS (weekly contact hours) and course language available)
- 03-SRM-2-132: K (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 03-SRM-1-132:** Practical Training Stem Cells and Regenerative Medicine

- 10 ECTS, Method of grading: numerical grade
- term paper (minimum 10 pages, ready-to-publish written summary of results of experiments)
- Language of assessment: German, English

**Assessment in module component 03-SRM-2-132:** Colloquium Stem Cells and Regenerative Medicine

- 5 ECTS, Method of grading: numerical grade
- oral presentation and discussion of results of lab course (approx. 15 to 20 minutes)
- Language of assessment: German, English

**Allocation of places**

---

**Additional information**

---

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

---
Module title: Structure and Function of Proteins

Abbreviation: 03-EM-SFP-132-m01

Module coordinator: holder of the Chair of Structural Biology

Module offered by: Faculty of Medicine

ECTS: 15

Method of grading: numerical grade

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

Duration: 1 semester

Module level: graduate

Other prerequisites: --

Contents:
Students spend 4 to 6 weeks working on their own small, well-defined scientific lab project in the area of the structure and function of proteins and present the results of the laboratory project at the Institute seminar.

Intended learning outcomes:
Participating in clinically-oriented research projects, students gain initial hands-on experience. They reinforce previously acquired lab skills, acquire new lab techniques, and learn how to apply theoretical knowledge in the lab. Students gain expertise in the analysis and presentation of raw data.

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

- 03-EM-SFP-1-132: P (no information on SWS (weekly contact hours) and course language available)
- 03-EM-SFP-2-132: K (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 03-EM-SFP-1-132: Practical Training Structure and Function of Proteins

- 10 ECTS, Method of grading: numerical grade
- term paper (minimum 10 pages, ready-to-publish written summary of results of experiments)
- Language of assessment: German, English

Assessment in module component 03-EM-SFP-2-132: Colloquium Structure and Function of Proteins

- 5 ECTS, Method of grading: numerical grade
- oral presentation and discussion of results of lab course (approx. 15 to 20 minutes)
- Language of assessment: German, English

Allocation of places

Additional information

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