Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

# Module Catalogue

for the Subject

# Biochemistry

as a Master's with 1 major

with the degree "Master of Science"

(120 ECTS credits)

Examination regulations version: 2012
Responsible: Faculty of Chemistry and Pharmacy

# Contents

# The subject is divided into

# Content and Objectives of the Programme

No translation available.

# Abbreviations used

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

Term: **SS** = summer semester, **WS** = winter semester

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

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

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

# Conventions

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

# Notes

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

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

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

# In accordance with

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

**ASPO2009**

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

**28-Aug-2012 (2012-151) except for mandatory elective 08-MCB-MSP-142 added in Fast Track procedure at a later time**

**17-Dec-2014 (2014-87)**

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

# Compulsory Electives

(90 ECTS credits)

# Compulsory Electives 1

(50 ECTS credits)

# Focus 1 - Biochemistry and Molecular Biology

( ECTS credits)

Module 08-BC-MOL may only be taken by students that did not take 03-MTUB in the Bachelor's degree programme.

| Module title | | | Abbreviation |
|---|---|---|---|
| **RNA worlds** | | | 08-MBC-RNAW-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Biochemistry | | Chair of Biochemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This module comprises a lecture and a seminar. It provides a detailed and in-depth exploration of the current state of research on RNA-protein complexes, their structures and functions as well as the theoretical principles of cutting-edge RNA-based research methods.

**Intended learning outcomes**

Students have become familiar with the topics discussed in the module and are able to transfer what they have learned to new problems. They are able to situate new research findings within the context of existing knowledge as well as to determine the significance of those findings.

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

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

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

a) 1 to 3 written examinations (1 written examination: approx. 60 minutes; 2 written examinations: approx. 45 minutes each; 3 written examinations: approx. 40 minutes each) or b) log (approx. 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or e) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Life cycle of proteins** | | | 08-MBC-LCP-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Biochemistry | | Chair of Biochemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This module comprises a lecture and a seminar. It provides a detailed and in-depth exploration of the current state of research on the regulation and control of the entire life cycle of proteins.

**Intended learning outcomes**

Students have become familiar with the topics discussed in the module and are able to transfer what they have learned to new problems. They are able to situate new research findings within the context of existing knowledge as well as to determine the significance of those findings.

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

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

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

a) 1 to 3 written examinations (1 written examination: approx. 60 minutes; 2 written examinations: approx. 45 minutes each; 3 written examinations: approx. 40 minutes each) or b) log (approx. 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or e) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Genome stability** | | | 08-MBC-GST-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Biochemistry | | Chair of Biochemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This module comprises a lecture and a seminar. It provides a detailed and in-depth exploration of the current state of research on the stability of genomes in dependence of certain structural and epigenetic factors.

**Intended learning outcomes**

Students have become familiar with the topics discussed in the module and are able to transfer what they have learned to new problems. They are able to situate new research findings within the context of existing knowledge as well as to determine the significance of those findings.

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

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

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

a) 1 to 3 written examinations (1 written examination: approx. 60 minutes; 2 written examinations: approx. 45 minutes each; 3 written examinations: approx. 40 minutes each) or b) log (approx. 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or e) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Structure and function of RNA-protein complexes** | | | 08-MBC-RNP-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Biochemistry | | Chair of Biochemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Performing practical experiments, students will actively engage with scientific methods and lab techniques for the investigation of RNA-protein complexes.

**Intended learning outcomes**

Students master the techniques used in the practical course. They are able to explain and critically reflect upon the experiments they have performed as well as to present and discuss their findings in a written report.

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

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

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

a) log (approx. 20 pages) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation/talk (approx. 15 to 30 minutes)
Assessment offered: once a year
Language of assessment: German or English

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Protein quality control** | | | 08-MBC-PQK-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Biochemistry | | Chair of Biochemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Performing practical experiments, students will actively engage with scientific methods and lab techniques in the field of protein degradation in eukaryotes.

**Intended learning outcomes**

Students master the techniques used in the practical course. They are able to explain and critically reflect upon the experiments they have performed as well as to present and discuss their findings in a written report.

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

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

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

a) log (approx. 20 pages) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation/talk (approx. 15 to 30 minutes)
Assessment offered: once a year
Language of assessment: German or English

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Genome and epigenetics** | | | 08-MBC-GEG-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Biochemistry | | Chair of Biochemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Performing practical experiments, students will actively engage with scientific methods and lab techniques for the investigation of epigenetic modifications, DNA structures and genome stability.

**Intended learning outcomes**

Students master the techniques used in the practical course. They are able to explain and critically reflect upon the experiments they have performed as well as to present and discuss their findings in a written report.

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

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

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

a) log (approx. 20 pages) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation/talk (approx. 15 to 30 minutes)
Assessment offered: once a year
Language of assessment: German or English

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Macromolecular Crystallography** | | | 08-MBC-MK-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Biochemistry | | Chair of Biochemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Comprising a lecture, an exercise and a seminar, this module discusses cloning and the expression of protein constructs for crystallisation. It teaches students the fundamental principles and techniques of crystallisation and crystal optimisation as well as crystallographic data collection.

**Intended learning outcomes**

Students have developed an understanding of the method of selecting protein constructs for crystallisation. They have learned the theoretical foundations of, as well as key skills and techniques for, protein crystallisation and data collection/processing. They are able to write up, reflect upon and discuss the results obtained.

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

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

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

a) 1 to 3 written examinations (1 written examination: approx. 60 minutes; 2 written examinations: approx. 45 minutes each; 3 written examinations: approx. 40 minutes each) or b) log (approx. 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or e) presentation/talk (approx. 15 to 30 minutes)
Assessment offered: once a year
Language of assessment: German or English

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Principles of drug design** | | | 08-MCM3-102-m01 |
| **Module coordinator** | | **Module offered by** | |
| lecturers Pharmazeutische Chemie (Pharmaceutical Chemistry) | | Institute of Pharmacy and Food Chemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Fundamentals: drug targets (types and classification), target validation, effect mechanisms, protein-ligand interactions, lead finding; lead optimisation. Experimental methods: bioassays, HTS, combinatorial chemistry, naturally occurring substances. Theoretical methods: molecular modelling, structure-based drug design, pharmacophore models, docking, virtual screening, simulation methods, de novo design. Ligand-based drug design. QSAR. Predictions of pharmacokinetic and toxicological components (ADME). Case examples, prodrug strategies, bioisosterism, SAR.

**Intended learning outcomes**

Students master the theoretical and experimental methods and aspects of drug design.

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

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

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

presentation with discussion (approx. 30 minutes)
Language of assessment: German or English

**Allocation of places**

Chemistry Master's and Mathematics Master's: no restrictions. Biochemistry Master's: 10 places. Places will be allocated by lot.

**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)
Master's degree (1 major) Chemistry (2010)
Master's degree (1 major) Mathematics (2010)
Master's degree (1 major) FOKUS Pharmacy (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Mass-Spectrometry and Proteomics** | | | 08-MBC-MSP-142-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Biochemistry | | Chair of Biochemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This module comprises a lecture, a seminar and a lab course. The lecture will discuss the theoretical principles of, and essential methods for, the mass spectrometry of biomolecules. In the seminar, students will become familiar with different software packages and the fundamental principles of the analysis of mass spectrometry data. The lab course will give students the opportunity to independently apply to practical experiments what they have learned in theory.

**Intended learning outcomes**

Students have learned the theoretical foundations of mass spectrometry protein and proteomic analysis and are able to work with software tools for the analysis of mass spectrometry data. They have learned the steps involved in the procedure - from sample preparation through to mass spectrometry protein analysis - and have gained an insight into how to operate a nanoHPLC-coupled mass spectrometer.

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

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

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

a) written examination (approx. 60 minutes) or Biochemie (Biochemistry): b) log (approx. 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or e) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German, English

**Allocation of places**

Biochemistry Master's: 6 places. Places will be allocated by lot.

**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Molecular Biology for Biochemistry students** | | | 08-BC-MOL-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Biochemistry | | Chair of Biochemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 6 | numerical grade | 08-BC (module component 08-BC-1 only) | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Comprising a lecture and an exercise, this module discusses advanced topics in molecular physiology and functional biochemistry. Another lecture discusses the fields of genetic engineering and biosafety.

**Intended learning outcomes**

Students have developed a sound knowledge of molecular biology. They know what infrastructure is needed for each of the four safety levels into which genetic engineering facilities are categorised and are familiar with the usage rules for them. They have developed a knowledge and understanding of the theoretical principles of genetic engineering and are able to describe relevant examples of applications of genetic engineering as well as to discuss the associated safety issues.

**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-GTBS-1-092: V (no information on SWS (weekly contact hours) and course language available)
- 08-BC-MOL-1-122: V + Ü (no information on SWS (weekly contact hours) and course language available)

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

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-GTBS-1-092:** Genetic Engineering and Biosafety

- 1 ECTS, Method of grading: (not) successfully completed
- written examination (approx. 30 minutes)

**Assessment in module component 08-BC-MOL-1-122:** Molecular Biology Molecular Biology

- 5 ECTS, Method of grading: numerical grade
- a) written examination (approx. 60 to 90 minutes) or b) log (approx. 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation (approx. 30 minutes). Students will be informed about the method and length of the assessment prior to the course.
- Language of assessment: German or English

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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| **Module appears in** |
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| Bachelor' degree (1 major) Biochemistry (2013)<br>Master's degree (1 major) Biochemistry (2012) |

| Module title | | | Abbreviation |
|---|---|---|---|
| **Literature seminar 1** | | | 08-MBC-LIT1-122-m01 |
| **Module coordinator** | | | **Module offered by** |
| chairperson of examination committee Biochemie (Biochemistry) | | | Chair of Biochemistry |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Participants deliver presentations on a topic in the life sciences (to be pre-agreed with lecturer). Those presentations will discuss publications in the relevant field and will be followed by critical discussions of those publications.

**Intended learning outcomes**

Students are able to summarise publications on a topic in the life sciences and deliver presentations of those publications to the scientific community. They have practised engaging critically with scientific literature and situating that literature within the context of the current state of research in the relevant field.

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

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

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

presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Contemporary Biochemical Methods** | | | 08-AMB-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Biochemistry | | Chair of Biochemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

A series of lectures that introduce students to a range of cutting-edge methods in biochemistry. Renowned experts will discuss the methods used by them as well as the theoretical principles of those methods in depth and detail.

**Intended learning outcomes**

Students have become familiar with cutting-edge methods in biochemistry. They are able to explain and describe the methods covered in the module as well as to critically evaluate whether those methods can provide answers to new problems in biochemistry.

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

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

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

1 to 3 written examinations (1 written examination: approx. 60 minutes; 2 written examinations: approx. 45 minutes each; 3 written examinations: approx. 40 minutes each)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

# Focus 2 - Cell- and Developmental Biology/Molecular Medicine

( ECTS credits)

Module 03-MTUB may only be taken by students that did not take 03-MTUB in the Bachelor's degree programme.

| Module title | | | Abbreviation |
|---|---|---|---|
| **Biophysics and Molecular Biotechnology (Lecture and Seminar)** | | | 07-MS2BT-102-m01 |

| Module coordinator | Module offered by |
|---|---|
| holder of the Chair of Biotechnology and Biophysics | Faculty of Biology |

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

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

**Contents**

This lecture provides a broad overview of biophysical techniques and their applications. The first part of the lecture discusses fundamental aspects of thermodynamics, kinetics and molecular interactions. The course then moves on to discuss biophysical methods that facilitate the investigation of individual cells down to the level of single molecules. Focus is on electromanipulation and dielectric spectroscopy of cells, biomembranes, electrophysiology, ion channels, protein folding, single-molecule fluorescence methods and high-resolution as well as dynamic microscopy.

**Intended learning outcomes**

Students will have acquired a knowledge of fundamental biophysical methods and their applications that will enable them to independently review relevant literature. In addition, they will have become acquainted with - or, where necessary, will be able to independently acquaint themselves with - biophysical mechanisms.

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

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

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

**Allocation of places**

Biochemistry Master's: 4 places. Places will be allocated by lot.

**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)
Master's degree (1 major) Biology (2011)
Master's degree (1 major) Biology (2010)
Master's degree (1 major) Biology (2014)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Human genetics** | | | 03-MS2HG-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of of Human Genetics | | Faculty of Medicine | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 2 semester | graduate | -- | |

**Contents**

This module will discuss current topics in human genetics.

**Intended learning outcomes**

Students have developed the ability to understand relevant questions in human genetics and to discuss these in detail.

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

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

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Clinical and Analytical Chemistry** | | | 08-PH-KAC-092-m01 |
| **Module coordinator** | | **Module offered by** | |
| lecturer of lecture "Klinisch-analytische Chemie" (Clinical and Analytical Chemistry) | | Institute of Pharmacy and Food Chemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

This module discusses advanced topics in clinical analytical chemistry.

**Intended learning outcomes**

Students have developed an advanced knowledge of molecular biology.

**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 is creditable for bonus)

written examination (120 minutes)

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)
Master's degree (1 major) Chemistry (2013)
Master's degree (1 major) Chemistry (2010)
Master's degree (1 major) Chemistry (2014)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Clinical and Analytical Chemistry (practical course)** | | | 08-PH-KACP-092-m01 |
| **Module coordinator** | | **Module offered by** | |
| lecturer of lecture "Klinisch-analytische Chemie" (Clinical and Analytical Chemistry) | | Institute of Pharmacy and Food Chemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

This module covers practical topics in clinical chemistry and clinical diagnostics as well as the related analytical methods.

**Intended learning outcomes**

Students have developed a knowledge of clinical analytical chemistry and are able to apply it to practical experiments.

**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 is creditable for bonus)

examination talks (Testate, approx. 15 minutes each), log (approx. 5 to 10 pages)

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

--

**Module appears in**

Master's degree (1 major) Biochemistry (2012)
Master's degree (1 major) Chemistry (2013)
Master's degree (1 major) Chemistry (2010)
Master's degree (1 major) Chemistry (2014)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Microbiology 1 (Lecture and Seminar)** | | | 07-MS2M1-112-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Microbiology | | Faculty of Biology | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Fundamentals of molecular microbiology and infection biology, mechanisms of adherence and invasion, bacterial pathogenicity factors, regulation of virulence, mechanisms of host defence and pathogen interference, current methods in infection biology.

**Intended learning outcomes**

The students are able to understand fundamental theories of molecular microbiology and infection biology, emergence of infectious diseases.

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

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

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

**Allocation of places**

Biology Master's: no restrictions. Biochemistry Master's: 15 places. Places will be allocated by lot.

**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)
Master's degree (1 major) Biology (2011)
Master's degree (1 major) Biology (2014)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Microbiology 2 (Lecture and Seminar)** | | | 07-MS2M2-112-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Microbiology | | Faculty of Biology | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Fundamental principles of the mode of action of microbial pathogenicity factors will be presented using selected prokaryotic and eukaryotic pathogens as model organisms. In addition, current research methods in infection biology will be presented.

**Intended learning outcomes**

Students have gained fundamental knowledge in infection biology and pathogenicity research and the mechanisms behind infectious diseases.

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

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

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

**Allocation of places**

Biology Master's: no restrictions. Biochemistry Master's: 15 places. Places will be allocated by lot.

**Additional information**

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**Workload**

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**Teaching cycle**

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

--

**Module appears in**

Master's degree (1 major) Biochemistry (2012)
Master's degree (1 major) Biology (2011)
Master's degree (1 major) Biology (2014)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Immunology 1** | | | 03-MS2IM1-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Professorship of Immunogenetics | | Faculty of Medicine | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Familiarity with the fundamentals of molecular and cellular immunology that allow a deeper understanding of immune-mediated defence mechanisms. This incorporates common literature readings, presentations and tests on selected immunology book chapters and recent original literature in English language.

**Intended learning outcomes**

Students will gain a knowledge of fundamental concepts and methods in molecular and cellular immunology and will be able to present and discuss these.

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

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

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

**Allocation of places**

Biochemistry Master's: 3 places. Places will be allocated by lot.

**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Immunology 2** | | | 03-MS2IM2-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Professorship of Immunogenetics | | Faculty of Medicine | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Recent progress in molecular and cellular immunology. Deeper insights into selected immunology chapters , such as autoimmunity and immune modulation, development of the immune system, immunogenetics, evolution, infection immunology, and more. This incorporates common literature readings, presentations and tests on selected immunology book chapters and recent original literature.

**Intended learning outcomes**

Students are able to understand current problems in immunology and to discuss these in detail.

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

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

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

**Allocation of places**

Biochemistry Master's: 3 places. Places will be allocated by lot.

**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Virology 1** | | | 03-MS2V1-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Virology | | Faculty of Medicine | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This module will discuss contemporary topics in virology.

**Intended learning outcomes**

Students are able to understand current problems in virology and to discuss these in detail.

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

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

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

**Allocation of places**

Biochemistry Master's: 3 places. Places will be allocated by lot.

**Additional information**

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**Workload**

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**Teaching cycle**

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

--

**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Virology 2** | | | 03-MS2V2-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Virology | | Faculty of Medicine | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This module will discuss contemporary topics in virology.

**Intended learning outcomes**

Students are able to understand current problems in virology and to discuss these in detail.

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

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

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

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

**Allocation of places**

Biochemistry Master's: 3 places. Places will be allocated by lot.

**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Molecular Tumor Biology** | | | 03-MTUB-092-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Physiological Chemistry | | Faculty of Medicine | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

Practical introduction to model systems (cell culture, animal models) and experimental methods of molecular tumour research. Reading and presentation of original research articles.

**Intended learning outcomes**

Students are familiar with tumour models and experimental techniques in molecular cancer research, and they are able to apply this knowledge in practice.

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

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

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

a) written examination (approx. 60 to 90 minutes) or b) log (approx. 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation (approx. 30 minutes). Students will be informed about the method and length of the assessment prior to the course.
Assessment offered: once a year, winter semester
Language of assessment: German, English

**Allocation of places**

Number of places: 12. Selection process Biochemie (Biochemistry) Bachelor's: Should the number of applications exceed the number of available places, places will be allocated according to the following quotas: Quota 1 (two thirds of places): current average grade of successfully completed modules; among applicants with the same average grade, places will be allocated by lot. Quota 2 (one third of places): number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated as they become available. Selection process Biochemie (Biochemistry) Master's: allocation by lot.

**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Bachelor' degree (1 major) Biochemistry (2011)
Bachelor' degree (1 major) Biochemistry (2009)
Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Literature seminar 2** | | | 08-MBC-LIT2-122-m01 |
| **Module coordinator** | | | **Module offered by** |
| chairperson of examination committee Biochemie (Biochemistry) | | | Chair of Biochemistry |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Participants deliver presentations on a topic in the life sciences (to be pre-agreed with lecturer). Those presentations will discuss publications in the relevant field and will be followed by critical discussions of those publications.

**Intended learning outcomes**

Students are able to summarise publications on a topic in the life sciences and deliver presentations of those publications to the scientific community. They have practised engaging critically with scientific literature and situating that literature within the context of the current state of research in the relevant field.

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

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

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

presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Bacterial genetics - Infectiology** | | | 03-98-PBG-092-m01 |
| **Module coordinator** | | **Module offered by** | |
| Institute of Molecular Infection Biology | | Faculty of Medicine | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | Admission prerequisite to assessment: regular attendance of courses (lectures excluded) as specified at the beginning of the course. | |

**Contents**

Foundations and analytical approaches of bacterial genetics are taught based on selected questions from molecular microbiology. Genetic processes are analysed with the help of examples of gene transfer. Molecular genetic and functional biochemical pathways are presented using examples from microbiology.

**Intended learning outcomes**

Students have developed the ability to approach, analyse and interpret general problems in bacterial genetics based on individually assigned tasks, using techniques of modern molecular biology, microbiology and genetics. They also have developed skills in experimental design, bench work, data analysis and the presentation of scientific results both orally and in writing.

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

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

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

methods of assessment: a) written examination (45 to 60 minutes) or b) log (10 to 20 pages) or c) oral examination of one candidate each (approx. 20 minutes) or d) oral examination in groups of up to 3 candidates (approx. 15 minutes per candidate) or e) presentation (20 to 30 minutes)

**Allocation of places**

Biochemistry Bachelor's: no restrictions. Biochemistry Master's: 4 places. Places will be allocated by lot.

**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Bachelor' degree (1 major) Biomedicine (2009)
Bachelor' degree (1 major) Biomedicine (2013)
Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Cardiovascular Biology** | | | 03-98-MVKB-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Experimental Biomedicine | | Faculty of Medicine | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Fundamental and specific knowledge of cardiovascular biology is taught based on selected questions from this field.

**Intended learning outcomes**

Students have developed the ability to approach, analyse and interpret general problems in cardiovascular biology and, in particular, in developmental biology, erythropoiesis, blood coagulation, myocardial diseases, diabetes, regulation of blood pressure, platelets and stroke.

**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 is creditable for bonus)

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)
Master's degree (1 major) Biomedicine (2013)
Master's degree (1 major) Biomedicine (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Molecular Oncology** | | | 03-98-MVMO-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Biochemistry and Molecular Biology | | | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Molecular mechanisms of tumourigenesis; experimental dissection of tumours; metabolic reprogramming in cancer; visualising in vivo tumour progression and response to therapy; targeting Myc for tumour therapy; Wnt signalling and colorectal cancer; cell cycle and tumour suppressor genes; protein turnover in normal and cancer cells; molecular mechanisms of melanoma development; tumour immunology; stem cells and epigenetics; signal transduction and personalised cancer therapy; molecular pathology; infections and tumour development.

**Intended learning outcomes**

Students understand the current topics and challenges in tumour research and the methods used to address such challenges.

**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 is creditable for bonus)

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)
Master's degree (1 major) Biomedicine (2013)
Master's degree (1 major) Biomedicine (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Stem Cell Biology** | | | 03-98-MVSZ-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| Institute of Medical Radiology and Cell Research (MSZ) | | Faculty of Medicine | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**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)

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 is creditable for bonus)

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)
Master's degree (1 major) Biomedicine (2013)
Master's degree (1 major) Biomedicine (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Clinical Neurobiology** | | | 03-98-MVKN-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Clinical Neurobiology | | Faculty of Medicine | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Students will get a theoretical introduction to neurobiology and clinical neurobiology. The following topics will be discussed: introduction to neurons and glia, ion channels and membrane potential, ion channelopathies, synapses, transmitter release, NMJ, myasthenia gravis, cerebellum, basal ganglia, ataxia and Morbus Parkinson, somatosensory system, touch, pain, schizophrenia and autism spectrum disorders, disorders of cognition, muscle and muscle diseases, anatomy and function of the motor system, spinal reflexes, motoneuron diseases, hippocampus, learning and memory, anterograde amnesia, visual agnosia, cortex and the limbic system, emotions, disorders of conscious and unconscious mental processes, attention, smell and taste and hearing , sleep, EEG, epilepsy, vision and diseases of the visual system. The literature seminars are based on fundamental literature on lecture-relevant topics to document the experiments underlying our present knowledge in neurobiology.

**Intended learning outcomes**

Students who successfully completed this module will have acquired insights into current theoretical concepts in neurobiology. They will have examined clinical aspects of neurobiology with a focus on the molecular, cellular and physiological mechanisms. Additionally, they will have learned how to evaluate and present data in oral form. The students will have learned to critically read scientific publications in the field of neurobiology and will have been trained in the ability to extract relevant information from the original literature.

**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 is creditable for bonus)

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)
Master's degree (1 major) Biomedicine (2013)
Master's degree (1 major) Biomedicine (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Tissue Engineering / Functional Materials** | | | 03-98-MVTF-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Tissue Engineering (University Hospital) | | Faculty of Medicine | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Cell culture techniques, fundamentals of tissue engineering, test systems as an alternative to animal experiments in skin, intestine, lung, trachea, kidney, blood-brain barrier, tumours and other diseases, development of cell-based transplants, regulatory fundamentals for approval of medical products and drugs. These are REACH (registration, evaluation, restriction and approval of drugs), medicine products law, GLP (good lab practice), GMP (good manufacturing practice), GCP (good clinical practice).

**Intended learning outcomes**

Students have developed a knowledge of cell biology, metabolism, differentiation, adhesion to surfaces, mechanobiology. They are familiar with the fundamental principles of tissue engineering and quality management.

**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 is creditable for bonus)

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

**Allocation of places**

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**Additional information**

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**Workload**

--

**Teaching cycle**

--

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

--

**Module appears in**

Master's degree (1 major) Biochemistry (2012)
Master's degree (1 major) Biomedicine (2013)
Master's degree (1 major) Biomedicine (2012)

# Compulsory Electives 2

(10 ECTS credits)

Modules 07-3A3BI, 07-4BFMZ4-BC and 03-VTK may only be taken by students that did not take these modules in the Bachelor's degree programme; module component 08-MBC-OC4-1 may only be taken by students that did not take module component 08-OC4-1 in the Bachelor's degree programme.

| Module title | | | Abbreviation |
|---|---|---|---|
| **Contemporary Research in Biochemistry M1** | | | 08-MBC-AFB1-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Biochemistry | | Chair of Biochemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 3 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 2 semester | graduate | -- | |

**Contents**

A series of lectures discussing recent findings from local, national or international research. The lectures will describe the research methods used and will discuss the findings in the context of recent literature.

**Intended learning outcomes**

Students have become familiar with recent findings from biochemical research. They have developed an understanding of the problems discussed in the module and are able to deliver a short presentation on those problems.

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

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

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

presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

**Allocation of places**

--

**Additional information**

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**Workload**

--

**Teaching cycle**

--

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

--

**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Contemporary Research in Biochemistry M2** | | | 08-MBC-AFB2-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Biochemistry | | Chair of Biochemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 3 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 2 semester | graduate | -- | |

**Contents**

A series of lectures discussing recent findings from local, national or international research. The lectures will describe the research methods used and will discuss the findings in the context of recent literature.

**Intended learning outcomes**

Students have become familiar with recent findings from biochemical research. They have developed an understanding of the problems discussed in the module and are able to deliver a short presentation on those problems.

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

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

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

presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

--

**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Bioorganic Chemistry** | | | 08-SCM3-102-m01 |
| **Module coordinator** | | **Module offered by** | |
| lecturer of lecture "Bioorganische Chemie" (Bioorganic Chemistry) | | Institute of Organic Chemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This module discusses topics at the interface of organic chemistry, biology and medicine. It focuses on molecular interactions and recognition, molecular diversity, active agent development, new aspects of DNA, RNA, proteins and carbohydrates.

**Intended learning outcomes**

Students are able to describe molecular interactions and detection mechanisms of bioorganic chemistry. They can explain the molecular diversity of biological systems. They can characterise the fabrication of agents. They can describe modern aspects of DNA, RNA, proteins and carbohydrates.

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

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

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

a) 1 to 3 written examinations (60 or 90 minutes) or b) oral examination of one candidate each (20 minutes) or c) oral examination in groups (groups of 2, 30 minutes). Should there be the option to choose between several methods of assessment, the module coordinator will choose the method to be used for the module component in the current semester at the beginning of the course.
Language of assessment: German or English

**Allocation of places**

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**Additional information**

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**Workload**

--

**Teaching cycle**

--

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

--

**Module appears in**

Master's degree (1 major) Biochemistry (2012)
Master's degree (1 major) Chemistry (2013)
Master's degree (1 major) Chemistry (2010)
Master's degree (1 major) FOKUS Pharmacy (2012)

| Module title | Abbreviation |
|---|---|
| **Bioinorganic Chemistry** | 08-ACM2-102-m01 |

| Module coordinator | Module offered by |
|---|---|
| lecturer of seminar "Anorganische Aspekte der Biochemie and Medizinischen Chemie" (Inorganic Aspects of Biochemistry and Medicinal Chemistry) | Institute of Inorganic Chemistry |

| ECTS | Method of grading | Only after succ. compl. of module(s) |
|---|---|---|
| 5 | numerical grade | -- |

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

**Contents**

This module introduces students to the fundamental principles of bioinorganic chemistry (BIC). It discusses the methods of BIC, structures and effects of metalliferous enzymes and applications of BIC in the fields of diagnosis and therapy.

**Intended learning outcomes**

Students are able to describe the principles of, and methods in, BIC. They can explain the structure and effects of metalliferous enzymes and describe applications of BIC in biochemistry and medicine.

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

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

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

a) 1 to 3 written examinations (60 or 90 minutes) or b) oral examination of one candidate each (20 minutes) or c) oral examination in groups (groups of 2, 30 minutes). Should there be the option to choose between several methods of assessment, the module coordinator will choose the method to be used for the module component in the current semester at the beginning of the course.
Language of assessment: German or English

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

--

**Module appears in**

Master's degree (1 major) Biochemistry (2012)
Master's degree (1 major) Chemistry (2013)
Master's degree (1 major) Chemistry (2010)
Master's degree (1 major) FOKUS Pharmacy (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Modern Aspects of Natural Product Chemistry and Biological Chemistry** | | | 08-OCM-NAT-102-m01 |
| **Module coordinator** | | | **Module offered by** |
| lecturer of the seminar | | | Institute of Organic Chemistry |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This module discusses advanced topics in natural product chemistry and biological chemistry.

**Intended learning outcomes**

Students are able to discuss advanced topics in natural product chemistry and biological chemistry.

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

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

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

a) 1 to 3 written examinations (60 or 90 minutes) or b) oral examination of one candidate each (20 minutes) or c) oral examination in groups (groups of 2, 30 minutes). Should there be the option to choose between several methods of assessment, the module coordinator will choose the method to be used for the module component in the current semester at the beginning of the course.
Language of assessment: German or English

**Allocation of places**

Chemistry Master's: no restrictions. Biochemistry Master's: 20 places. Places will be allocated by lot.

**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)
Master's degree (1 major) Chemistry (2013)
Master's degree (1 major) Chemistry (2010)
Master's degree (1 major) FOKUS Pharmacy (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Organo- and Biocatalysis** | | | 08-HKM1-102-m01 |
| **Module coordinator** | | **Module offered by** | |
| lecturer of the seminar "Organo- and Biokatalyse" | | Institute of Organic Chemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This module provides students with deeper insights into topics in organic compounds and enzymes in catalytic processes. Organocatalysis: enantioselective implementation, principles, green chemistry, substance classes and application areas. Biocatalysis: effects of enzymes in view of different aspects, especially regarding organic synthesis.

**Intended learning outcomes**

Students are able to categorise organocatalysts and explain their effects and areas of application. They can describe the structure and applications of enzymes in organic synthesis. They are able to mechanistically describe and analyse the effects of enzymes.

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

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

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

a) 1 to 3 written examinations (60 or 90 minutes) or b) oral examination of one candidate each (20 minutes) or c) oral examination in groups (groups of 2, 30 minutes). Should there be the option to choose between several methods of assessment, the module coordinator will choose the method to be used for the module component in the current semester at the beginning of the course.
Language of assessment: German or English

**Allocation of places**

--

**Additional information**

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**Workload**

--

**Teaching cycle**

--

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

--

**Module appears in**

Master's degree (1 major) Biochemistry (2012)
Master's degree (1 major) Chemistry (2013)
Master's degree (1 major) Chemistry (2010)
Master's degree (1 major) FOKUS Pharmacy (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Bioinformatics (Lecture and Seminar)** | | | 07-MS2BI-102-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Bioinformatics | | Faculty of Biology | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Advances and current results of bioinformatics are explained and discussed, this includes results from genome and sequence analysis, protein domains and protein families, large-scale data analysis (e. g. net generation sequences, proteomics data), analysis of different functional RNAs (e. g. miRNAs, lncRNAs).

**Intended learning outcomes**

Understand recent results in bioinformatics. Discuss their implications. Have an advanced (Master) level knowledge of typical technologies and research questions in bioinformatics.

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

S + 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 is creditable for bonus)

Students will be informed about the method, length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) oral examination of one candidate each (30 to 60 minutes) or c) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes)

**Allocation of places**

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**Additional information**

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**Workload**

--

**Teaching cycle**

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

--

**Module appears in**

Master's degree (1 major) Biochemistry (2012)
Master's degree (1 major) Biology (2011)
Master's degree (1 major) Biology (2010)
Master's degree (1 major) Biology (2014)
Master's degree (1 major) Mathematics (2012)
Master's degree (1 major) Computational Mathematics (2012)

| Module title | Abbreviation |
|---|---|
| **Bioinformatics** | 07-3A3BI-072-m01 |

| Module coordinator | Module offered by |
|---|---|
| holder of the Chair of Bioinformatics | Faculty of Biology |

| ECTS | Method of grading | Only after succ. compl. of module(s) |
|---|---|---|
| 2 | numerical grade | -- |

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

**Contents**

Fundamental principles of bioinformatics.

**Intended learning outcomes**

Students are proficient in methods for the analysis of DNA and protein databases.

**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.

- 07-3A3BI-1B-072: V (no information on SWS (weekly contact hours) and course language available)
- 07-3A3BI-2B-072: S (no information on SWS (weekly contact hours) and course language available)

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

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 07-3A3BI-1B-072:** Bioinformatics (Lecture)

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

**Assessment in module component 07-3A3BI-2B-072:** Bioinformatics (Seminar)

- 1 ECTS, Method of grading: (not) successfully completed
- term paper (approx. 5 to 10 pages)

**Allocation of places**

Only as part of Biochemistry Master's: 5 places. Places will be allocated by lot.

**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Bachelor' degree (1 major) Biochemistry (2011)
Bachelor' degree (1 major) Biochemistry (2009)
Bachelor' degree (1 major) Biology (2007)
Bachelor' degree (1 major) Mathematics (2008)
Bachelor' degree (1 major) Mathematics (2007)
Bachelor' degree (1 major) Computational Mathematics (2009)
Master's degree (1 major) Biochemistry (2012)

Bachelor's degree (1 major, 1 minor) Biology (Minor, 2008)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Bioinformatics for advanced Students in Biochemistry** | | | 07-4BFMZ4-BC-092-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Bioinformatics | | Faculty of Biology | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | Admission prerequisite to assessment: regular attendance of exercises and successful completion of the respective exercises as specified at the beginning of the course. | |

**Contents**

The module will introduce students to the practice of bioinformatics and will cover the following topics: sequence analysis, structure analysis, genome analysis, cellular and metabolic networks as well as gene regulation.

**Intended learning outcomes**

Students are able to use appropriate bioinformatic algorithms to address simple problems as well as to interpret their results.

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

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

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

log (approx. 10 to 20 pages)
Assessment offered: once a year, summer semester
Language of assessment: German or English

**Allocation of places**

Biochemie (Biochemistry) Bachelor's: 4 places. Selection process Biochemie (Biochemistry) Bachelor's: Should the number of applications exceed the number of available places, places will be allocated according to the following quotas: Quota 1 (two thirds of places): current average grade of successfully completed modules; among applicants with the same average grade, places will be allocated by lot. Quota 2 (one third of places) number of subject semesters of the respective applicant; among applicants with the same number of subject semesters, places will be allocated by lot. A waiting list will be maintained and places re-allocated as they become available.

**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Bachelor' degree (1 major) Biochemistry (2011)
Bachelor' degree (1 major) Biochemistry (2009)
Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Laboratory animal sciences** | | | 03-VTK-092-m01 |
| **Module coordinator** | | **Module offered by** | |
| Animal Welfare Officer of the University of Würzburg | | Faculty of Medicine | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 2 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | Admission prerequisite to assessment: regular attendance of lab course as specified at the beginning of the course. | |

**Contents**

Theoretical and practical basic knowledge of animal welfare legislation, animal welfare ethics and laboratory animal science.

**Intended learning outcomes**

Students have the expertise to carry out or participate in animal experiments according to the guidelines of FELASA (Cat. B).

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

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

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

written examination (approx. 60 minutes)

**Allocation of places**

--

**Additional information**

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**Workload**

--

**Teaching cycle**

--

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

--

**Module appears in**

Bachelor' degree (1 major) Biochemistry (2011)
Bachelor' degree (1 major) Biochemistry (2009)
Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Scientific lecturing M1** | | | 08-MBC-WR1-122-m01 |
| **Module coordinator** | | | **Module offered by** |
| chairperson of examination committee Biochemie (Biochemistry) | | | Chair of Biochemistry |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This module gives students the opportunity to teach a tutorial accompanying a lecture offered by the Faculty of Chemistry and Pharmacy and learn how to present and teach topics in an appropriate manner.

**Intended learning outcomes**

Students are able to teach students in earlier stages of their degrees and tailor their teaching to those students' needs.

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

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

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

preparing and supervising study groups: assessment to be successfully completed (type and length of assessment to be specified at the beginning of the course)
Language of assessment: German or English

**Allocation of places**

--

**Additional information**

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**Workload**

--

**Teaching cycle**

--

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

--

**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Assistance in practical courses 1** | | | 08-MBC-AWA1-122-m01 |
| **Module coordinator** | | | **Module offered by** |
| chairperson of examination committee Biochemie (Biochemistry) | | | Chair of Biochemistry |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This module gives students the opportunity to guide students in earlier stages of their degrees through a practical experiment and learn how to organise scientific experiments, perform those experiments in a responsible manner and instruct others in the lab.

**Intended learning outcomes**

Students are able to guide students in earlier stages of their degrees through practical experiments and have learned how to instruct others in the lab.

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

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

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

preparing and supervising student lab courses: assessment to be successfully completed (type and length of assessment to be specified at the beginning of the course)
Language of assessment: German or English

**Allocation of places**

--

**Additional information**

--

**Workload**

--

**Teaching cycle**

--

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

--

**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Presentation of Scientific Data** | | | 07-MPWD-112-m01 |
| **Module coordinator** | | **Module offered by** | |
| Coordinator BioCareers | | Faculty of Biology | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Principles for the preparation of scientific manuscripts, citations and the presentation of scientific data. Students will write a scientific mini review and present this in a talk (15 minutes). Content, structure, coherence and the logical chain of arguments will be discussed. Students will write and publish (where possible) a scientific paper or review on a selected topic in a scientific journal. The students' work will be based on original papers as well as on reviews and will follow the instructions of a scientific journal of the students' choice. These instructions can be found on the website of the respective journal under "Instructions to Authors" or similar. Both length of chapters and structure of the article should be based on the style of the journal selected. Attendance of no less than 20 scientific talks (e. g. defences of doctoral theses, presentations of research projects, retreats) including presentations by guest speakers. Students are to obtain proof of attendance from the organisers or speakers.

**Intended learning outcomes**

The students are familiar with the details of publishing scientific data in written and oral form. They have become familiar with the methodology of scientific publishing in oral or written fashion. In addition, they have enhanced their English reading, speaking and writing skills.

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

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

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

Students will be informed about the length and scope of the assessment prior to the course. Usually, one of the following options will be chosen: a) written examination (30 to 60 minutes, including multiple choice questions) or b) log (approx. 10 to 30 pages) or c) oral examination of one candidate each (30 to 60 minutes) or d) oral examination in groups of up to 3 candidates (approx. 30 to 60 minutes) or e) presentation (20 to 45 minutes)

**Allocation of places**

Biology Master's: no restrictions. Biochemistry Master's: 10 places. Places will be allocated by lot.

**Additional information**

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**Workload**

--

**Teaching cycle**

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

--

**Module appears in**

Master's degree (1 major) Biochemistry (2012)
Master's degree (1 major) Biology (2011)
Master's degree (1 major) Biology (2014)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Basics in Organic Chemistry 4** | | | 08-MBC-OC4-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| holder of the Chair of Organic Chemistry II | | Institute of Organic Chemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | numerical grade | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | undergraduate | -- | |

**Contents**

This module discusses biologically important bonding classes, their reactions and syntheses, working with special hazardous substances, complicated working and synthesis techniques, purification methods and product analysis.

**Intended learning outcomes**

Students are able to name important heteroaromatics and to formulate their reactions and syntheses. They are able to characterise and categorise dyes. Students are able to describe the structure and selective synthesis of proteins. In addition, they are able to describe the structure of the DNA, carbohydrates, fats, terpenes and steroids.

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

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

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

a) 1 to 3 written examinations (1 written examination: approx. 90 minutes; 2 written examinations: approx. 60 or 90 minutes each; 3 written examinations: approx. 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes)
Language of assessment: German or English

**Allocation of places**

--

**Additional information**

--

**Workload**

--

**Teaching cycle**

--

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

--

**Module appears in**

Master's degree (1 major) Biochemistry (2012)

# Compulsory Electives 3

(30 ECTS credits)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Practical course - abroad 1** | | | 08-MBC-AP1-122-m01 |
| **Module coordinator** | | | **Module offered by** |
| chairperson of examination committee Biochemie (Biochemistry) | | | Chair of Biochemistry |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 30 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Practical course to be completed at universities abroad. Students may complete this course in the context of exchange programmes such as Erasmus etc. The contents of the course should correspond to the contents of a lab course offered in the context of the Master's programme in Biochemistry (120 ECTS credits); please consult with the competent coordinator in advance.

**Intended learning outcomes**

Students are familiar with procedures and processes used at universities in countries other than Germany. They have acquired subject-specific skills as well as language and interpersonal skills.

**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 is creditable for bonus)

a) log (approx. 20 pages) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

Additional information on module duration: block lab course with a minimum duration of 15 weeks.

**Workload**

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**Teaching cycle**

--

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Practical course - abroad 2** | | | 08-MBC-AP2-122-m01 |
| **Module coordinator** | | | **Module offered by** |
| chairperson of examination committee Biochemie (Biochemistry) | | | Chair of Biochemistry |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 15 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Practical course to be completed at universities abroad. Students may complete this course in the context of exchange programmes such as Erasmus etc. The contents of the course should correspond to the contents of a lab course offered in the context of the Master's programme in Biochemistry (120 ECTS credits); please consult with the competent coordinator in advance.

**Intended learning outcomes**

Students are familiar with procedures and processes used at universities in countries other than Germany. They have acquired subject-specific skills as well as language and interpersonal skills.

**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 is creditable for bonus)

a) log (approx. 20 pages) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

Additional information on module duration: block lab course with a minimum duration of 8 weeks.

**Workload**

--

**Teaching cycle**

--

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Practical course - external 1** | | | 08-MBC-EP1-122-m01 |
| **Module coordinator** | | | **Module offered by** |
| chairperson of examination committee Biochemie (Biochemistry) | | | Chair of Biochemistry |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 15 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Students complete a placement at a non-university research/diagnostic institution or a business. Contents to be determined by the host institution. The contents of the placement should correspond to the contents of a lab course offered in the context of the Bachelor's programme in Biochemistry (180 ECTS credits); please consult with the competent coordinator in advance.

**Intended learning outcomes**

Students have become familiar with the structures of non-university research institutions and have developed skills which qualify them to work in their profession.

**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 is creditable for bonus)

a) log (approx. 20 pages) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

Additional information on module duration: block lab course with a minimum duration of 8 weeks.

**Workload**

--

**Teaching cycle**

--

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Practical course - external 2** | | | 08-MBC-EP2-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| chairperson of examination committee Biochemie (Biochemistry) | | Chair of Biochemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 15 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

Students complete a placement at a non-university research/diagnostic institution or a business. Contents to be determined by the host institution. The contents of the placement should correspond to the contents of a lab course offered in the context of the Bachelor's programme in Biochemistry (180 ECTS credits); please consult with the competent coordinator in advance.

**Intended learning outcomes**

Students have become familiar with the structures of non-university research institutions and have developed skills which qualify them to work in their profession.

**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 is creditable for bonus)

a) log (approx. 20 pages) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

**Allocation of places**

--

**Additional information**

Additional information on module duration: block lab course with a minimum duration of 8 weeks.

**Workload**

--

**Teaching cycle**

--

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Practical lab course 1** | | | 08-MBC-LP1-122-m01 |
| **Module coordinator** | | | **Module offered by** |
| chairperson of examination committee Biochemie (Biochemistry) | | | Chair of Biochemistry |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 15 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This lab course is based in a biochemistry and/or molecular biology research group at the University of Würzburg. Please consult with the competent coordinator in advance regarding contents to be covered. The course gives students the opportunity to actively engage with methods in biochemistry, molecular biology and/or bioinformatics. Students will be expected to write a lab report documenting their experiments and findings.

**Intended learning outcomes**

Students have consolidated and enhanced their proficiency in research methods. They have developed the ability to apply those methods to new problems and to determine whether they are suitable for those problems. They have learned how to document and discuss experimental procedures and findings according to best scientific practice.

**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 is creditable for bonus)

a) log (approx. 20 pages) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

Additional information on module duration: block lab course with a minimum duration of 8 weeks.

**Workload**

--

**Teaching cycle**

--

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Practical lab course 2** | | | 08-MBC-LP2-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| chairperson of examination committee Biochemie (Biochemistry) | | Chair of Biochemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 15 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This lab course is based in a biochemistry and/or molecular biology research group at the University of Würzburg. Please consult with the competent coordinator in advance regarding contents to be covered. The course gives students the opportunity to actively engage with methods in biochemistry, molecular biology and/or bioinformatics. Students will be expected to write a lab report documenting their experiments and findings.

**Intended learning outcomes**

Students have consolidated and enhanced their proficiency in research methods. They have developed the ability to apply those methods to new problems and to determine whether they are suitable for those problems. They have learned how to document and discuss experimental procedures and findings according to best scientific practice.

**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 is creditable for bonus)

a) log (approx. 20 pages) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

Additional information on module duration: block lab course with a minimum duration of 8 weeks.

**Workload**

--

**Teaching cycle**

--

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Practical lab course 3** | | | 08-MBC-LP3-122-m01 |
| **Module coordinator** | | | **Module offered by** |
| chairperson of examination committee Biochemie (Biochemistry) | | | Chair of Biochemistry |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This lab course is based in a biochemistry and/or molecular biology research group at the University of Würzburg. Please consult with the competent coordinator in advance regarding contents to be covered. The course gives students the opportunity to actively engage with methods in biochemistry, molecular biology and/or bioinformatics. Students will be expected to write a lab report documenting their experiments and findings.

**Intended learning outcomes**

Students have consolidated and enhanced their proficiency in research methods. They have developed the ability to apply those methods to new problems and to determine whether they are suitable for those problems. They have learned how to document and discuss experimental procedures and findings according to best scientific practice.

**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 is creditable for bonus)

a) log (approx. 20 pages) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

Additional information on module duration: block lab course with a minimum duration of 6 weeks.

**Workload**

--

**Teaching cycle**

--

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Practical lab course 4** | | | 08-MBC-LP4-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| chairperson of examination committee Biochemie (Biochemistry) | | Chair of Biochemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 10 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This lab course is based in a biochemistry and/or molecular biology research group at the University of Würzburg. Please consult with the competent coordinator in advance regarding contents to be covered. The course gives students the opportunity to actively engage with methods in biochemistry, molecular biology and/or bioinformatics. Students will be expected to write a lab report documenting their experiments and findings.

**Intended learning outcomes**

Students have consolidated and enhanced their proficiency in research methods. They have developed the ability to apply those methods to new problems and to determine whether they are suitable for those problems. They have learned how to document and discuss experimental procedures and findings according to best scientific practice.

**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 is creditable for bonus)

a) log (approx. 20 pages) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

Additional information on module duration: block lab course with a minimum duration of 6 weeks.

**Workload**

--

**Teaching cycle**

--

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

--

**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Practical lab course 5** | | | 08-MBC-LP5-122-m01 |
| **Module coordinator** | | | **Module offered by** |
| chairperson of examination committee Biochemie (Biochemistry) | | | Chair of Biochemistry |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This lab course is based in a biochemistry and/or molecular biology research group at the University of Würzburg. Please consult with the competent coordinator in advance regarding contents to be covered. The course gives students the opportunity to actively engage with methods in biochemistry, molecular biology and/or bioinformatics. Students will be expected to write a lab report documenting their experiments and findings.

**Intended learning outcomes**

Students have consolidated and enhanced their proficiency in research methods. They have developed the ability to apply those methods to new problems and to determine whether they are suitable for those problems. They have learned how to document and discuss experimental procedures and findings according to best scientific practice.

**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 is creditable for bonus)

a) log (approx. 20 pages) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

Additional information on module duration: block lab course with a minimum duration of 3 weeks.

**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Practical lab course 6** | | | 08-MBC-LP6-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| chairperson of examination committee Biochemie (Biochemistry) | | Chair of Biochemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This lab course is based in a biochemistry and/or molecular biology research group at the University of Würzburg. Please consult with the competent coordinator in advance regarding contents to be covered. The course gives students the opportunity to actively engage with methods in biochemistry, molecular biology and/or bioinformatics. Students will be expected to write a lab report documenting their experiments and findings.

**Intended learning outcomes**

Students have consolidated and enhanced their proficiency in research methods. They have developed the ability to apply those methods to new problems and to determine whether they are suitable for those problems. They have learned how to document and discuss experimental procedures and findings according to best scientific practice.

**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 is creditable for bonus)

a) log (approx. 20 pages) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2: approx. 30 minutes, groups of 3: approx. 40 minutes) or d) presentation/talk (approx. 15 to 30 minutes)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

Additional information on module duration: block lab course with a minimum duration of 3 weeks.

**Workload**

--

**Teaching cycle**

--

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Scientific lecturing M2** | | | 08-MBC-WR2-122-m01 |
| **Module coordinator** | | **Module offered by** | |
| chairperson of examination committee Biochemie (Biochemistry) | | Chair of Biochemistry | |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This module gives students the opportunity to teach a tutorial accompanying a lecture offered by the Faculty of Chemistry and Pharmacy and learn how to present and teach topics in an appropriate manner.

**Intended learning outcomes**

Students are able to teach students in earlier stages of their degrees and tailor their teaching to those students' needs.

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

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

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

preparing and supervising study groups: assessment to be successfully completed (type and length of assessment to be specified at the beginning of the course)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

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**Workload**

--

**Teaching cycle**

--

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

| Module title | | | Abbreviation |
|---|---|---|---|
| **Assistance in practical courses 2** | | | 08-MBC-AWA2-122-m01 |
| **Module coordinator** | | | **Module offered by** |
| chairperson of examination committee Biochemie (Biochemistry) | | | Chair of Biochemistry |
| **ECTS** | **Method of grading** | **Only after succ. compl. of module(s)** | |
| 5 | (not) successfully completed | -- | |
| **Duration** | **Module level** | **Other prerequisites** | |
| 1 semester | graduate | -- | |

**Contents**

This module gives students the opportunity to guide students in earlier stages of their degrees through a practical experiment and learn how to organise scientific experiments, perform those experiments in a responsible manner and instruct others in the lab.

**Intended learning outcomes**

Students are able to guide students in earlier stages of their degrees through practical experiments and have learned how to instruct others in the lab.

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

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

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

preparing and supervising student lab courses: assessment to be successfully completed (type and length of assessment to be specified at the beginning of the course)
Language of assessment: German or English

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

--

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)

# Thesis

(30 ECTS credits)

| Module title | Abbreviation |
|---|---|
| **Final Examination in Biochemistry** | 08-MBC-MA-122-m01 |

| Module coordinator | Module offered by |
|---|---|
| chairperson of examination committee Biochemie (Biochemistry) | Chair of Biochemistry |

| ECTS | Method of grading | Only after succ. compl. of module(s) |
|---|---|---|
| 30 | numerical grade | -- |

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

**Contents**

This module gives students the opportunity to research and write on a defined problem within a given time frame and using the scientific methods they have learned during the programme. Students will also be required to go through a thesis defence.

**Intended learning outcomes**

Students are able to conduct research on a defined problem/topic, adhering to the principles of good scientific practice, and to write up the results of their work. They are able to present the findings of their projects. They can defend their choice of experimental methods, their findings as well as the evaluation and interpretation of those findings in a scientific discussion.

**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.

- 08-MBC-MA-2-122: K (no information on language and number of weekly contact hours available)
- 08-MBC-MA-1-122: 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 is creditable for 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 08-MBC-MA-2-122:** Abschlusskolloquium

- 5 ECTS credits, method of grading: numerical grade
- Abschlusskolloquium (approx. 45 minutes)
- Language of assessment: German or English

**Assessment component to module component 08-MBC-MA-1-122:** Master-Arbeit

- 25 ECTS credits, method of grading: numerical grade
- written thesis (approx. 60 pages)
- Language of assessment: German or English

**Allocation of places**

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**Additional information**

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**Workload**

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**Teaching cycle**

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

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**Module appears in**

Master's degree (1 major) Biochemistry (2012)