

Module Catalogue

for the Subject

Chemistry

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

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



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The subject is divided into

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|--|--------------|------------------|
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| Compulsory Electives | 5 | 13 |
| Organic Chemistry | 25 | 17 |
| Compulsory Courses | 15 | 18 |
| Compulsory Electives | 10 | 22 |
| Physical Chemistry | 25 | 29 |
| Compulsory Courses | 10 | 30 |
| Compulsory Electives | 15 | 33 |
| Biochemistry | 25 | 41 |
| Compulsory Courses | 10 | 42 |
| Compulsory Electives | 15 | 45 |
| Functional Materials | 25 | 58 |
| Compulsory Courses | 20 | 59 |
| Compulsory Electives | 5 | 64 |
| Homogeneous Catalysis | 25 | 72 |
| Compulsory Courses | 20 | 73 |
| Compulsory Electives | 5 | 77 |
| Medicinal Chemistry | 25 | 81 |
| Compulsory Courses | 25 | 82 |
| Supramolecular Chemistry | 25 | 86 |
| Compulsory Courses | 10 | 87 |
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Content and Objectives of the Programme

The Master's program in Chemistry is offered by the Faculty of Chemistry and Pharmacy of the JMU as a fundamentally-oriented course with the degree of "Master of Science" (M.Sc.), in the context of a consecutive Bachelor's and Master's degree program.

The Master's course prepares students for scientific as well as doctoral work in chemistry and the eventual award of the degree Dr. rer. nat. The aim of the training is to provide students with in-depth knowledge of scientific work in the research and application of chemistry and the associated basic concepts. Through the education and training of analytical thinking, students should acquire the ability to independently apply the basic knowledge obtained earlier in their Bachelor studies and to transfer it to, and later familiarize themselves with, a wide variety of new tasks.

Through the thesis, students should show that they are able to deal with an experimental or theoretical task in a thematically-limited extent using known methods and from a scientific point of view. The Master's examination intends to determine whether the candidate or the candidate has an overview of the relationships in chemistry, and has the ability to apply the learned scientific methods. It allows the acquisition of an internationally comparable degree in the field of chemistry and provides a professional qualification to prepare for future work in research and development.



Abbreviations used

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

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:

ASP02009

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

14-Jul-2010 (2010-31)

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)

Divided up into 3 focus subjects (25 ECTS credits each) + additional qualifications (15 ECTS credits).



Inorganic Chemistry

(25 ECTS credits)



Compulsory Courses

(20 ECTS credits)



| Module title | | | Abbreviation | | |
|---|-------|---|---------------------|-------------------|--|
| Advanced Inorganic Chemistry | | dvanced Inorganic Chemistry 08-ACM1-102-m01 | | 08-ACM1-102-m01 | |
| Module coordinator N | | | | Module offered by | |
| Managing Director of the Institute of Inorganic Chemistry Institute of Ir | | Institute of Inorgan | ic Chemistry | | |
| ECTS Method of grading Only after succ. con | | npl. of module(s) | | | |
| 20 | nume | rical grade | | | |
| Duratio | on | Module level | Other prerequisites | | |
| 2 seme | ester | ter graduate | | | |
| Combonto | | | | | |

Contents

This module discusses advanced topics in main group chemistry and transition metal chemistry. It focuses on special compounds of the main group elements (MGEs), bonding situations of MGEs and MGE compounds, the chemistry of transition metals and coordination chemistry. The course gives students the opportunity to enhance their skills in advanced synthesis and analytical methods in inorganic chemistry. The focus will be on working under inert atmospheres, purification methods, spectral analysis and crystallography. Students will be expected to conduct their work in the lab independently, write a lab report documenting their findings and deliver a presentation.

Intended learning outcomes

Students are able to characterise and explain special compounds of the main group elements. They can describe the chemical properties of transition metals and analyse the structure as well as chemical and physical aspects of coordination compounds. Students are able to use advanced synthesis and analytical methods in inorganic chemistry in the lab and to interpret their findings. They are able to write a lab report documenting their findings and deliver a presentation.

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.

- 08-ACM1-1-102: S + S (no information on SWS (weekly contact hours) and course language available)
- o8-ACM1-2-102: P (no information on SWS (weekly contact hours) and course language available)

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

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

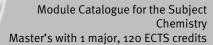
Assessment in module component o8-ACM1-1-102: Inorganic Chemistry for advanced students Inorganic Chemistry for advanced students

- 10 ECTS, Method of grading: numerical grade
- a) 1 to 3 written examinations (90 to 120 minutes each) or b) oral examination of one candidate each (30 minutes) or c) oral examination in groups (groups of 2, 45 minutes)
- Language of assessment: German or English

Assessment in module component o8-ACM1-2-102: Inorganic Chemistry practical course for advanced

- 10 ECTS, Method of grading: (not) successfully completed
- practical work with lab report (20 pages) and talk (15 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) Chemistry (2010) |



Compulsory Electives

(5 ECTS credits)



| Bioinorganic Chemistry Module coordinator | | | | | | |
|--|-----------------------------|--|---|--|--|--|
| Module coordinator | | Bioinorganic Chemistry 08-ACM2-102-m01 | | | | |
| | | Module offered by | | | | |
| lecturer of seminar "Anorganische Aspekte der Biochemie and Medizinischen Chemie" (Inorganic Aspects of Bioche- mistry and Medicinal Chemistry) | | Institute of Inorgan | ic Chemistry | | | |
| ECTS Method of grading | Only after succ. con | npl. of module(s) | | | | |
| 5 numerical grade | | | | | | |
| Duration Module level | Other prerequisites | | | | | |
| 1 semester graduate | | | | | | |
| Contents | | | | | | |
| This module introduces students to the methods of BIC, structures and effects and therapy. | | | | | | |
| Intended learning outcomes | | | | | | |
| Students are able to describe the princ of metalliferous enzymes and describe | | | | | | |
| Courses (type, number of weekly contact hours, l | anguage — if other than Ger | rman) | | | | |
| S (no information on SWS (weekly cont | act hours) and cours | e language available | <u>e)</u> | | | |
| Method of assessment (type, scope, langua module is creditable for bonus) | ge — if other than German, | examination offered — if no | ot every semester, information on whether | | | |
| 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 | | | | | | |
| | | | | | | |
| Workload | | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |

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)

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



| Module title Abbreviation | | | | | Abbreviation | |
|---|--|---|--|-----------------------------|---|--|
| Solid state chemistry and inorganic materials | | | | 08-ACM3-102-m01 | | |
| Module coordinator | | | | Module offered by | L | |
| lecturer of seminar "Festkörperchemie and Anorganische Materialien" (Solid State Chemistry and Inorganic Materi- als) | | Institute of Inorgan | ic Chemistry | | | |
| ECTS | Meth | od of grading | Only after succ. cor | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Durati | on | Module level | Other prerequisites | | | |
| 1 seme | ester | graduate | | | | |
| Conte | nts | | | | | |
| | | provides an introduction nthesis methods and s | | | structure, chemical and physical | |
| Intend | led lear | ning outcomes | | | | |
| | | | | | xplain methods for solid-state the corresponding solids. | |
| Course | es (type, r | number of weekly contact hour | s, language — if other than Ge | rman) | | |
| S (no i | informa | tion on SWS (weekly co | ontact hours) and cours | se language availabl | e) | |
| | | sessment (type, scope, lang le for bonus) | guage — if other than German, | examination offered — if no | ot every semester, information on whether | |
| oral ex thods the cu | caminat of asse rrent se | ion in groups (groups c | of 2, 30 minutes). Shou ordinator will choose t g of the course. | ld there be the optio | candidate each (20 minutes) or c) on to choose between several me- ed for the module component in | |
| Alloca | tion of | olaces | | | | |
| | | | | | | |
| Additi | onal inf | ormation | | | | |
| | | | · | | | |
| Workload | | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module appears in | | | | | | |
| | Master's degree (1 major) Chemistry (2013) | | | | | |
| Mantania da mara (a maia) Chamistra (a a a a) | | | | | | |

Master's degree (1 major) Chemistry (2010)



| Module | Module title Abbreviation | | | | | |
|---|---|-----------------------------------|---|-----------------------------|--|--|
| Advano lysis | ed org | anometallic chemistry ar | 08-HKM2-102-m01 | | | |
| Module | Module coordinator Module offered by | | | | | |
| | lecturer of the seminar "Spezielle Metallorganische Chemie Institute of Inorganic Chemistry and deren Anwendung in der Homogenkatalyse" | | | | | |
| ECTS | CTS Method of grading Only after succ. compl. of module(s) | | | | | |
| 5 | nume | rical grade | | | | |
| Duratio | n | Module level | Other prerequisites | | | |
| 1 seme | ster | graduate | | | | |
| Conten | ts | | | | | |
| This mo | odule e | xamines elementary orga | anic compounds of tra | ansition metals with | homogeneous catalytic applica- | |
| Intend | ed lear | ning outcomes | | | | |
| | | | | | entary organic compounds. They neous catalysis reactions. | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Ger | man) | | |
| S (no ir | nformat | tion on SWS (weekly cont | act hours) and cours | e language available | 2) | |
| Metho | d of ass | sessment (type, scope, langua | ge — if other than German, e | examination offered — if no | t every semester, information on whether | |
| module is | creditab | le for bonus) | | | | |
| oral ext thods of the cur | aminat of asses rent se | ion in groups (groups of 2 | 2, 30 minutes). Shoul dinator will choose th of the course. | d there be the option | andidate each (20 minutes) or c) n to choose between several me- d for the module component in | |
| Allocat | ion of p | olaces | | | | |
| | | | | | | |
| Additio | nal inf | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module | Module appears in | | | | | |
| | Master's degree (1 major) Chemistry (2013) | | | | | |
| Master | Master's degree (1 major) Chemistry (2010) | | | | | |

Organic Chemistry

(25 ECTS credits)



Compulsory Courses

(15 ECTS credits)



| Module | Module title Abbreviation | | | | |
|---|--|---|--|----------------------------|--|
| Modern Synthetic Method 08-OCM-SYNT-102-m01 | | | | | |
| Module coordinator Module offered by | | | | | |
| lecture | r of the | seminar | | Institute of Organic | Chemistry |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | |
| 5 | nume | rical grade | | | |
| Duratio | n | Module level | Other prerequisites | | |
| 1 seme | ster | graduate | Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence). | | |
| Conten | ts | | | | |
| | | liscusses modern stereo emistry and catalysis. | selective synthesis m | ethods. It focuses o | n selected total syntheses, orga- |
| Intend | ed lear | ning outcomes | | | |
| | an expl | ain total syntheses. They | | | stereochemically analyse them. chemistry and catalysis in synthe- |
| Course | S (type, r | number of weekly contact hours, | language — if other than Ge | rman) | |
| S + Ü (1 | no info | rmation on SWS (weekly | contact hours) and co | ourse language avai | lable) |
| | | sessment (type, scope, langua ble for bonus) | age — if other than German, | examination offered — if n | ot every semester, information on whether |
| oral ext thods of the cur | 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 | | | | |
| Allocat | ion of p | olaces | | | |
| | | | | | |
| Additio | nal inf | ormation | | | |
| | | | | | |
| Workload | | | | | |
| | | | | | |
| Teaching cycle | | | | | |
| | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | |
| | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | |

Module appears in

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



| Module | Module title Abbreviation | | | | |
|---|--|---|------------------------------|-----------------------------|---|
| Advanced NMR- and Mass Spectrometry 08-OCM-NMRMS-102-m | | | 08-OCM-NMRMS-102-m01 | | |
| Module coordinator Module offered by | | | L | | |
| lab cou | ırse sup | pervisor | | Institute of Organic | Chemistry |
| ECTS | Metho | od of grading | Only after succ. con | ıpl. of module(s) | |
| 5 | nume | rical grade | | | |
| Duratio | n | Module level | Other prerequisites | | |
| 1 seme | ster | graduate | | | |
| Conten | ts | | | | |
| sights i | into the | | the two measuring to | echniques and inclu | pectrometry. It offers deeper indes exercises that give students meter. |
| Intende | ed learı | ning outcomes | | | |
| | | able to discuss NMR and to experiment with both | | | n degree of expertise in the field. |
| Course | S (type, n | number of weekly contact hours, l | anguage — if other than Ger | man) | |
| P (no ir | nformat | ion on SWS (weekly cont | act hours) and cours | e language available | e) |
| | | sessment (type, scope, langua le for bonus) | ge — if other than German, o | examination offered — if no | ot every semester, information on whether |
| oral ex | aminati | n examinations (60 or 90 ion in groups (groups of 2 ssessment: German or El | 2, 30 minutes) | examination of one o | candidate each (20 minutes) or c) |
| Allocat | | | | | |
| | | | | | |
| Additio | nal inf | ormation | | | |
| | | | | | |
| Worklo | ad | | | | |
| | | | | | |
| Teaching cycle | | | | | |
| | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | |
| <u>r</u> | | | | | |
| Module | Module appears in | | | | |
| | Master's degree (1 major) Chemistry (2013) | | | | |
| Master | Master's degree (1 major) Chemistry (2010) | | | | |



| Modul | e title | | Abbreviation | | | | |
|-----------------------------|---|---|---|-----------------------------|--|--|--|
| Advanced Research Project 1 | | | | | 08-0CM-AKP1-102-m01 | | |
| Modul | e coord | inator | | Module offered by | , | | |
| head o | f the re | search group offering the | e module | Institute of Organic | Chemistry | | |
| ECTS | Metho | od of grading | Only after succ. com | npl. of module(s) | | | |
| 5 | (not) | successfully completed | | | | | |
| Duratio | on | Module level | Other prerequisites | | | | |
| 1 seme | ster | graduate | | | | | |
| Conter | ıts | | | | | | |
| | | ives students the opport f Organic Chemistry and | | | the research groups based at ytical methods. | | |
| Intend | ed learı | ning outcomes | | | | | |
| | | able to describe and use well as to describe theor | | s and analytical met | hods typically used by the rese- | | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Ger | man) | | | |
| P (no i | nformat | ion on SWS (weekly cont | act hours) and cours | e language available | e) | | |
| | | sessment (type, scope, langua le for bonus) | ge $-$ if other than German, ϵ | examination offered — if no | ot every semester, information on whether | | |
| | | .5 minutes) and log (appr ssessment: German or E | | | | | |
| Allocat | tion of p | olaces | | | | | |
| | , | | | | | | |
| Additio | onal inf | ormation | | | | | |
| | | | | | | | |
| Worklo | ad | | , | | | | |
| | | | | | | | |
| Teaching cycle | | | | | | | |
| | | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | | |
| Modul | Module appears in | | | | | | |
| Master | 's degr | Master's degree (1 major) Chemistry (2010) | | | | | |



Compulsory Electives

(10 ECTS credits)



| Modul | e title | | Abbreviation | | | | |
|---|---|---|---|-----------------------------|---|--|--|
| Moder | Modern Aspects of Natural Product Chemistry and Biological Chemistry 08-OCM-NAT-102-m01 | | | | | | |
| Modul | e coord | inator | | Module offered by | - | | |
| lecture | r of the | seminar | | Institute of Organic | Chemistry | | |
| ECTS | Meth | od of grading | Only after succ. com | pl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Duratio | on | Module level | Other prerequisites | | | | |
| 1 seme | ster | graduate | - | | | | |
| Conter | ıts | | | | | | |
| This m | odule c | liscusses advanced topic | s in natural product o | hemistry and biolog | gical chemistry. | | |
| Intend | ed lear | ning outcomes | , | | | | |
| Studer | its are | able to discuss advanced | topics in natural pro | duct chemistry and | biological chemistry. | | |
| Course | S (type, i | number of weekly contact hours, l | anguage — if other than Ger | man) | | | |
| S (no i | nforma | tion on SWS (weekly cont | act hours) and cours | e language available | e) | | |
| | | sessment (type, scope, langua ble for bonus) | ge $-$ if other than German, ϵ | examination offered — if no | ot every semester, information on whether | | |
| oral ex thods the cui | aminat of asse rent se | ion in groups (groups of a | 2, 30 minutes). Shoul dinator will choose th of the course. | d there be the optio | candidate each (20 minutes) or c) on to choose between several me- od for the module component in | | |
| Allocat | tion of | places | | | | | |
| Chemi | stry Ma | ster's: no restrictions. Bid | ochemistry Master's: | 20 places. Places w | ill be allocated by lot. | | |
| Additio | onal inf | ormation | | | | | |
| | | | | | | | |
| Workload | | | | | | | |
| | | | | | | | |
| Teaching cycle | | | | | | | |
| | | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | | |
| | | | | | | | |

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

Module appears in



| Modul | e title | | | | Abbreviation | |
|----------------------------|---------------------|-----------------------|----------------------|--------------------------------|-------------------|--|
| Organi | ic Funct | ional Materials | | | 08-0CM-FM-102-m01 | |
| Module coordinator | | | | Module offered by | | |
| lecture | r of the | seminar "Organische F | unktionsmaterialien" | Institute of Organic Chemistry | | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duration Module level Othe | | | Other prerequisites | Other prerequisites | | |
| 1 seme | 1 semester graduate | | | | | |
| Conter | Contents | | | | | |

The module deals with specific topics in organic functional materials. The focus is on fundamental (photo) physical effects in organic molecular and polymeric semiconductors as well as their application in (opto)electronic components such as field effect transistors, organic light-emitting diodes, or organic solar cells as well as in nonlinear optics.

Intended learning outcomes

The students are able to explain fundamental (photo)physical processes in organic semiconductors. He/She can explain the synthesis of these semiconductor materials as well as their application in (opto)electronic components such as field effect transistors, organic light-emitting diodes or in organic photovoltaics as well as in nonlinear optics.

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

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

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ 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

Workload

Teaching cycle

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

Module appears in

Master's degree (1 major) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)

Master's degree (1 major) Functional Materials (2012)



| Module title | | | | | Abbreviation |
|-------------------------|-----------|------------------------|----------------------|--------------------------------|-----------------|
| Organ | o- and E | Biocatalysis | | | 08-HKM1-102-m01 |
| Modul | e coord | inator | | Module offered by | |
| lecture | er of the | seminar "Organo- and B | Biokatalyse" | Institute of Organic Chemistry | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | |
| 5 | nume | rical grade | | | |
| Duration Module level O | | 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

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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)

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 | |
|---|----------|------------------------|---|-----------------------------------|-----------------|--|
| Supramolecular Chemistry (Basics) | | | | | 08-SCM1-102-m01 | |
| Modul | e coord | inator | | Module offered by | | |
| lecture | r of lec | ture "Organischen Chem | ie" | Faculty of Chemistry and Pharmacy | | |
| ECTS | Metho | od of grading | of grading Only after succ. compl. of module(s) | | | |
| 5 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequisites | | | |
| 1 seme | ester | graduate | | | | |
| Contents | | | | | | |
| This module introduces students to the fundamental principles of supramolecular chemistry. It focuses on inter- actions between molecules, molecular recognition by receptors, complexes, supramolecular polymers, coordi- | | | | | | |

Intended learning outcomes

dern applications of supramolecular chemistry.

Students are able to explain interactions between molecules demonstrating a high degree of expertise in the field as well as to describe the formation, structure and polymers of coordination compounds. They are able to describe the self-assembly of polymers in aqueous media as well as to identify the characteristics of synthetic ion channels. They can name modern applications of supramolecular chemistry.

nation polymers and networks, liquid crystals, self-assembly in aqueous media, synthetic ion channels and mo-

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

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

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

written examination (approx. 90 minutes) or oral examination of one candidate each (approx. 20 minutes) 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) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)

Master's degree (1 major) Chemistry (2014)

Master's degree (1 major) Functional Materials (2012)



| Module title | | | | | Abbreviation | |
|--------------|---|---------------|----------------------|--------------------------------|-----------------|--|
| Bioorg | anic Ch | nemistry | | | 08-SCM3-102-m01 | |
| Modul | e coord | inator | | Module offered by | | |
| 1 | lecturer of lecture "Bioorganische Chemie" (E Chemistry) | | | Institute of Organic Chemistry | | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | Duration Module level C | | Other prerequisites | | | |
| 1 seme | ester | graduate | | | | |
| Conter | 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)

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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 | | | | | | |
|---|--|--|--|-----------------------------|---|--|
| Computational Chemistry | | | | | 08-TCM2-102-m01 | |
| Module coordinator | | | | Module offered by | L | |
| lecture | er of lec | ture "Computational Ch | nemistry" | Institute of Physica | l and Theoretical Chemistry | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequisites | | | |
| 1 semester graduate | | ses in the respective (usually 70% of exe | Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence). | | | |
| Conter | nts | | | | | |
| This m | odule i | ntroduces students to t | he fundamental princi | oles of computation | al chemistry. | |
| Intend | ed lear | ning outcomes | | | | |
| | | able to explain the thece | oretical principles of co | mputational chemis | try and to apply methods in com- | |
| Course | es (type, | number of weekly contact hour | s, language — if other than Ge | rman) | | |
| S + Ü (| no info | rmation on SWS (weekl | y contact hours) and co | ourse language avail | lable) | |
| | | sessment (type, scope, lang | guage — if other than German, | examination offered — if no | ot every semester, information on whether | |
| | | nation (90 minutes) assessment: German or | English | | | |
| Alloca | tion of | places | | | | |
| | | | | | | |
| Additio | onal inf | ormation | | | | |
| | | | | | | |
| Worklo | oad | | | | | |
| | | | | | | |
| Teachi | ing cyc | le | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module appears in | | | | | | |
| Master's degree (1 major) Chemistry (2010) | | | | | | |
| Master | Master's degree (1 major) Mathematics (2012) | | | | | |
| | Master's degree (1 major) Mathematics (2010) | | | | | |
| Maste | Master's degree (1 major) Computational Mathematics (2012) | | | | | |

Physical Chemistry

(25 ECTS credits)



Compulsory Courses

(10 ECTS credits)



| Module title | | | | | Abbreviation |
|---|----------|---------------------|-----------------------|---|-----------------|
| Advanc | ed Phy | sical Chemistry | | | 08-PCM1-102-m01 |
| Module | e coord | inator | | Module offered by | |
| lecturer of seminar "Laserspektroskopie" (Laser Spectroscopy) | | | oie" (Laser Spectros- | Institute of Physical and Theoretical Chemistry | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | |
| 10 | nume | rical grade | | | |
| Duration Module level Other prerequisit | | Other prerequisites | | | |
| 1 semester graduate | | | | | |
| Conten | Contents | | | | |

This module introduces students to the fundamental principles of laser spectroscopy. It discusses absorption and emission spectroscopy. In addition, the module gives students the opportunity to use modern experimental methods in physical chemistry in the laboratory. After a safety briefing, the students autonomously conduct experiments in the laboratory. Students will be expected to take tests and write lab reports to demonstrate their knowledge.

Intended learning outcomes

Students are able to explain the components and operating principles of lasers as well as the optical principles of laser technology. They are able to describe the principles of absorption and emission spectroscopy. Students have developed a high level of proficiency in modern experimental methods in physical chemistry. They are able to analyse the resulting measurements and write a lab report.

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.

- o8-PCM1-1-102: S + Ü (no information on SWS (weekly contact hours) and course language available)
- o8-PCM1-2-102: 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

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 o8-PCM1-1-102: Laser Spectroscopy Laser Spectroscopy

- 5 ECTS, Method of grading: numerical grade
- written examination (90 minutes) or oral examination (20 minutes)
- Language of assessment: German or English

Assessment in module component o8-PCM1-2-102: Advanced Physical Chemistry (Lab)

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

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Module appears in

Master's degree (1 major) Chemistry (2010)

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

Master's degree (1 major) Computational Mathematics (2012)



Compulsory Electives

(15 ECTS credits)



| Module title Abbreviation | | | | | | | |
|---|--|--|--|----------------------------|---|--|--|
| Computational Chemistry | | | | | 08-TCM2-102-m01 | | |
| Modul | le coord | linator | | Module offered by | I. | | |
| lecture | er of led | ture "Computationa | l Chemistry" | Institute of Physica | al and Theoretical Chemistry | | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | | |
| 5 | nume | erical grade | | | | | |
| Durati | on | Module level | Other prerequisites | i | | | |
| 1 semester graduate | | ses in the respectiv (usually 70% of exe | Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcu- | | | | |
| Conte | nts | | | | | | |
| This m | nodule i | ntroduces students | to the fundamental princi | ples of computation | al chemistry. | | |
| Intend | led lear | ning outcomes | | | | | |
| | | able to explain the t | heoretical principles of co | mputational chemis | try and to apply methods in com- | | |
| Course | es (type, | number of weekly contact h | nours, language — if other than Ge | rman) | | | |
| S + Ü (| (no info | rmation on SWS (we | ekly contact hours) and co | ourse language avai | lable) | | |
| | | sessment (type, scope, ble for bonus) | language — if other than German, | examination offered — if n | ot every semester, information on whether | | |
| | | nation (90 minutes) assessment: German | | | | | |
| Alloca | tion of | places | , | | | | |
| | | - | | | | | |
| Additi | onal in | formation | | | | | |
| | | | | | | | |
| Workl | oad | | | | | | |
| | , | | | | | | |
| Teach | ing cyc | le | | | | | |
| | | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | | |
| | | | | | | | |
| Module appears in | | | | | | | |
| Master's degree (1 major) Chemistry (2010) | | | | | | | |
| Maste | Master's degree (1 major) Mathematics (2012) | | | | | | |
| | Master's degree (1 major) Mathematics (2010) | | | | | | |
| Maste | Master's degree (1 major) Computational Mathematics (2012) | | | | | | |



| Module title | | | | | Abbreviation | | |
|-------------------|--|---|---|----------------------------|---|--|--|
| Chemi | cal Dyn | amics | | | 08-PCM2-102-m01 | | |
| Modul | e coord | inator | | Module offered by | | | |
| | er of ser | ninar "Chemische Dynam | ik" (Chemical Dyna- | Institute of Physica | al and Theoretical Chemistry | | |
| mics) | | | F | | | | |
| ECTS | | od of grading | Only after succ. con | npl. of module(s) | | | |
| 5 | • | rical grade | | | | | |
| Durati | on | Module level | Other prerequisites | | | | |
| 1 seme | ester | graduate | | | | | |
| Conte | nts | | | | | | |
| | | | | | nical kinetics and reaction dyna- scribing chemical reactions. | | |
| Intend | ed lear | ning outcomes | | | | | |
| | | able to discuss advanced dels for the investigation | | | dynamics. They can describe me | | |
| Course | es (type, r | number of weekly contact hours, I | anguage — if other than Ger | man) | | | |
| S + Ü (| no info | mation on SWS (weekly | contact hours) and co | ourse language avai | lable) | | |
| | | sessment (type, scope, langua le for bonus) | ge — if other than German, | examination offered — if n | ot every semester, information on whether | | |
| | | nation (90 minutes) or or ssessment: German or E | | e candidate each (2 | o minutes) or talk (30 minutes) | | |
| | tion of p | | <u>. </u> | | | | |
| | | | | | | | |
| Additio | onal inf | ormation | | | | | |
| | | | | | | | |
| Worklo | oad | | | | | | |
| | | | | | | | |
| Teachi | ng cycl | e | | | | | |
| | | | | | | | |
| Referre | ed to in | LPO I (examination regulation | s for teaching-degree progra | ımmes) | | | |
| | | | | | | | |
| Module appears in | | | | | | | |
| | Master's degree (1 major) Chemistry (2013) | | | | | | |
| | Master's degree (1 major) Chemistry (2010) | | | | | | |
| Maste | Master's degree (1 major) Chemistry (2014) | | | | | | |

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

Master's degree (1 major) Computational Mathematics (2012)



| Module title | | | | | Abbreviation | |
|---------------------|---|---------------|----------------------|---|-----------------|--|
| Nanos | Nanoscale Materials | | | | 08-PCM3-102-m01 | |
| Module coordinator | | | | Module offered by | | |
| lecture | lecturer of the seminar "Nanoskalige Materialien" | | | Institute of Physical and Theoretical Chemistry | | |
| ECTS | Meth | od of grading | Only after succ. cor | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequisites | Other prerequisites | | |
| 1 semester graduate | | | | | | |
| Conten | Contents | | | | | |

This module discusses advanced topics in nanoscale materials. It focuses on the structure, properties, fabrication, modern characterisation methods and application areas of nanoscale materials.

Intended learning outcomes

Students are able to characterise nanoscale materials. They are able to name analytical methods and application areas of nanoscale materials.

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)

written examination (90 minutes) or oral examination of one candidate each (20 minutes) or talk (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

Bachelor' degree (1 major) Nanostructure Technology (2010)

Bachelor' degree (1 major) Nanostructure Technology (2012)

Master's degree (1 major) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)

Master's degree (1 major) Chemistry (2014)

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

Master's degree (1 major) Computational Mathematics (2012)

Master's degree (1 major) Functional Materials (2012)



| | | | | | T | | |
|---|--|---|---|-----------------------------|--|--|--|
| Module title Abbreviation | | | | | | | |
| Ultrafast spectroscopy and quantum-control 08-PCM4-102-m01 | | | | | | | |
| Module | e coord | inator | | Module offered by | | | |
| | r of the enkontr | seminar "Ultrakurzzeitsp olle" | oektroskopie and | Institute of Physica | ll and Theoretical Chemistry | | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Duratio | on | Module level | Other prerequisites | ; | | | |
| 1 seme | ster | graduate | | | | | |
| Conten | its | | | | | | |
| | | liscusses advanced topic ime-resolved laser spect | | | control. It focuses on ultrashort | | |
| Intend | ed lear | ning outcomes | | | | | |
| plain the princip | ne theo les and es (type, r | ry of time-resolved laser I applications of quantun number of weekly contact hours, I | spectroscopy and na n control. anguage — if other than Ge | me experimental me | naracterise them. They can exethods. They can describe the | | |
| S + Ü (ı | no info | rmation on SWS (weekly | contact hours) and co | ourse language avail | able) | | |
| | | sessment (type, scope, langua vle for bonus) | ge — if other than German, | examination offered — if no | ot every semester, information on whether | | |
| | | nation (90 minutes) or or ssessment: German or E | | e candidate each (20 | o minutes) or talk (30 minutes) | | |
| Allocat | ion of p | olaces | | | | | |
| | | | | | | | |
| Additio | nal inf | ormation | | | | | |
| | | | | | | | |
| Worklo | ad | | | | | | |
| | | | | | | | |
| Teaching cycle | | | | | | | |
| | | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | | |
| T | | | | | | | |
| Module appears in | | | | | | | |
| Master | Master's degree (1 major) Chemistry (2010) | | | | | | |

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

Master's degree (1 major) Computational Mathematics (2012)



| Module title | | | | | Abbreviation |
|---|-------------------|--|--|--------------------------|---|
| Physical chemistry of supramolecular assemblies | | | | | 08-PCM5-102-m01 |
| Module | coord | inator | | Module offered b | y |
| lecture: kularer | | | ne Chemie Supramole- | Institute of Physic | cal and Theoretical Chemistry |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | |
| 5 | | rical grade | | | |
| Duratio | | Module level | Other prerequisites | | |
| 1 seme: | ster | graduate | | | |
| Conten | | 0 | | | |
| cal pro | perties | | eractions between mole as key applications of s | | the formation and physical-chemi mistry. |
| Studen in the f | ts are a | able to explain the bas | ormation and physical-c | | strating a high degree of expertise of aggregates. They can name mo |
| Course | S (type, r | number of weekly contact hou | ırs, language — if other than Ge | rman) | |
| S + Ü (r | no infor | mation on SWS (week | cly contact hours) and co | ourse language ava | nilable) |
| | | sessment (type, scope, lar le for bonus) | guage — if other than German, | examination offered — if | not every semester, information on whether |
| minute | s) | nation (90 minutes) a ssessment: German o | | of one candidate ea | ach (20 minutes) and/or talk (30 |
| Allocat | | | | | |
| | • | | | | |
| Additio | nal inf | ormation | | | |
| | | | | | |
| Worklo | ad | | | | |
| | | | | | |
| Teachir | ng cvcl | e | | | |
| | 3 3,30 | | | | |
| Referre | d to in | LPO I (examination regula | tions for teaching-degree progra | ummes) | |
| | | | 101 10001111/5 405100 110510 | | |
| | | • | | | |
| Modula | annes | rs in | | | |
| Module Master | | | (2013) | | |
| Master' | 's degr | ee (1 major) Chemistry | | | |
| Master' Master' | 's degr | | (2010) | | |

Master's degree (1 major) Technology of Functional Materials (2009) Master's degree (1 major) Computational Mathematics (2012)

Master's degree (1 major) Functional Materials (2012)



| Module | Module title Abbreviation | | | | | | |
|----------|---|---|------------------------------|-----------------------------|--|--|--|
| Physic | Physical Chemistry (Advanced Lab) 08-PCM6-102-m01 | | | | | | |
| Module | e coord | inator | | Module offered by | | | |
| lecture | rs Phys | ikalische Chemie (Physic | al Chemistry) | Institute of Physica | l and Theoretical Chemistry | | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | | | |
| 5 | (not) | successfully completed | - | | | | |
| Duratio | on | Module level | Other prerequisites | | | | |
| 1 seme | ster | graduate | - | | | | |
| Conten | its | | | | | | |
| | | ives students the opport f Physical Chemistry and | | | f the research groups based at lytical methods. | | |
| Intend | ed learı | ning outcomes | | | | | |
| | | | | | relevant physical chemistry resequestions in physical chemistry. | | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Ger | rman) | | | |
| P (no ir | nformat | ion on SWS (weekly cont | act hours) and cours | e language available | 2) | | |
| | | sessment (type, scope, langua le for bonus) | ge — if other than German, o | examination offered — if no | ot every semester, information on whether | | |
| | | (20 minutes) ssessment: German or Ei | nglish | | | | |
| Allocat | ion of p | olaces | | | | | |
| | | | | | | | |
| Additio | nal inf | ormation | | | | | |
| | | | | | | | |
| Worklo | ad | | | | | | |
| | | | | | | | |
| Teachi | ng cycl | e | | | | | |
| | | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | | |
| Module | Module appears in | | | | | | |
| Master | Master's degree (1 major) Chemistry (2010) | | | | | | |
| | Master's degree (1 major) Mathematics (2012) | | | | | | |
| Master | Master's degree (1 major) Computational Mathematics (2012) | | | | | | |



| Module title | | | | | Abbreviation | |
|--------------------------------------|--|--|---|---|---|--|
| Theoretical Chemistry | | | | | 08-TCM1-102-m01 | |
| Module coordinator Module offered by | | | | | , | |
| lecture | r of lec | ture "Theoretische Chemi | ie" | Institute of Physica | l and Theoretical Chemistry | |
| ECTS | Meth | od of grading | Only after succ. com | pl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequisites | | | |
| 1 seme | ester | graduate | ses in the respective (usually 70% of exe | e classes as specifie rcises to be success | successful completion of exercidat the beginning of the course fully completed) as well as reguaximum of 2 incidents of unexcu- | |
| Conten | ıts | | | | | |
| This m | odule i | ntroduces students to the | e fundamental princip | oles of theoretical ch | emistry. | |
| Intend | ed lear | ning outcomes | | | | |
| | | able to describe the math amical approaches of the | | al principles underly | ing the quantum chemical and | |
| Course | S (type, i | number of weekly contact hours, l | anguage — if other than Ger | man) | | |
| S + Ü (ı | no info | rmation on SWS (weekly o | contact hours) and co | urse language avail | able) | |
| | | sessment (type, scope, langua ole for bonus) | ge — if other than German, o | examination offered — if no | ot every semester, information on whether | |
| | | nation (90 minutes) ssessment: German or Ei | nglish | | | |
| Allocat | tion of | places | | | | |
| | | | | | | |
| Additio | onal inf | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teachi | ng cycl | e | | | | |
| | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | |
| | | | | | | |
| Module | Module appears in | | | | | |
| Master Master Master | Master's degree (1 major) Chemistry (2010) Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012) | | | | | |
| Master | Master's degree (1 major) FOKUS Pharmacy (2012) | | | | | |

Biochemistry

(25 ECTS credits)



Compulsory Courses

(10 ECTS credits)



| Module title | | | | | Abbreviation | | |
|--|---|--|------------------------------|-----------------------------|---|--|--|
| Molecular Biology | | | | | 08-BC-MOL-102-m01 | | |
| Module coordinator | | | | Module offered by | | | |
| holder | of the | Chair of Biochemistry | | Chair of Biochemis | try | | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Duratio | on | Module level | Other prerequisites | | | | |
| 1 seme | ster | undergraduate | | | | | |
| Conter | ıts | , | | | | | |
| Compr tional I | | | this module discusse | s advanced topics in | n molecular physiology and func- | | |
| Intend | ed lear | ning outcomes | | | | | |
| Studer | nts have | e developed a sound kno | wledge of molecular | biology. | | | |
| Course | S (type, i | number of weekly contact hours, | language — if other than Ger | man) | | | |
| Ü + V (| no info | rmation on SWS (weekly | contact hours) and co | ourse language avail | lable) | | |
| | | sessment (type, scope, langua ble for bonus) | age — if other than German, | examination offered — if no | ot every semester, information on whether | | |
| | | nination (90 minutes) or assessment: German or E | | ıs (60 to 90 minutes |) | | |
| Allocat | tion of | places | | | | | |
| | | | | | | | |
| Additio | onal inf | ormation | | | | | |
| | | | | | | | |
| Worklo | ad | | | | | | |
| | | | - | | | | |
| Teaching cycle | | | | | | | |
| | | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | | |
| Module appears in | | | | | | | |
| Master's degree (1 major) Chemistry (2010) | | | | | | | |



| Module title | | | | | Abbreviation | |
|-------------------------------------|------|---------------|---------------------|-----------------------|----------------------------------|--|
| Molecular Biology Practical Course | | | | | 08-BC-MOLP-102-m01 | |
| Module coordinator | | | | Module offered by | | |
| holder of the Chair of Biochemistry | | | | Chair of Biochemistry | | |
| ECTS | Meth | od of grading | Only after succ. co | mpl. of module(s) | | |
| 5 | nume | erical grade | | | | |
| Duratio | on | Module level | Other prerequisite | S | | |
| 1 semester undergraduate | | undergraduate | | | | |
| Conter | nts | | | | | |
| Tla: a | | | | | aging aring and characterisation | |

This module equips students with practical skills in the areas of recombinant engineering and characterisation of macromolecular complexes, modern biomolecular techniques, in vivo analysis of biochemical processes, and modern imaging techniques.

Intended learning outcomes

Students have developed a knowledge of molecular biology 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)

pre/post-experiment examination talks (Vor-/Nachtestate, approx. 15 minutes), log (approx. 5 to 10 pages) Language of assessment: German or English

Allocation of places

Number of places: 12. Should the number of applications exceed the number of available places, places will be allocated in a standardised procedure among all applicants irrespective of their subjects according to the following quotas: Quota 1 (80% of places): grade achieved in module 08-BC; among applicants with the same grade, places will be allocated by lot. Quota 2 (20% 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

--

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

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Module appears in

Compulsory Electives

(15 ECTS credits)



| | | | Abbreviation | | | | |
|---|---|---|---|--|--|--|--|
| Biochemistry | | | 08-BC-092-m01 | | | | |
| Module coordinator | | Module offered by | | | | | |
| holder of the Chair of Bioch | nemistry | Chair of Biochemis | try | | | | |
| ECTS Method of grading | Only after succ. co | mpl. of module(s) | | | | | |
| 6 numerical grade | | | | | | | |
| Duration Module leve | Other prerequisites | 5 | | | | | |
| 2 semester undergradu | ses in the respective (usually 70% of exe | Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence) | | | | | |
| Contents | · | | | | | | |
| Comprising lectures and exmistry. | xercises, this module acquaints | students with the fun | idamental principles of bioche- | | | | |
| Intended learning outcome | | | | | | | |
| Students have become fan key biochemical processes | niliar with the fundamental princ in cellular systems. | iples of biochemistry | . They are able to describe the | | | | |
| Courses (type, number of weekly | contact hours, language — if other than Ge | rman) | | | | | |
| V + Ü + V + Ü (no information | on on SWS (weekly contact hour | s) and course langua | ge available) | | | | |
| Method of assessment (type module is creditable for bonus) | e, scope, language — if other than German, | examination offered — if no | ot every semester, information on whether | | | | |
| or 90 minutes each; 3 writt | ons (1 written examination: approten examinations: approx. 60 mi or c) oral examination in groups | nutes each) or b) ora | l examination of one candidate | | | | |
| Allocation of places | | | | | | | |
| | | | | | | | |
| Additional information | | | | | | | |
| | | | | | | | |
| Workload | Workload | | | | | | |
| | | | | | | | |
| Teaching cycle | | | | | | | |
| | | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | | |
| | | | | | | | |
| Module appears in | | | | | | | |

Bachelor' degree (1 major) Chemistry (2010)

Bachelor' degree (1 major) Chemistry (2009)

Bachelor' degree (1 major) Nanostructure Technology (2010)

Bachelor' degree (1 major) Nanostructure Technology (2012)

Bachelor' degree (1 major) FOKUS Chemistry (2011)



| Modul | e title | | | Abbreviation | | |
|--------------------------|-----------------------|------------------------|----------------------|-----------------------|----------------|--|
| Biochemistry Lab | | | | | 08-BCP-092-m01 | |
| Module coordinator | | | | Module offered by | | |
| holder | of the | Chair of Biochemistry | | Chair of Biochemistry | | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | (not) | successfully completed | o8-BC | | | |
| Duratio | Duration Module level | | Other prerequisites | | | |
| 1 semester undergraduate | | | | | | |
| | | | | | | |

Contents

Practical exercises give students the opportunity to learn the fundamental principles of conducting biochemical experiments.

Intended learning outcomes

Students have become proficient in essential methods in biochemistry.

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)

pre/post-experiment examination talks (Vortestate and Nachtestate, approx. 15 minutes each), practical work (log, approx. 5 to 10 pages)

Assessment offered: once a year, summer semester

Allocation of places

Number of places: 24. Should the number of applications exceed the number of available places, places will be allocated in a standardised procedure among all applicants irrespective of their subjects according to the following quotas: Quota 1 (80% of places): grade achieved in module 08-BC; among applicants with the same grade, places will be allocated by lot. Quota 2 (20% 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

--

 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

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Module appears in

Bachelor' degree (1 major) Chemistry (2010)

Bachelor' degree (1 major) Chemistry (2009)

Master's degree (1 major) Chemistry (2013)



| Module title | | | | | Abbreviation | |
|--|----------|---|----------------------------------|-----------------------------|---|--|
| Bioinorganic Chemistry | | | | | 08-ACM2-102-m01 | |
| Modul | e coord | linator | | Module offered by | I. | |
| lecturer of seminar "Anorganische Aspekte der Biochem and Medizinischen Chemie" (Inorganic Aspects of Bioch mistry and Medicinal Chemistry) | | | Institute of Inorganic Chemistry | | | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequisites | | | |
| 1 seme | ster | graduate | | | | |
| Conter | nts | , | , | | | |
| Studer | ed lear | ning outcomes able to describe the prirus enzymes and describ | | | explain the structure and effects | |
| | | number of weekly contact hours | | <u> </u> | | |
| | | tion on SWS (weekly co | | | e) | |
| | | sessment (type, scope, langu | age — if other than German, | examination offered — if no | ot every semester, information on whether | |
| 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 | | | | | | |
| | | | | | | |
| Additio | onal inf | ormation | | | | |
| | | | | | | |

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)



| Module lecturer | Aspects of Natural Productor coordinator of the seminar | A | Chemistry | 08-0CM-NAT-102-m01 | | |
|----------------------------------|---|---|---------------------------|---|--|--|
| lecturer | of the seminar | | | | | |
| | | | Module offered by | | | |
| ECTS | | li | nstitute of Organic | Chemistry | | |
| | Method of grading | Only after succ. comp | l. of module(s) | | | |
| 5 | numerical grade | | | | | |
| Duratio | n Module level | Other prerequisites | | | | |
| 1 semes | ter graduate | | | | | |
| Content | S | | | | | |
| This mo | dule discusses advanced t | opics in natural product ch | emistry and biolog | gical chemistry. | | |
| Intende | d learning outcomes | | | | | |
| Student | s are able to discuss advar | ced topics in natural produ | uct chemistry and | biological chemistry. | | |
| Courses | (type, number of weekly contact ho | urs, language — if other than Germa | an) | | | |
| S (no in | formation on SWS (weekly | contact hours) and course l | language available | 2) | | |
| | of assessment (type, scope, la creditable for bonus) | nguage — if other than German, exa | amination offered — if no | ot every semester, information on whether | | |
| oral exa thods of the curr | mination in groups (groups | of 2, 30 minutes). Should coordinator will choose the ng of the course. | there be the optio | candidate each (20 minutes) or c) n to choose between several med d for the module component in | | |
| | on of places | <u>_</u> | | | | |
| Chemist | try Master's: no restrictions | . Biochemistry Master's: 20 | o places. Places w | ill be allocated by lot. | | |
| Additio | nal information | | • | · | | |
| | | | | | | |
| Workload | | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referred | d to in LPO I (examination regul | ations for teaching-degree program | mes) | | | |

Module appears in

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

Master's degree (1 major) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)



| Module title | | | | | Abbreviation |
|--------------------------|---------------------|---------------------|---------------------|--------------------------------|-----------------|
| Organo- and Biocatalysis | | | | | 08-HKM1-102-m01 |
| Modul | e coord | inator | | Module offered by | |
| lecture | er of the | seminar "Organo- ar | nd Biokatalyse" | Institute of Organic Chemistry | |
| ECTS | Meth | od of grading | Only after succ. co | mpl. of module(s) | |
| 5 | nume | rical grade | | | |
| Duration Module level | | Other prerequisite | Other prerequisites | | |
| 1 seme | 1 semester graduate | | | | |
| Combants | | | | | |

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

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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)

Master's degree (1 major) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)



| Module title Abbreviation | | | | | | | |
|---|--|---|---|-----------------------------|--|--|--|
| Practical course "Molecular Machines" for advanced students | | | | | 08-BC-VPMM-102-m01 | | |
| Module | e coord | inator | | Module offered by | | | |
| holder | of the (| Chair of Biochemistry | | Chair of Biochemist | try | | |
| ECTS | Metho | od of grading | Only after succ. com | pl. of module(s) | | | |
| 10 | numei | rical grade | | | | | |
| Duratio | on | Module level | Other prerequisites | | | | |
| 1 seme | ster | graduate | | | | | |
| Conten | its | | | | | | |
| lar biol | ogy and | | mutagenesis, protein | expression and pur | d methods and topics in molecu- ification, RNA-protein and prote- pplexes. | | |
| Intend | ed learr | ning outcomes | | | | | |
| Studen work. | its are a | able to explore a specific | research topic and d | eliver an oral presen | tation on the results of their | | |
| Course | !S (type, n | umber of weekly contact hours, l | anguage — if other than Ger | man) | | | |
| P (no ir | nformat | ion on SWS (weekly cont | act hours) and cours | e language available | <u>e)</u> | | |
| | | eessment (type, scope, langua le for bonus) | ge $-$ if other than German, ϵ | examination offered — if no | ot every semester, information on whether | | |
| | | o pages) and talk (appro: ssessment: German or Er | | | | | |
| Allocat | ion of p | olaces | | | | | |
| | | | | | | | |
| Additio | nal inf | ormation | | | | | |
| | _ | | | | | | |
| Worklo | ad | | | | | | |
| | | | | | | | |
| Teaching cycle | | | | | | | |
| | | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | | |
| | | | | | | | |
| Module | Module appears in | | | | | | |
| Master | Master's degree (1 major) Chemistry (2010) | | | | | | |



| Module title | | | | | Abbreviation | |
|---|---|-----------------------------------|------------------------------|-----------------------------|---|--|
| Practical course "Protein Degradation in Eukaryotes" for advanced students 08-BC-VPPD-102-m01 | | | | | 08-BC-VPPD-102-m01 | |
| Module coordinator Module offered by | | | | | | |
| holder | of the | Chair of Biochemistry | | Chair of Biochemis | try | |
| ECTS | Meth | od of grading | Only after succ. com | ipl. of module(s) | | |
| 10 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequisites | | | |
| 1 seme | ster | graduate | | | | |
| Conter | nts | | | | | |
| This m | _ | gives students the opport | unity to explore a res | earch topic in the fie | eld of protein degradation in eu- | |
| Intend | ed lear | ning outcomes | | | | |
| Studer work. | nts are | able to explore a specific | research topic and d | eliver an oral presen | ntation on the results of their | |
| Course | S (type, | number of weekly contact hours, I | language — if other than Ger | man) | | |
| P (no i | nforma | tion on SWS (weekly cont | tact hours) and cours | e language available | 2) | |
| | | sessment (type, scope, langua | ge — if other than German, e | examination offered — if no | ot every semester, information on whether | |
| | | o pages) and talk (appro | | | | |
| Allocat | tion of | places | | | | |
| | | | | | | |
| Additio | nal inf | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teachi | ng cycl | e | | | | |
| | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | |
| | | | | | | |
| Modul | e appe | ars in | | | | |
| Master | 's degr | ee (1 major) Chemistry (2 | 010) | | | |



| Module | title | | | | Abbreviation |
|---|----------|--|------------------------------|------------------------|--|
| Practical course "RNA Biochemistry" for advanced students | | | S | 08-BC-VPRB-102-m01 | |
| Module | coord | inator | | Module offered by | |
| holder | of the (| Chair of Biochemistry | | Chair of Biochemist | ry |
| ECTS | Metho | od of grading | Only after succ. con | ipl. of module(s) | , |
| 10 | nume | rical grade | | | |
| Duratio | n | Module level | Other prerequisites | | |
| 1 semes | ster | graduate | | | |
| Conten | ts | | | | |
| mes as | "mole | | ory mechanisms of eu | | ld of RNA biochemistry. Ribososynthesis. Gradient centrifugati- |
| Intende | ed learı | ning outcomes | | | |
| trol with | n the h | | as well as to present | their findings in an a | eral and specific translation con- appropriate and understandable |
| | | ion on SWS (weekly cont | | |) |
| Method | l of ass | · · | | | t every semester, information on whether |
| | | o pages) and talk (appro ssessment: German or E | | | |
| Allocati | ion of p | olaces | | | |
| | | | | | |
| Additio | nal inf | ormation | | | |
| | | | | | |
| Worklo | ad | | | | |
| | | | | | |
| Teachir | ng cycl | e | | | |
| | | | | | |
| Referre | d to in | LPO I (examination regulation | s for teaching-degree progra | mmes) | |
| <u></u> | | | | | |
| Module | appea | rs in | | | |
| Master' | s degr | ee (1 major) Chemistry (2 | 010) | | |



| Module title | | | | | Abbreviation | |
|--|---|---|--------------------------------|-----------------------------|--|--|
| Practical course "Structural Biology" for advanced | | | | | 08-BC-VPSB-102-m01 | |
| Module coordinator | | | | Module offered by | | |
| holder | of the (| Chair of Biochemistry | | Chair of Biochemis | try | |
| ECTS | | od of grading | Only after succ. con | | • | |
| 10 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequisites | i | | |
| 1 seme | ster | graduate | | | | |
| Conten | its | | | | | |
| the fun | | tal principles and tech | | | stallisation. It teaches students sation as well as crystallographic | |
| Intend | ed learı | ning outcomes | | | | |
| | | • | • | . | constructs for crystallisation. Il as data collection and proces- | |
| Course | S (type, r | number of weekly contact hours | s, language — if other than Ge | rman) | | |
| P (no ir | nformat | ion on SWS (weekly co | ntact hours) and cours | e language available | e) | |
| | | sessment (type, scope, lang le for bonus) | uage — if other than German, | examination offered — if no | ot every semester, information on whether | |
| | | o pages) and talk (appi ssessment: German or | | | | |
| _ | ion of p | | | | | |
| | | | | | | |
| Additio | onal inf | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | |
| | | | | | | |
| Module | e appea | nrs in | | | | |
| Master's degree (1 major) Chemistry (2010) | | | | | | |



| Module title | | | | | Abbreviation |
|--------------------------|---|---------------------|----------------------|--|-----------------|
| Princip | oles of o | drug design | | | 08-MCM3-102-m01 |
| Module coordinator | | | | Module offered by | |
| | lecturers Pharmazeutische Chemie (Pharmaceutical Chemistry) | | narmaceutical Che- | Institute of Pharmacy and Food Chemistry | |
| ECTS | Meth | od of grading | Only after succ. cor | npl. of module(s) | |
| 5 | nume | rical grade | | | |
| Duration Module level Ot | | 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)

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ 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

Workload

Teaching cycle

 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

Module appears in

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

Master's degree (1 major) Chemistry (2010)

Master's degree (1 major) Mathematics (2010)



| Module | Module title Abbreviation | | | | | |
|--|---|--|------------------------------|-----------------------------|--|--|
| Clinica | l and A | nalytical Chemistry | | | 08-PH-KAC-092-m01 | |
| Module | e coord | inator | | Module offered by | | |
| | | ture "Klinisch-analytische l Chemistry) | e Chemie" (Clinical | Institute of Pharma | cy and Food Chemistry | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | - | | | |
| Duratio | on | Module level | Other prerequisites | | | |
| 1 seme | ster | undergraduate | | | | |
| Conten | its | | | | | |
| This mo | odule d | liscusses advanced topic | s in clinical analytica | l chemistry. | | |
| Intende | ed learı | ning outcomes | | | | |
| Studen | its have | e developed an advanced | knowledge of molec | ular biology. | | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Gei | rman) | | |
| V (no ir | nformat | tion on SWS (weekly cont | act hours) and cours | e language available | e) | |
| Metho | d of ass | sessment (type, scope, langua | ge — if other than German, | examination offered — if no | t every semester, information on whether | |
| | | le for bonus) | | | | |
| written | exami | nation (120 minutes) | | | | |
| Allocat | ion of p | olaces | | | | |
| | - | | | | | |
| Additio | nal inf | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teachi | ng cycl | е | | | | |
| | | | | | | |
| Referre | ed to in | LPO I (examination regulations | s for teaching-degree progra | immes) | | |
| | | | | | | |
| Module appears in | | | | | | |
| | Master's degree (1 major) Biochemistry (2012) | | | | | |
| | _ | ee (1 major) Chemistry (2 | | | | |
| | _ | ee (1 major) Chemistry (2 | | | | |
| Master's degree (1 major) Chemistry (2014) | | | | | | |



| Module | e title | | | | Abbreviation | |
|---------------|--|--|------------------------------|-----------------------------|---|--|
| Clinica | l and A | nalytical Chemistry (prac | ctical course) | | 08-PH-KACP-092-m01 | |
| Module | e coord | linator | | Module offered by | L | |
| | | ture "Klinisch-analytische l Chemistry) | e Chemie" (Clinical | Institute of Pharma | cy and Food Chemistry | |
| ECTS | Meth | od of grading | Only after succ. cor | npl. of module(s) | | |
| 5 | (not) | successfully completed | | | | |
| Duratio | n | Module level | Other prerequisites | | | |
| 1 seme | ster | undergraduate | | | | |
| Conten | ts | | | | | |
| This mo | | covers practical topics in | clinical chemistry and | d clinical diagnostics | s as well as the related analytical | |
| Intende | ed lear | ning outcomes | | | | |
| Studen ments. | | e developed a knowledge | e of clinical analytical | chemistry and are a | ble to apply it to practical experi- | |
| Course | S (type, | number of weekly contact hours, I | language — if other than Ge | rman) | | |
| P (no ir | nforma | tion on SWS (weekly cont | tact hours) and cours | e language available | 2) | |
| | | sessment (type, scope, langua | ge — if other than German, | examination offered — if no | ot every semester, information on whether | |
| examin | ation t | alks (Testate, approx. 15 | minutes each), log (a | approx. 5 to 10 pages | 5) | |
| Allocat | ion of | places | | | | |
| | | | | | | |
| Additio | nal inf | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teachi | ng cycl | le | | | | |
| | | | | | | |
| Referre | d to in | LPO I (examination regulation | s for teaching-degree progra | ammes) | | |
| | | | | | | |
| Module | e appe | ars in | | | | |
| | | ree (1 major) Biochemistry | y (2012) | | | |
| Master | Master's degree (1 major) Chemistry (2013) | | | | | |
| | _ | ree (1 major) Chemistry (2 | • | | | |
| Master | Master's degree (1 major) Chemistry (2014) | | | | | |



Functional Materials

(25 ECTS credits)



Compulsory Courses

(20 ECTS credits)



| Module title Abbreviation | | | | | Abbreviation | |
|---|--|---|---------------------------------------|-----------------------------|--|--|
| Materials Science 1 (Basic Introduction) 08-FS1-101-m01 | | | | | 08-FS1-101-m01 | |
| Module | e coord | inator | | Module offered by | | |
| Dean o | f Studi | es Funktionswerkstoffe (F | unctional Materials) | Chair of Chemical T | echnology of Material Synthesis | |
| ECTS | Metho | od of grading | Only after succ. com | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequisites | | | |
| 1 seme | ster | undergraduate | | | | |
| Conten | its | | | | | |
| | | iscusses the fundamenta | al relations between o | chemical bonding, th | ne structure, the microstructure | |
| Intende | ed learı | ning outcomes | | | | |
| | | | | | al bonding, the structure, the to apply them to research pro- | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Ger | rman) | | |
| V + Ü (r | no infor | mation on SWS (weekly o | contact hours) and co | ourse language avail | able) | |
| | | sessment (type, scope, langua le for bonus) | ge — if other than German, ϵ | examination offered — if no | t every semester, information on whether | |
| written | examiı | nation (90 minutes) | | | | |
| Allocat | ion of p | olaces | | | | |
| | | | | | | |
| Additio | nal inf | ormation | | | | |
| | _ | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teachi | ng cycl | e | | | | |
| | | | | | | |
| Referre | ed to in | LPO I (examination regulations | s for teaching-degree progra | mmes) | | |
| | | | | | | |
| Module | Module appears in | | | | | |
| Bachel | Bachelor' degree (1 major) Technology of Functional Materials (2010) Bachelor' degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Chemistry (2010) | | | | | |



| Modul | e title | | | | Abbreviation |
|------------------------------|-----------------------|------------------------|----------------------|--------------------------------|-------------------|
| Organic Functional Materials | | | | | 08-0CM-FM-102-m01 |
| Module coordinator | | | | Module offered by | |
| lecture | r of the | seminar "Organische Fu | unktionsmaterialien" | Institute of Organic Chemistry | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | |
| 5 | nume | rical grade | | | |
| Duratio | Duration Module level | | Other prerequisites | | |
| 1 semester graduate | | | | | |
| Contents | | | | | |

The module deals with specific topics in organic functional materials. The focus is on fundamental (photo) physical effects in organic molecular and polymeric semiconductors as well as their application in (opto)electronic components such as field effect transistors, organic light-emitting diodes, or organic solar cells as well as in nonlinear optics.

Intended learning outcomes

The students are able to explain fundamental (photo)physical processes in organic semiconductors. He/She can explain the synthesis of these semiconductor materials as well as their application in (opto)electronic components such as field effect transistors, organic light-emitting diodes or in organic photovoltaics as well as in nonlinear optics.

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

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

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ 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

Workload

Teaching cycle

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

Module appears in

Master's degree (1 major) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)

Master's degree (1 major) Functional Materials (2012)



| Module | Module title Abbreviation | | | | | |
|--|--|--|------------------------------|-----------------------------|--|--|
| Lab Course Materials Science 08-FMM-MP-102-m01 | | | 08-FMM-MP-102-m01 | | | |
| Module | Module coordinator Module offered by | | | | | |
| lecture ctional | • | cialisation subject Funktio ials) | onsmaterialien (Fun- | Chair of Chemical T | echnology of Material Synthesis | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | (not) | successfully completed | | | | |
| Duratio | on | Module level | Other prerequisites | | | |
| 1 seme | ster | graduate | | | | |
| Conten | its | | | | | |
| Ten sel | ected (| experiments in materials | science. | | | |
| Intend | ed lear | ning outcomes | | | | |
| Studen | its hav | e developed an advanced | proficiency in the pe | erformance of experi | ments in materials science. | |
| Course | S (type, i | number of weekly contact hours, l | anguage — if other than Ger | rman) | | |
| P (no ir | nforma | tion on SWS (weekly cont | act hours) and cours | e language available | 2) | |
| | | sessment (type, scope, langua ole for bonus) | ge — if other than German, | examination offered — if no | t every semester, information on whether | |
| cal per | forman | re-experiment exams) and ice, log (5 to 10 pages) assessment: German or Ei | , | xperiment exams) (1 | 5 minutes), assessment of practi- | |
| Allocat | ion of | places | | | | |
| | | | | | | |
| Additio | nal inf | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teachi | ng cycl | le | | | | |
| | - | | | | | |
| Referre | ed to in | LPO I (examination regulation | s for teaching-degree progra | mmes) | | |
| | | | | | | |
| Module | Module appears in | | | | | |
| | Master's degree (1 major) Chemistry (2013) | | | | | |
| | _ | ee (1 major) Chemistry (2 | | | | |
| Master | Master's degree (1 major) Chemistry (2014) | | | | | |



| Module | Module title Abbreviation | | | | | | |
|----------|--|---|------------------------------|-----------------------------|---|--|--|
| Project | Project Work 08-FMM-PA-102-m01 | | | | | | |
| Module | e coord | inator | | Module offered by | | | |
| head o | f the re | search group offering the | e module | Chair of Chemical T | echnology of Material Synthesis | | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | | | |
| 5 | (not) | successfully completed | | | | | |
| Duratio | on | Module level | Other prerequisites | | | | |
| 1 seme | ster | graduate | | | | | |
| Conten | its | | | | | | |
| | | ives students the opport findings. | unity to explore a res | earch topic under th | e guidance of a supervisor and to | | |
| Intend | ed lear | ning outcomes | | | | | |
| Studen | its have | e developed an advanced | proficiency in the pe | erformance of experi | ments in materials science. | | |
| Course | S (type, r | number of weekly contact hours, I | anguage — if other than Ger | rman) | | | |
| P (no ir | nformat | ion on SWS (weekly cont | act hours) and cours | e language available | 2) | | |
| | | sessment (type, scope, langua le for bonus) | ge — if other than German, | examination offered — if no | ot every semester, information on whether | | |
| | | .5 minutes) and log (appr ssessment: German or E | | | | | |
| Allocat | ion of p | olaces | | | | | |
| | | | | | | | |
| Additio | nal inf | ormation | | | | | |
| | | | | | | | |
| Worklo | ad | | | | | | |
| | | | | | | | |
| Teachi | ng cycl | e | | | | | |
| | | | | | | | |
| Referre | ed to in | LPO I (examination regulation | s for teaching-degree progra | mmes) | | | |
| | | | | | | | |
| Module | e appea | ars in | | | | | |
| l | _ | ee (1 major) Chemistry (2 | | | | | |
| | _ | ee (1 major) Chemistry (2 | | | | | |
| Master | Master's degree (1 major) Chemistry (2014) | | | | | | |



Compulsory Electives

(5 ECTS credits)



| Module title | | | | | Abbreviation | |
|---|--|---------------|----------------------|--|---------------|--|
| Chemically and biologically inspired Nanotechnology for Materials Synthesis | | | | | 08-NT-101-m01 | |
| Module coordinator Module | | | | Module offered by | | |
| holder thesis | holder of the Chair of Chemical Technology of Material Synthesis | | | Chair of Chemical Technology of Material Synthesis | | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | Duration Module level O | | Other prerequisites | | | |
| 1 seme | 1 semester undergraduate | | | | | |
| Conter | Contents | | | | | |

Contents

This module provides an introduction to the synthesis methods of sol-gel chemistry and discusses the methods of analysis used to characterise the generated materials. It also discusses the fundamental principles of biomineralisation and uses examples to introduce students to bio-inspired material synthesis.

Intended learning outcomes

Students have developed an advanced knowledge of sol-gel chemistry and biomineralisation.

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.

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

Method of assessment (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 o8-NT-1-101: Chemically and biologically inspired Nanotechnology for Materials Synthesis

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

Assessment in module component o8-NT-2-101: From Biomineralisation to biologically inspired Materials Synthesis

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

Allocation of places

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Additional information

_

Workload

Teaching cycle

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

Module appears in

Bachelor' degree (1 major) Technology of Functional Materials (2010)

Bachelor' degree (1 major) Nanostructure Technology (2010)

| Master's with 1 major Chemistry (2010) | JMU Würzburg • generated 26-Aug-2024 • exam. | page 65 / 163 |
|--|--|---------------|
| | reg. data record Master (120 ECTS) Chemie - 2010 | |





| Module | Module title Abbreviation | | | | | |
|---|--|---|-----------------------------|-----------------------|-----------------------------------|--|
| Materials Science 2 (The Major Material Groups) 08-FS2-101-m01 | | | | | 08-FS2-101-m01 | |
| Module coordinator | | | | Module offered by | | |
| Dean o | f Studi | es Funktionswerkstoffe (I | unctional Materials) | Chair of Chemical T | echnology of Material Synthesis | |
| ECTS | TS Method of grading Only after succ. compl. of module(s) | | | | | |
| 5 | nume | rical grade | | | | |
| Duratio | Duration Module level Other pr | | Other prerequisites | her prerequisites | | |
| 1 seme | 1 semester undergraduat | | | | | |
| Conten | its | | | | | |
| This m | odule c | leals with the fabrication | and properties of the | main material grou | ps. | |
| Intend | ed lear | ning outcomes | | | | |
| | | e developed a knowledge knowledge to research pr | | d properties of the r | nain material groups and are able | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Ger | man) | | |
| V + Ü (ı | no info | rmation on SWS (weekly | contact hours) and co | urse language avail | able) | |
| | 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 | exami | nation (approx. 90 minut | es) | | | |
| Allocat | ion of p | places | | | | |
| | | | | | | |
| Additio | nal inf | ormation | | | | |
| | | | | | | |
| Worklo | Workload | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module appears in | | | | | | |
| Bachel | Bachelor' degree (1 major) Technology of Functional Materials (2010) Bachelor' degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Chemistry (2010) | | | | | |



| Module title | | | | | Abbreviation | |
|--|--------------------|---|---|----------------------------------|--|--|
| Solid state chemistry and inorganic materials | | | | | 08-ACM3-102-m01 | |
| Module coordinator | | | | Module offered by | | |
| lecturer of seminar "Festkörperchemie and Anorganische Materialien" (Solid State Chemistry and Inorganic Materials) | | | | Institute of Inorganic Chemistry | | |
| ECTS | Metho | od of grading | Only after succ. cor | after succ. compl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Durati | on | Module level | Other prerequisites | | | |
| 1 seme | ester | graduate | | | | |
| Conte | nts | | | | | |
| | | | n to solid-state chemis selected materials of sc | | structure, chemical and physical | |
| Intend | led lear | ning outcomes | | | | |
| | | | | | xplain methods for solid-state the corresponding solids. | |
| Course | es (type, r | number of weekly contact hour | s, language — if other than Ge | rman) | | |
| S (no i | informat | tion on SWS (weekly co | ontact hours) and cours | se language availabl | e) | |
| | | sessment (type, scope, lang le for bonus) | guage — if other than German, | examination offered — if no | ot every semester, information on whether | |
| 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 | | | | | | |
| Alloca | tion of p | olaces | , | | | |
| | | | | | | |
| Additional information | | | | | | |
| | | | | | | |
| Workload | | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Modul | le appea | ars in | | | | |
| Maste | r's degr | ee (1 major) Chemistry | (2013) | | | |
| Mantagle degree (consists) Chamistry (cons) | | | | | | |



| Module title | | | | Abbreviation | |
|---|------|--------------------------------------|---------------------|-----------------------------------|-----------------|
| Supramolecular Chemistry (Basics) | | | | | 08-SCM1-102-m01 |
| Module coordinator | | | | Module offered by | |
| lecturer of lecture "Organischen Chemie" | | | emie" | Faculty of Chemistry and Pharmacy | |
| ECTS | Meth | thod of grading Only after succ. cor | | npl. of module(s) | |
| 5 | nume | umerical grade | | | |
| Duration Module level | | Other prerequisites | Other prerequisites | | |
| 1 semester | | graduate | | | |
| Contents | | | | | |
| This module introduces students to the fundamental principles of supramolecular chemistry. It focuses on inter- | | | | | |

dern applications of supramolecular chemistry.

Intended learning outcomes

Students are able to explain interactions between molecules demonstrating a high degree of expertise in the field as well as to describe the formation, structure and polymers of coordination compounds. They are able to describe the self-assembly of polymers in aqueous media as well as to identify the characteristics of synthetic ion channels. They can name modern applications of supramolecular chemistry.

actions between molecules, molecular recognition by receptors, complexes, supramolecular polymers, coordination polymers and networks, liquid crystals, self-assembly in aqueous media, synthetic ion channels and mo-

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

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

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

written examination (approx. 90 minutes) or oral examination of one candidate each (approx. 20 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) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)

Master's degree (1 major) Chemistry (2014)

Master's degree (1 major) Functional Materials (2012)



| Module title | | | | | Abbreviation |
|---|------|------------------------------------|--------------|---|-----------------|
| Nanoscale Materials | | | | | 08-PCM3-102-m01 |
| Module coordinator | | | | Module offered by | |
| lecturer of the seminar "Nanoskalige Materialien" | | | Naterialien" | Institute of Physical and Theoretical Chemistry | |
| ECTS | Meth | od of grading Only after succ. cor | | npl. of module(s) | |
| 5 | nume | nerical grade | | | |
| Duration Module level | | Other prerequisites | | | |
| 1 semester graduate | | graduate | | | |
| Contents | | | | | |

This module discusses advanced topics in nanoscale materials. It focuses on the structure, properties, fabrication, modern characterisation methods and application areas of nanoscale materials.

Intended learning outcomes

Students are able to characterise nanoscale materials. They are able to name analytical methods and application areas of nanoscale materials.

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)

written examination (90 minutes) or oral examination of one candidate each (20 minutes) or talk (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

Bachelor' degree (1 major) Nanostructure Technology (2010)

Bachelor' degree (1 major) Nanostructure Technology (2012)

Master's degree (1 major) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)

Master's degree (1 major) Chemistry (2014)

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

Master's degree (1 major) Computational Mathematics (2012)

Master's degree (1 major) Functional Materials (2012)



| Module title Abbreviation | | | | | Abbreviation | |
|---|---|---|-----------------------------|-----------------------|--------------------------------|--|
| Molecular Materials (Lecture) | | | | | 08-FMM-CT-102-m01 | |
| Module coordinator | | | | Module offered by | | |
| Dean of Studies Funktionswerkstoffe (Functional Materia | | | unctional Materials) | <u> </u> | | |
| ECTS | | | | | | |
| 5 | numei | rical grade | | | | |
| Duratio | Duration Module level Other prerequisites | | | | | |
| 1 seme | ster | graduate | - | | | |
| Conten | ts | | | | | |
| This mo | odule d | iscusses the theoretical | principles of molecul | ar and soft materials | ò. | |
| Intende | ed learr | ning outcomes | | | | |
| | | e developed a knowledge se to research problems. | of the principles of n | nolecular and soft m | aterials and are able to apply | |
| Course | S (type, n | umber of weekly contact hours, l | anguage — if other than Ger | man) | | |
| V + Ü (r | no infor | mation on SWS (weekly o | contact hours) and co | urse language avail | able) | |
| | Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus) | | | | | |
| ten exa | presentation (approx. 30 minutes) and a) 1 to 3 written examinations (1 written examination: 90 minutes; 2 written examinations: 60 or 90 minutes each; 3 written examinations: 60 minutes each) or b) oral examination of one candidate each (approx. 20 minutes) or c) oral examination in groups (groups of 2, approx. 30 minutes) | | | | | |
| Allocation of places | | | | | | |
| Additional information | | | | | | |
| | | | | | | |
| Workload | | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | <u>r</u> | | | | | |
| Module | Module appears in | | | | | |
| Master | 's degre | ee (1 major) Chemistry (2 | 010) | | | |



Homogeneous Catalysis

(25 ECTS credits)



Compulsory Courses

(20 ECTS credits)



| Module title | | | | | Abbreviation | | |
|--|---|---|---|-----------------------------|--|--|--|
| Advanced organometallic chemistry and its application in homogeneous catalysis | | | | | 08-HKM2-102-m01 | | |
| Module | coord | inator | | Module offered by | | | |
| | | seminar "Spezielle Meta wendung in der Homogen | | Institute of Inorgan | ic Chemistry | | |
| ECTS | Metho | od of grading | Only after succ. com | pl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Duratio | n | Module level | Other prerequisites | | | | |
| 1 seme | ster | graduate | | | | | |
| Conten | ts | | | | | | |
| This mo | odule e | xamines elementary orga | anic compounds of tra | ansition metals with | homogeneous catalytic applica- | | |
| Intend | ed lear | ning outcomes | | | | | |
| | | | | | entary organic compounds. They neous catalysis reactions. | | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Ger | man) | | | |
| S (no ir | nformat | tion on SWS (weekly cont | act hours) and cours | e language available | 2) | | |
| Metho | d of ass | sessment (type, scope, langua | ge — if other than German, e | examination offered — if no | t every semester, information on whether | | |
| module is | creditab | le for bonus) | | | | | |
| oral ext thods of the cur | aminat of asse rent se | ion in groups (groups of 2 | 2, 30 minutes). Shoul dinator will choose th of the course. | d there be the option | andidate each (20 minutes) or c) n to choose between several me- d for the module component in | | |
| Allocat | ion of p | olaces | | | | | |
| | | | | | | | |
| Additio | nal inf | ormation | | | | | |
| | | | | | | | |
| Worklo | ad | | | | | | |
| | | | | | | | |
| Teaching cycle | | | | | | | |
| - | | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | | |
| Module | Module appears in | | | | | | |
| | Master's degree (1 major) Chemistry (2013) | | | | | | |
| Master | Master's degree (1 major) Chemistry (2010) | | | | | | |



| Module title | | | | | Abbreviation | |
|--------------|-----------------------|----------------------|---------------------|--------------------------------|-----------------|--|
| Organ | o- and E | Biocatalysis | | | 08-HKM1-102-m01 | |
| Modul | e coord | inator | | Module offered by | | |
| lecture | r of the | seminar "Organo- and | Biokatalyse" | Institute of Organic Chemistry | | |
| ECTS | Meth | od of grading | Only after succ. co | mpl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | Duration Module level | | Other prerequisites | | | |
| 1 seme | 1 semester graduate | | | | | |
| <i>c</i> . | Combants | | | | | |

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

--

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)

Master's degree (1 major) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)



| Module title Abbreviation | | | | | | |
|--|---|---|---|-----------------------------|--|--|
| Practical course "Homogeneous catalysis" | | | | | 08-HKM3-102-m01 | |
| Module | coord | inator | | Module offered by | | |
| | | seminar "Spezielle Meta wendung in der Homoger | _ | Faculty of Chemistr | y and Pharmacy | |
| ECTS | Meth | od of grading | Only after succ. com | ıpl. of module(s) | | |
| 10 | (not) | successfully completed | | | | |
| Duratio | n | Module level | Other prerequisites | | | |
| 1 seme | ster | graduate | | | | |
| Conten | ts | | | | | |
| thods i and cry docum | n homo stallog enting | ogeneous catalysis. The f graphy. Students will be e their findings and deliver | ocus will be on cataly xpected to conduct t | st synthesis and ch | synthesis and analytical me- aracterisation, spectral analysis independently, write a lab report | |
| | | ning outcomes | | | | |
| | | | | | eneous catalysis in the lab and to dings and deliver a presentation. | |
| Course | S (type, i | number of weekly contact hours, l | anguage — if other than Ger | man) | | |
| P + P (n | o info | mation on SWS (weekly o | contact hours) and co | urse language avail | able) | |
| | | sessment (type, scope, langua ole for bonus) | ge $-$ if other than German, ϵ | examination offered — if no | ot every semester, information on whether | |
| | | with lab report (approx. ssessment: German or E | | pprox. 15 minutes) | | |
| Allocat | ion of | places | | | | |
| | | | | | | |
| Additio | nal inf | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | |
| | | | | | | |
| Module | appea | ars in | | | | |
| Master | 's degr | ee (1 major) Chemistry (2 | 010) | | | |



Compulsory Electives

(5 ECTS credits)



| Modern Synthetic Method | | | | | | |
|---|---|--|--|--|--|--|
| Modern Synthetic Method | 08-OCM-SYNT-102-m01 | | | | | |
| Module coordinator | Module offered by | | | | | |
| lecturer of the seminar | Institute of Organic Chemistry | | | | | |
| ECTS Method of grading Only after succ. of | ompl. of module(s) | | | | | |
| 5 numerical grade | | | | | | |
| Duration Module level Other prerequisit | es | | | | | |
| ses in the respect (usually 70% of e | Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence) | | | | | |
| Contents | | | | | | |
| This module discusses modern stereoselective synthesis nometallic chemistry and catalysis. | methods. It focuses on selected total syntheses, o | | | | | |
| Intended learning outcomes | | | | | | |
| Students are able to stereoselectively plan complex chem They can explain total syntheses. They can describe aspesis chemistry. Courses (type, number of weekly contact hours, language — if other than | ects of organometallic chemistry and catalysis in sy | | | | | |
| $S + \ddot{U}$ (no information on SWS (weekly contact hours) and | | | | | | |
| Method of assessment (type, scope, language — if other than Germa | | | | | | |
| module is creditable for bonus) | in, examination offered — if not every semester, information on whe | | | | | |
| a) 1 to 3 written examinations (60 or 90 minutes) or b) or oral examination in groups (groups of 2, 30 minutes). She thods of assessment, the module coordinator will choose the current semester at the beginning of the course. Language of assessment: German or English | ould there be the option to choose between severa | | | | | |
| Allocation of places | | | | | | |
| | | | | | | |
| Additional information | | | | | | |
| | | | | | | |
| Workload | | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| | | | | | | |

Module appears in

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



| Modul | e title | | | | Abbreviation | |
|---|--|--|--|-----------------------------|---|--|
| Compu | ıtation | al Chemistry | | | 08-TCM2-102-m01 | |
| Module coordinator | | | | Module offered by | L | |
| lecture | er of lec | ture "Computational Ch | nemistry" | Institute of Physica | l and Theoretical Chemistry | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequisites | | | |
| 1 semester graduate | | ses in the respective (usually 70% of exe | Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence). | | | |
| Conter | nts | | | | | |
| This m | odule i | ntroduces students to t | he fundamental princi | oles of computation | al chemistry. | |
| Intend | ed lear | ning outcomes | | | | |
| | | able to explain the thece | oretical principles of co | mputational chemis | try and to apply methods in com- | |
| Course | es (type, | number of weekly contact hour | s, language — if other than Ge | rman) | | |
| S + Ü (| no info | rmation on SWS (weekl | y contact hours) and co | ourse language avail | lable) | |
| | | sessment (type, scope, lang | guage — if other than German, | examination offered — if no | ot every semester, information on whether | |
| | | nation (90 minutes) assessment: German or | English | | | |
| Alloca | tion of | places | | | | |
| | | | | | | |
| Additio | onal inf | ormation | | | | |
| | | | | | | |
| Worklo | oad | | | | | |
| | | | | | | |
| Teachi | ing cyc | le | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module appears in | | | | | | |
| Master's degree (1 major) Chemistry (2010) | | | | | | |
| Master | r's degi | ee (1 major) Mathemati | ics (2012) | | | |
| | Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012) | | | | | |
| Maste | r's degi | ee (1 major) Computati | onal Mathematics (201 | 2) | | |



| Modul | e title | , | | Abbreviation | | | | |
|----------------------------|---|--|--|----------------------------|---|--|--|--|
| Advan | ced tra | nsition metal chemist | try | | 08-HKM4-102-m01 | | | |
| Modul | e coord | inator | | Module offered by | 1 | | | |
| lecture | er of the | seminar "Spezielle Ü | bergangsmetallchemie | Institute of Inorgai | nic Chemistry | | | |
| ECTS | Meth | od of grading | Only after succ. con | ıpl. of module(s) | | | | |
| 5 | nume | rical grade | | | | | | |
| Durati | on | Module level | Other prerequisites | | | | | |
| 1 seme | ester | graduate | | | | | | |
| Conte | nts | | | | | | | |
| nation | chemis | | | | y of transition metals and coordidics. It is a discusses recent developments | | | |
| Intend | ed lear | ning outcomes | | | | | | |
| | | | tion metals and coordina n the fundamental princi | | emonstrating a high degree of exc chemistry. | | | |
| Course | es (type, i | number of weekly contact ho | urs, language — if other than Ger | rman) | | | | |
| S (no i | nforma | tion on SWS (weekly o | contact hours) and cours | e language availab | le) | | | |
| | | sessment (type, scope, la ble for bonus) | nguage — if other than German, | examination offered — if r | not every semester, information on whether | | | |
| oral ex thods the cu | aminat of asse rrent se | ion in groups (groups | of 2, 30 minutes). Should coordinator will choose thing of the course. | d there be the option | candidate each (20 minutes) or c) on to choose between several me- ed for the module component in | | | |
| Alloca | tion of | places | | | | | | |
| | | | | | | | | |
| Additi | onal inf | ormation | | | | | | |
| | | | | | | | | |
| Workle | Workload | | | | | | | |
| | | | | | | | | |
| Teachi | Teaching cycle | | | | | | | |
| | | | | | | | | |
| Referr | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | | |
| | - | | | | | | | |
| Modul | Module appears in | | | | | | | |
| | | | | | | | | |

Master's degree (1 major) Chemistry (2013) Master's degree (1 major) Chemistry (2010)



Medicinal Chemistry

(25 ECTS credits)



Compulsory Courses

(25 ECTS credits)



| Module title | | | | | Abbreviation | |
|--------------|---|---------------|----------------------|--|-----------------|--|
| Princip | oles of o | drug design | | | 08-MCM3-102-m01 | |
| Modul | e coord | inator | | Module offered by | | |
| 1 | lecturers Pharmazeutische Chemie (Pharmaceutical Chemistry) | | | Institute of Pharmacy and Food Chemistry | | |
| ECTS | Meth | od of grading | Only after succ. con | mpl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duration | Duration Module level | | Other prerequisites | | | |
| 1 seme | 1 semester graduate | | | | | |
| Contents | | | | | | |

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

--

Workload

--

Teaching cycle

 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

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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)



| Module title | | | | | Abbreviation | | |
|--------------------------------------|--|--|---|------------------------|---|--|--|
| Practical course medicinal chemistry | | | | | 08-MCM1-102-m01 | | |
| Module | e coord | inator | | Module offered by | | | |
| lecture mistry) | | mazeutische Chemie (Ph | armaceutical Che- | Institute of Pharma | cy and Food Chemistry | | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | | | |
| 10 | (not) | successfully completed | | | | | |
| Duratio | n | Module level | Other prerequisites | | | | |
| 1 seme | ster | graduate | - | | | | |
| Conten | ts | | | | | | |
| Selecte | ed meth | nods and topics in medic | inal chemistry (synth | esis, testing, analysi | is, theory, pharmacokinetics). | | |
| Intend | ed lear | ning outcomes | | | | | |
| Studen | ts have | e developed a knowledge | of medicinal chemis | try and are able to a | pply it to practical experiments. | | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Gei | rman) | | | |
| P (no ir | nformat | tion on SWS (weekly cont | act hours) and cours | e language available | 2) | | |
| wodule is Vortest of prac | creditab ate (pr | e-experiment exams) and erformance, written repor | l Nachtestate (post-e t (approx. 30 to 50 pa | xperiment exams) (a | ot every semester, information on whether approx. 20 minutes), assessment | | |
| | | ssessment: German or E | nglish | | | | |
| Allocat | ion of p | olaces | | | | | |
| A J J!4! - | | | | | | | |
| Additio | nat inf | ormation | | | | | |
| | | | | | | | |
| Worklo | ad | | | | | | |
| | | | | | | | |
| Teachi | ng cycl | e | | | | | |
| | | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | | |
| | Module appears in | | | | | | |
| | Master's degree (1 major) Chemistry (2013) Master's degree (1 major) Chemistry (2010) | | | | | | |
| | Master's degree (1 major) Chemistry (2010) Master's degree (1 major) Chemistry (2014) | | | | | | |
| | Master's degree (1 major) FOKUS Pharmacy (2012) | | | | | | |



| Module | e title | | | | Abbreviation | |
|------------------------------------|---|---|--|-----------------------------|---|--|
| Pharmaceutical/Medicinal Chemistry | | | | | 08-MCM2-102-m01 | |
| Module | e coord | inator | | Module offered by | l. | |
| lecture mistry) | | mazeutische Chemie (Ph | armaceutical Che- | Institute of Pharma | cy and Food Chemistry | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 10 | nume | rical grade | - | | | |
| Duratio | on | Module level | Other prerequisites | i | | |
| 3 seme | ster | graduate | - | | | |
| Conten | its | | | | | |
| structu in the r drug de | re-activ nodule evelopi | vity relationships; molecu ; drug analysis; drug synt ment: discussion of speci | ılar effect mechanisn thesis; biotransforma | ns; pharmacological | gies for active agent discovery; principles of the drugs discussed tics of individual drugs; history of | |
| | | ning outcomes | | | | |
| | | e developed a knowledge | | | | |
| | | number of weekly contact hours, l | | | | |
| V (no ir | nforma | tion on SWS (weekly cont | act hours) and cours | e language available | 2) | |
| | | sessment (type, scope, langua ole for bonus) | ge — if other than German, | examination offered — if no | ot every semester, information on whether | |
| | | ion of one candidate eacl ssessment: German or Er | | s) | | |
| Allocat | ion of | places | | | | |
| | | | | | | |
| Additio | nal inf | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | |
| | | | | | | |
| | Module appears in | | | | | |
| Master | Master's degree (1 major) Chemistry (2010) | | | | | |



Supramolecular Chemistry

(25 ECTS credits)



Compulsory Courses

(10 ECTS credits)



| Module title | | | | | Abbreviation | |
|---|----------|----------------------|----------------------|-----------------------------------|-----------------|--|
| Supramolecular Chemistry (Basics) | | | | | 08-SCM1-102-m01 | |
| Module coordinator | | | | Module offered by | | |
| lecture | r of lec | ture "Organischen Ch | emie" | Faculty of Chemistry and Pharmacy | | |
| ECTS | Meth | od of grading | Only after succ. cor | npl. of module(s) | | |
| 5 | nume | erical grade | | | | |
| Duratio | on | Module level | Other prerequisites | 3 | | |
| 1 semester graduate | | | | | | |
| Contents | | | | | | |
| This module introduces students to the fundamental principles of supramolecular chemistry. It focuses on inter- | | | | | | |

actions between molecules, molecular recognition by receptors, complexes, supramolecular polymers, coordination polymers and networks, liquid crystals, self-assembly in aqueous media, synthetic ion channels and modern applications of supramolecular chemistry.

Intended learning outcomes

Students are able to explain interactions between molecules demonstrating a high degree of expertise in the field as well as to describe the formation, structure and polymers of coordination compounds. They are able to describe the self-assembly of polymers in aqueous media as well as to identify the characteristics of synthetic ion channels. They can name modern applications of supramolecular 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)

written examination (approx. 90 minutes) or oral examination of one candidate each (approx. 20 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) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)

Master's degree (1 major) Chemistry (2014)

Master's degree (1 major) Functional Materials (2012)



| Module | e title | | | | Abbreviation | | |
|---|---|--|------------------------------|-----------------------------|---|--|--|
| Supramolecular Chemistry (Practical Course) | | | | | 08-SCM2-102-m01 | | |
| Module | e coord | inator | | Module offered by | | | |
| | | ture "Supramolekularen (ikalische Chemie)" | Chemie (Organische | Faculty of Chemistr | y and Pharmacy | | |
| ECTS | Meth | od of grading | Only after succ. com | npl. of module(s) | | | |
| 5 | (not) | successfully completed | | | | | |
| Duratio | on | Module level | Other prerequisites | | | | |
| 1 seme | ster | graduate | | | | | |
| Conten | ıts | | | | | | |
| mistry. | They w | | host-guest complexe | | ents in supramolecular che- d nanoparticles and use advan- | | |
| Intend | ed lear | ning outcomes | | | | | |
| | | able to perform synthese: hem. They are able to pro | | | roscopic methods to analyse and hem microscopically. | | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Ger | rman) | | | |
| P (no ir | nformat | tion on SWS (weekly cont | act hours) and cours | e language available | e) | | |
| | | sessment (type, scope, langua ole for bonus) | ge — if other than German, o | examination offered — if no | ot every semester, information on whether | | |
| | | x, logs (approx. 5 pages e assessment: German or E | | | | | |
| Allocat | ion of | places | | | | | |
| | - | | | | | | |
| Additio | nal inf | ormation | | | | | |
| | | | | | | | |
| Worklo | ad | | | | | | |
| | | | | | | | |
| Teachi | ng cycl | e | | | | | |
| | | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | | |
| Module | Module appears in | | | | | | |
| | Master's degree (1 major) Chemistry (2013) | | | | | | |
| | Naster's degree (1 major) Chemistry (2010) | | | | | | |
| Master | Master's degree (1 major) Chemistry (2014) | | | | | | |



Compulsory Electives

(15 ECTS credits)



| Module title | | | | | Abbreviation |
|--|----------------------|---|--|-----------------------------|--|
| Bioinorganic Chemistry | | | | | 08-ACM2-102-m01 |
| Modu | le coord | inator | | Module offered by | |
| lecturer of seminar "Anorganische Aspekte der Biochemie and Medizinischen Chemie" (Inorganic Aspects of Bioche mistry and Medicinal Chemistry) | | | | Institute of Inorgan | ic Chemistry |
| ECTS | Metho | od of grading | Only after succ. cor | npl. of module(s) | |
| 5 | nume | rical grade | | | |
| Durat | ion | Module level | Other prerequisites | ; | |
| 1 sem | ester | graduate | | | |
| Conte | nts | | | | |
| metho | ods of Bl nerapy. | C, structures and ef | | | chemistry (BIC). It discusses the ns of BIC in the fields of diagnosis |
| Inten | ded lear | ning outcomes | | | |
| | | | principles of, and method cribe applications of BIC | | explain the structure and effects medicine. |
| Cours | es (type, r | number of weekly contact h | nours, language — if other than Ge | rman) | |
| S (no | informa | tion on SWS (weekly | contact hours) and cours | e language availabl | e) |
| | | sessment (type, scope, le for bonus) | language — if other than German, | examination offered — if no | ot every semester, information on whether |
| 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 | | | | | |
| | | | | | |
| 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)



| Module title | | | | Abbrevia | tion |
|------------------------------|---|---------------|----------------------|--------------------------------|------------|
| Organic Functional Materials | | | | o8-OCM- | FM-102-m01 |
| Module coordinator | | | | Module offered by | |
| lecture | lecturer of the seminar "Organische Funktionsmaterialien" | | | Institute of Organic Chemistry | |
| ECTS | Meth | od of grading | Only after succ. con | pl. of module(s) | |
| 5 | nume | rical grade | | | |
| Duratio | Duration Module level | | Other prerequisites | Other prerequisites | |
| 1 semester graduate | | | | | |
| Contents | | | | | |

Contents

The module deals with specific topics in organic functional materials. The focus is on fundamental (photo)physical effects in organic molecular and polymeric semiconductors as well as their application in (opto)electronic components such as field effect transistors, organic light-emitting diodes, or organic solar cells as well as in nonlinear optics.

Intended learning outcomes

The students are able to explain fundamental (photo)physical processes in organic semiconductors. He/She can explain the synthesis of these semiconductor materials as well as their application in (opto)electronic components such as field effect transistors, organic light-emitting diodes or in organic photovoltaics as well as in nonlinear optics.

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

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

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ 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

Workload

Teaching cycle

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

Module appears in

Master's degree (1 major) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)

Master's degree (1 major) Functional Materials (2012)



| Module title | | | | | Abbreviation |
|--|--------------------|---------------------|----------------------|--------------------------------|-----------------|
| Bioorga | anic Ch | emistry | | | 08-SCM3-102-m01 |
| Module | Module coordinator | | | Module offered by | |
| lecturer of lecture "Bioorganische Chemie" (Bioorganic Chemistry) | | | mie" (Bioorganic | Institute of Organic Chemistry | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | |
| 5 | nume | rical grade | | | |
| Duration Module level | | Other prerequisites | | | |
| 1 semester graduate | | | | | |
| Conten | 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

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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)



| Modul | Module title Abbreviation | | | | | |
|---|--|---|--|-----------------------------|---|--|
| Computational Chemistry 08-TCM2-102-m01 | | | | | 08-TCM2-102-m01 | |
| Modul | e coord | inator | | Module offered by | | |
| lecture | r of lect | ture "Computational Che | mistry" | Institute of Physica | l and Theoretical Chemistry | |
| ECTS | Metho | od of grading | Only after succ. com | ipl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequisites | | | |
| ses ir (usua lar at | | ses in the respective (usually 70% of exe | Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcu- | | | |
| Conter | nts | | | | | |
| This m | odule ir | ntroduces students to the | e fundamental princip | oles of computationa | al chemistry. | |
| Intend | ed learı | ning outcomes | | | | |
| | | able to explain the theore | tical principles of co | mputational chemist | try and to apply methods in com- | |
| Course | es (type, r | number of weekly contact hours, l | anguage — if other than Ger | man) | | |
| S + Ü (| no infor | mation on SWS (weekly o | contact hours) and co | ourse language avail | able) | |
| | | sessment (type, scope, langua le for bonus) | ge $-$ if other than German, ϵ | examination offered — if no | ot every semester, information on whether | |
| | | nation (90 minutes) ssessment: German or Er | nglish | | | |
| Allocat | tion of p | olaces | | | | |
| | | | | | | |
| Additio | onal inf | ormation | | | | |
| | | | | | | |
| Worklo | oad | | | | | |
| | | | | | | |
| Teachi | ng cycl | e | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module appears in | | | | | | |
| Master's degree (1 major) Chemistry (2010) | | | | | | |
| Master's degree (1 major) Mathematics (2012) | | | | | | |
| | Master's degree (1 major) Mathematics (2010) | | | | | |
| Master's degree (1 major) Computational Mathematics (2012) | | | | | | |



| Modul | e title | | | | Abbreviation | |
|---------------------|-----------------------|----------------------|--------------------|----------------------|---|--|
| Nanos | cale Ma | aterials | | | 08-PCM3-102-m01 | |
| Module coordinator | | | | Module offered by | Module offered by | |
| lecture | er of the | seminar "Nanoskalige | e Materialien" | Institute of Physica | Institute of Physical and Theoretical Chemistry | |
| ECTS | Meth | od of grading | Only after succ. o | compl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | Duration Module level | | Other prerequisi | Other prerequisites | | |
| 1 semester graduate | | | | | | |
| Conter | Contents | | | | | |

This module discusses advanced topics in nanoscale materials. It focuses on the structure, properties, fabrication, modern characterisation methods and application areas of nanoscale materials.

Intended learning outcomes

Students are able to characterise nanoscale materials. They are able to name analytical methods and application areas of nanoscale materials.

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)

written examination (90 minutes) or oral examination of one candidate each (20 minutes) or talk (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

Bachelor' degree (1 major) Nanostructure Technology (2010)

Bachelor' degree (1 major) Nanostructure Technology (2012)

Master's degree (1 major) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)

Master's degree (1 major) Chemistry (2014)

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

Master's degree (1 major) Computational Mathematics (2012)

Master's degree (1 major) Functional Materials (2012)



| Module | title | | | Abbreviation | | |
|---|---|--|-----------------------------|----------------------------|--|--|
| Physical chemistry of supramolecular assemblies 08-PCM5-102-m01 | | | | | 08-PCM5-102-m01 | |
| Module | coord | inator | | Module offered by | | |
| lecture kularer | | seminar "Physikalische | Chemie Supramole- | Institute of Physica | al and Theoretical Chemistry | |
| ECTS | | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | | rical grade | | , ,, | | |
| Duratio | n | Module level | Other prerequisites | | | |
| 1 seme | ster | graduate | | | | |
| Conten | ts | | | | | |
| | | xamines the basic intera of aggregates as well as | | | the formation and physical-cheministry. | |
| Intende | ed lear | ning outcomes | | | | |
| in the f | ield. Th | | nation and physical-c | | trating a high degree of expertise of aggregates. They can name mo | |
| Course | S (type, r | number of weekly contact hours, | language — if other than Ge | rman) | | |
| S + Ü (r | no info | rmation on SWS (weekly | contact hours) and co | ourse language avai | lable) | |
| | | sessment (type, scope, langu le for bonus) | age — if other than German, | examination offered — if n | ot every semester, information on whether | |
| minute | s) | nation (90 minutes) and ssessment: German or E | | of one candidate ea | ch (20 minutes) and/or talk (30 | |
| Allocat | | - | | | | |
| | | | | | | |
| Additio | nal inf | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teachi | ng cycl | e | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module appears in | | | | | | |
| Master's degree (1 major) Chemistry (2013) | | | | | | |
| Master's degree (1 major) Chemistry (2010) | | | | | | |
| | Master's degree (1 major) Mathematics (2012) | | | | | |
| Master | Master's degree (1 major) Technology of Functional Materials (2010) | | | | | |

Master's degree (1 major) Technology of Functional Materials (2009) Master's degree (1 major) Computational Mathematics (2012)

Master's degree (1 major) Functional Materials (2012)



| Module title | | | | | Abbreviation |
|--------------------|---|---------------|----------------------|--|-----------------|
| Princip | oles of o | drug design | | | 08-MCM3-102-m01 |
| Module coordinator | | | | Module offered by | |
| | lecturers Pharmazeutische Chemie (Pharmaceutical Chemistry) | | | Institute of Pharmacy and Food Chemistry | |
| ECTS | Meth | od of grading | Only after succ. cor | npl. of module(s) | |
| 5 | nume | rical grade | | | |
| Duratio | Duration Module level Ot | | Other prerequisites | | |
| 1 seme | 1 semester graduate | | | | |
| Conter | 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)

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ 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

Workload

Teaching cycle

 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

Module appears in

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

Master's degree (1 major) Chemistry (2010)

Master's degree (1 major) Mathematics (2010)



Theoretical Chemistry

(25 ECTS credits)



Compulsory Courses

(20 ECTS credits)



| Modul | Module title Abbreviation | | | | | |
|--|---|---|---|---|---|--|
| Theore | etical Cl | nemistry | | | 08-TCM1-102-m01 | |
| Modul | e coord | inator | | Module offered by | | |
| lecture | er of lec | ture "Theoretische Chem | ie" | Institute of Physica | l and Theoretical Chemistry | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequisites | | | |
| 1 seme | ester | graduate | ses in the respective (usually 70% of exe | Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence) | | |
| Conter | nts | | | | | |
| This m | odule ii | ntroduces students to the | e fundamental princi | oles of theoretical ch | nemistry. | |
| Intend | ed lear | ning outcomes | | | | |
| | | able to describe the math amical approaches of the | • • | al principles underly | ing the quantum chemical and | |
| Course | es (type, r | number of weekly contact hours, | language — if other than Gei | man) | | |
| S + Ü (| no info | rmation on SWS (weekly | contact hours) and co | ourse language avail | able) | |
| | | sessment (type, scope, langua le for bonus) | age — if other than German, | examination offered — if no | ot every semester, information on whether | |
| | | nation (90 minutes) ssessment: German or E | nglish | | | |
| Allocat | tion of p | olaces | | | | |
| | | | | | | |
| Additio | onal inf | ormation | | | | |
| | | | | | | |
| Worklo | oad | | | | | |
| | | | | | | |
| Teachi | ing cycl | e | | | | |
| - | | | | | | |
| Referre | ed to in | LPO I (examination regulation | s for teaching-degree progra | mmes) | | |
| | | | | | | |
| Module appears in | | | | | | |
| Master's degree (1 major) Chemistry (2010) | | | | | | |
| Master's degree (1 major) Mathematics (2012) | | | | | | |
| | Master's degree (1 major) Mathematics (2010) Master's degree (1 major) Computational Mathematics (2012) | | | | | |
| | _ | · · · · · · · · · · · · · · · · · · · | | 2) | | |
| mastel | Master's degree (1 major) FOKUS Pharmacy (2012) | | | | | |



| Module title Abbreviation | | | | | | |
|---|--|---|----------------------------|-----------------------------|---|--|
| Progra | Programming in Theoretical Chemistry 08-TCM3-102-m01 | | | | | |
| Modul | Module coordinator Module offered by | | | | | |
| lecture mie" | er of lec | ture "Programmieren in T | heoretischer Che- | Institute of Physica | l and Theoretical Chemistry | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Durati | on | Module level | Other prerequisites | | | |
| 1 seme | ester | graduate | | | | |
| Conte | nts | | | | | |
| | | provides an introduction tation at | to the fundamentals o | of programming in th | neoretical chemistry and discus- | |
| Intend | ed lear | ning outcomes | | | | |
| | | able to explain and use o | | ng languages typical | ly used in theoretical chemistry | |
| Course | es (type, | number of weekly contact hours, | anguage — if other than Ge | rman) | | |
| S + Ü (| no info | rmation on SWS (weekly | contact hours) and co | ourse language avai | lable) | |
| | | sessment (type, scope, langua | ge — if other than German, | examination offered — if no | ot every semester, information on whether | |
| | | nd discussion of approx. assessment: German or E | | ises as well as talk (| approx. 45 minutes) | |
| Alloca | tion of | places | | | | |
| | | - | | | | |
| Additio | onal inf | formation | | | | |
| | | | | | | |
| Workle | oad | | | | | |
| | | | | | | |
| Teachi | ng cyc | le | | | | |
| - | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module appears in | | | | | | |
| | Master's degree (1 major) Chemistry (2013) | | | | | |
| | Master's degree (1 major) Chemistry (2010) | | | | | |
| | _ | ree (1 major) Chemistry (2 | • | | | |
| Maste | Master's degree (1 major) Mathematics (2012) | | | | | |

Master's degree (1 major) Mathematics (2010)

Master's degree (1 major) Computational Mathematics (2012)



| Modul | e title | | | | Abbreviation |
|--------------------|--|-------------------------|----------------------|---|-----------------|
| Theore | etical Cl | hemistry - Project work | | | 08-TCAP-102-m01 |
| Module coordinator | | | | Module offered by | <u> </u> |
| head o | head of the research group offering the module | | | Institute of Physical and Theoretical Chemistry | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | |
| 10 | (not) | successfully completed | | | |
| Duratio | Duration Module level | | Other prerequisites | | |
| 1 seme | ester | graduate | | | |
| <i>c</i> . | | | | | |

Contents

This module gives students the opportunity to get involved in the work of one of the research groups based at the Institute of Theoretical Chemistry and learn some of the methods typically used in the discipline.

Intended learning outcomes

Students have learned some of the methods typically used in theoretical chemistry. They are able to explain issues that are relevant to the fields covered.

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

This module has 3 components; information on courses listed separately for each component.

- o8-TCAP-1-102: P (no information on language and number of weekly contact hours available)
- 08-TCAP-2-102: P (no information on language and number of weekly contact hours available)
- 08-TCAP-3-102: P (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 3 assessment components. To pass the module as a whole students must pass two out of these three assessment components.

Assessment component to module component o8-TCAP-1-102: Theoretische Chemie Arbeitsgruppenpraktikum Wellenpaketdynamik

- 5 ECTS credits, method of grading: (not) successfully completed
- presentation (approx. 30 minutes)
- Language of assessment: German or English

Assessment component to module component o8-TCAP-2-102: Theoretische Chemie Arbeitsgruppenpraktikum Wellenfunktionsmethoden

- 5 ECTS credits, method of grading: (not) successfully completed
- presentation (approx. 30 minutes)
- Language of assessment: German or English

Assessment component to module component o8-TCAP-3-102: Theoretische Chemie Arbeitsgruppenpraktikum Dichtefunktionaltheorie

- 5 ECTS credits, method of grading: (not) successfully completed
- presentation (approx. 30 minutes)
- Language of assessment: German or English

Allocation of places

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Additional information

Additional information on module duration: 4 weeks..

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) Chemistry (2010)

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

Master's degree (1 major) Mathematics (2010)

Master's degree (1 major) Computational Mathematics (2012)



Compulsory Electives

(5 ECTS credits)



| Modul | Module title Abbreviation | | | | | |
|---|--|---|--|-----------------------------|---|--|
| Computational Chemistry 08-TCM2-102-m01 | | | | | 08-TCM2-102-m01 | |
| Modul | e coord | inator | | Module offered by | | |
| lecture | r of lect | ture "Computational Che | mistry" | Institute of Physica | l and Theoretical Chemistry | |
| ECTS | Metho | od of grading | Only after succ. com | ipl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequisites | | | |
| ses ir (usua lar at | | ses in the respective (usually 70% of exe | Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcu- | | | |
| Conter | nts | | | | | |
| This m | odule ir | ntroduces students to the | e fundamental princip | oles of computationa | al chemistry. | |
| Intend | ed learı | ning outcomes | | | | |
| | | able to explain the theore | tical principles of co | mputational chemist | try and to apply methods in com- | |
| Course | es (type, r | number of weekly contact hours, l | anguage — if other than Ger | man) | | |
| S + Ü (| no infor | mation on SWS (weekly o | contact hours) and co | ourse language avail | able) | |
| | | sessment (type, scope, langua le for bonus) | ge $-$ if other than German, ϵ | examination offered — if no | ot every semester, information on whether | |
| | | nation (90 minutes) ssessment: German or Er | nglish | | | |
| Allocat | tion of p | olaces | | | | |
| | | | | | | |
| Additio | onal inf | ormation | | | | |
| | | | | | | |
| Worklo | oad | | | | | |
| | | | | | | |
| Teachi | ng cycl | e | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module appears in | | | | | | |
| Master's degree (1 major) Chemistry (2010) | | | | | | |
| Master's degree (1 major) Mathematics (2012) | | | | | | |
| | Master's degree (1 major) Mathematics (2010) | | | | | |
| Master's degree (1 major) Computational Mathematics (2012) | | | | | | |



| Module title | | | | | Abbreviation |
|--------------------|---|---------------|----------------------|--|-----------------|
| Princip | oles of o | drug design | | | 08-MCM3-102-m01 |
| Module coordinator | | | | Module offered by | |
| | lecturers Pharmazeutische Chemie (Pharmaceutical Chemistry) | | | Institute of Pharmacy and Food Chemistry | |
| ECTS | Meth | od of grading | Only after succ. cor | npl. of module(s) | |
| 5 | nume | rical grade | | | |
| Duratio | Duration Module level Ot | | Other prerequisites | | |
| 1 seme | 1 semester graduate | | | | |
| Conter | 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)

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ 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

Workload

Teaching cycle

 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

Module appears in

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

Master's degree (1 major) Chemistry (2010)

Master's degree (1 major) Mathematics (2010)



Compulsory Electives Additional Qualifications

(15 ECTS credits)



| Module title | | | | | Abbreviation | |
|------------------|--|----------------------------|----------------------|---------------------|---------------------------------|--|
| Chemi | cally ar | nd biologically inspired I | 08-NT-101-m01 | | | |
| Modul | Module coordinator Module | | | | | |
| holder thesis | holder of the Chair of Chemical Technology of Material Synthesis | | | Chair of Chemical T | echnology of Material Synthesis | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duratio | Duration Module level O | | Other prerequisites | | | |
| 1 seme | 1 semester undergraduate | | | | | |
| Conter | Contents | | | | | |

This module provides an introduction to the synthesis methods of sol-gel chemistry and discusses the methods of analysis used to characterise the generated materials. It also discusses the fundamental principles of biomineralisation and uses examples to introduce students to bio-inspired material synthesis.

Intended learning outcomes

Students have developed an advanced knowledge of sol-gel chemistry and biomineralisation.

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.

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

Method of assessment (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 o8-NT-1-101: Chemically and biologically inspired Nanotechnology for Materials Synthesis

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

Assessment in module component o8-NT-2-101: From Biomineralisation to biologically inspired Materials Synthesis

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

Allocation of places

Additional information

Workload

Teaching cycle

$\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

Module appears in

Bachelor' degree (1 major) Technology of Functional Materials (2010)

Bachelor' degree (1 major) Nanostructure Technology (2010)

| Master's with 1 major Chemistry (2010) | JMU Würzburg • generated 26-Aug-2024 • exam. | page 108 / 163 |
|--|--|----------------|
| | reg. data record Master (120 ECTS) Chemie - 2010 | |





| Module t | title | | | Abbreviation | | | |
|---|---|-----------------------------------|-----------------------------|--|--|--|--|
| Material | s Science 1 (Basic Introduc | ction) | | 08-FS1-101-m01 | | | |
| Module o | coordinator | | Module offered by | | | | |
| Dean of Studies Funktionswerkstoffe (Functional Materials | | | Chair of Chemical T | echnology of Material Synthesis | | | |
| ECTS I | TS Method of grading Only after succ. c | | ıpl. of module(s) | | | | |
| 5 r | numerical grade | | | | | | |
| Duration | Module level | Other prerequisites | Other prerequisites | | | | |
| 1 semest | semester undergraduate | | | | | | |
| Contents | 5 | | | | | | |
| | lule discusses the fundam properties of materials. | ental relations between | chemical bonding, th | ne structure, the microstructure | | | |
| Intended | l learning outcomes | | | | | | |
| | Students have become familiar with the fundamental relations between chemical bonding, the structure, the microstructure and the properties of materials. They have developed the ability to apply them to research problems. | | | | | | |
| Courses | (type, number of weekly contact ho | urs, language — if other than Gei | rman) | | | | |
| V + Ü (no | information on SWS (wee | kly contact hours) and co | ourse language avail | able) | | | |
| | of assessment (type, scope, la reditable for bonus) | nguage — if other than German, | examination offered — if no | t every semester, information on whether | | | |
| written e | xamination (90 minutes) | | | | | | |
| Allocatio | on of places | | | | | | |
| | | | | | | | |
| Addition | al information | | | | | | |
| | | | | | | | |
| Workload | d | | | | | | |
| | | | | | | | |
| Teaching | g cycle | | | | | | |
| | | | | | | | |
| Referred | to in LPO I (examination regula | ations for teaching-degree progra | mmes) | | | | |
| | | | | | | | |
| Module a | appears in | | | | | | |
| Bachelor | Aodule appears in Bachelor' degree (1 major) Technology of Functional Materials (2010) Bachelor' degree (1 major) Nanostructure Technology (2010) Master's degree (1 major) Chemistry (2010) | | | | | | |



| Module | Module title Abbreviation | | | | | | |
|----------|---|--|---|-----------------------------|--|--|--|
| Materia | als Scie | ence 2 (The Major Materi | al Groups) | | 08-FS2-101-m01 | | |
| Module | e coord | inator | | Module offered by | | | |
| Dean o | Dean of Studies Funktionswerkstoffe (Functional Mater | | | Chair of Chemical T | echnology of Material Synthesis | | |
| ECTS | CTS Method of grading Only after succ. co | | | pl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Duratio | n | Module level | Other prerequisites | | | | |
| 1 seme | ster | undergraduate | | | | | |
| Conten | ts | | | | | | |
| This mo | odule d | eals with the fabrication | and properties of the | main material grou | ps. | | |
| Intende | ed learı | ning outcomes | | | | | |
| | | e developed a knowledge knowledge to research pr | | d properties of the n | nain material groups and are able | | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Ger | man) | | | |
| V + Ü (r | no infor | mation on SWS (weekly o | contact hours) and co | ourse language avail | able) | | |
| | | sessment (type, scope, langua le for bonus) | ge $-$ if other than German, ϵ | examination offered — if no | t every semester, information on whether | | |
| written | examiı | nation (approx. 90 minut | es) | | | | |
| Allocat | ion of p | olaces | | | | | |
| | | | | | | | |
| Additio | nal inf | ormation | | | | | |
| | | | | | | | |
| Worklo | ad | | | | | | |
| | | | | | | | |
| Teachi | ng cycl | <u></u> е | | | | | |
| | | | | | | | |
| Referre | d to in | LPO I (examination regulations | s for teaching-degree progra | mmes) | | | |
| | | | | | | | |
| Module | e appea | nrs in | | | | | |
| Bachel | or' deg | ree (1 major) Technology ree (1 major) Nanostructu ee (1 major) Chemistry (2 | ire Technology (2010) | | | | |



| Module title | | | | | Abbreviation | |
|---|-------------------|--------------------------------------|--------------------|---------------------|-------------------|--|
| Toxico | logy an | d legal studies | | | 03-TR-072-m01 | |
| Modul | e coord | inator | | Module offered by | Module offered by | |
| lecturer of lecture "Toxikologie und Rechts | | | Rechtskunde" | Faculty of Medicine | | |
| ECTS | Meth | Method of grading Only after succ. c | | mpl. of module(s) | | |
| 3 | 3 numerical grade | | | | | |
| Duratio | on | Module level | Other prerequisite | Other prerequisites | | |
| 1 seme | ster | undergraduate | | | | |
| Conter | its | | | | | |

Basics of legal regulations for chemists (handling and transportation of hazardous materials), fundamentals of toxicology.

Intended learning outcomes

The students master the basics of legal regulations for chemists (handling and transport of hazardous substances) as well as the fundamentals of toxicology.

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

V + 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 (approx. 90 minutes)

Allocation of places

Additional information

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 (2013)

Bachelor' degree (1 major) Biochemistry (2009)

Bachelor' degree (1 major) Chemistry (2007)

Bachelor' degree (1 major) Chemistry (2008)

Bachelor' degree (1 major) Chemistry (2010)

Bachelor' degree (1 major) Chemistry (2009)

Bachelor' degree (1 major) Food Chemistry (2009)

Bachelor' degree (1 major) FOKUS Chemistry (2011)

Master's degree (1 major) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)

Master's degree (1 major) Chemistry (2014)

First state examination for the teaching degree Grundschule Chemistry (2009)

First state examination for the teaching degree Hauptschule Chemistry (2009)

First state examination for the teaching degree Realschule Chemistry (2009)

First state examination for the teaching degree Gymnasium Chemistry (2009)



First state examination for the teaching degree Mittelschule Chemistry (2013)



| Modu | Module title Abbreviation | | | | | |
|---|-------------------------------------|---|----------------------------------|--|---|--|
| Bioch | emistry | | | | 08-BC-092-m01 | |
| Modu | le coord | linator | | Module offered by | | |
| holde | r of the | Chair of Biochemistry | | Chair of Biochemis | stry | |
| ECTS | ECTS Method of grading Only after s | | Only after succ. cor | npl. of module(s) | | |
| 6 | nume | rical grade | | | | |
| Durati | ion | Module level | Other prerequisites | | | |
| 2 semester undergraduate Admission prerequisite to assessment: successful completion as ses in the respective classes as specified at the beginning of th (usually 70% of exercises to be successfully completed) as wellar attendance of exercises (usually a maximum of 2 incidents a sed absence). | | | | ed at the beginning of the course sfully completed) as well as regu- | | |
| Conte | nts | | · · | | | |
| Comp | _ | ectures and exercises, | this module acquaints s | students with the fu | ndamental principles of bioche- | |
| | | ning outcomes | | | | |
| Stude | nts hav | - | • | iples of biochemistr | ry. They are able to describe the | |
| Cours | es (type, i | number of weekly contact ho | urs, language — if other than Ge | rman) | | |
| V + Ü - | + V + Ü (| no information on SW | S (weekly contact hours | s) and course langua | age available) | |
| | | sessment (type, scope, landle for bonus) | nguage — if other than German, | examination offered — if r | not every semester, information on whether | |
| or 90 | minutes | each; 3 written exam | | nutes each) or b) or | itten examinations: approx. 60 al examination of one candidate x. 30 minutes) | |
| Alloca | tion of | places | , | | | |
| | | | | | | |
| Additi | ional inf | ormation | | | | |
| | | | , | | | |
| Workl | oad | | | | | |
| | | | | | | |
| Teach | ing cycl | le | | | | |
| | | | | | | |
| Referr | red to in | LPO I (examination regula | tions for teaching-degree progra | ammes) | | |
| | | | | | | |
| Modu | le appe | ars in | | | | |
| <u> </u> | | / | / | | | |

Bachelor' degree (1 major) Chemistry (2010)

Bachelor' degree (1 major) Chemistry (2009)

Bachelor' degree (1 major) Nanostructure Technology (2010)

Bachelor' degree (1 major) Nanostructure Technology (2012)

Bachelor' degree (1 major) FOKUS Chemistry (2011)



| Module title | | | | | Abbreviation |
|-------------------------------------|--|---------------|---------------------|-----------------------|----------------|
| Biochemistry Lab | | | | | 08-BCP-092-m01 |
| Module coordinator | | | | Module offered by | |
| holder of the Chair of Biochemistry | | | | Chair of Biochemistry | |
| ECTS | Method of grading Only after succ. cor | | | ıpl. of module(s) | |
| 5 | (not) successfully completed o8-BC | | | | |
| Duration Module level | | | Other prerequisites | | |
| 1 seme | ester | undergraduate | | | |

Contents

Practical exercises give students the opportunity to learn the fundamental principles of conducting biochemical experiments.

Intended learning outcomes

Students have become proficient in essential methods in biochemistry.

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)

pre/post-experiment examination talks (Vortestate and Nachtestate, approx. 15 minutes each), practical work (log, approx. 5 to 10 pages)

Assessment offered: once a year, summer semester

Allocation of places

Number of places: 24. Should the number of applications exceed the number of available places, places will be allocated in a standardised procedure among all applicants irrespective of their subjects according to the following quotas: Quota 1 (80% of places): grade achieved in module 08-BC; among applicants with the same grade, places will be allocated by lot. Quota 2 (20% 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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 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

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Module appears in

Bachelor' degree (1 major) Chemistry (2010)

Bachelor' degree (1 major) Chemistry (2009)

Master's degree (1 major) Chemistry (2013)



| Module title | | | | | Abbreviation |
|---|---------------------------------------|---|--------------------------|----------------------------------|-----------------|
| Advanced Inorganic Chemistry | | | | | 08-ACM1-102-m01 |
| Module coordinator Mo | | | | Module offered by | |
| Managing Director of the Institute of Inorganic Chemistry | | | e of Inorganic Chemistry | Institute of Inorganic Chemistry | |
| ECTS | Method of grading Only after succ. co | | Only after succ. cor | mpl. of module(s) | |
| 20 | 20 numerical grade | | | | |
| Duration Module level Other prerequisite | | | Other prerequisites | 5 | |
| 2 seme | 2 semester graduate | | | | |
| Contor | atc | • | * | | |

Contents

This module discusses advanced topics in main group chemistry and transition metal chemistry. It focuses on special compounds of the main group elements (MGEs), bonding situations of MGEs and MGE compounds, the chemistry of transition metals and coordination chemistry. The course gives students the opportunity to enhance their skills in advanced synthesis and analytical methods in inorganic chemistry. The focus will be on working under inert atmospheres, purification methods, spectral analysis and crystallography. Students will be expected to conduct their work in the lab independently, write a lab report documenting their findings and deliver a presentation.

Intended learning outcomes

Students are able to characterise and explain special compounds of the main group elements. They can describe the chemical properties of transition metals and analyse the structure as well as chemical and physical aspects of coordination compounds. Students are able to use advanced synthesis and analytical methods in inorganic chemistry in the lab and to interpret their findings. They are able to write a lab report documenting their findings and deliver a presentation.

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.

- 08-ACM1-1-102: S + S (no information on SWS (weekly contact hours) and course language available)
- o8-ACM1-2-102: P (no information on SWS (weekly contact hours) and course language available)

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

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

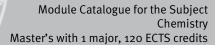
Assessment in module component o8-ACM1-1-102: Inorganic Chemistry for advanced students Inorganic Chemistry for advanced students

- 10 ECTS, Method of grading: numerical grade
- a) 1 to 3 written examinations (90 to 120 minutes each) or b) oral examination of one candidate each (30 minutes) or c) oral examination in groups (groups of 2, 45 minutes)
- Language of assessment: German or English

Assessment in module component o8-ACM1-2-102: Inorganic Chemistry practical course for advanced

- 10 ECTS, Method of grading: (not) successfully completed
- practical work with lab report (20 pages) and talk (15 minutes)
- Language of assessment: German or English

| Language of assessment: definal of English |
|--|
| Allocation of places |
| |
| Additional information |
| |
| 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) Chemistry (2010) |



| Module | title | | | | Abbreviation | | |
|---------------------------------|-------------------------------|--|--|-----------------------------|---|--|--|
| Bioinorganic Chemistry | | | | | 08-ACM2-102-m01 | | |
| Module coordinator | | | | Module offered by | I. | | |
| and Me | dizinis | ninar "Anorganische Asp schen Chemie" (Inorganio edicinal Chemistry) | | Institute of Inorgan | ic Chemistry | | |
| ECTS | Metho | od of grading | Only after succ. con | pl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Duratio | n | Module level | Other prerequisites | | | | |
| 1 semester graduate | | | | | | | |
| Conten | ts | | • | | | | |
| Studen | ed lear | ning outcomes able to describe the princus enzymes and describe | | | xplain the structure and effects medicine. | | |
| Course | S (type, r | number of weekly contact hours, | language — if other than Ger | man) | | | |
| S (no ir | format | tion on SWS (weekly con | tact hours) and cours | e language available | e) | | |
| | | sessment (type, scope, langualle for bonus) | age — if other than German, | examination offered — if no | ot every semester, information on whether | | |
| oral exa thods of the cur | aminat of asses rent se | ion in groups (groups of | 2, 30 minutes). Should a dinator will choose the course. | d there be the optio | candidate each (20 minutes) or c) n to choose between several me- d for the module component in | | |
| Allocat | ion of p | olaces | | | | | |
| | | | | | | | |
| Additio | nal inf | ormation | | | | | |
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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)



| Modul | le title | | | | Abbreviation |
|---|--------------------------------|---|--|-----------------------------|---|
| Solid s | state ch | emistry and inorganic | materials | | 08-ACM3-102-m01 |
| Modul | le coord | inator | | Module offered by | |
| | | ninar "Festkörperchem Solid State Chemistry a | | Institute of Inorgan | ic Chemistry |
| ECTS | Meth | od of grading | Only after succ. cor | . compl. of module(s) | |
| 5 | nume | rical grade | | | |
| Durati | on | Module level | Other prerequisites | | |
| 1 seme | ester | graduate | | | |
| Conte | nts | | | | |
| | | provides an introduction nthesis methods and s | | | structure, chemical and physical |
| Intend | led lear | ning outcomes | | | |
| | | | | | xplain methods for solid-state the corresponding solids. |
| Course | es (type, r | number of weekly contact hour | s, language — if other than Ge | rman) | |
| S (no i | informa | tion on SWS (weekly co | ontact hours) and cours | se language availabl | e) |
| | | sessment (type, scope, lang le for bonus) | guage — if other than German, | examination offered — if no | ot every semester, information on whether |
| oral ex thods the cu | caminat of asse rrent se | ion in groups (groups c | of 2, 30 minutes). Shou ordinator will choose t g of the course. | ld there be the optio | candidate each (20 minutes) or c) on to choose between several me- ed for the module component in |
| Alloca | tion of | olaces | | | |
| | | | | | |
| Additi | onal inf | ormation | | | |
| | | | · | | |
| Workle | oad | | | | |
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| Teachi | ing cycl | e | | | |
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| Referr | ed to in | LPO I (examination regulati | ons for teaching-degree progra | ammes) | |
| | | | | | |
| Modul | le appea | ars in | | | |
| | | ee (1 major) Chemistry | (2013) | | |
| Mantagle desired (mail of the mintagle) | | | | | |



| Module | e title | | | | Abbreviation | |
|--|---|--|---|-----------------------------|--|--|
| Advanc | ed org | anometallic chemistry ar | nd its application in h | nomogeneous cata- | 08-HKM2-102-m01 | |
| lysis | | | | | | |
| Module | e coord | | | | | |
| lecturer of the seminar "Spezielle Metallorganische Chemie Institute of In and deren Anwendung in der Homogenkatalyse" | | | | | ic Chemistry | |
| ECTS | Meth | od of grading | Only after succ. compl. of module(s) | | | |
| 5 | nume | rical grade | | | | |
| Duratio | Ouration Module level Other prerequisites | | | | | |
| 1 seme | ster | graduate | | | | |
| Conten | its | | | | | |
| This mo | odule e | examines elementary orga | anic compounds of tr | ansition metals with | homogeneous catalytic applica- | |
| Intend | ed lear | ning outcomes | | | | |
| | | | | | nentary organic compounds. They neous catalysis reactions. | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Ger | rman) | | |
| S (no ir | nforma | tion on SWS (weekly cont | act hours) and cours | e language available | 2) | |
| | | sessment (type, scope, langua ble for bonus) | ge — if other than German, o | examination offered — if no | t every semester, information on whether | |
| oral ex thods of the cur | aminat of asse rent se | ion in groups (groups of a | 2, 30 minutes). Shoul dinator will choose th of the course. | ld there be the optio | andidate each (20 minutes) or c) n to choose between several me- d for the module component in | |
| Allocat | ion of | places | | | | |
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| Additio | nal inf | ormation | , | | | |
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| Worklo | ad | | | | | |
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| Teachi | ng cycl | e | | | | |
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| Referre | d to in | LPO I (examination regulation | s for teaching-degree progra | mmes) | | |
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| Module | e appea | ars in | | | | |
| Master | 's degr | ee (1 major) Chemistry (2 | 013) | | | |
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| Module appears in | | | | | |
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Master's degree (1 major) Chemistry (2010) Master's degree (1 major) FOKUS Pharmacy (2012)



| Module title Abbreviation | | | | | | | |
|---|--|--|-----------------------------|----------------------------|---|--|--|
| Advanc | Advanced NMR- and Mass Spectrometry 08-OCM-NMRMS-102-mo1 | | | | | | |
| Module | coord | inator | | Module offered by | | | |
| lab cou | rse sup | pervisor | | Institute of Organic | : Chemistry | | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Duratio | n | Module level | Other prerequisites | i | | | |
| 1 seme | ster | graduate | | | | | |
| Conten | ts | | | | | | |
| sights i the opp | nto the ortunit | theoretical principles of ty to learn how to evaluat | the two measuring to | echniques and inclu | pectrometry. It offers deeper indes exercises that give students meter. | | |
| Intende | <u>ed lear</u> ı | ning outcomes | | | | | |
| | | able to discuss NMR and to experiment with both | | | n degree of expertise in the field. spectra. | | |
| Course | S (type, n | number of weekly contact hours, l | anguage — if other than Ger | rman) | | | |
| P (no in | format | ion on SWS (weekly cont | act hours) and cours | e language availabl | e) | | |
| | | sessment (type, scope, langua le for bonus) | ge — if other than German, | examination offered — if n | ot every semester, information on whether | | |
| oral exa | aminati | n examinations (60 or 90 ion in groups (groups of 2 ssessment: German or E | 2, 30 minutes) | examination of one o | candidate each (20 minutes) or c) | | |
| Allocat | ion of p | olaces | | | | | |
| Additio | nal info | ormation | | | | | |
| | | | | | | | |
| Workload | | | | | | | |
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| Teaching cycle | | | | | | | |
| | | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | | |
| | | | | | | | |
| Module | Module appears in | | | | | | |

Master's degree (1 major) Chemistry (2013) Master's degree (1 major) Chemistry (2010)



| Module | Module title Abbreviation | | | | | | |
|---|--|---|------------------------------|-----------------------------|--|--|--|
| Advanced Research Project 1 08-OCM-AKP1-102-m01 | | | | | | | |
| Module | e coord | linator | | Module offered by | | | |
| head o | f the re | esearch group offering the | e module | Institute of Organic | Chemistry | | |
| ECTS | Meth | od of grading | Only after succ. con | ıpl. of module(s) | | | |
| 5 | (not) | successfully completed | | | | | |
| Duratio | on | Module level | Other prerequisites | | | | |
| 1 seme | ster | graduate | | | | | |
| Conten | its | | | | | | |
| | | gives students the opport of Organic Chemistry and | | | f the research groups based at ytical methods. | | |
| Intend | ed lear | ning outcomes | | | | | |
| | | able to describe and use well as to describe theor | , | s and analytical met | hods typically used by the rese- | | |
| Course | S (type, | number of weekly contact hours, l | anguage — if other than Ger | man) | | | |
| P (no ir | nforma | tion on SWS (weekly cont | act hours) and cours | e language available | e) | | |
| Metho | d of as | sessment (type, scope, langua | ge — if other than German, o | examination offered — if no | ot every semester, information on whether | | |
| | | ole for bonus) | | | | | |
| | | 15 minutes) and log (appr Issessment: German or E | | | | | |
| Allocat | ion of | places | | | | | |
| | | | | | | | |
| Additio | nal inf | ormation | | | | | |
| | | | | | | | |
| Worklo | ad | | | | | | |
| | | | | | | | |
| Teaching cycle | | | | | | | |
| | | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | | |
| | | | | | | | |
| Module | Module appears in | | | | | | |
| Master | Master's degree (1 major) Chemistry (2010) | | | | | | |



| AA - J1 | - 4:41 - | | | | ALL | | |
|---|-------------------------------|---|---|-----------------------------|---|--|--|
| Module title Abbreviation | | | | | | | |
| Modern Aspects of Natural Product Chemistry and Biological Chemistry 08-OCM-NAT-102-m01 | | | | | | | |
| Modul | e coord | inator | | Module offered by | | | |
| lecture | r of the | seminar | | Institute of Organic | : Chemistry | | |
| ECTS | Metho | od of grading | Only after succ. com | npl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Duratio | on | Module level | Other prerequisites | | | | |
| 1 seme | ster | graduate | | | | | |
| Conter | its | | | | | | |
| This m | odule d | iscusses advanced topic | s in natural product o | themistry and biolog | gical chemistry. | | |
| Intend | ed lear | ning outcomes | | | | | |
| Studer | its are a | able to discuss advanced | topics in natural pro | duct chemistry and | biological chemistry. | | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Ger | rman) | | | |
| S (no i | nformat | ion on SWS (weekly cont | act hours) and cours | e language availabl | e) | | |
| | | sessment (type, scope, langua le for bonus) | ge — if other than German, e | examination offered — if no | ot every semester, information on whether | | |
| oral ex thods of the cur | aminat of asses rent se | ion in groups (groups of a | 2, 30 minutes). Shoul dinator will choose th of the course. | d there be the optio | candidate each (20 minutes) or c) on to choose between several me- ed for the module component in | | |
| Allocat | tion of p | olaces | | | | | |
| Chemis | stry Ma | ster's: no restrictions. Bio | ochemistry Master's: | 20 places. Places w | ill be allocated by lot. | | |
| Additio | onal inf | ormation | | | | | |
| | | | | | | | |
| 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)



| Module title | | | | | Abbreviation |
|------------------------------|---------------------------------------|-----------------------|----------------------|--------------------------------|-------------------|
| Organic Functional Materials | | | | | 08-0CM-FM-102-m01 |
| Module coordinator | | | | Module offered by | |
| lecture | r of the | seminar "Organische F | unktionsmaterialien" | Institute of Organic Chemistry | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | |
| 5 | nume | rical grade | | | |
| Duratio | Duration Module level Other prerequis | | | | |
| 1 seme | 1 semester graduate | | | | |
| Contents | | | | | |

Contents

The module deals with specific topics in organic functional materials. The focus is on fundamental (photo)physical effects in organic molecular and polymeric semiconductors as well as their application in (opto)electronic components such as field effect transistors, organic light-emitting diodes, or organic solar cells as well as in non-linear optics.

Intended learning outcomes

The students are able to explain fundamental (photo)physical processes in organic semiconductors. He/She can explain the synthesis of these semiconductor materials as well as their application in (opto)electronic components such as field effect transistors, organic light-emitting diodes or in organic photovoltaics as well as in nonlinear optics.

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)

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Module appears in

Master's degree (1 major) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)

Master's degree (1 major) Functional Materials (2012)



| Module title | | | | | Abbreviation |
|-----------------------|---|---------------------|----------------------|--------------------------------|-----------------|
| Organ | o- and E | Biocatalysis | | | 08-HKM1-102-m01 |
| Module coordinator | | | | Module offered by | |
| lecture | lecturer of the seminar "Organo- and Biokatalyse" | | | Institute of Organic Chemistry | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | |
| 5 | nume | rical grade | | | |
| Duration Module level | | Other prerequisites | | | |
| 1 seme | 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

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Additional information

--

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)

Master's degree (1 major) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)



| Module title | | | | | Abbreviation |
|---|----------|-------------------------|----------------------|-----------------------------------|-----------------|
| Supramolecular Chemistry (Basics) | | | | | 08-SCM1-102-m01 |
| Module coordinator M | | | | Module offered by | |
| lecture | r of lec | ture "Organischen Chemi | e" | Faculty of Chemistry and Pharmacy | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | |
| 5 | nume | rical grade | | | |
| Duratio | n | Module level | Other prerequisites | | |
| 1 semester graduate | | | | | |
| Contents | | | | | |
| This module introduces students to the fundamental principles of supramolecular chemistry. It focuses on inter- | | | | | |

This module introduces students to the fundamental principles of supramolecular chemistry. It focuses on interactions between molecules, molecular recognition by receptors, complexes, supramolecular polymers, coordination polymers and networks, liquid crystals, self-assembly in aqueous media, synthetic ion channels and modern applications of supramolecular chemistry.

Intended learning outcomes

Students are able to explain interactions between molecules demonstrating a high degree of expertise in the field as well as to describe the formation, structure and polymers of coordination compounds. They are able to describe the self-assembly of polymers in aqueous media as well as to identify the characteristics of synthetic ion channels. They can name modern applications of supramolecular 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)

written examination (approx. 90 minutes) or oral examination of one candidate each (approx. 20 minutes) 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) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)

Master's degree (1 major) Chemistry (2014)

Master's degree (1 major) Functional Materials (2012)



| Module title | | | | | Abbreviation | |
|----------------------------------|---|---------------------|----------------------|--------------------------------|-----------------|--|
| Bioorganic Chemistry | | | | | 08-SCM3-102-m01 | |
| Module | e coord | inator | | Module offered by | | |
| 1 | lecturer of lecture "Bioorganische Chemie" (Bioorganic Chemistry) | | | Institute of Organic Chemistry | | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duration Module level Other prei | | Other prerequisites | | | | |
| 1 seme | 1 semester graduate | | | | | |
| Conten | 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

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)

Master's degree (1 major) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)



| Modul | Module title Abbreviation | | | | | | |
|---|--|---|--|-----------------------------|---|--|--|
| Computational Chemistry 08-TCM2-102-m01 | | | | | | | |
| Module coordinator Module o | | | | | | | |
| lecture | er of lec | ture "Computational Che | mistry" | Institute of Physica | l and Theoretical Chemistry | | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Durati | on | Module level | Other prerequisites | | | | |
| 1 seme | ester | graduate | Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence). | | | | |
| Conte | nts | | , | | | | |
| This m | odule ii | ntroduces students to the | fundamental princip | oles of computationa | al chemistry. | | |
| Intend | ed lear | ning outcomes | | | | | |
| | | able to explain the theore emistry. | etical principles of co | mputational chemist | try and to apply methods in com- | | |
| Course | es (type, r | number of weekly contact hours, l | anguage — if other than Ger | man) | | | |
| S + Ü (| no info | rmation on SWS (weekly o | contact hours) and co | ourse language avail | able) | | |
| | | sessment (type, scope, langua le for bonus) | ge — if other than German, o | examination offered — if no | ot every semester, information on whether | | |
| | | nation (90 minutes) ssessment: German or Er | nglish | | | | |
| Alloca | tion of p | olaces | | | | | |
| | | | | | | | |
| Additio | onal inf | ormation | | | | | |
| | | | | | | | |
| Worklo | oad | | | | | | |
| | | | | | | | |
| Teachi | ing cycl | e | | | | | |
| | | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | | |
| | | | | | | | |
| Module appears in | | | | | | | |
| Master's degree (1 major) Chemistry (2010) | | | | | | | |
| | Master's degree (1 major) Mathematics (2012) | | | | | | |
| | Master's degree (1 major) Mathematics (2010) | | | | | | |
| maste | Master's degree (1 major) Computational Mathematics (2012) | | | | | | |



| Module title | | | | | Abbreviation | |
|--|---|---------------------|----------------------|---|-----------------|--|
| Advanced Physical Chemistry | | | | | 08-PCM1-102-m01 | |
| Module coordinator | | | | Module offered by | | |
| lecture copy) | lecturer of seminar "Laserspektroskopie" (Laser Spectroscopy) | | | Institute of Physical and Theoretical Chemistry | | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | | |
| 10 | nume | rical grade | | | | |
| Duration Module level Other prerequisi | | Other prerequisites | | | | |
| 1 semester graduate | | | | | | |
| Conter | Contents | | | | | |

This module introduces students to the fundamental principles of laser spectroscopy. It discusses absorption and emission spectroscopy. In addition, the module gives students the opportunity to use modern experimental methods in physical chemistry in the laboratory. After a safety briefing, the students autonomously conduct experiments in the laboratory. Students will be expected to take tests and write lab reports to demonstrate their knowledge.

Intended learning outcomes

Students are able to explain the components and operating principles of lasers as well as the optical principles of laser technology. They are able to describe the principles of absorption and emission spectroscopy. Students have developed a high level of proficiency in modern experimental methods in physical chemistry. They are able to analyse the resulting measurements and write a lab report.

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.

- o8-PCM1-1-102: S + Ü (no information on SWS (weekly contact hours) and course language available)
- o8-PCM1-2-102: 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

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 o8-PCM1-1-102: Laser Spectroscopy Laser Spectroscopy

- 5 ECTS, Method of grading: numerical grade
- written examination (90 minutes) or oral examination (20 minutes)
- Language of assessment: German or English

Assessment in module component o8-PCM1-2-102: Advanced Physical Chemistry (Lab)

- 5 ECTS, Method of grading: (not) successfully completed
- Vortestate (pre-experiment exams) and Nachtestate (post-experiment exams) (approx. 15 minutes), log (approx. 15 pages)
- Language of assessment, German or English

| Allocation of places |
|------------------------|
| - |
| Additional information |
| - |
| Workload |
| |
| 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) Chemistry (2010)

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

Master's degree (1 major) Computational Mathematics (2012)



| Module | e title | | | | Abbreviation | | |
|---|--|--|--|-----------------------------|---|--|--|
| Chemical Dynamics | | | | | 08-PCM2-102-m01 | | |
| Module | e coord | inator | | Module offered by | | | |
| lecture mics) | r of sen | ninar "Chemische Dyna | amik" (Chemical Dyna- | Institute of Physica | ll and Theoretical Chemistry | | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Duratio | on | Module level | Other prerequisites | | | | |
| 1 seme | ster | graduate | | | | | |
| Conten | its | | • | | | | |
| | | | | | ical kinetics and reaction dyna- cribing chemical reactions. | | |
| Intend | ed learı | ning outcomes | | | | | |
| | | | ed topics in chemical k on of chemical reaction | | dynamics. They can describe me- | | |
| Course | S (type, r | number of weekly contact hour | s, language — if other than Ge | man) | | | |
| S + Ü (ı | no infor | rmation on SWS (weekl | y contact hours) and co | ourse language avail | able) | | |
| | | sessment (type, scope, lang | guage — if other than German, | examination offered — if no | ot every semester, information on whether | | |
| | | nation (90 minutes) or ssessment: German or | | e candidate each (20 | o minutes) or talk (30 minutes) | | |
| Allocat | ion of p | olaces | | | | | |
| | | | | | | | |
| Additio | nal inf | ormation | | | | | |
| | | | | | | | |
| Worklo | ad | | | | | | |
| | | | | | | | |
| Teaching cycle | | | | | | | |
| | | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | | |
| | | | | | | | |
| Module appears in | | | | | | | |
| Master's degree (1 major) Chemistry (2013) | | | | | | | |
| Master | Master's degree (1 major) Chemistry (2010) | | | | | | |

Master's degree (1 major) Chemistry (2014) Master's degree (1 major) Mathematics (2012)

Master's degree (1 major) Computational Mathematics (2012)



| Module title | | | | | Abbreviation | |
|---|-------|---------------------|----------------------|---|-----------------|--|
| Nanoscale Materials | | | | | 08-PCM3-102-m01 | |
| Module coordinator | | | | Module offered by | | |
| lecturer of the seminar "Nanoskalige Materialien" | | | laterialien" | Institute of Physical and Theoretical Chemistry | | |
| ECTS | Metho | od of grading | Only after succ. con | mpl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Duration Module level | | Other prerequisites | | | | |
| 1 semester graduate | | | | | | |
| Contents | | | | | | |

This module discusses advanced topics in nanoscale materials. It focuses on the structure, properties, fabrication, modern characterisation methods and application areas of nanoscale materials.

Intended learning outcomes

Students are able to characterise nanoscale materials. They are able to name analytical methods and application areas of nanoscale materials.

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)

written examination (90 minutes) or oral examination of one candidate each (20 minutes) or talk (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

Bachelor' degree (1 major) Nanostructure Technology (2010)

Bachelor' degree (1 major) Nanostructure Technology (2012)

Master's degree (1 major) Chemistry (2013)

Master's degree (1 major) Chemistry (2010)

Master's degree (1 major) Chemistry (2014)

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

Master's degree (1 major) Computational Mathematics (2012)

Master's degree (1 major) Functional Materials (2012)



| AA - J.J. | | | | | | | |
|---|--|--|-----------------------------------|-----------------------------|--|--|--|
| Module | | | | | Abbreviation | | |
| Ultrafa | Ultrafast spectroscopy and quantum-control 08-PCM4-102-m01 | | | | | | |
| Module | e coord | inator | | Module offered by | | | |
| | | seminar "Ultrakurzzeitsp | oektroskopie and | Institute of Physica | al and Theoretical Chemistry | | |
| _ | enkontr | | _ | | | | |
| ECTS | | od of grading | Only after succ. con | ıpl. of module(s) | | | |
| 5 | | rical grade | | | | | |
| Duratio | on | Module level | Other prerequisites | | | | |
| 1 seme | | graduate | | | | | |
| Conten | its | | | | | | |
| | | liscusses advanced topic ime-resolved laser spect | | | control. It focuses on ultrashort | | |
| Intend | ed learı | ning outcomes | | | | | |
| plain th princip | ne theo les and | ry of time-resolved laser I applications of quantun | spectroscopy and na n control. | me experimental me | haracterise them. They can exethods. They can describe the | | |
| | | number of weekly contact hours, l | | | | | |
| | | mation on SWS (weekly | | | | | |
| | | sessment (type, scope, langua le for bonus) | ge — if other than German, | examination offered — if no | ot every semester, information on whether | | |
| | | nation (90 minutes) or or ssessment: German or E | | e candidate each (20 | o minutes) or talk (30 minutes) | | |
| Allocat | ion of p | olaces | | | | | |
| | | | | | | | |
| Additio | onal inf | ormation | • | | | | |
| | _ | | , | | | | |
| Worklo | ad | | | | | | |
| | | | | | | | |
| Teaching cycle | | | | | | | |
| | | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | | |
| | | | | | | | |
| Module | e appea | rs in | | | | | |
| Master's degree (1 major) Chemistry (2010) | | | | | | | |

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

Master's degree (1 major) Computational Mathematics (2012)



| Module title | | | | | Abbreviation | | |
|---|---|--|-----------------------------|----------------------------|--|--|--|
| Physical chemistry of supramolecular assemblies 08-PCM5-102-mo1 | | | | | 08-PCM5-102-m01 | | |
| Module coordinator | | | | Module offered by | | | |
| lecture kularer | | seminar "Physikalische | Chemie Supramole- | Institute of Physica | al and Theoretical Chemistry | | |
| ECTS | | od of grading | Only after succ. con | npl. of module(s) | | | |
| 5 | | rical grade | | • | | | |
| Duratio | n | Module level | Other prerequisites | i | | | |
| 1 seme | ster | graduate | | | | | |
| Conten | ts | | • | | | | |
| | | xamines the basic intera of aggregates as well as | | | the formation and physical-cheministry. | | |
| Intende | ed lear | ning outcomes | | | | | |
| in the f | ield. Th | | nation and physical-c | | trating a high degree of expertise of aggregates. They can name mo | | |
| Course | S (type, r | number of weekly contact hours, | language — if other than Ge | rman) | | | |
| S + Ü (r | no info | mation on SWS (weekly | contact hours) and co | ourse language avai | lable) | | |
| | | sessment (type, scope, langualle for bonus) | age — if other than German, | examination offered — if n | ot every semester, information on whether | | |
| minute | s) | nation (90 minutes) and ssessment: German or E | | of one candidate ea | ch (20 minutes) and/or talk (30 | | |
| Allocat | | | | | | | |
| | | | | | | | |
| Additio | nal inf | ormation | | | | | |
| | | | | | | | |
| Worklo | ad | | | | | | |
| | | | . ' | | | | |
| Teachi | ng cycl | e | 1 | | | | |
| | | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | | |
| | | | | | | | |
| Module appears in | | | | | | | |
| | | ee (1 major) Chemistry (2 | 2013) | | | | |
| Master | 's degr | ee (1 major) Chemistry (2 | 2010) | | | | |
| | _ | ee (1 major) Mathematic | | | | | |
| Master | Master's degree (1 major) Technology of Functional Materials (2010) | | | | | | |

Master's degree (1 major) Technology of Functional Materials (2009) Master's degree (1 major) Computational Mathematics (2012)

Master's degree (1 major) Functional Materials (2012)



| Module title Abbreviation | | | | | Abbreviation | |
|---|--|--|------------------------------|-----------------------------|---|--|
| Physical Chemistry (Advanced Lab) 08-PCM6-102-m01 | | | | | 08-PCM6-102-m01 | |
| Module | coord | inator | | Module offered by | | |
| lecture | rs Phys | ikalische Chemie (Physic | cal Chemistry) | Institute of Physica | l and Theoretical Chemistry | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | (not) s | successfully completed | | | | |
| Duratio | n | Module level | Other prerequisites | | | |
| 1 seme | ster | graduate | | | | |
| Conten | ts | | , | | | |
| | | ives students the opport f Physical Chemistry and | | | the research groups based at | |
| | | ning outcomes | team some advance | a synthesis and ana | ytical methods. | |
| | | | research methods t | vnically used by the | relevant physical chemistry rese- | |
| | | | | | questions in physical chemistry. | |
| Course | S (type, r | umber of weekly contact hours, l | anguage — if other than Ger | rman) | | |
| P (no in | format | ion on SWS (weekly cont | act hours) and cours | e language available | 2) | |
| | | | ge — if other than German, o | examination offered — if no | ot every semester, information on whether | |
| | | le for bonus) | | | | |
| | | 20 minutes) ssessment: German or E | nglish | | | |
| Allocat | .= | | | | | |
| | | | | | | |
| Additio | nal inf | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teachir | ng cycl | e | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module appears in | | | | | | |
| Master | 's degr | ee (1 major) Chemistry (2 | 010) | | | |
| Master | Master's degree (1 major) Mathematics (2012) | | | | | |

Master's degree (1 major) Computational Mathematics (2012)



| Module title | | | | | Abbreviation | |
|---|--|--|--|-----------------------------|--|--|
| Theoretical Chemistry 08-TCM1-102-m01 | | | | | 08-TCM1-102-m01 | |
| Module coordinator Module offered by | | | | | | |
| lecture | er of lec | ture "Theoretische Chemi | ie" | Institute of Physica | l and Theoretical Chemistry | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | | | | |
| Durati | on | Module level | Other prerequisites | | | |
| 1 seme | ester | graduate | Admission prerequisite to assessment: successful completion of exercises in the respective classes as specified at the beginning of the course (usually 70% of exercises to be successfully completed) as well as regular attendance of exercises (usually a maximum of 2 incidents of unexcused absence). | | | |
| Conte | nts | | | | | |
| This m | odule i | ntroduces students to the | e fundamental princip | oles of theoretical ch | emistry. | |
| Intend | ed lear | ning outcomes | | | | |
| | | able to describe the math amical approaches of the | | al principles underly | ing the quantum chemical and | |
| Course | es (type, i | number of weekly contact hours, l | anguage — if other than Ger | rman) | | |
| S + Ü (| no info | rmation on SWS (weekly | contact hours) and co | ourse language avail | able) | |
| | | sessment (type, scope, langua ble for bonus) | ge — if other than German, o | examination offered — if no | t every semester, information on whether | |
| | | nation (90 minutes) ssessment: German or E | nglish | | | |
| Alloca | tion of | olaces | | | | |
| | | | | | | |
| Additio | onal inf | ormation | | | | |
| | | | | | | |
| Workle | oad | | | | | |
| | | | | | | |
| Teachi | ing cycl | е | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module appears in | | | | | | |
| | Master's degree (1 major) Chemistry (2010) | | | | | |
| Master's degree (1 major) Mathematics (2012) Master's degree (1 major) Mathematics (2010) | | | | | | |
| | _ | ee (1 major) Mathematics ee (1 major) Computation | | 2) | | |
| | _ | ee (1 major) Computation ee (1 major) FOKUS Pharr | | ۷) | | |
| Master's degree (1 major) Fords Friannacy (2012) | | | | | | |



| Module | Module title Abbreviation | | | | | |
|---|-------------------------------------|--|------------------------------|-----------------------------|---|--|
| Molecu | Molecular Biology 08-BC-MOL-102-m01 | | | | | |
| Module | e coord | inator | | Module offered by | | |
| holder | of the | Chair of Biochemistry | | Chair of Biochemist | try | |
| ECTS | Meth | od of grading | Only after succ. com | pl. of module(s) | | |
| 5 | | rical grade | | • | | |
| Duratio | n | Module level | Other prerequisites | | | |
| 1 seme | ster | undergraduate | | | | |
| Conten | ts | | | | | |
| Compri tional b | | | this module discusse | s advanced topics ir | n molecular physiology and func- | |
| Intende | ed lear | ning outcomes | | | | |
| Studen | ts have | e developed a sound kno | wledge of molecular | biology. | | |
| Course | S (type, i | number of weekly contact hours, l | anguage — if other than Ger | man) | | |
| Ü + V (1 | no info | rmation on SWS (weekly | contact hours) and co | ourse language avail | able) | |
| | | sessment (type, scope, langua ole for bonus) | ge — if other than German, e | examination offered — if no | ot every semester, information on whether | |
| | | nination (90 minutes) or 2 Issessment: German or E | | s (60 to 90 minutes) |) | |
| Allocat | | | | | | |
| | | | | | | |
| Additio | nal inf | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module appears in | | | | | | |
| Master's degree (1 major) Chemistry (2010) | | | | | | |



| Module title | | | | | Abbreviation |
|--|--------|-----------------------|----------------------|-----------------------|--------------------|
| Molecular Biology Practical Course | | | | | 08-BC-MOLP-102-m01 |
| Module coordinator Module offered b | | | | | |
| holder | of the | Chair of Biochemistry | | Chair of Biochemistry | |
| ECTS | Meth | od of grading | Only after succ. con | pl. of module(s) | |
| 5 | nume | rical grade | | | |
| Duratio | on | Module level | Other prerequisites | | |
| 1 seme | ster | undergraduate | | | |
| Contents | | | | | |
| This module equips students with practical skills in the areas of recombinant engineering and characterisation of macromolecular complexes, modern biomolecular techniques, in vivo analysis of biochemical processes, and | | | | | |

modern imaging techniques. Intended learning outcomes

Students have developed a knowledge of molecular biology 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)

pre/post-experiment examination talks (Vor-/Nachtestate, approx. 15 minutes), log (approx. 5 to 10 pages) Language of assessment: German or English

Allocation of places

Number of places: 12. Should the number of applications exceed the number of available places, places will be allocated in a standardised procedure among all applicants irrespective of their subjects according to the following quotas: Quota 1 (80% of places): grade achieved in module 08-BC; among applicants with the same grade, places will be allocated by lot. Quota 2 (20% 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

--

Teaching cycle

--

 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

--

Module appears in



| Module title | | | | | Abbreviation | |
|--|-------------------|--|------------------------------|-----------------------------|--|--|
| Practical course "Molecular Machines" for advanced students 08-BC-VPMM-102-m01 | | | | | 08-BC-VPMM-102-m01 | |
| Module | coord | inator | | Module offered by | , | |
| holder | of the (| Chair of Biochemistry | | Chair of Biochemis | try | |
| ECTS | Metho | od of grading | Only after succ. com | npl. of module(s) | | |
| 10 | nume | rical grade | | | | |
| Duratio | n | Module level | Other prerequisites | | | |
| 1 seme | ster | graduate | | | | |
| Conten | ts | | | | | |
| lar biol | ogy and | | mutagenesis, protein | expression and pur | d methods and topics in molecu- ification, RNA-protein and prote- nplexes. | |
| Intende | ed learr | ning outcomes | | | | |
| Studen work. | ts are a | able to explore a specific | research topic and d | eliver an oral presen | tation on the results of their | |
| Course | S (type, n | umber of weekly contact hours, l | anguage — if other than Ger | rman) | | |
| P (no ir | format | ion on SWS (weekly cont | act hours) and cours | e language available | <u>e)</u> | |
| | | essment (type, scope, langua le for bonus) | ge — if other than German, e | examination offered — if no | ot every semester, information on whether | |
| | | o pages) and talk (appro ssessment: German or E | | | | |
| Allocat | ion of p | olaces | | | | |
| | | | | | | |
| Additio | nal info | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module | Module appears in | | | | | |
| Master's degree (1 major) Chemistry (2010) | | | | | | |



| Module title | | | | | Abbreviation | |
|---|-------------------|---|------------------------------|-----------------------------|---|--|
| Practic | al cour | se "Protein Degradation | 08-BC-VPPD-102-m01 | | | |
| Module | e coord | inator | Module offered by | , | | |
| holder | of the (| Chair of Biochemistry | | Chair of Biochemist | try | |
| ECTS | Metho | od of grading | Only after succ. com | pl. of module(s) | | |
| 10 | nume | rical grade | | | | |
| Duratio | n | Module level | Other prerequisites | | | |
| 1 seme | ster | graduate | | | | |
| Conten | ts | | | | | |
| This mo | _ | ives students the opport | unity to explore a res | earch topic in the fie | eld of protein degradation in eu- | |
| Intend | ed lear | ning outcomes | | | | |
| Studen work. | ts are a | able to explore a specific | research topic and d | eliver an oral presen | tation on the results of their | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Ger | man) | | |
| P (no ir | nformat | tion on SWS (weekly cont | act hours) and course | e language available | 2) | |
| | | Sessment (type, scope, langua | ge — if other than German, e | examination offered — if no | ot every semester, information on whether | |
| | | o pages) and talk (appro ssessment: German or Ei | | | | |
| Allocat | ion of p | olaces | | | | |
| | | | | | | |
| Additio | nal inf | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module | Module appears in | | | | | |
| Master's degree (1 major) Chemistry (2010) | | | | | | |



| Module title Abbreviation | | | | | |
|---|-----------|--|-----------------------------|-----------------------------|--|
| Practio | al cour | se "RNA Biochemistry" f | 08-BC-VPRB-102-m01 | | |
| Module coordinator | | | | Module offered by | |
| holder | of the (| Chair of Biochemistry | | Chair of Biochemis | try |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | |
| 10 | nume | rical grade | | | |
| Duratio | on | Module level | Other prerequisites | | |
| 1 seme | ester | graduate | | | |
| Conter | nts | | | | |
| mes as | s "mole | | ory mechanisms of eu | | eld of RNA biochemistry. Ribososynthesis. Gradient centrifugati- |
| Intend | ed lear | ning outcomes | | | |
| trol wit | th the h | elp of different methods | as well as to present | their findings in an a | eral and specific translation con- appropriate and understandable |
| | _ | number of weekly contact hours, | | | ` |
| | | ion on SWS (weekly con | | | |
| | | sessment (type, scope, langua le for bonus) | age — if other than German, | examination offered — if no | ot every semester, information on whether |
| | | o pages) and talk (appro ssessment: German or E | | | |
| Alloca | tion of p | olaces | | | |
| | | | | | |
| Additio | onal inf | ormation | | | |
| | | | | | |
| Workload | | | | | |
| <u></u> | | | | | |
| Teaching cycle | | | | | |
| | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | |
| | | | | | |
| Module appears in | | | | | |
| Master's degree (1 major) Chemistry (2010) | | | | | |



| Module title Abbreviation | | | | | |
|---|-------------------|---|-----------------------------|-----------------------------|--|
| Practical course "Structural Biology" for advanced | | | | | 08-BC-VPSB-102-m01 |
| Module | coord | inator | | Module offered by | l. |
| holder | of the (| Chair of Biochemistry | | Chair of Biochemis | try |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | |
| 10 | nume | rical grade | | | |
| Duratio | n | Module level | Other prerequisites | | |
| 1 seme | ster | graduate | | | |
| Conten | ts | | | | |
| | damen | tal principles and techni | | | tallisation. It teaches students sation as well as crystallographic |
| Intende | ed lear | ning outcomes | | | |
| | | | | | constructs for crystallisation. Il as data collection and proces- |
| Course | S (type, r | number of weekly contact hours, | anguage — if other than Ger | rman) | |
| P (no in | format | ion on SWS (weekly cont | act hours) and cours | e language available | 2) |
| | | sessment (type, scope, langua le for bonus) | ge — if other than German, | examination offered — if no | ot every semester, information on whether |
| | | o pages) and talk (appro ssessment: German or E | | | |
| Allocat | ion of p | olaces | , | | |
| | | | | | |
| Additio | nal inf | ormation | | | |
| | | | | | |
| Worklo | ad | | | | |
| | | | | | |
| Teaching cycle | | | | | |
| | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | |
| | | | | | |
| Module | appea | ars in | | | |
| Master's degree (1 major) Chemistry (2010) | | | | | |



| Module | e title | | Abbreviation | | |
|---------------------------------------|---|---------------------|----------------------|--|-----------------|
| Princip | les of o | drug design | | | 08-MCM3-102-m01 |
| Module | e coord | inator | | Module offered by | |
| | lecturers Pharmazeutische Chemie (Pharmaceutical Chemistry) | | | Institute of Pharmacy and Food Chemistry | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | |
| 5 | nume | rical grade | | | |
| Duration Module level Other prerequis | | Other prerequisites | es | | |
| 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)

 $\textbf{Method of assessment} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language} - \textbf{if other than German, examination offered} - \textbf{if not every semester, information on whether} \ (\textbf{type}, \textbf{scope}, \textbf{language}) \ (\textbf{type}, \textbf{language}) \$ 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

Workload

Teaching cycle

 $\textbf{Referred to in LPO I} \ \ (\text{examination regulations for teaching-degree programmes})$

Module appears in

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

Master's degree (1 major) Chemistry (2010)

Master's degree (1 major) Mathematics (2010)



| Modul | Module title Abbreviation | | | | | |
|----------|--|--|-----------------------------|-----------------------------|--|--|
| Clinica | l and A | nalytical Chemistry | | | 08-PH-KAC-092-m01 | |
| Modul | e coord | inator | | Module offered by | | |
| | | ture "Klinisch-analytische Chemistry) | e Chemie" (Clinical | Institute of Pharma | cy and Food Chemistry | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | nume | rical grade | - | | | |
| Duration | on | Module level | Other prerequisites | | | |
| 1 seme | ester | undergraduate | | | | |
| Conter | nts | | | | | |
| This m | odule d | iscusses advanced topic | s in clinical analytica | l chemistry. | | |
| Intend | ed lear | ning outcomes | | | | |
| Studer | nts have | e developed an advanced | knowledge of molec | ular biology. | | |
| Course | es (type, r | number of weekly contact hours, l | anguage — if other than Ger | rman) | | |
| V (no i | nformat | tion on SWS (weekly cont | act hours) and cours | e language available | e) | |
| | | | ge — if other than German, | examination offered — if no | t every semester, information on whether | |
| | | le for bonus) | | | | |
| | _ | nation (120 minutes) | | | | |
| Alloca | tion of p | olaces | | | | |
| | | | | | | |
| Additio | onal inf | ormation | | | | |
| | | | | | | |
| Worklo | oad | | | | | |
| | - | | | | | |
| Teachi | ng cycl | e | | | | |
| | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | |
| | | | | | | |
| | Module appears in | | | | | |
| I | Master's degree (1 major) Biochemistry (2012) | | | | | |
| | Master's degree (1 major) Chemistry (2013) Master's degree (1 major) Chemistry (2010) | | | | | |
| | _ | ee (1 major) Chemistry (2 ee (1 major) Chemistry (2 | | | | |
| | musici s degree (1 major) enemistry (2014) | | | | | |



| Module | Module title Abbreviation | | | | | |
|-------------------|---|--|-----------------------------|-----------------------------|---|--|
| Clinica | l and A | nalytical Chemistry (prac | ctical course) | | 08-PH-KACP-092-m01 | |
| Module | e coord | linator | | Module offered by | L | |
| | | ture "Klinisch-analytische l Chemistry) | e Chemie" (Clinical | Institute of Pharma | cy and Food Chemistry | |
| ECTS | Meth | od of grading | Only after succ. cor | npl. of module(s) | | |
| 5 | (not) | successfully completed | | | | |
| Duratio | n | Module level | Other prerequisites | | | |
| 1 seme | ster | undergraduate | | | | |
| Conten | ts | | | | | |
| This mo | | covers practical topics in | clinical chemistry and | d clinical diagnostics | s as well as the related analytical | |
| Intende | ed lear | ning outcomes | | | | |
| Studen ments. | | e developed a knowledge | e of clinical analytical | chemistry and are a | ble to apply it to practical experi- | |
| Course | S (type, | number of weekly contact hours, I | language — if other than Ge | rman) | | |
| P (no ir | nforma | tion on SWS (weekly cont | tact hours) and cours | e language available | 2) | |
| | | sessment (type, scope, langua | ge — if other than German, | examination offered — if no | ot every semester, information on whether | |
| examin | ation t | alks (Testate, approx. 15 | minutes each), log (a | approx. 5 to 10 pages | 5) | |
| Allocat | ion of | places | | | | |
| | | | | | | |
| Additio | nal inf | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teachi | ng cycl | le | | | | |
| | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | |
| | | | | | | |
| Module appears in | | | | | | |
| | Master's degree (1 major) Biochemistry (2012) | | | | | |
| Master | Master's degree (1 major) Chemistry (2013) | | | | | |
| | Master's degree (1 major) Chemistry (2010) | | | | | |
| Master | Master's degree (1 major) Chemistry (2014) | | | | | |



| Module | Module title Abbreviation | | | | | |
|---|--|--|-----------------------------|----------------------|--|--|
| Lab Co | urse M | aterials Science | | | 08-FMM-MP-102-m01 | |
| Module | Module coordinator | | | Module offered by | | |
| lecture ctional | | cialisation subject Funktionals | onsmaterialien (Fun- | Chair of Chemical T | echnology of Material Synthesis | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | (not) | successfully completed | | | | |
| Duratio | on | Module level | Other prerequisites | | | |
| 1 seme | ster | graduate | | | | |
| Conten | its | | | | | |
| Ten sel | lected (| experiments in materials | science. | | | |
| Intend | ed lear | ning outcomes | | | | |
| Studen | its have | e developed an advanced | proficiency in the pe | erformance of experi | ments in materials science. | |
| Course | S (type, i | number of weekly contact hours, l | anguage — if other than Gei | rman) | | |
| P (no ir | nforma | tion on SWS (weekly cont | act hours) and cours | e language available | <u>e)</u> | |
| wodule is Vortest cal per | s creditab tate (pr forman | ole for bonus) re-experiment exams) and ice, log (5 to 10 pages) | l Nachtestate (post-e | | ot every semester, information on whether 5 minutes), assessment of practi | |
| | | ssessment: German or E | nglish | | | |
| Allocat | ion of | places | | | | |
| 1 1949 | | | | | | |
| | nal int | ormation | | | | |
| | | | | | | |
| Worklo | aa | | | | | |
| | | | | | | |
| Teachi | ng cycl | e | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| | Module appears in | | | | | |
| | Master's degree (1 major) Chemistry (2013) Master's degree (1 major) Chemistry (2010) | | | | | |
| | | ee (1 major) Chemistry (2 ee (1 major) Chemistry (2 | | | | |
| Musici | viasier s degree (1 major) enemistry (2014) | | | | | |



| Module | Module title Abbreviation | | | | | |
|----------|---|---|------------------------------|-----------------------------|---|--|
| Project | Work | | | | 08-FMM-PA-102-m01 | |
| Module | Module coordinator | | | Module offered by | | |
| head o | f the re | search group offering the | e module | Chair of Chemical T | echnology of Material Synthesis | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | | |
| 5 | (not) | successfully completed | | | | |
| Duratio | on | Module level | Other prerequisites | | | |
| 1 seme | ster | graduate | - | | | |
| Conten | its | | | | | |
| | | ives students the opport findings. | unity to explore a res | earch topic under th | e guidance of a supervisor and to | |
| Intend | ed lear | ning outcomes | | | | |
| Studen | its have | e developed an advanced | proficiency in the pe | erformance of experi | ments in materials science. | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Ger | man) | | |
| P (no ir | nformat | tion on SWS (weekly cont | act hours) and cours | e language available | 2) | |
| | | sessment (type, scope, langua | ge — if other than German, o | examination offered — if no | ot every semester, information on whether | |
| | | 15 minutes) and log (appr ssessment: German or E | | | | |
| Allocat | ion of p | olaces | | | | |
| | | | | | | |
| Additio | onal inf | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teachi | ng cycl | e | | | | |
| - | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | |
| - | - | | | | | |
| Module | Module appears in | | | | | |
| | Master's degree (1 major) Chemistry (2013) | | | | | |
| | _ | ee (1 major) Chemistry (2 | | | | |
| Master | Master's degree (1 major) Chemistry (2014) | | | | | |



| Modul | Module title Abbreviation | | | | | | |
|----------------|---|---|---|-----------------------------|--|--|--|
| Molecu | ılar Ma | terials (Lecture) | | 08-FMM-CT-102-m01 | | | |
| Modul | e coord | linator | | Module offered by | | | |
| Dean o | f Studi | es Funktionswerkstoffe (I | unctional Materials) | Chair of Chemical T | echnology of Material Synthesis | | |
| ECTS | Meth | od of grading | Only after succ. com | pl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Duratio | n | Module level | Other prerequisites | | | | |
| 1 seme | ster | graduate | | | | | |
| Conter | its | | | | | | |
| This m | odule c | liscusses the theoretical | principles of molecul | ar and soft materials | 5. | | |
| Intend | ed lear | ning outcomes | | | | | |
| | | e developed a knowledge ge to research problems. | of the principles of n | nolecular and soft m | aterials and are able to apply | | |
| Course | S (type, 1 | number of weekly contact hours, l | anguage — if other than Ger | man) | | | |
| V + Ü (| no info | rmation on SWS (weekly | contact hours) and co | urse language avail | able) | | |
| | | sessment (type, scope, langua | ge $-$ if other than German, ϵ | examination offered — if no | t every semester, information on whether | | |
| ten exa | minati | ons: 60 or 90 minutes ea | ch; 3 written examina | ntions: 60 minutes e | examination: 90 minutes; 2 writach) or b) oral examination of ps of 2, approx. 30 minutes) | | |
| Allocat | ion of | places | | | | | |
| | | | | | | | |
| Additio | nal inf | ormation | | | | | |
| | | | | | | | |
| Worklo | ad | | | | | | |
| | | | | | | | |
| Teaching cycle | | | | | | | |
| | | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | | |
| Modul | Module appears in | | | | | | |
| | Master's degree (1 major) Chemistry (2010) | | | | | | |



| Module title Abbro | | | | | Abbreviation | | |
|-----------------------------|---|--|--|-----------------------------|---|--|--|
| Practic | Practical course "Homogeneous catalysis" | | | | 08-HKM3-102-m01 | | |
| Module | coord | inator | | Module offered by | | | |
| | | seminar "Spezielle Meta vendung in der Homoger | J | Faculty of Chemistr | y and Pharmacy | | |
| ECTS | Metho | od of grading | Only after succ. com | pl. of module(s) | | | |
| 10 | (not) | successfully completed | | | | | |
| Duratio | n | Module level | Other prerequisites | | | | |
| 1 seme | ster | graduate | | | | | |
| Conten | ts | | | | | | |
| thods i and cry docum | n homo stallog enting | ogeneous catalysis. The f raphy. Students will be e their findings and deliver | ocus will be on cataly xpected to conduct t | st synthesis and ch | synthesis and analytical me- aracterisation, spectral analysis ndependently, write a lab report | | |
| | - | ning outcomes | | | | | |
| | | | | | eneous catalysis in the lab and to dings and deliver a presentation. | | |
| Course | S (type, r | umber of weekly contact hours, l | anguage — if other than Ger | man) | | | |
| P + P (n | o infor | mation on SWS (weekly o | contact hours) and co | urse language availa | able) | | |
| | | sessment (type, scope, langua le for bonus) | ge — if other than German, o | examination offered — if no | t every semester, information on whether | | |
| | | with lab report (approx. ssessment: German or E | | pprox. 15 minutes) | | | |
| Allocat | | | -3 | | | | |
| | | | | | | | |
| Additio | nal inf | ormation | | | | | |
| | | | | | | | |
| Worklo | ad | | | | | | |
| | | | | | | | |
| Teaching cycle | | | | | | | |
| | | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | | |
| | Module appears in | | | | | | |
| Master | Master's degree (1 major) Chemistry (2010) | | | | | | |



| Modul | e title | | | | Abbreviation | | |
|-------------------------------------|---|---|---|-----------------------------|---|--|--|
| Advanced transition metal chemistry | | | | | 08-HKM4-102-m01 | | |
| Modul | e coord | inator | | Module offered by | | | |
| lecture | r of the | seminar "Spezielle Über | gangsmetallchemie" | Institute of Inorgan | ic Chemistry | | |
| ECTS | Metho | od of grading | Only after succ. com | pl. of module(s) | | | |
| 5 | nume | rical grade | | | | | |
| Duratio | on | Module level | Other prerequisites | | | | |
| 1 seme | ster | graduate | - | | | | |
| Conter | ıts | | | | | | |
| nation | chemis | | | | of transition metals and coordi- l discusses recent developments | | |
| Intend | ed lear | ning outcomes | | | | | |
| | | able to explain transition field. They can explain th | | | monstrating a high degree of exchemistry. | | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Ger | man) | | | |
| S (no i | nformat | tion on SWS (weekly cont | act hours) and cours | e language available | e) | | |
| | | sessment (type, scope, langua le for bonus) | ge $-$ if other than German, ϵ | examination offered — if no | ot every semester, information on whether | | |
| oral ex thods of the cur | aminat of asses rent se | ion in groups (groups of 2 | 2, 30 minutes). Shoul dinator will choose th of the course. | d there be the optio | candidate each (20 minutes) or c) n to choose between several me- d for the module component in | | |
| Allocat | tion of p | olaces | | | | | |
| | | | | | | | |
| Additio | nal inf | ormation | | | | | |
| | | | | | | | |
| Workload | | | | | | | |
| | | | | | | | |
| Teachi | Teaching cycle | | | | | | |
| | | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | - | | | | | | |

Module appears in

Master's degree (1 major) Chemistry (2013) Master's degree (1 major) Chemistry (2010)



| Module title Abbreviation | | | | | Abbreviation | |
|---------------------------------|---|--|---|------------------------|-----------------------------------|--|
| Practic | Practical course medicinal chemistry | | | | 08-MCM1-102-m01 | |
| Module | e coord | inator | | Module offered by | | |
| lecture mistry) | rs Phar | mazeutische Chemie (Ph | armaceutical Che- | Institute of Pharma | cy and Food Chemistry | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 10 | (not) | successfully completed | | | | |
| Duratio | n | Module level | Other prerequisites | | | |
| 1 seme | ster | graduate | | | | |
| Conten | ts | | | | | |
| Selecte | d meth | nods and topics in medic | inal chemistry (synth | esis, testing, analysi | is, theory, pharmacokinetics). | |
| Intende | ed lear | ning outcomes | | | | |
| Studen | ts have | e developed a knowledge | of medicinal chemis | stry and are able to a | pply it to practical experiments. | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Ge | rman) | | |
| P (no ir | nformat | tion on SWS (weekly cont | act hours) and cours | e language available | 2) | |
| wodule is Vortest of prac | creditab ate (pr tical pe | ole for bonus) e-experiment exams) and erformance, written repor | I Nachtestate (post-e t (approx. 30 to 50 pa | xperiment exams) (a | approx. 20 minutes), assessment | |
| Allocat | | ssessment: German or E | ilgiisii | | | |
| Allocal | ן וט ווטון | Diaces | | | | |
| Δdditio | nal inf | ormation | | | | |
| | mat min | omation | | | | |
| Worklo | | | | | | |
| | - uu | | | | | |
| Teachi | ng cycl | <u> </u> | | | | |
| | 3 0,00 | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | |
| | | | | | | |
| Module appears in | | | | | | |
| Master Master Master | Master's degree (1 major) Chemistry (2013) Master's degree (1 major) Chemistry (2010) Master's degree (1 major) Chemistry (2014) Master's degree (1 major) FOKUS Pharmacy (2012) | | | | | |



| Modul | Module title Abbreviation | | | | | |
|---|--|--|--|-----------------------------|---|--|
| Pharmaceutical/Medicinal Chemistry | | | | | 08-MCM2-102-m01 | |
| Modul | e coord | inator | | Module offered by | <u>L</u> | |
| lecture mistry) | | mazeutische Chemie (Ph | armaceutical Che- | Institute of Pharma | cy and Food Chemistry | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | | |
| 10 | nume | rical grade | | | | |
| Duratio | on | Module level | Other prerequisites | | | |
| 3 seme | ester | graduate | | | | |
| Conter | nts | | | | | |
| structu in the r | ire-activ module | vity relationships; molecu | ular effect mechanism thesis; biotransforma | ns; pharmacological | gies for active agent discovery; principles of the drugs discussed tics of individual drugs; history of | |
| Intend | ed lear | ning outcomes | | | | |
| Studer | its have | e developed a knowledge | of pharmaceutical/r | nedicinal chemistry. | | |
| Course | S (type, i | number of weekly contact hours, l | anguage — if other than Ge | rman) | | |
| V (no i | nforma | tion on SWS (weekly cont | act hours) and cours | e language available | e) | |
| | | sessment (type, scope, langua ole for bonus) | ge — if other than German, | examination offered — if no | ot every semester, information on whether | |
| | | ion of one candidate eac ssessment: German or E | | s) | | |
| Allocat | tion of | places | | | | |
| | | | | | | |
| Additio | onal inf | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module appears in | | | | | | |
| Master | Master's degree (1 major) Chemistry (2010) | | | | | |



| Module | Module title Abbreviation | | | | | | |
|---|--|--|----------------------------|-----------------------------|--|--|--|
| Supran | nolecul | ar Chemistry (Practical C | ourse) | | 08-SCM2-102-m01 | | |
| Module | e coord | inator | | Module offered by | I. | | |
| | | ture "Supramolekularen (kalische Chemie)" | Chemie (Organische | Faculty of Chemistr | y and Pharmacy | | |
| ECTS | Metho | od of grading | Only after succ. con | npl. of module(s) | | | |
| 5 | (not) | successfully completed | | | | | |
| Duratio | on | Module level | Other prerequisites | | | | |
| 1 seme | ster | graduate | | | | | |
| Conten | its | | | | | | |
| mistry. | They w | | host-guest complexe | | ents in supramolecular che- nd nanoparticles and use advan- | | |
| Intende | ed learı | ning outcomes | | | | | |
| | | able to perform syntheses hem. They are able to pro | | | roscopic methods to analyse and hem microscopically. | | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Ge | rman) | | | |
| P (no ir | nformat | ion on SWS (weekly cont | act hours) and cours | e language available | e) | | |
| | | sessment (type, scope, langua le for bonus) | ge — if other than German, | examination offered — if no | ot every semester, information on whether | | |
| | | , logs (approx. 5 pages e ssessment: German or E | | | | | |
| Allocat | ion of p | olaces | | | | | |
| | | | | | | | |
| Additio | nal inf | ormation | | | | | |
| Worklo | ad | | | | | | |
| | | | | | | | |
| Teachi | ng cvcl | | | | | | |
| | Teaching cycle | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | | |
| | | | | | | | |
| Module | Module appears in | | | | | | |
| Master | Master's degree (1 major) Chemistry (2013) | | | | | | |
| | Master's degree (1 major) Chemistry (2010) | | | | | | |
| Master | Master's degree (1 major) Chemistry (2014) | | | | | | |



| Module title | | | | | Abbreviation | |
|---|--|---------------------------------------|--|----------------------------|--|--|
| Progra | mming | ; in Theoretical Chem | istry | | 08-TCM3-102-m01 | |
| Module coordinator Module offer | | | | | | |
| lecture mie" | er of led | ture "Programmieren | in Theoretischer Che- | Institute of Physica | al and Theoretical Chemistry | |
| ECTS | Meth | od of grading | Only after succ. cor | npl. of module(s) | | |
| 5 | nume | erical grade | | | | |
| Durati | on | Module level | Other prerequisites | ; | | |
| 1 seme | ester | graduate | | | | |
| Conte | nts | • | | | | |
| | | orovides an introduct ation areas. | ion to the fundamentals | of programming in t | heoretical chemistry and discus- | |
| Intend | ed lear | ning outcomes | | | | |
| | | able to explain and u | | ng languages typica | lly used in theoretical chemistry | |
| Course | es (type, | number of weekly contact h | ours, language — if other than Ge | rman) | | |
| S + Ü (| no info | rmation on SWS (wee | ekly contact hours) and c | ourse language avai | ilable) | |
| | | sessment (type, scope, l | anguage — if other than German, | examination offered — if n | not every semester, information on whether | |
| | | nd discussion of app | rox. 5 programming exerc or English | ises as well as talk | (approx. 45 minutes) | |
| Alloca | tion of | places | | | | |
| | | | | | | |
| Additi | onal in | formation | | | | |
| | | | | | | |
| Workle | oad | | | | | |
| | | | | | | |
| Teachi | ng cyc | le | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module appears in | | | | | | |
| | Master's degree (1 major) Chemistry (2013) | | | | | |
| | Master's degree (1 major) Chemistry (2010) | | | | | |
| | _ | ree (1 major) Chemist | , , , | | | |
| Maste | laster's degree (1 major) Mathematics (2012) | | | | | |

Master's degree (1 major) Mathematics (2010)

Master's degree (1 major) Computational Mathematics (2012)



| Module title | | | | | Abbreviation |
|--------------------------------------|-----------|---------------------------|----------------------|---|-----------------|
| Theoretical Chemistry - Project work | | | | | 08-TCAP-102-m01 |
| Module coordinator | | | | Module offered by | |
| head o | of the re | search group offering the | e module | Institute of Physical and Theoretical Chemistry | |
| ECTS | Meth | od of grading | Only after succ. con | npl. of module(s) | |
| 10 | (not) | successfully completed | | | |
| Duration Module level | | Other prerequisites | | | |
| 1 seme | ester | graduate | | | |
| <i>-</i> . | Combonie | | | | |

Contents

This module gives students the opportunity to get involved in the work of one of the research groups based at the Institute of Theoretical Chemistry and learn some of the methods typically used in the discipline.

Intended learning outcomes

Students have learned some of the methods typically used in theoretical chemistry. They are able to explain issues that are relevant to the fields covered.

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

This module has 3 components; information on courses listed separately for each component.

- 08-TCAP-1-102: P (no information on language and number of weekly contact hours available)
- 08-TCAP-2-102: P (no information on language and number of weekly contact hours available)
- 08-TCAP-3-102: P (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 3 assessment components. To pass the module as a whole students must pass two out of these three assessment components.

Assessment component to module component o8-TCAP-1-102: Theoretische Chemie Arbeitsgruppenpraktikum Wellenpaketdynamik

- 5 ECTS credits, method of grading: (not) successfully completed
- presentation (approx. 30 minutes)
- Language of assessment: German or English

Assessment component to module component o8-TCAP-2-102: Theoretische Chemie Arbeitsgruppenpraktikum Wellenfunktionsmethoden

- 5 ECTS credits, method of grading: (not) successfully completed
- presentation (approx. 30 minutes)
- Language of assessment: German or English

Assessment component to module component o8-TCAP-3-102: Theoretische Chemie Arbeitsgruppenpraktikum Dichtefunktionaltheorie

- 5 ECTS credits, method of grading: (not) successfully completed
- presentation (approx. 30 minutes)
- Language of assessment: German or English

Allocation of places

--

Additional information

Additional information on module duration: 4 weeks..

Workload

--

Teaching cycle

--



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

-

Module appears in

Master's degree (1 major) Chemistry (2010)

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

Master's degree (1 major) Mathematics (2010)

Master's degree (1 major) Computational Mathematics (2012)



| Module title | | | | | Abbreviation | |
|--|------------|---|------------------------------|---------------------|--|--|
| Tutoring 1 (practical course) 08-WRM1-102-m01 | | | | | 08-WRM1-102-m01 | |
| Module coordinator | | | | Module offered by | | |
| Dean of Studies Chemie (Chemistry) | | | | Faculty of Chemistr | y and Pharmacy | |
| ECTS | Meth | od of grading | Only after succ. con | ipl. of module(s) | | |
| 5 | (not) | successfully completed | | | | |
| Duration Module level Other prerequisites | | | Other prerequisites | | | |
| 1 semester graduate - | | | | | | |
| Conter | ıts | | | | | |
| | | rives students the opport d Pharmacy and learn how | | | lecture offered by the Faculty of an appropriate manner. | |
| Intend | ed lear | ning outcomes | | | | |
| Students are able to teach students in earlier stages of their degrees and tailor their teaching to those students' needs. | | | | | | |
| Course | S (type, ı | number of weekly contact hours, | language — if other than Ger | rman) | | |
| 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) | | | | | | |
| preparation of materials for demonstrations and exercises 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) Chemistry (2010) Master's degree (1 major) Food Chemistry (2012) Master's degree (1 major) FOKUS Pharmacy (2012)



| Module | Module title Abbreviation | | | | | |
|---|---|---|--------------------------------------|-----------------------------------|---|--|
| Tutorin | Tutoring 2 (practical course) 08-WRM2-102-m01 | | | | | |
| Module coordinator | | | | Module offered by | | |
| Dean of Studies Chemie (Chemistry) | | | | Faculty of Chemistry and Pharmacy | | |
| ECTS Method of grading | | Only after succ. com | Only after succ. compl. of module(s) | | | |
| 5 | (not) s | successfully completed | | | | |
| Duration | | Module level | Other prerequisites | | | |
| 1 seme | ster | graduate | | | | |
| Conten | ts | | | | | |
| | | gives students the opport I Pharmacy and learn how | | | ecture offered by the Faculty of an appropriate manner. | |
| Intende | ed lear | ning outcomes | | | | |
| Studen needs. | ts are a | able to teach students in | earlier stages of their | r degrees and tailor t | their teaching to those students' | |
| Course | S (type, r | number of weekly contact hours, l | anguage — if other than Ger | man) | | |
| Ü (no ir | nforma | tion on SWS (weekly cont | tact hours) and cours | e language available | <u></u> | |
| | | sessment (type, scope, langua ole for bonus) | ge — if other than German, e | examination offered — if no | ot every semester, information on whether | |
| preparation of materials for demonstrations and exercises Language of assessment: German or English | | | | | | |
| Allocat | | | | | | |
| | | | | | | |
| Additio | nal inf | ormation | | | | |
| | | | | | | |
| Worklo | ad | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module appears in | | | | | | |
| NA 4 | 'c doar | ee (1 major) Chemistry (2 | 010) | | | |

Master's degree (1 major) Food Chemistry (2012)



| Module title Abbreviation | | | | | | |
|--|--|---|--|-----------------|--|--|
| Foreign | Studies (short) | | | 08-APM1-102-m01 | | |
| Module | coordinator | | Module offered by | | | |
| Erasmu | s programme coordinator Ch | emie (Chemistry) | istry) Faculty of Chemistry and Pharmacy | | | |
| ECTS | | | mpl. of module(s) | | | |
| 5 | (not) successfully completed | l | | | | |
| Duration Module level | | Other prerequisites | Other prerequisites | | | |
| 1 semes | ster graduate | Admission prerequisite to assessment: regular attendance of placement | | | | |
| Content | ts | | | | | |
| course | 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 Chemistry (120 ECTS credits); please consult with the competent coordinator in advance. | | | | | |
| Intende | ed 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 | S (type, number of weekly contact hour | s, language — if other than Ge | rman) | | | |
| 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) | | | | | | |
| report (2 pages); proof of having completed lab course Language of assessment: German or English; language of the respective placement country where required | | | | | | |
| Allocation of places | | | | | | |
| | | | | | | |
| Additional information | | | | | | |
| | | | | | | |
| Workload | | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| - | | | | | | |
| Module | Module appears in | | | | | |

Master's degree (1 major) Chemistry (2010) Master's degree (1 major) Food Chemistry (2012)



| Module title Abbreviation | | | | | Abbreviation | |
|--|--|------------------------|--------------------------------------|-----------------------------------|----------------------------------|--|
| Foreign Studies (long) | | | | | 08-APM2-102-m01 | |
| Module coordinator | | | | Module offered by | | |
| Erasmus programme coordinator Chemie | | | nie (Chemistry) | Faculty of Chemistry and Pharmacy | | |
| ECTS | Meth | od of grading | Only after succ. compl. of module(s) | | | |
| 10 | (not) | successfully completed | | | | |
| Duration Module level | | Other prerequisites | | | | |
| 2 seme | ester | graduate | Admission prerequi | site to assessment: | regular attendance of placement. | |
| Conter | ıts | , | | | | |
| 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 Chemistry (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 i | 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) | | | | | | |
| report (2 pages); proof of having completed lab course Language of assessment: German or English; language of the respective placement country where required | | | | | | |
| Allocation of places | | | | | | |
| | | | | | | |
| Additional information | | | | | | |
| <u></u> | | | | | | |
| Workload | | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referre | Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | |

Module appears in

Master's degree (1 major) Chemistry (2010) Master's degree (1 major) Food Chemistry (2012)



Thesis

(30 ECTS credits)



| Module title Abbreviation | | | | | | |
|--|--|---|--|---------------------|-----------------------------------|--|
| Master's Thesis 08-MA-102-m01 | | | | | 08-MA-102-m01 | |
| Module coordinator | | | | Module offered by | | |
| degree programme coordinator Chemie (Chemistry) | | | ie (Chemistry) | Faculty of Chemistr | y and Pharmacy | |
| ECTS | T T | | Only after succ. con | npl. of module(s) | | |
| 30 | nume | erical grade | | • | | |
| | | Other prerequisites | ther prerequisites | | | |
| 1 seme | ster | graduate | Where applicable, specific modules as specified by supervisor. | | | |
| Conten | its | , | , | | | |
| | | gives students the opporescientific methods they | | | oroblem within a given time frame | |
| Intend | ed lear | ning outcomes | | | | |
| | | able to conduct research to present the results of | | | the principles of good scientific | |
| Course | S (type, | number of weekly contact hours | language — if other than Ger | rman) | | |
| no cou | rses as | ssigned | | | | |
| Method of assessment (type, scope, language — if other than German, examination offered — if not every semester, information on whether module is creditable for bonus) | | | | | | |
| written thesis Language of assessment: German or English | | | | | | |
| Allocat | ion of | places | | | | |
| | | | | | | |
| Additional information | | | | | | |
| | | | | | | |
| Workload | | | | | | |
| | | | | | | |
| Teaching cycle | | | | | | |
| | | | | | | |
| Referred to in LPO I (examination regulations for teaching-degree programmes) | | | | | | |
| | | | | | | |
| Module appears in | | | | | | |
| Master | Master's degree (1 major) Chemistry (2010) | | | | | |