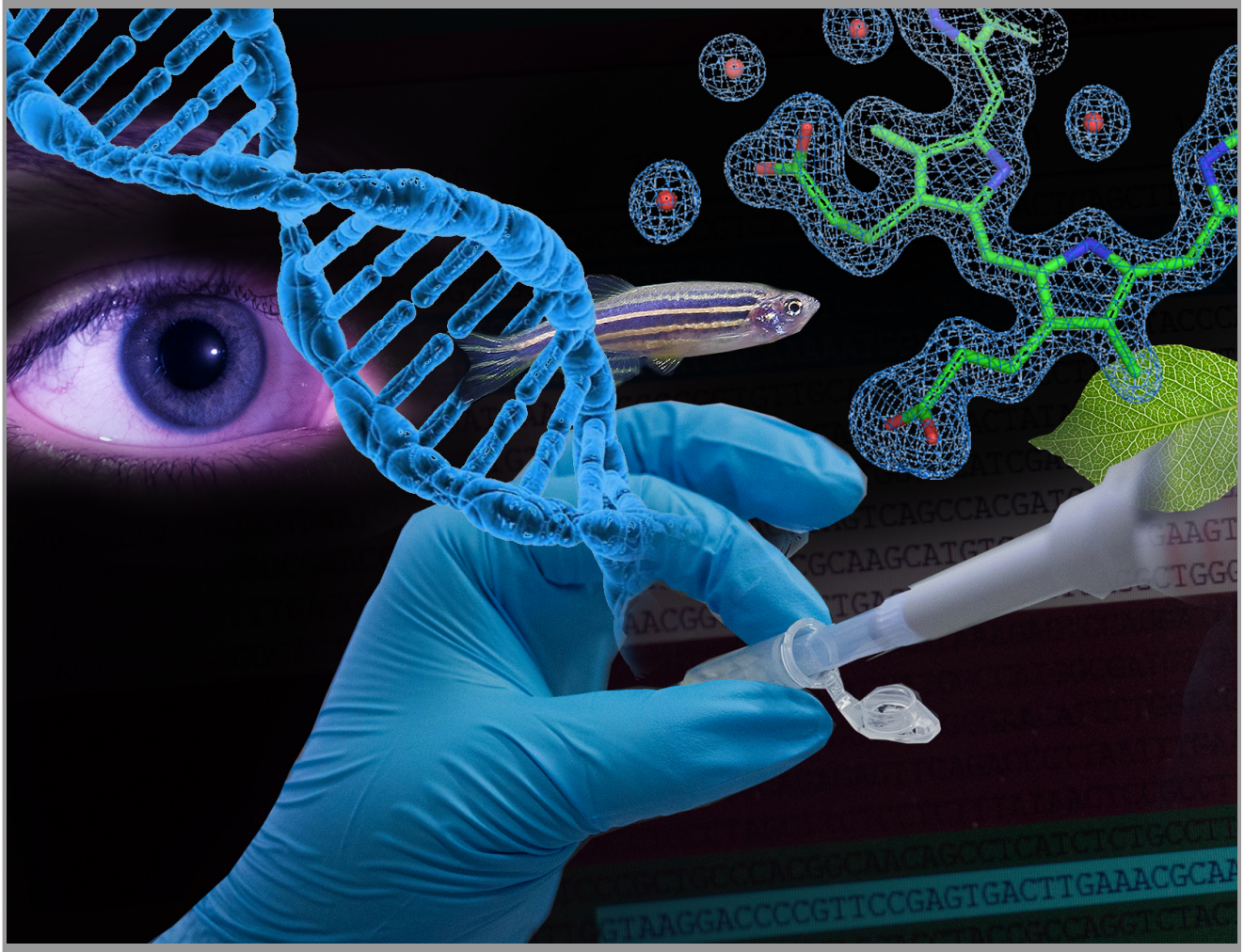
Karlsruher Institut für Technologie

Module Handbook
Biology (B.Sc.)

SPO 2017
Summer term 2018
Stand: 04/09/2018

KIT Department of Chemistry and Biosciences



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SPO 2017 STUDIENPLAN BACHELOR ALLGEMEINE BIOLOGIE ab SS18

Fach	Code	Studienrichtung Allgemeine Biologie	Art	Prüfung	LP
		1. Semester			**30**
Grundlagen biologischer Forschung					
	BA-01	**M-CHEMBIO--103725- Struktur und Funktion des Lebens**			**19**
		T-CHEMBIO-100180 - Grundlagen der Biologie	V	PS	4
		T-CHEMBIO-107514 - Organisation der Tiere	V,P	PS	8
		T-CHEMBIO-107746 - Protokoll Organisation der Tiere		SL	0
		T-CHEMBIO-107515 - Botanik der Nutzpflanzen und zelluläre Grundlagen der Entwicklung	V,P	PA	7
Naturwissenschaftliche Grundlagen biologischer Forschung					
	BA-NA-01	**M-CHEMBIO-100144 - Allgemeine Chemie**			**11**
		T-CHEMBIO-100207 - Allgemeine Chemie	V	PS	4
		T-CHEMBIO-100208 - Praktikum Allgemeine Chemie	P	SL	7
		2. Semester			**29**
Grundlagen biologischer Forschung					
	BA-02	**M-CHEMBIO-103729 - Physiologie**			**11**
		T-CHEMBIO-108658 - Molekularbiologie, Biochemie und Physiologie der Pflanzen	V	PS	2
		T-CHEMBIO-107568 - Physiologie der Tiere	V,P	PS	9
		T-CHEMBIO-107573 - Protokoll Tierphysiologisches Praktikum		SL	0
	BA-03	**M-CHEMBIO-103744- Biodiversität**			**8**
		T-CHEMBIO-107569 - Botanische Bestimmungsübungen	P	PA	3
		T-CHEMBIO-107571 - Botanische Exkursionen	E	SL	1
		T-CHEMBIO-107570 - Zoologische Bestimmungsübungen	P	PA	3
		T-CHEMBIO-107572 - Zoologische Exkursionen	E	SL	1
Naturwissenschaftliche Grundlagen biologischer Forschung					
	BA-NA02	**M-CHEMBIO-100145 - Organische Chemie**			**10**
		T-CHEMBIO-100209 - Organische Chemie	V	PS	3
		T-CHEMBIO-106425 - Praktikum Organische Chemie	P	SL	7
		3. Semester			**30**
Grundlagen biologischer Forschung					
	BA-04	**M-CHEMBIO-103747 - Molekulare Biologie**			**21**
		T-CHEMBIO-107574 - Molekulare Biologie	V	PS	14
		T-CHEMBIO-107575 - Protokoll Praktikum Molekularbiologie		SL	0
		T-CHEMBIO-107576- Praktikum Pflanzenphysiologie	P	PA	7
Naturwissenschaftliche Grundlagen biologischer Forschung					
	BA-NA03	**M-CHEMBIO-100146 - Quantitative Grundlagen**			**4**
		T-CHEMBIO-100211 - Mathematik	V+Ü	SL	4
	BA-NA04	**M-PHYS-100283 - Experimentalphysik Teil1**			**5**
		T-PHYS-100278 - Experimentalphysik Teil 1	V		5

	4. Semester				**31**
Grundlagen biologischer Forschung					
BA-05	**M-CHEMBIO-103748 - Biologische Methoden**				**20**
	T-CHEMBIO-107577 - Moderne Methoden der Biologie	V	PA		4
	T-CHEMBIO-107578 - Methodenpraktikum	P	SL		16
Überfachliche Qualifikationen					
BA-ÜQ-01	**M-CHEMBIO-100151 - Präsentieren/Strukturieren**				**6**
	T-CHEMBIO-100217 - Versuchsdesign (Schnupperpraktikum)	S	SL		3
	T-CHEMBIO-107628 - Einführung in die Präsentationstechniken	Ü	SL		1
	T-CHEMBIO-107629 - Präsentationstechniken*	S	SL		2
Naturwissenschaftliche Grundlagen biologischer Forschung					
BA-NA04	**M-PHYS-100283 - Experimentalphysik Teil2**				**5**
	T-PHYS-100278 - Experimentalphysik Teil 2	V	PS		5
	5. Semester				**30**
Grundlagen biologischer Forschung					
BA-06	**M-CHEMBIO-103749- Biologische Konzepte**				**10**
	T-CHEMBIO-107579 - Modellorganismen und Modellbildung	V	PA		10
BA-07	**M-BGU-103766 - Ökosysteme**				**4**
	T-BGU-101567 - Ökosysteme- Ökosysteme	V	PS		4
Überfachliche Qualifikationen					
BA-ÜQ-02	**M-CHEMBIO-100152 - Recherchieren**				**6**
	T-CHEMBIO-100219 - Originalliteratur kritisch lesen	S	SL		3
	T-CHEMBIO-107630 - Einführung in die Literaturrecherche	Ü	SL		1
	T-CHEMBIO-107631 - Recherche- und Filtertechniken*	S	SL		2
Naturwissenschaftliche Grundlagen biologischer Forschung					
BA-NA-05	**M-CHEMBIO-100149 - Biochemie**				**4**
	T-CHEMBIO-100214 - Biochemie	V	PS		4
BA-NA-06	**M-MATH-100150 - Statistik**				**6**
	T-MATH-106848 - Statistik – Klausur	V	PS		3
	T-MATH-106849 - Statistik – Übungen	Ü	SL		1
	T-MATH-100216 - Rechnergestützte Übungen Statistik	Ü	SL		2
	6. Semester				**30**
Grundlagen biologischer Forschung					
BA-08	**M-CHEMBIO-103750 - Biologische Forschung**				**15**
	T-CHEMBIO-107580 -Moderne biologische Forschung	V, P,S	PA		15
BA-09	**M-CHEMBIO-103836 - Modul Bachelorarbeit**				**15**
	T-CHEMBIO-107935 - Bachelorarbeit	A		PA	15
			Summe		**180**

V= Vorlesung; S= Seminar; P= Praktikum; Ü= Übung; E= Exkursion
PS= Prüfungsleistung schriftlich (benotet); SL= Studienleistung (unbenotet)
PA= Prüfungsleistung anderer Art
* kann durch Veranstaltungen des ZAK/HOC oder Sprachzentrum ersetzt werder

22.02.2018

SPO 2017 ANGEWANDTE BIOLOGIE STUDIENPLAN ab SS18

Code	Studienrichtung Angewandte Biologie	Art	Prüfung	LP
	1. Semester			**30**
Grundlagen biologischer Forschung				
ANG-01	**M-CHEMBIO-103751 - Strukturell-funktionelle Aspekte biologischer Anwendung**			**19**
	T-CHEMBIO-100180 - Grundlagen der Biologie	V	PS	4
	T-CHEMBIO-107745- Organisation der Tiere (Studienrichtung Angewandte Biologie)	V, P	PS	6
	T-CHEMBIO-107746 - Protokoll Organisation der Tiere		SL	0
	T-CHEMBIO-107582 - Botanik der Nutzpflanzen und Grüne Biotechnologie	V,P,S	PA	9
Naturwissenschaftliche Grundlagen biologischer Anwendung				
ANG-NA-01	**M-CHEMBIO-100144 - Allgemeine Chemie**			**11**
	T-CHEMBIO-100207 - Allgemeine Chemie	V	PS	4
	T-CHEMBIO-100208 - Praktikum Allgemeine Chemie	P	SL	7
	2. Semester			**30**
Grundlagen biologischer Anwendung				
ANG-02	**M-CHEMBIO-103784 - Physiologische Aspekte der Biotechnologie**			**16**
	T-CHEMBIO-108658 - Molekularbiologie, Biochemie und Physiologie der Pflanzen	V	PS	2
	T-CHEMBIO-107568 - Physiologie der Tiere	V,P	PS	9
	T-CHEMBIO-107573 - Protokoll Tierphysiologisches Praktikum		SL	0
	T-CHEMBIO-107633 - Praktikum Grüne Biotechnologie	P	PA	5
ANG-03	**M-CHEMBIO-103785 - Angewandte Biodiversität**			**4**
	T-CHEMBIO-107634 - Praktikum mikrobielle Diversität	P	PA	4
Naturwissenschaftliche Grundlagen biologischer Anwendung				
ANG-NA02	**M-CHEMBIO-100145 - Organische Chemie**			**10**
	T-CHEMBIO-100209 - Organische Chemie	V	PS	3
	T-CHEMBIO-106425 - Praktikum Organische Chemie	P	SL	7
	3. Semester			**29**
Grundlagen biologischer Anwendung				
ANG-04	**M-CHEMBIO-103786- Molekulare Aspekte der Angewandten Biologie**			**20**
	T-CHEMBIO-107636 - Molekulare Biologie für Angewandte Biologie	V	PS	14
	T-CHEMBIO- 107637- Protokoll Praktikum Molekularbiologie		SL	0
	T-CHEMBIO-107638 - Praktikum Technische Biologie	P	PA	6
Naturwissenschaftliche Grundlagen biologischer Anwendung				
ANG-NA03	**M-CHEMBIO-100146 - Quantitative Grundlagen**			**4**
	T-CHEMBIO-100211 - Mathematik	V+Ü	SL	4
ANG-NA04	**M-PHYS-100283 - Experimentalphysik Teil1**			**5**
	T-PHYS-100278 - Experimentalphysik Teil 1	V		5
	4. Semester			**31**
Grundlagen biologischer Anwendung				
ANG-05	**M-CHEMBIO-103748 - Biologische Methoden**			**20**
	T-CHEMBIO-107577 - Moderne Methoden der Biologie	V	PA	4
	T-CHEMBIO-107578 - Methodenpraktikum	P	SL	16
Überfachliche Qualifikationen				
ANG-ÜQ-01	**M-CHEMBIO-100151 - Präsentieren/Strukturieren**			**6**
	T-CHEMBIO-100217 - Versuchsdesign (Schnupperpraktikum)	S	SL	3
	T-CHEMBIO-107628 - Einführung in die Präsentationstechniken	Ü	SL	1
	T-CHEMBIO-107629 - Präsentationstechniken*	S	SL	2
Naturwissenschaftliche Grundlagen biologischer Anwendung				
ANG-NA04	**M-PHYS-100283 - Experimentalphysik Teil2**			**5**
	T-PHYS-100278 - Experimentalphysik Teil 2	V	PS	5

	5. Semester			**30**
Grundlagen biologischer Anwendung				
ANG-06	**M-CHEMBIO-103812 - Konzepte der biologischen Anwendung**			**7**
	T-CIWVT-103335 - Bioprozesstechnik	V	PS	7
ANG-07	**M-BGU-103766- Ökosysteme**			**4**
	T-BGU-101567- Ökosysteme	V	PS	4
Überfachliche Qualifikationen				
ANG-ÜQ-02	**M-CHEMBIO-103789 - Gesellschaftliche Aspekte der Biotechnologie**			**9**
	T-CHEMBIO-100233 - Biotechnologie und Gesellschaft	S	SL	6
	T-CHEMBIO- 100219 - Originalliteratur kritisch lesen	S	SL	3
Naturwissenschaftliche Grundlagen biologischer Anwendung				
ANG-NA-05	**M-CHEMBIO-100149 - Biochemie**			**4**
	T-CHEMBIO-100214 - Biochemie	V	PS	4
ANG-NA-06	**M-MATH-100150 - Statistik**			**6**
	T-MATH-106848 - Statistik – Klausur	V	PS	3
	T-MATH-106849 - Statistik – Übungen	Ü	SL	1
	T-MATH-100216 - Rechnergestützte Übungen Statistik	Ü	SL	2
	6. Semester			**30**
Grundlagen biologischer Anwendung				
ANG-08	**M-CHEMBIO-103823- Biologische Anwendung**			**15**
	T-CHEMBIO-107580 -Moderne biologischen Foschung	V,P,S	PA	15
ANG-09	**M-CHEMBIO-103836 - Modul Bachelorarbeit**			**15**
	T-CHEMBIO-107935 - Bachelorarbeit	PA	PA	15
			Summe	**180**

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08.04.2018

Teil III
Modules

1 Orientation Exam

M Module: Orientation Exam [M-CHEMBIO-103490]

Responsibility:

Organisation: KIT-Fakultät für Chemie und Biowissenschaften
Curricular Anchorage: Compulsory
Contained in: Orientation Exam

ECTS	Recurrence	Duration	Language	Version
0	Each term	2 terms	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-100180	Fundamentals of Biology (S. 75)	4	Peter Nick
T-CHEMBIO-107746	Protocol of the practical Morphology of Animals (S. 97)	0	Joachim Bentrop

Organisation der Tiere
Non-Compulsory Block; You must choose 1 courses.

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-107514	Functional Morphology of Animals (S. 73)	8	Joachim Bentrop
T-CHEMBIO-107745	Functional Morphology of Animals (Degree Course Applied Biology) (S. 74)	6	

Botanik der Nutzpflanzen/Grüne Biotechnologie/Zelluläre Grundlagen der Entwicklung
Non-Compulsory Block; You must choose 1 courses.

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-107582	Botany of Crop Plants and Green Biotechnology (S. 62)	9	Peter Nick
T-CHEMBIO-107515	Botany of Crop Plants and Cellular Basics of Development (S. 61)	7	Peter Nick

Conditions
None

2 Bachelor Thesis

M Module: Module Bachelor Thesis (ANG-08/BA-08) [M-CHEMBIO-103836]

Responsibility: Johannes Gescher

Organisation: KIT-Fakultät für Chemie und Biowissenschaften

Curricular Anchorage: Compulsory

Contained in: Bachelor Thesis

ECTS	Recurrence	Duration	Language	Version
15	Each winter term	1 term	German	1

Compulsory

Identifier	Course	ECTS Responsibility
T-CHEMBIO-107758	Bachelor Thesis (S. 57)	15

Conditions
120 CP

3 Field of Study

3.1 General Biology

3.1.1 Fundamentals of Biological Research

M Module: Stucture and Function of Life (BA-01) [M-CHEMBIO-103725]

Responsibility: Martin Bastmeyer, Jörg Kämper, Peter Nick

Organisation: KIT-Fakultät für Chemie und Biowissenschaften

Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Biological Research

ECTS	Recurrence	Duration	Language	Version
19	Each winter term	1 term	German	7

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-100180	Fundamentals of Biology (S. 75)	4	Peter Nick
T-CHEMBIO-107514	Functional Morphology of Animals (S. 73)	8	Joachim Bentrop
T-CHEMBIO-107515	Botany of Crop Plants and Cellular Basics of Development (S. 61)	7	Peter Nick
T-CHEMBIO-107746	Protocol of the practical Morphology of Animals (S. 97)	0	Joachim Bentrop

Learning Control / Examinations
The control of success of this module includes two marked certificates of performance and one evaluations composed of a different kind of graded assessment and one ungraded coursework.
Written examination with a duration of 120 minutes is passed for "Fundamentals of Biology" and "Functional Morphology of Animals" For the practical part of "Functional Morphology of Animals" a scientific protocol should be made. (ungraded courswork)
For "Botany of Crop Plants and Cellular Basics of Development" the examination consists of a different kind of graded assessment

The Modul Structure and Function of life is part of the Orienation exam and therefor it has to be passed until the end of the rewiev period of the second semester.

Conditions
none

Qualification Objectives
The students can follow biological basics and put them in relation to each other on a simple level to explain basic phenomena of biology:

- molecular and cellular basics of life
- mechanism and fundamental laws of inheritance
- characteristics of organisation from different animal groups and their context to evolution, function and development
- structure and function of plant cells, tissue and organs and their context to evolution, function and development
- understanding of the principles of plant organisation and the base of plant biodiversity

Content
The module structure and function of life is a general introduction to the basics of biology. This includes fundamentals of cell biology and genetics as well as morphology and anatomy from animals and plants and mechanisms of evolution.

Content of the botanical part:
Lecture Crop Plants:

- Part 1 Organisation and function of plant cells, pflanzlicher Zellen
- Part 2 Differentiation and function of plant tissues
- Part 3 Structure and adaptation of plant organs
- Part 4: Specific traits, domestication, and utiliszation of selected crop-plant taxa. Cross-linked topis: Applied aspects of plant research, plant aspects of human nutrition.

Practical Course Crop Plants:

- practical exercise of the topics discussed in the lecture, scientific drawing, and interpretation of microscopial specimens.
- Cellular Aspects of Plant Development: Cell division and cytoskeleton, organisation of plant cells, plant organelles, metabolic activities of plants, pattern formation, cell differentiation, control of growth, genetical control of flowering, embryogenesis, regulation of developmental dynamics.

Literature
Grundlagen der Biologie

- Purves, Sadava, Orians, Heller - Biologie (in der Lehrbuchsammlung, Lesesaal Naturwissenschaften unter 2006 A 5765(7))
- Campbell, Reece, Markl - Biologie (in der Lehrbuchsammlung, Lesesaal Naturwissenschaften unter 97 E 322(6,N))
- Weitere Lehrbücher werden in den einführenden Vorlesungsstunden vorgestellt.

Lehrbücher der Zoologie, z.B.:

- Zoologie (Hickman et al.) Pearson Studium, 13. Auflage
- Zoologie (Wehner, Gehring) Thieme Verlag, 24. Auflage
- Spezielle Zoologie (Rieger, Westheide) Spektrum Akademischer Verlag, 2. Auflage
- Systematische Zoologie (Storch, Welsch) Spektrum Akademischer Verlag, 6. Auflage
- Internetmaterialien

Botanik der Nutzpflanzen und zelluläre Grundlagen der Entwicklung

- Strasburger Botanik Standort: Lehrbuchsammlung, Fachgruppe: biol 4.03, Signatur: 91 E 677(36)

- Lüttge, Kluge, Bauer, Botanik Standort: Lehrbuchsammlung, Fachgruppe: biol 4.03 Signatur: 88 A 3916(5)
- Raven, Biologie der Pflanzen Standort: Lehrbuchsammlung Fachgruppe: biol 4.0, Signatur: 85 E 671(4)
- Internetmaterialien

weitere Informationen auf:
http://www.biologie.kit.edu/308.php

Workload

- Fundamentals of Biology (L): 56 presence hours; 64 hours processing time
- Functional Morphology of Animals (L): 42presence hours; 48 hours processing time
- Zoological Practical course: (P): 56 presence hours; 94 hours processing time
- Functional Morphology of Plants (L): 28 presence hours; 32 hours processing time
- Botanical Practical course (P): 56 presence hours; 94 hours processing time

Processing time is generally understood as preparation and follow up processing time. In the practical courses the processing time includes also the evaluation of results, the preparing of drawings and writing of reports.

M Module: Physiology (BA-02) [M-CHEMBIO-103729]

Responsibility: Manfred Focke, Dietmar Gradl, Ferdinand le Noble, Holger Puchta

Organisation: KIT-Fakultät für Chemie und Biowissenschaften

Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Biological Research

ECTS	Recurrence	Duration	Language	Version
11	Each summer term	1 term	German	4

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-107568	Animal Physiology (S. 55)	9	Dietmar Gradl
T-CHEMBIO-107573	Animal Physiology Practical Protocol (S. 56)	0	
T-CHEMBIO-108658	Molecular Biology, Biochemistry and Physiology of Plants (S. 86)		Holger Puchta

Learning Control / Examinations
The control of success of this module includes two written examinations and one ungraded coursework.

The written examination examination with a duration of 120 minutes is passed for the lecture "Plant Physiology an biochemistry" and the Practical Course and lecture of "Animal Physiology"
For the Practical course "Animal Physiology" on protocol should be made (ungraded coursework)

Conditions
none

Qualification Objectives
The students develop an understanding for the dynamic function of organisms. They can explain biological phenomena on functional level:

- Animal Physiology, funktion of animal organs
- Characteristics of the animal metabolism
- Physiology of plants
- Characteristics of the plant metabolism
- trangene plants

Content
The module Physiology leads the mechanisms and principles, which were mediated in module BA-01 to the level of the organism (Physiology, Biochemistry and development Biology)

Literature
Physiology and Biochemistry of Plants:

- Allgemeine und molekulare Botanik (E. Weiler, L. Nover) Thieme 2008
- Srasburger- Lehrbuch der Pflanzenwissenschaften (Kadereit) Springer 2014
- Biochemistry and Molecular Biology of Plants (Buchanan) Wiley 2015
- Pflanzenbiochemie (H.W. Heldt) Springer 2014
- Pflanzenphysiologie (Schopfer, Brennicke) Springer 2016
- Botanik (U. Lüttge et al) Wiley-VCH 2015
- Internetmaterialien

Physiology of Animals:

- Lehrbücher: Tierphysiologie (Eckert) Thieme 2003
- Tierphysiologie (Penzlin) Springer 2003
- Biologie (Campbell) Pearson 2006

Workload

- Physiology and biochemistry of plants (V) 2 SWS; 22 hours presence time; 2 CP; 38 hours processing time
- Animal Physiologie (V) 2 SWS; 22 hours presence time; 2 CP; 38 hours processing time
- Practical course animal physiology (P) 4 SWS; 45 hours presence time;5 LP; 105 hours processing time

M Module: Biodiversity (BA-03) [M-CHEMBIO-103744]

Responsibility: Maren Riemann, Urszula Weclawski, Beatrix Zaban

Organisation: KIT-Fakultät für Chemie und Biowissenschaften

Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Biological Research

ECTS	Recurrence	Duration	Language	Version
8	Each summer term	1 term	German	3

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-107569	Exercise in Botanical Taxonomy (S. 67)	3	Maren Riemann, Beatrix Zaban
T-CHEMBIO-107571	Field Practical Botany (S. 71)	1	Maren Riemann, Beatrix Zaban
T-CHEMBIO-107570	Exercise in Zoological Taxonomy (S. 68)	3	Urszula Weclawski
T-CHEMBIO-107572	Field Practical Zoology (S. 72)	1	Horst Taraschewski, Urszula Weclawski

Learning Control / Examinations
The control of success of this module includes two marked performance of different types of examtination and two academic performendes for the excursions.

Details of the Controll of Success are listed in the respective partial performence

Conditions
none

Qualification Objectives
The students learn organism and the interaction of organisms in eccological systems. They are able to recognize the biodiversity of animals and plants. They understand following themes and can create the relationships between them:

- Botanical and zoological systematics
- Relation between morphology and mode of life
- basic legality of ecology

With this together the students can:

- understand basic taxonomical methods
- create simple pedigree
- they can handle the classification keys.
- to relate and recognize the characteristics of the plant and animal families of
- to recognize typical regional biotopes
- on the example of this biotopes the students can networked ecological connections.

Content
On the level of biotic communities of organisms, in other words ecosystems (biodiversity and ecology) the level of orgnanisms will be brought together. This is a question of getting the overview over the biological diversity.

- understand basic taxonomical methods
- they can handle the classification keys.
- to relate and recognize the characteristics of the plant and animal families of
- to recognize typical regional biotopes
- on the example of this biotopes the students can networked ecological connections.

Literature
botany

- SCHMEIL-FITSCHEN - Die Flora Deutschlands und angrenzender Länder (96. Auflage)
- Rothmaler - Exkursionsflora von Deutschland, Gefäßpflanzen: Atlasband (13. Auflage)
- Rita Lüder - Grundkurs Pflanzenbestimmung: Eine Praxisanleitung für Anfänger und Fortgeschrittene (7. Auflage)

- botanical garden of the KIT

zoology

- M. Schaefer: Brohmer - Fauna von Deutschland, Quelle & Meyer, neueste Auflage

- Spezielle Zoologie (R.M. Rieger, W. Westheide), Spektrum, Akademischer Verlag, 2003/2004

M Module: Molecular Biology (BA-04) [M-CHEMBIO-103747]

Responsibility: Reinhard Fischer, Jörg Kämper, Natalia Requena

Organisation: KIT-Fakultät für Chemie und Biowissenschaften

Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Biological Research

ECTS	Recurrence	Duration	Language	Version
21	Each winter term	1 term	German	2

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-107574	Molecular Biology (S. 83)	14	Reinhard Fischer, Jörg Kämper, Natalia Requena
T-CHEMBIO-107575	Molecular Biology Practical Protocol (S. 85)	0	Reinhard Fischer, Jörg Kämper, Natalia Requena
T-CHEMBIO-107576	Practical Course in Plant Physiology (S. 89)	7	Manfred Focke, Holger Puchta

Learning Control / Examinations
The control of success of this module includes one written marked certificate of performance and one non graded coursework

- The written examination in the extent of 120 minutes is passed passed for the exam component Molecular Biology wich includes the lecture of Microbiology (3 CP), Molecular Biology (2CP) and Genetics (2LP) and the practical course of Molecular Biology(14LP)
- For the Practical course "Plant Physiology" the controll of success is an alternative exam assessment.
- For the Practical course "Molecular Biology" a protocol has to be written. (non graded coursework)

Detailed Information about the control of success can be read in the description of the exam components

Conditions
none

Qualification Objectives
The students will deepen their knowledge of the molecular basics of life and the technical possibilities about the changings of genes and the manipulation of their expression. This includes a deep theoretical understanding in the following fields:

- introducing in molecular biology of plants
- particular characteristics of the plant metabolism
- transgene plants
- Microbiology
- Genetics
- Molecular Biology

Content
The module Molecular Biology expands the knowledge of the molecular fundamentals.
Besides the molecular biology of plants within the Plant Physiology practical course lectures in Microbiology, Genetics and Molecular Biology are on the program. The lectures are deepened by the Molecular Biology Practical course

Literature
Mikrobiology:

- K. Munk (Hrsg.) Grundstudium Mikrobiologie, Spektrum Vlg.
- Madigan/Martinko/Parker "Brock Mikrobiologie (Hrsg. W. Goebel), Spektrum

- G. Fuchs "Allgemeine Mikrobiologie", Thieme Vlg.

Genetics:

- Inhalt der Vorlesung in Stichworten
- Lehrbücher der Genetik, z.B. Knippers, Molekulare Genetik, 9. Auflage; Watson, Molecular Biology of the Gene, 5. Auflage; Griffiths, Introduction to Genetic Analysis, 9. Auflage

Molecular Biology:

- Lehrbücher der Molekularbiologie, z.B. Molekulare Zellbiologie-Lodish (Spektrum),Watson-Molekularbiologie (Pearson)

M Module: Biological Methods (BA-05/ ANG-05) [M-CHEMBIO-103748]

Responsibility: Peter Nick

Organisation: KIT-Fakultät für Chemie und Biowissenschaften
Curricular Anchorage: Compulsory
Contained in: Field of Study / General Biology / Fundamentals of Biological Research
Field of Study / Applied Biology / Fundamentals of Biological Application

ECTS	Recurrence	Duration	Language	Version
20	Each summer term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-107577	Methods of Current Biology (S. 81)	4	Peter Nick
T-CHEMBIO-107578	Practical Course Biological Methods (S. 88)	16	Peter Nick

Learning Control / Examinations
The control of success of this module includes one alternative exam assesment for the exam component Methods of Current Biology one non graded coursework for the Practical Course Biological Methods

The detailed description of the control of success can be found in the description of the exam component.

Conditions
none

Qualification Objectives
The students understand the theoretical fundamentals from all methods applied in Biology. Underguidance they can put important techniques of modern biology into practice. Amongst those following techniques:

- fluorescence microscopy.; Handling with fluorescent proteins and immunofluorescence
- Western Blotting
- Genomic and RT-PCR
- Bio-informatic analysis and Handling with Gen Databases

They are able to

- adapt the basic techniques to the particular scientific question and system
- They can assure not to produce scientific artefacts by the conception of control experiments.
- They can find problem solving strategies for a defined question.
- Working successful in a research team.

Content
The module Biological Methods deal the modern practical aspects of Biology. In a series of lectures the entire spectrum ofbiological methods is presented undthoroughly treated. Competence in applying scientific methods does not mean to "cook" the protocols in the lab. Only those who understand, why a biological method function a special way, is expected to be in a position to answer to a concrete problem successfully.
The lecture is being held during the semester and is accompanied by theintensive practical course, where the students can exercise in the afternoon what they have heard in the lecture in the morning. During the practical course the studenst circulate in small teams through the different institutes and learn thereby differnet scientific question of research.
In the second half of the semester the students will be familiarized with theoretical methods of Biology and data base research in a special bio-informaticblock.
In the last third of the semester an initiation practical is absolved (if possible in the lab of choice). In a connection of a seminar, own research and practical labwork they have the possibility to get first laboratory experience

Recommendations
important informations on:
http://www.biologie.kit.edu/311.php
http://www.biologie.kit.edu/454.php
http://www.biologie.kit.edu/543.php

M Module: Biological Concepts (BA-06) [M-CHEMBIO-103749]

Responsibility: Peter Nick

Organisation: KIT-Fakultät für Chemie und Biowissenschaften
Curricular Anchorage: Compulsory
Contained in: Field of Study / General Biology / Fundamentals of Biological Research

ECTS	Recurrence	Duration	Language	Version
10	Each winter term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-107579	Model Organisms and Model Generation and Design (S. 82)	10	Peter Nick

Learning Control / Examinations
The examination consists of a different kind of graded assessment.
All together it can 100 points be earned. The following examination parts must be completed:

- one oral part examination with a duration of 30 minutes about the contents of the lectures Modell Organisms (60 points)
- successful completion of exercises about the contents of the lecture Model Generation and Design (40 points)
- In addition a mark improvement of one part grade for a voluntary homework may be obtained

Conditions
none

Qualification Objectives
The students learn to think conceptional and networked. They gained following skills:

- Thinking problem orientated through the example of model organisms
- They can handle basic concepts biological model generation and Theory of scientists
- They are able to dicuss ethical aspects of Biology
- Thea can formulate scientific questions and develop experimental strategies
- They can read publications critical
- They can research scientific databases indipendently
- The are able to develop a scientific stndpoint

Content
The fourth semester was characterized by experimental methods, but the fifth semester deals mainly with the question of concepts in Biology.
The contents of the previous semesters (organismic-oriented courses: Morphology, Anatomy, Evolution, Ecology; cellular oriented courses: Cell Biology, Microbiology and molecular oriented courses: Genetics, Molecular Biology, Methods) could be related to each other.
On the other side you learn to reflect about your own approaches and to think about their limits and to reflect Basics of scientific thinking.
In a lecture series the most important model organisms, their applications, their advantages and disadvantages are introduced.
1. What are model organisms?
2. Prokaryotes
3. Archea
4. Yeast

5. filamentous fungus
6. Plant-microbe- interaction
7. Arabidopsis
8. Rice
9. Moses
10. Parasites and Ceanorhabditis
11: Fish and chicken
12. Amphibian
13. Mouse
14. Mammalian cell culture

Literature
http://www.biologie.kit.edu/390.php

M Module: Ecosystems (BA-07/ ANG-07) [M-BGU-103766]

Responsibility: Sebastian Schmidtlein, Wolfgang Wilcke

Organisation: KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften

Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Biological Research
Field of Study / Applied Biology / Fundamentals of Biological Application

ECTS	Recurrence	Duration	Language	Version
4	Jährlich	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-BGU-101567	Ecosystems (S. 66)	4	Sebastian Schmidtlein

Conditions
None

Remarks
None

M Module: Biological Reseach (BA-08/ ANG-08) [M-CHEMBIO-103750]

Responsibility: Johannes Gescher

Organisation: KIT-Fakultät für Chemie und Biowissenschaften
Curricular Anchorage: Compulsory
Contained in: Field of Study / General Biology / Fundamentals of Biological Research

ECTS	Recurrence	Duration	Language	Version
15	Each winter term	1 term	German	2

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-107580	Current Biological Research (S. 65)	15	Johannes Gescher

Learning Control / Examinations
The control of success of this module is one marked performance of different types of examination
Maximum 100 points can be reached. These points consits the following components:

- On examination is a written part, with duration of 120 minutes, about the contents of the lecture and the practical part. With this performance 80 points can be reached.
- Beside this written test, a protocol of the practical part must be written. This protocol must be in accordance with scientific requirements.
  For this protocol 10 points can be reached.
- Furthermore, 10 points can be achieved by giving a talk about the contents of the course within the working group.

Conditions
none

Qualification Objectives
The students develop their Knowledge in theory and practical experience and methods in a field of their choice.

- They get a deeper insight in biological concepts
- They exercise problem orientated thinking and experimental design
- They gain routine in dealing with biological methods
- They learn to formulate a scientific project independently and to process it.
- They learn to present their work understandably and clearly to other people.
- They learn to collect informations problem orientated and to scrutinize critically scientific datas

Content
For the practical course with the associated lecture and seminar a research subject in a working group could be selected. Here you can get an insight in the current research of a working group, where you absolve also your bachelor thesis. It is a matter to get a deeper insight exemplary , konceptionell and methodically in a biological field.

Remarks
The duration of the module is 4 weeks, the module takes place after the WS.

Workload
Presence time (lecture and practical course): 156 h
Preparation and follow-up time: 394 h

3.1.2 Fundamentals of Natural Science in Biological Research

M Module: General Chemistry (BA-NA01) [M-CHEMBIO-100144]

Responsibility: Claus Feldmann

Organisation: KIT-Fakultät für Chemie und Biowissenschaften

Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Natural Science in Biological Research
Field of Study / Applied Biology / Fundamentals of Natural Science on Biological Application

ECTS	Recurrence	Duration	Language	Version
11	Each winter term	1 term	German	2

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-100207	General Chemistry (S. 76)	4	Helmut Goesmann
T-CHEMBIO-100208	Practical in General Chemistry (S. 91)	7	Helmut Goesmann

Learning Control / Examinations
The control of success is one written examination with a duration of 120 minutes about the contents of the lecture and one ungraded coursework about the practical course.

M Module: Organic Chemistry (BA-NA02) [M-CHEMBIO-100145]

Responsibility: Stefan Bräse

Organisation: KIT-Fakultät für Chemie und Biowissenschaften
Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Natural Science in Biological Research
Field of Study / Applied Biology / Fundamentals of Natural Science on Biological Application

ECTS	Recurrence	Duration	Language	Version
10	Each summer term	2 terms	German	2

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-100209	Organic Chemistry (S. 87)	3	Norbert Foitzik, wechselnde Dozenten, siehe Vorlesungsverzeichnis
T-CHEMBIO-106425	Practical Course Organic Chemistry (S. 90)	7	

Learning Control / Examinations
The control of success is one written examination with a duration of 120 minutes about the contents of the lecture and one ungraded coursework about the practical course.

Conditions
None

Qualification Objectives
the students aqcuire theoretical and practical basic knowledge of chemistry

- They can handle hazardous substances laboratory apparatus safety
- They can handle with basic lab techniques (weigh, mess and calibrate substances)
- They can handle with chemical calculations
- They know basic characteristics from important elements and ions
- They understand the basics of qualitatively and quantitatively analytics
- They understand binding, structure and the systematic of organic compounds
- They know the structure and the function of important chemical classes
- They can understand and perform basic reaction of organically synthesis
- They understand the processes in structure and function of proteins and lipids
- They understand the chemical basics of biomembranes and transport
- They know the principles of important metabolic pathway

Content
contents of the lecture

- structure of organical molecules and intermolecular interaction
- Introduction in the reaction of organical molecules

- kinetic, acidity/ basidity mechanisms
- alkane and their reaction, nomenklatur and stereochemistry
- Alkene, Halogenalkane
- aromatics
- aldehydes and ketones
- carbon acids and their derivates
- Amine and Thioles
- Ethanols and their reaction
- lipids, suggar and amino acids
- nucleic acids and biomacromolecules

contensts of the practical course
the students have to prepare 6 preparates from the following fields within 4 weeks:

- Block 1: 1 preparation of radical substitution, nucleophile substitution on saturated hydrocarbons
- Block 2: 1 preparation of elimination with the formation from C-C-multiple bonding
- Block 3: 1 preparation of elekrophile and nucleophile substitution on aromates, oxidation and dehydration
- Block 4: 1 preparation of reaction of carbonyl compounds
- Block 5: 1 preperation of reaction several carbonyl compounds in analogy

Literature
for the lecture

K.P.C. Vollhardt, N.E. Schore, Organic Chemistry, 3rd Edition, W.H., Freeman & Company, New York: 1999

K.P.C. Vollhardt, N.E. Schore, (Übersetzung von H. Butenschön), Organische Chemie, 3. Auflage, Wiley-VCH, Weinheim: 2000
for the practical course

Organikum, Wiley-VCH, Weinheim

K.P.C. Vollhardt, N.E. Schore, (Übersetzung von H. Butenschön), Organische Chemie, 3. Auflage, Wiley-VCH, Weinheim: 2000

Workload
lecture:
Presence time:33 h
preparation and follow-up time:57 h
total workload: 90 h
practical course:
Presence time:68 h
preparation and follow-up time:142 h
total workload: 219 h

M Module: Quantitative Fundamentals (BA-NA03) [M-CHEMBIO-100146]

Responsibility: Peter Nick

Organisation: KIT-Fakultät für Chemie und Biowissenschaften
Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Natural Science in Biological Research
Field of Study / Applied Biology / Fundamentals of Natural Science on Biological Application

ECTS	Recurrence	Duration	Language	Version
4	Jährlich	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-100211	Mathematics (S. 80)	4	Isabel Braun

Learning Control / Examinations
The control of success is an ungraded coursework
In Mathematics regulary small tests have to be absolved. These tests are processes at the computer in ILIAS.

Module Grade
The module is not marked

Conditions
none

Qualification Objectives
The students are able to handle mathematical problems in biological daily research routine
This includes Lab calculations and the ability, to translate different scientific questions in mathematical equation

Content
Repetition of selected basics, special functions, vectors and matrices, differential and integral calculus, differential equation.

Literature
Teaching books like Eickhoff-Schachtenbeck, A., Schöbel, A.: „Mathematik in der Biologie“

Workload
Lecture and exercises: 45 h
Preparation and follow up processing: 75 h

M Module: Biochemistry (BA-NA05) [M-CHEMBIO-100149]

Responsibility: Frank Breitling

Organisation: KIT-Fakultät für Chemie und Biowissenschaften

Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Natural Science in Biological Research
Field of Study / Applied Biology / Fundamentals of Natural Science on Biological Application

ECTS	Recurrence	Duration	Language	Version
4	Jährlich	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-100214	Biochemistry (S. 58)	4	Frank Breitling

Learning Control / Examinations
Control of succes is one written exam over 120 minutes about the contens of the lecture

Module Grade
the mark results from the reached points in the writen exam

Conditions
none

Qualification Objectives

- They know the backgrounds of Enzyme kinetics
- They understand the regularity in structure and function of proteins and lipids
- They understand chemical basics of biomembranes and Transport.

Content

- Biophysical basics: Thermodynamic, Kinetics Spectroscopy
- Proteins: structural principles, functional consequences
- Enzymes: Fundamentals of catalysis, Cofactores
- Enzymes Kinetics: Quantitative description, Inhibitors
- Functional Proteinkomplexes: Antibodies, muscles
- Lipids: Creation and properties
- Biomembranes: Composition and behaviour
- Membrane Proteins: Building principles and functions
- Transport through membranes: Pores, channels, transporter
- Signal transduction: Receptors, ligands, cascades

Remarks
Scritpts on:
http://www.biologie.kit.edu/450.php

Literature

- W. Müller-Esterl "Biochemie" (Spektrum Verlag)
- L. Stryer "Biochemie" (Spektrum Verlag)
- K. Munk „Biochemie, Zellbiologie, Ökologie, Evolution" (Spektrum Verlag)
- Horn/Lindenmeier/Moc/Grilhösl/Berghold/Schneider/Münster „Biochemie des Menschen" (Thieme Verlag)
- Internet matrerials

Workload
Presence time:22 h
preparation and follow-up time:38 h
total workload: 60 h

M Module: Statistics [M-MATH-100150]

Responsibility: Bruno Ebner

Organisation: KIT-Fakultät für Mathematik
Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Natural Science in Biological Research
Field of Study / Applied Biology / Fundamentals of Natural Science on Biological Application

ECTS	Recurrence	Duration	Language	Version
6	Each winter term	1 term	German	2

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-106848	Statistics - Exam (S. 98)	3	Bruno Ebner, Bernhard Klar
T-MATH-106849	Statistics - Exercises (S. 99)	1	Bruno Ebner, Bernhard Klar
T-MATH-100216	Computer-Based Exercise in Statistics (S. 63)	2	Bruno Ebner, Bernhard Klar

M Module: Experimental Physics [M-PHYS-100283]

Responsibility: Thomas Schimmel

Organisation: KIT-Fakultät für Physik
Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Natural Science in Biological Research
Field of Study / Applied Biology / Fundamentals of Natural Science on Biological Application

ECTS	Recurrence	Duration	Language	Version
10	Each winter term	2 terms	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-PHYS-100278	Experimental Physics (S. 70)	10	Thomas Schimmel

Conditions
none

3.1.3 Soft Skills

M Module: Presentation/Structuring (BA-SQ01) [M-CHEMBIO-100151]

Responsibility: Peter Nick

Organisation: KIT-Fakultät für Chemie und Biowissenschaften

Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Soft Skills
Field of Study / Applied Biology / Soft Skills

ECTS	Recurrence	Duration	Language	Version
6	Each summer term	1 term	German	3

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-100217	Experimental Design (S. 69)	3	Peter Nick
T-CHEMBIO-107628	Introduction to presentation techniques (S. 78)	1	Peter Nick

Überfachliche Qualifikationen 1

Non-Compulsory Block; You must choose between 1 und 2 courses and at most 2 credits.

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-107629	Presentation Techniques (S. 95)	2	Peter Nick

Learning Control / Examinations

Controll of success consists of 3 ungraded courseworks.

- written portfolio about the individual development process for the courswork “Introduction to Presentation Techniques”
- Presentation about a researched theme for the coursework “Presentation Techniques”
- Presentation within the exam component “Experimental Design”

Detaild description can be read in the respective exam components.

M Module: Literature Research (BA-SQ02) [M-CHEMBIO-100152]

Responsibility: Peter Nick

Organisation: KIT-Fakultät für Chemie und Biowissenschaften
Curricular Anchorage: Compulsory
Contained in: Field of Study / General Biology / Soft Skills

ECTS	Recurrence	Duration	Language	Version
6	Each winter term	1 term	German	5

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-100219	Critical reading of Original Literature (S. 64)	3	Peter Nick
T-CHEMBIO-107630	Introduction to literature research (S. 77)	1	Peter Nick

Überfachliche Qualifikationen 2
Non-Compulsory Block; You must choose between 1 und 2 courses and at most 2 credits.

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-107631	Literature research techniques (S. 79)	2	

Learning Control / Examinations
Controll of success consists of 3 ungraded courseworks.

- written portfolio about the individual development process for the courswork "Introduction to literature research"
- Presentation about a researched theme for the coursework "Literature research techniques"
- Presentation within the exam component "Critical reading of Original Literature"

Conditions
none

3.2 Applied Biology

3.2.1 Fundamentals of Biological Application

M Module: Structural and functional Aspects of Biological Application (ANG-01) [M-CHEMBIO-103751]

Responsibility: Martin Bastmeyer, Joachim Bentrop, Jörg Kämper, Peter Nick

Organisation: KIT-Fakultät für Chemie und Biowissenschaften

Curricular Anchorage: Compulsory

Contained in: Field of Study / Applied Biology / Fundamentals of Biological Application

ECTS	Recurrence	Duration	Language	Version
19	Each winter term	1 term	German	4

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-100180	Fundamentals of Biology (S. 75)	4	Peter Nick
T-CHEMBIO-107582	Botany of Crop Plants and Green Biotechnology (S. 62)	9	Peter Nick
T-CHEMBIO-107745	Functional Morphology of Animals (Degree Course Applied Biology) (S. 74)	6	
T-CHEMBIO-107746	Protocol of the practical Morphology of Animals (S. 97)	0	Joachim Bentrop

Learning Control / Examinations
The control of success of this module includes two marked certificates of performance and one evaluations composed of a different kind of graded assessment and one ungraded coursework.
Written examination with a duration of 120 minutes is passed for "Fundamentals of Biology" and "Functional Morphology of Animals" For the practical part of "Functional Morphology of Animals" a scientific protocol should be made. (ungraded courswork)
For "Botany of Crop Plants and Green Biotechnology" the examination consists of a different kind of graded assessment

The Modul Structure and Function of life is part of the Orienation exam and therefor it has to be passed until the end of the rewiev period of the second semester.

Conditions
none

Qualification Objectives
The students can follow biological basics and put them in relation to each other on a simple level to explain basic phenomena of biology:

- molecular and cellular basics of life
- mechanism and fundamental laws of inheritance
- characteristics of organisation from different animal groups and their context to evolution, function and development
- structure and function of plant cells, tissue and organs and their context to evolution, function and development
- understanding of the principles of plant organisation and the base of plant biodiversity

Particularly in the botanical courses:

Students understand the principles of plant organisation and the base for plant biodiversity. They are able to recognise and interpret the important cell and tissue types of plants. They have a general understanding of central applications of Green Biotechnology, Genetic Engineering und the agricultural use of plants and can discuss these in the social context and develop in the respective debate their own, differentiated standpoint. They can conceive on a basal level, a research project in Green Biotechnology and express the related problems.

Content
The module structure and function of life is a general introduction to the basics of biology. This includes fundamentals of cell biology and genetics as well as morphology and anatomy from animals and plants and mechanisms of evolution.

Content of the botanical part:

Lecture Crop Plants:

- Part 1 Organisation and function of plant cells, pflanzlicher Zellen
- Part 2 Differentiation and function of plant tissues
- Part 3 Structure and adaptation of plant organs
- Part 4: Specific traits, domestication, and utiliszation of selected crop-plant taxa.
- Cross-linked topis: Applied aspects of plant research, plant aspects of human nutrition.

Practical Course Crop Plants:

- practical exercise of the topics discussed in the lecture, scientific drawing, and interpretation of microscopial specimens.
- Cellular Aspects of Plant Development:

Cell division and cytoskeleton, organisation of plant cells, plant organelles, metabolic activities of plants, pattern formation, cell differentiation, control of growth, genetical control of flowering, embryogenesis, regulation of developmental dynamics.

Literature
Grundlagen der Biologie

- Purves, Sadava, Orians, Heller - Biologie (in der Lehrbuchsammlung, Lesesaal Naturwissenschaften unter 2006 A 5765(7))
- Campbell, Reece, Markl - Biologie (in der Lehrbuchsammlung, Lesesaal Naturwissenschaften unter 97 E 322(6,N))
- Weitere Lehrbücher werden in den einführenden Vorlesungsstunden vorgestellt.

Lehrbücher der Zoologie, z.B.:

- Zoologie (Hickman et al.) Pearson Studium, 13. Auflage
- Zoologie (Wehner, Gehring) Thieme Verlag, 24. Auflage
- Spezielle Zoologie (Rieger, Westheide) Spektrum Akademischer Verlag, 2. Auflage
- Systematische Zoologie (Storch, Welsch) Spektrum Akademischer Verlag, 6. Auflage
- Internetmaterialien

Botanik der Nutzpflanzen und zelluläre Grundlagen der Entwicklung

- Strasburger Botanik Standort: Lehrbuchsammlung, Fachgruppe: biol 4.03, Signatur: 91 E 677(36)
- Lüttge, Kluge, Bauer, Botanik Standort: Lehrbuchsammlung, Fachgruppe: biol 4.03 Signatur: 88 A 3916(5)
- Raven, Biologie der Pflanzen Standort: Lehrbuchsammlung Fachgruppe: biol 4.0, Signatur: 85 E 671(4)
- Internetmaterialien

weitere Informationen auf:
http://www.biologie.kit.edu/308.php

Workload

- Fundamentals of Biology (L): 56 presence hours; 64 hours processing time
- Functional Morphology of Animals (L): 42presence hours; 48 hours processing time
- Zoological Practical course: (P): 56 presence hours; 94 hours processing time
- Functional Morphology of Plants (L): 28 presence hours; 32 hours processing time
- Botanical Practical course (P): 56 presence hours; 94 hours processing time

Processing time is generally understood as preparation and follow up processing time. In the practical courses the processing time includes also the evaluation of results, the preparing of drawings and writing of reports.

M Module: Physiological Aspects of Biotechnology (ANG-02) [M-CHEMBIO-103784]

Responsibility: Holger Puchta

Organisation: KIT-Fakultät für Chemie und Biowissenschaften

Curricular Anchorage: Compulsory

Contained in: Field of Study / Applied Biology / Fundamentals of Biological Application

ECTS	Recurrence	Duration	Language	Version
16	Each summer term	1 term	German	3

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-107568	Animal Physiology (S. 55)	9	Dietmar Gradl
T-CHEMBIO-107573	Animal Physiology Practical Protocol (S. 56)	0	
T-CHEMBIO-107633	Practical in Green Biotechnology (S. 92)	5	Manfred Focke, Holger Puchta
T-CHEMBIO-108658	Molecular Biology, Biochemistry and Physiology of Plants (S. 86)		Holger Puchta

Learning Control / Examinations
The control of success of this modul includes two written exams for the exam components "Physiology and Biochemistry of Plants" and "Animal Physiology"
For the practical part in animal physiology a protocol has to be written (ungraded coursework)

Detailed description of the examination can be read in the exam components

Conditions
none

M Module: Applied Biodiversity (ANG-03) [M-CHEMBIO-103785]

Responsibility: Johannes Gescher

Organisation: KIT-Fakultät für Chemie und Biowissenschaften

Curricular Anchorage: Compulsory

Contained in: Field of Study / Applied Biology / Fundamentals of Biological Application

ECTS	Recurrence	Duration	Language	Version
4	Each summer term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-107634	Practical in Microbial Diversity (S. 93)	4	Johannes Gescher

Conditions
none

M Module: Molecular aspects of applied Biology (ANG-04) [M-CHEMBIO-103786]

Responsibility: Reinhard Fischer, Johannes Gescher, Jörg Kämper, Natalia Requena Sanchez

Organisation: KIT-Fakultät für Chemie und Biowissenschaften

Curricular Anchorage: Compulsory

Contained in: Field of Study / Applied Biology / Fundamentals of Biological Application

ECTS	Recurrence	Duration	Language	Version
20	Each winter term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-107636	Molecular Biology for applied Biology (S. 84)	14	Reinhard Fischer, Johannes Gescher, Jörg Kämper, Natalia Requena Sanchez
T-CHEMBIO-107637	Protocol of the practical Molecular Biology (S. 96)	0	Reinhard Fischer, Jörg Kämper, Natalia Requena Sanchez
T-CHEMBIO-107638	Practical in Technical Biology (S. 94)	6	Johannes Gescher

Learning Control / Examinations
The control of success of this module includes one written marked certificate of performance and one non graded coursework

- The written examination in the extent of 120 minutes is passed passed for the exam component Molecular Biology wich includes the lecture of Microbiology (3 CP), Molecular Biology (2CP) and Genetics (2LP) and the practical course of Molecular Biology(14LP)
- For the Practical course Technical Biology the controll of success is an alternative exam assessment.
- For the Practical course "Molecular Biology" a protocol has to be written. (non graded coursework)

Detailed Information about the control of success can be read in the description of the exam components

Conditions
none

M Module: Biological Methods (BA-05/ ANG-05) [M-CHEMBIO-103748]

Responsibility: Peter Nick

Organisation: KIT-Fakultät für Chemie und Biowissenschaften
Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Biological Research
Field of Study / Applied Biology / Fundamentals of Biological Application

ECTS	Recurrence	Duration	Language	Version
20	Each summer term	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-107577	Methods of Current Biology (S. 81)	4	Peter Nick
T-CHEMBIO-107578	Practical Course Biological Methods (S. 88)	16	Peter Nick

Learning Control / Examinations
The control of success of this module includes one alternative exam assesment for the exam component Methods of Current Biology one non graded coursework for the Practical Course Biological Methods

The detailed description of the control of success can be found in the description of the exam component.

Conditions
none

Qualification Objectives
The students understand the theoretical fundamentals from all methods applied in Biology. Underguidance they can put important techniques of modern biology into practice. Amongst those following techniques:

- fluorescence microscopy.; Handling with fluorescent proteins and immunofluorescence
- Western Blotting
- Genomic and RT-PCR
- Bio-informatic analysis and Handling with Gen Databases

They are able to

- adapt the basic techniques to the particular scientific question and system
- They can assure not to produce scientific artefacts by the conception of control experiments.
- They can find problem solving strategies for a defined question.
- Working successful in a research team.

Content
The module Biological Methods deal the modern practical aspects of Biology. In a series of lectures the entire spectrum ofbiological methods is presented undthoroughly treated. Competence in applying scientific methods does not mean to "cook" the protocols in the lab. Only those who understand, why a biological method function a special way, is expected to be in a position to answer to a concrete problem successfully.
The lecture is being held during the semester and is accompanied by theintensive practical course, where the students can exercise in the afternoon what they have heard in the lecture in the morning. During the practical course the studenst circulate in small teams through the different institutes and learn thereby differnet scientific question of research.
In the second half of the semester the students will be familiarized with theoretical methods of Biology and data base research in a special bio-informaticblock.
In the last third of the semester an initiation practical is absolved (if possible in the lab of choice). In a connection of a seminar, own research and practical labwork they have the possibility to get first laboratory experience

Recommendations
important informations on:
http://www.biologie.kit.edu/311.php
http://www.biologie.kit.edu/454.php
http://www.biologie.kit.edu/543.php

M Module: Concepts of Biological Application (ANG-06) [M-CHEMBIO-103812]

Responsibility: Clemens Posten, Christoph Syldatk

Organisation: KIT-Fakultät für Chemie und Biowissenschaften

Curricular Anchorage: Compulsory

Contained in: Field of Study / Applied Biology / Fundamentals of Biological Application

ECTS	Recurrence	Duration	Language	Version
7	Each winter term	1 term	German	1

Compulsory

Identifier	Course	ECTS Responsibility
T-CIWVT-103335	Biotechnological Processes (S. 59)	7

Learning Control / Examinations
The examination is a written examination with a duration of 180 minutes

Conditions
None

Workload
Attendance time: 42 h
self-study: 68 h
exam-preparation:100 h

M Module: Ecosystems (BA-07/ ANG-07) [M-BGU-103766]

Responsibility: Sebastian Schmidtlein, Wolfgang Wilcke

Organisation: KIT-Fakultät für Bauingenieur-, Geo- und Umweltwissenschaften

Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Biological Research
Field of Study / Applied Biology / Fundamentals of Biological Application

ECTS	Recurrence	Duration	Language	Version
4	Jährlich	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-BGU-101567	Ecosystems (S. 66)	4	Sebastian Schmidtlein

Conditions
None

Remarks
None

M Module: Biological Application (ANG-08) [M-CHEMBIO-103823]

Responsibility:

Organisation: KIT-Fakultät für Chemie und Biowissenschaften
Curricular Anchorage: Compulsory
Contained in: Field of Study / Applied Biology / Fundamentals of Biological Application

ECTS	Recurrence	Duration	Language	Version
15	Each winter term	1 term	German	4

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-107580	Current Biological Research (S. 65)	15	Johannes Gescher

Learning Control / Examinations
The control of success of this module is one marked performance of different types of examination
Maximum 100 points can be reached. These points consits the following components:

- On examination is a written part, with duration of 120 minutes, about the contents of the lecture and the practical part. With this performance 80 points can be reached.
- Beside this written test, a protocol of the practical part must be written. This protocol must be in accordance with scientific requirements.
  For this protocol 10 points can be reached.
- Furthermore, 10 points can be achieved by giving a talk about the contents of the course within the working group.

Student of the study field Applied Biology, who do not absolve their Bachelor thesis in a working group of the KIT, have to write a graded portfolio about their Practical work.

Qualification Objectives
The students develop their Knowledge in theory and practical experience and methods in a field of their choice.

- They get a deeper insight in biological concepts
- They exercise problem orientated thinking and experimental design
- They gain routine in dealing with biological methods
- They learn to formulate a scientific project independently and to process it.
- They learn to present their work understandably and clearly to other people.
- They learn to collect informations problem orientated and to scrutinize critically scientific datas

Content
For the practical course with the associated lecture and seminar a research subject in a working group or in a firm could be selected. Here you can get an insight in the current research, where you absolve also your bachelor thesis. It is a matter to get a deeper insight exemplary , konceptionell and methodically in a biological field.

Remarks
The duration of the module is 4 weeks, the module takes place after the WS.

Workload
Moderne Biologische Forschung (V,P): 156 Präsenzstunden, 15 LP, 294 Stunden Bearbeitung
Zur Bearbeitung zählt die Vor- und Nachbereitung der Vorlesung und das Lernen auf die Klausur. Bei den Praktika zählen hierzu auch das Auswerten von Ergebnissen, Anfertigen von Zeichnungen und Schreiben von Protkollen.

3.2.2 Fundamentals of Natural Science on Biological Application

M Module: General Chemistry (BA-NA01) [M-CHEMBIO-100144]

Responsibility: Claus Feldmann

Organisation: KIT-Fakultät für Chemie und Biowissenschaften

Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Natural Science in Biological Research
Field of Study / Applied Biology / Fundamentals of Natural Science on Biological Application

ECTS	Recurrence	Duration	Language	Version
11	Each winter term	1 term	German	2

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-100207	General Chemistry (S. 76)	4	Helmut Goesmann
T-CHEMBIO-100208	Practical in General Chemistry (S. 91)	7	Helmut Goesmann

Learning Control / Examinations
The control of success is one written examination with a duration of 120 minutes about the contents of the lecture and one ungraded coursework about the practical course.

M Module: Organic Chemistry (BA-NA02) [M-CHEMBIO-100145]

Responsibility: Stefan Bräse

Organisation: KIT-Fakultät für Chemie und Biowissenschaften
Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Natural Science in Biological Research
Field of Study / Applied Biology / Fundamentals of Natural Science on Biological Application

ECTS	Recurrence	Duration	Language	Version
10	Each summer term	2 terms	German	2

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-100209	Organic Chemistry (S. 87)	3	Norbert Foitzik, wechselnde Dozenten, siehe Vorlesungsverzeichnis
T-CHEMBIO-106425	Practical Course Organic Chemistry (S. 90)	7	

Learning Control / Examinations
The control of success is one written examination with a duration of 120 minutes about the contents of the lecture and one ungraded coursework about the practical course.

Conditions
None

Qualification Objectives
the students aqcuire theoretical and practical basic knowledge of chemistry

- They can handle hazardous substances laboratory apparatus safety
- They can handle with basic lab techniques (weigh, mess and calibrate substances)
- They can handle with chemical calculations
- They know basic characteristics from important elements and ions
- They understand the basics of qualitatively and quantitatively analytics
- They understand binding, structure and the systematic of organic compounds
- They know the structure and the function of important chemical classes
- They can understand and perform basic reaction of organically synthesis
- They understand the processes in structure and function of proteins and lipids
- They understand the chemical basics of biomembranes and transport
- They know the principles of important metabolic pathway

Content
contents of the lecture

- structure of organical molecules and intermolecular interaction
- Introduction in the reaction of organical molecules

- kinetic, acidity/ basidity mechanisms
- alkane and their reaction, nomenklatur and stereochemistry
- Alkene, Halogenalkane
- aromatics
- aldehydes and ketones
- carbon acids and their derivates
- Amine and Thioles
- Ethanols and their reaction
- lipids, suggar and amino acids
- nucleic acids and biomacromolecules

contensts of the practical course
the students have to prepare 6 preparates from the following fields within 4 weeks:

- Block 1: 1 preparation of radical substitution, nucleophile substitution on saturated hydrocarbons
- Block 2: 1 preparation of elimination with the formation from C-C-multiple bonding
- Block 3: 1 preparation of elekrophile and nucleophile substitution on aromates, oxidation and dehydration
- Block 4: 1 preparation of reaction of carbonyl compounds
- Block 5: 1 preperation of reaction several carbonyl compounds in analogy

Literature
for the lecture

K.P.C. Vollhardt, N.E. Schore, Organic Chemistry, 3rd Edition, W.H., Freeman & Company, New York: 1999

K.P.C. Vollhardt, N.E. Schore, (Übersetzung von H. Butenschön), Organische Chemie, 3. Auflage, Wiley-VCH, Weinheim: 2000
for the practical course

Organikum, Wiley-VCH, Weinheim

K.P.C. Vollhardt, N.E. Schore, (Übersetzung von H. Butenschön), Organische Chemie, 3. Auflage, Wiley-VCH, Weinheim: 2000

Workload
lecture:
Presence time:33 h
preparation and follow-up time:57 h
total workload: 90 h
practical course:
Presence time:68 h
preparation and follow-up time:142 h
total workload: 219 h

M Module: Quantitative Fundamentals (BA-NA03) [M-CHEMBIO-100146]

Responsibility: Peter Nick

Organisation: KIT-Fakultät für Chemie und Biowissenschaften
Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Natural Science in Biological Research
Field of Study / Applied Biology / Fundamentals of Natural Science on Biological Application

ECTS	Recurrence	Duration	Language	Version
4	Jährlich	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-100211	Mathematics (S. 80)	4	Isabel Braun

Learning Control / Examinations
The control of success is an ungraded coursework
In Mathematics regulary small tests have to be absolved. These tests are processes at the computer in ILIAS.

Module Grade
The module is not marked

Conditions
none

Qualification Objectives
The students are able to handle mathematical problems in biological daily research routine
This includes Lab calculations and the ability, to translate different scientific questions in mathematical equation

Content
Repetition of selected basics, special functions, vectors and matrices, differential and integral calculus, differential equation.

Literature
Teaching books like Eickhoff-Schachtenbeck, A., Schöbel, A.: „Mathematik in der Biologie“

Workload
Lecture and exercises: 45 h
Preparation and follow up processing: 75 h

M Module: Experimental Physics [M-PHYS-100283]

Responsibility: Thomas Schimmel

Organisation: KIT-Fakultät für Physik
Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Natural Science in Biological Research
Field of Study / Applied Biology / Fundamentals of Natural Science on Biological Application

ECTS	Recurrence	Duration	Language	Version
10	Each winter term	2 terms	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-PHYS-100278	Experimental Physics (S. 70)	10	Thomas Schimmel

Conditions
none

M Module: Biochemistry (BA-NA05) [M-CHEMBIO-100149]

Responsibility: Frank Breitling

Organisation: KIT-Fakultät für Chemie und Biowissenschaften
Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Fundamentals of Natural Science in Biological Research
Field of Study / Applied Biology / Fundamentals of Natural Science on Biological Application

ECTS	Recurrence	Duration	Language	Version
4	Jährlich	1 term	German	1

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-100214	Biochemistry (S. 58)	4	Frank Breitling

Learning Control / Examinations
Control of succes is one written exam over 120 minutes about the contens of the lecture

Module Grade
the mark results from the reached points in the writen exam

Conditions
none

Qualification Objectives

- They know the backgrounds of Enzyme kinetics
- They understand the regularity in structure and function of proteins and lipids
- They understand chemical basics of biomembranes and Transport.

Content

- Biophysical basics: Thermodynamic, Kinetics Spectroscopy
- Proteins: structural principles, functional consequences
- Enzymes: Fundamentals of catalysis, Cofactores
- Enzymes Kinetics: Quantitative description, Inhibitors
- Functional Proteinkomplexes: Antibodies, muscles
- Lipids: Creation and properties
- Biomembranes: Composition and behaviour
- Membrane Proteins: Building principles and functions
- Transport through membranes: Pores, channels, transporter
- Signal transduction: Receptors, ligands, cascades

Remarks
Scritpts on:
http://www.biologie.kit.edu/450.php

Literature

- W. Müller-Esterl "Biochemie" (Spektrum Verlag)
- L. Stryer "Biochemie" (Spektrum Verlag)
- K. Munk „Biochemie, Zellbiologie, Ökologie, Evolution" (Spektrum Verlag)
- Horn/Lindenmeier/Moc/Grilhösl/Berghold/Schneider/Münster „Biochemie des Menschen" (Thieme Verlag)
- Internet matrerials

Workload
Presence time:22 h
preparation and follow-up time:38 h
total workload: 60 h

M Module: Statistics [M-MATH-100150]

Responsibility: Bruno Ebner

Organisation: KIT-Fakultät für Mathematik
Curricular Anchorage: Compulsory
Contained in: Field of Study / General Biology / Fundamentals of Natural Science in Biological Research
Field of Study / Applied Biology / Fundamentals of Natural Science on Biological Application

ECTS	Recurrence	Duration	Language	Version
6	Each winter term	1 term	German	2

Compulsory

Identifier	Course	ECTS	Responsibility
T-MATH-106848	Statistics - Exam (S. 98)	3	Bruno Ebner, Bernhard Klar
T-MATH-106849	Statistics - Exercises (S. 99)	1	Bruno Ebner, Bernhard Klar
T-MATH-100216	Computer-Based Exercise in Statistics (S. 63)	2	Bruno Ebner, Bernhard Klar

3.2.3 Soft Skills

M Module: Social Aspects of Biotechnology (ANG-ÜQ-02) [M-CHEMBIO-103789]

Responsibility: Johannes Gescher

Organisation: KIT-Fakultät für Chemie und Biowissenschaften

Curricular Anchorage: Compulsory

Contained in: Field of Study / Applied Biology / Soft Skills

ECTS	Recurrence	Duration	Language	Version
9	Each winter term	1 term	German	3

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-100233	Biotechnology and Society (S. 60)	6	Johannes Gescher
T-CHEMBIO-100219	Critical reading of Original Literature (S. 64)	3	Peter Nick

Learning Control / Examinations
Examinaion are two ungraded coursworks for "Biotechnology and Society" and "Critical Reading of Original Literature"

Conditions
none

M Module: Presentation/Structuring (BA-SQ01) [M-CHEMBIO-100151]

Responsibility: Peter Nick

Organisation: KIT-Fakultät für Chemie und Biowissenschaften
Curricular Anchorage: Compulsory

Contained in: Field of Study / General Biology / Soft Skills
Field of Study / Applied Biology / Soft Skills

ECTS	Recurrence	Duration	Language	Version
6	Each summer term	1 term	German	3

Compulsory

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-100217	Experimental Design (S. 69)	3	Peter Nick
T-CHEMBIO-107628	Introduction to presentation techniques (S. 78)	1	Peter Nick

Überfachliche Qualifikationen 1
Non-Compulsory Block; You must choose between 1 und 2 courses and at most 2 credits.

Identifier	Course	ECTS	Responsibility
T-CHEMBIO-107629	Presentation Techniques (S. 95)	2	Peter Nick

Learning Control / Examinations
Controll of success consists of 3 ungraded courseworks.

- written portfolio about the individual development process for the courswork "Introduction to Presentation Techniques"
- Presentation about a researched theme for the coursework "Presentation Techniques"
- Presentation within the exam component "Experimental Design"

Detaild description can be read in the respective exam components.

Teil IV
Teilleistungen

T Course: Animal Physiology [T-CHEMBIO-107568]

Responsibility: Dietmar Gradl
Contained in: [M-CHEMBIO-103729] Physiology
[M-CHEMBIO-103784] Physiological Aspects of Biotechnology

ECTS	Recurrence	Exam type	Version
9	Jedes Sommersemester	Prüfungsleistung schriftlich	3

Learning Control / Examinations
Control of success takes place by the Exam BA-02 Animal Physiology (lecture and practical course) in a scope of 120 minutes with 120 points

Conditions
none

Recommendations

- Lehrbücher: Tierphysiologie (Eckert) Thieme 2003
- Tierphysiologie (Penzlin) Springer 2003
- Biologie (Campbell) Pearson 2006
- Internetmaterialien

Remarks
Important Informations on:

http://www.biologie.kit.edu/433.php

T Course: Animal Physiology Practical Protocol [T-CHEMBIO-107573]

Responsibility:
Contained in: [M-CHEMBIO-103729] Physiology
[M-CHEMBIO-103784] Physiological Aspects of Biotechnology

ECTS	Recurrence	Exam type	Version
0	Jedes Sommersemester	Studienleistung	1

Learning Control / Examinations
A protocol has to be written, that suffices the requirements of the scientific standard. Further details: http://www.biologie.kit.edu/822.php

Conditions
none

Remarks
Important informations on:

http://www.biologie.kit.edu/434.php

T Course: Bachelor Thesis [T-CHEMBIO-107758]

Responsibility:
Contained in: [M-CHEMBIO-103836] Module Bachelor Thesis

ECTS	Recurrence	Exam type	Version
15	Jedes Wintersemester	Abschlussarbeit	1

Conditions
120 CP

T Course: Biochemistry [T-CHEMBIO-100214]

Responsibility: Frank Breitling
Contained in: [M-CHEMBIO-100149] Biochemistry

ECTS	Recurrence	Exam type	Version
4	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 17/18	7007		Vorlesung (V)	2	Frank Breitling

Learning Control / Examinations
Written Exam (120 minutes)

Conditions
none

Recommendations
impotant informations on:
http://www.biologie.kit.edu/450.php

T Course: Biotechnological Processes [T-CIWVT-103335]

Responsibility:
Contained in: [M-CHEMBIO-103812] Concepts of Biological Application

ECTS	Recurrence	Exam type	Version
7	Jedes Semester	Prüfungsleistung schriftlich	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 17/18	22403		Vorlesung (V)	2	Christoph Syldatk
WS 17/18	22947		Vorlesung (V)		Clemens Posten

Conditions
None

T Course: Biotechnology and Society [T-CHEMBIO-100233]

Responsibility: Johannes Gescher
Contained in: [M-CHEMBIO-103789] Social Aspects of Biotechnology

ECTS	Recurrence	Exam type	Version
6	Jedes Wintersemester	Studienleistung	2

Learning Control / Examinations
Exmination is an ungraded coursework. The sudent have to make a presentation about the prepared project proposal

T Course: Botany of Crop Plants and Cellular Basics of Development [T-CHEMBIO-107515]

Responsibility: Peter Nick
Contained in: [M-CHEMBIO-103490] Orientation Exam
[M-CHEMBIO-103725] Stucture and Function of Life

ECTS	Recurrence	Exam type	Version
7	Jedes Wintersemester	Prüfungsleistung anderer Art	4

Learning Control / Examinations
Maximum 120 Points can be reached. These points consits the following components:

- written part with a duration of 120 minutes about the contents of the lecture "Crop Plants" (92 points)
- Drawings of the "Crop Plant" practical course 1-12 (12 points)
- Examination sheets (16 points)

Conditions
none

T Course: Botany of Crop Plants and Green Biotechnology [T-CHEMBIO-107582]

Responsibility: Peter Nick
Contained in: [M-CHEMBIO-103490] Orientation Exam
[M-CHEMBIO-103751] Structural and functional Aspects of Biological Application

ECTS	Recurrence	Exam type	Version
9	Jedes Wintersemester	Prüfungsleistung anderer Art	3

Conditions
none

T Course: Computer-Based Exercise in Statistics [T-MATH-100216]

Responsibility: Bruno Ebner, Bernhard Klar
Contained in: [M-MATH-100150] Statistics

ECTS	Recurrence	Exam type	Version
2	Jedes Wintersemester	Studienleistung	1

T Course: Critical reading of Original Literature [T-CHEMBIO-100219]

Responsibility: Peter Nick
Contained in: [M-CHEMBIO-100152] Literature Research
[M-CHEMBIO-103789] Social Aspects of Biotechnology

ECTS	Recurrence	Exam type	Version
3	Jedes Wintersemester	Studienleistung	1

Learning Control / Examinations
Presentation about a self researched theme

Conditions
none

Recommendations
The seminar is offered in different field as optional course, the selection for the fields is voted between mid-september and mid-october on:
http://www.biologie.kit.edu/461.php

T Course: Current Biological Research [T-CHEMBIO-107580]

Responsibility: Johannes Gescher
Contained in: [M-CHEMBIO-103750] Biological Reseach
[M-CHEMBIO-103823] Biological Application

ECTS	Recurrence	Exam type	Version
15	Jedes Wintersemester	Prüfungsleistung anderer Art	1

Conditions
none

T Course: Ecosystems [T-BGU-101567]

Responsibility: Sebastian Schmidtlein
Contained in: [M-BGU-103766] Ecosystems

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 17/18	6111431		Vorlesung (V)	2	Jana Eichel, Wolfgang Wilcke

Conditions
None

Recommendations
None

Remarks
None

T Course: Exercise in Botanical Taxonomy [T-CHEMBIO-107569]

Responsibility: Maren Riemann, Beatrix Zaban
Contained in: [M-CHEMBIO-103744] Biodiversity

ECTS	Recurrence	Exam type	Version
3	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Learning Control / Examinations
In the context of the Exercise in Botanical Taxonomy the following parts are evaluated:

- Creation of a herbarium (slide of the plant or pressed plant) with Specification of the destination way. 6P
- Destination of 3 plants 9P
- Short Test about the Plant Families

Conditions
none

Recommendations

- SCHMEIL-FITSCHEN - Die Flora Deutschlands und angrenzender Länder (96. Auflage)
- Rothmaler - Exkursionsflora von Deutschland, Gefäßpflanzen: Atlasband (13. Auflage)
- Rita Lüder - Grundkurs Pflanzenbestimmung: Eine Praxisanleitung für Anfänger und Fortgeschrittene (7. Auflage)

Remarks
class attendance is compulsory

T Course: Exercise in Zoological Taxonomy [T-CHEMBIO-107570]

Responsibility: Urszula Weclawski
Contained in: [M-CHEMBIO-103744] Biodiversity

ECTS	Recurrence	Exam type	Version
3	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Learning Control / Examinations
Togehter 20 Points can be reached:
Destinaion Test 3 x 2P =6P
Homework 2 x 2P=4P
Presentation 1 x 2P=2P
Script 1 x2P =2P
Test about the families 3 x 2P =6P

Conditions
none

T Course: Experimental Design [T-CHEMBIO-100217]

Responsibility: Peter Nick
Contained in: [M-CHEMBIO-100151] Presentation/Structuring

ECTS	Recurrence	Exam type	Version
3	Jedes Sommersemester	Studienleistung	1

Learning Control / Examinations
Presentation Techniques:
Students compile a portfolio that is not graded, but evaluated.

Conditions
none

T Course: Experimental Physics [T-PHYS-100278]

Responsibility: Thomas Schimmel
Contained in: [M-PHYS-100283] Experimental Physics

ECTS	Language	Recurrence	Exam type	Version
10	deutsch	Jedes Semester	Prüfungsleistung schriftlich	1

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	4040021		Vorlesung (V)	4	Bernd Pilawa
SS 2017	4040122		Übung (Ü)	2	Bernd Pilawa, Florian Wertz
WS 17/18	4040011		Vorlesung (V)	4	Thomas Schimmel
WS 17/18	4040112		Übung (Ü)	2	Thomas Schimmel, Florian Wertz

T Course: Field Practical Botany [T-CHEMBIO-107571]

Responsibility: Maren Riemann, Beatrix Zaban
Contained in: [M-CHEMBIO-103744] Biodiversity

ECTS	Recurrence	Exam type	Version
1	Jedes Sommersemester	Studienleistung	1

Learning Control / Examinations

- Participation on 5 three-hour Excursions.
- For one of the excursion an excel-file of the presented plants has to be created. The List has to fulfill the scientific requirements.
- At the end of one of the ecursions the contents of the excursion and the improtant plants of the society has to be presented.

Conditions
none

Recommendations

- SCHMEIL-FITSCHEN - Die Flora Deutschlands und angrenzender Länder (96. Auflage)
- Rothmaler - Exkursionsflora von Deutschland, Gefäßpflanzen: Atlasband (13. Auflage)
- Rita Lüder - Grundkurs Pflanzenbestimmung: Eine Praxisanleitung für Anfänger und Fortgeschrittene (7. Auflage)

T Course: Field Practical Zoology [T-CHEMBIO-107572]

Responsibility: Horst Taraschewski, Urszula Weclawski
Contained in: [M-CHEMBIO-103744] Biodiversity

ECTS	Recurrence	Exam type	Version
1	Jedes Sommersemester	Studienleistung	1

Learning Control / Examinations
Participation on 6 Excursions

Conditions
none

T Course: Functional Morphology of Animals [T-CHEMBIO-107514]

Responsibility: Joachim Bentrop
Contained in: [M-CHEMBIO-103490] Orientation Exam
[M-CHEMBIO-103725] Stucture and Function of Life

ECTS	Recurrence	Exam type	Version
8	Jedes Wintersemester	Prüfungsleistung schriftlich	2

Recommendations

Zoological textbooks , e.g. :

- Zoologie (Hickman et al.) Pearson Studium, 13. Auflage
- Zoologie (Wehner, Gehring) Thieme Verlag, 24. Auflage
- Spezielle Zoologie (Rieger, Westheide) Spektrum Akademischer Verlag, 2. Auflage
- Systematische Zoologie (Storch, Welsch) Spektrum Akademischer Verlag, 6. Auflage

- Internetmaterialien

T Course: Functional Morphology of Animals (Degree Course Applied Biology) [T-CHEMBIO-107745]

Responsibility:
Contained in: [M-CHEMBIO-103490] Orientation Exam
[M-CHEMBIO-103751] Structural and functional Aspects of Biological Application

ECTS	Recurrence	Exam type	Version
6	Jedes Wintersemester	Prüfungsleistung schriftlich	1

T Course: Fundamentals of Biology [T-CHEMBIO-100180]

Responsibility: Peter Nick
Contained in: [M-CHEMBIO-103490] Orientation Exam
[M-CHEMBIO-103725] Stucture and Function of Life
[M-CHEMBIO-103751] Structural and functional Aspects of Biological Application

ECTS	Language	Recurrence	Min Term	Max Term	Exam type	Version
4	deutsch	Jedes Wintersemester	1	3	Prüfungsleistung schriftlich	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 17/18	7001		Vorlesung (V)	4	Martin Bastmeyer, Jörg Kämper, Peter Nick

Learning Control / Examinations
Control of success takes place by the **Exam BA-01** in a scope of 120 minutes with 120 points;
Part of the orientation exam therefore just one re-examination;

Conditions
none

Recommendations
Materials

- Purves, Sadava, Orians, Heller - Biologie (in der Lehrbuchsammlung, Lesesaal Naturwissenschaften unter 2006 A 5765(7))
- Campbell, Reece, Markl - Biologie (in der Lehrbuchsammlung, Lesesaal Naturwissenschaften unter 97 E 322(6,N))
- Weitere Lehrbücher werden in den einführenden Vorlesungsstunden vorgestellt.

Tutorials
more informations to the tutorials:
http://www.biologie.kit.edu/349.php

Remarks
Lecture shedule and scripts:
http://www.biologie.kit.edu/351.php

T Course: General Chemistry [T-CHEMBIO-100207]

Responsibility: Helmut Goesmann
Contained in: [M-CHEMBIO-100144] General Chemistry

ECTS	Language	Recurrence	Exam type	Version
4	deutsch	Jedes Wintersemester	Prüfungsleistung schriftlich	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 17/18	5001		Vorlesung (V)	4	Claus Feldmann

T Course: Introduction to literature research [T-CHEMBIO-107630]

Responsibility: Peter Nick
Contained in: [M-CHEMBIO-100152] Literature Research

ECTS	Recurrence	Exam type	Version
1	Jedes Wintersemester	Studienleistung	2

Conditions
none

T Course: Introduction to presentation techniques [T-CHEMBIO-107628]

Responsibility: Peter Nick
Contained in: [M-CHEMBIO-100151] Presentation/Structuring

ECTS	Recurrence	Exam type	Version
1	Jedes Sommersemester	Studienleistung	1

Conditions
none

T Course: Literature research techniques [T-CHEMBIO-107631]

Responsibility:
Contained in: [M-CHEMBIO-100152] Literature Research

ECTS	Recurrence	Exam type	Version
2	Jedes Wintersemester	Studienleistung mündlich	5

Conditions
T-CHEMBIO-107630 Introduction to literature research

Modeled Conditions
The following conditions must be met:

- The course [T-CHEMBIO-107630] *Introduction to literature research* must have been started.

T Course: Mathematics [T-CHEMBIO-100211]

Responsibility: Isabel Braun
Contained in: [M-CHEMBIO-100146] Quantitative Fundamentals

ECTS	Recurrence	Exam type	Version
4	Jedes Wintersemester	Studienleistung schriftlich	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 17/18	017165		Vorlesung (V)	4	Isabel Braun
WS 17/18	017166		Tutorium (Tu)	1	Isabel Braun

Conditions
none

T Course: Methods of Current Biology [T-CHEMBIO-107577]

Responsibility: Peter Nick
Contained in: [M-CHEMBIO-103748] Biological Methods

ECTS	Recurrence	Exam type	Version
4	Jedes Sommersemester	Prüfungsleistung anderer Art	2

Learning Control / Examinations
The control of success of this exam component consists of a different kind of graded assessment and comprises two parts:

- For the written test in the extent of 120 minutes about the contents of the lecture Modern Methods of Biology 70 points can be reached
- For the exercises in the Bioinformatical part 30 points can be reached.

All together at least 100 points can be reached

Conditions
The successful participation at the Practical Course Biological Methods is prerequesite for the admission of this exam component.

3.2.4

T Course: Model Organisms and Model Generation and Design [T-CHEMBIO-107579]

Responsibility: Peter Nick
Contained in: [M-CHEMBIO-103749] Biological Concepts

ECTS	Recurrence	Exam type	Version
10	Jedes Wintersemester	Prüfungsleistung anderer Art	1

Learning Control / Examinations
The examination consists of a different kind of graded assessment.
All together it can 100 points be earned. The following examination parts must be completed:

- one oral part examination with a duration of 30 minutes about the contents of the lectures Modell Organisms. The Examination is taken by two examiners from two differen Institutes. The students are allowed to vote on emphasis, the second emphasis is not known. (60 points)
- successful completion of exercises about the contents of the lecture Model Generation and Design (40 points)
- In addition a mark improvement of one part grade for a voluntary homework may be obtained

Conditions
none

T Course: Molecular Biology [T-CHEMBIO-107574]

Responsibility: Reinhard Fischer, Jörg Kämper, Natalia Requena
Contained in: [M-CHEMBIO-103747] Molecular Biology

ECTS	Recurrence	Exam type	Version
14	Jedes Wintersemester	Prüfungsleistung schriftlich	2

Learning Control / Examinations
Written Exam about the contents of the lecture parts Microbiology (3LP) Molecular Biology (2LP) ans Genetics (2LP) and the associated practical course Molecular Biology (14LP)

Conditions
none

T Course: Molecular Biology for applied Biology [T-CHEMBIO-107636]

Responsibility: Reinhard Fischer, Johannes Gescher, Jörg Kämper, Natalia Requena Sanchez
Contained in: [M-CHEMBIO-103786] Molecular aspects of applied Biology

ECTS	Recurrence	Exam type	Version
14	Jedes Wintersemester	Prüfungsleistung schriftlich	1

Learning Control / Examinations
Written examinations in the extent of 120 minutes each are passed for the lecture of Microbiology (3 CP), Molecular Biology (2CP) and Genetics (2LP)

Conditions
none

Recommendations
further informations:

http://www.biologie.kit.edu/446.php

T Course: Molecular Biology Practical Protocol [T-CHEMBIO-107575]

Responsibility: Reinhard Fischer, Jörg Kämper, Natalia Requena
Contained in: [M-CHEMBIO-103747] Molecular Biology

ECTS	Recurrence	Exam type	Version
0	Jedes Wintersemester	Studienleistung	1

Learning Control / Examinations
A protocol has to be written, which fulfil scientific requirements

Conditions
none

T Course: Molecular Biology, Biochemistry and Physiology of Plants [T-CHEMBIO-108658]

Responsibility: Holger Puchta
Contained in: [M-CHEMBIO-103729] Physiology
[M-CHEMBIO-103784] Physiological Aspects of Biotechnology

Exam type
Prüfungsleistung schriftlich

T Course: Organic Chemistry [T-CHEMBIO-100209]

Responsibility: Norbert Foitzik, wechselnde Dozenten, siehe Vorlesungsverzeichnis
Contained in: [M-CHEMBIO-100145] Organic Chemistry

ECTS	Language	Recurrence	Exam type	Version
3	deutsch	Jedes Sommersemester	Prüfungsleistung schriftlich	3

Events

Term	Event-No.	Events	Type	SWS	Lecturers
SS 2017	5101		Vorlesung (V)	3	Hans-Achim Wagenknecht

Learning Control / Examinations
Exam over 120 minutes

T Course: Practical Course Biological Methods [T-CHEMBIO-107578]

Responsibility: Peter Nick
Contained in: [M-CHEMBIO-103748] Biological Methods

ECTS	Recurrence	Exam type	Version
16	Jedes Sommersemester	Studienleistung praktisch	1

Learning Control / Examinations
For this practical part a detailed protocol has to be written.

Conditions
none

Recommendations
http://www.biologie.kit.edu/311.php

T Course: Practical Course in Plant Physiology [T-CHEMBIO-107576]

Responsibility: Manfred Focke, Holger Puchta
Contained in: [M-CHEMBIO-103747] Molecular Biology

ECTS	Recurrence	Exam type	Version
7	Jedes Wintersemester	Prüfungsleistung anderer Art	2

Learning Control / Examinations
The practical Plant Physiology course will be graded by the performance in the following areas:

1. written exams concerning the course:
For each of the five parts of the course (enzymes, molecular biology, biolistic transformation, transformation with agrobacteria, natural substances and phytohormones) a test (at the first or second day) will be written with a maximum score of 15 points (therefore a maximum of 75 points can be achieved)

2. Report:
For one of the 5 parts an individual report describing the methods and results (including discussion) will be written (maximum score 25 points)
To full-fill the requirements at least 50 points as a sum of all tests and the protocol have to be achieved. If the sum is above 50 points a general mark will be given, if the sum is less than 50 points all tests with less than 7,5 points can be re-written at a central day. If the total sum is still less than 50 points an oral examination will occurr with the two alternatives: passed (= 4,0) or failed.

Conditions
none

T Course: Practical Course Organic Chemistry [T-CHEMBIO-106425]

Responsibility:
Contained in: [M-CHEMBIO-100145] Organic Chemistry

ECTS	Recurrence	Exam type	Version
7	Jedes Semester	Studienleistung	1

Learning Control / Examinations
Protocols

Conditions
The Examination of the lecture Organic Chemistry **T-CHEMBIO-100209 - Organische Chemie** has to be absolved

Modeled Conditions
The following conditions must be met:

- The course [T-CHEMBIO-100209] *Organic Chemistry* must have been passed.

Recommendations
important informations on:
https://www.ioc.kit.edu/104.php

T Course: Practical in General Chemistry [T-CHEMBIO-100208]

Responsibility: Helmut Goesmann
Contained in: [M-CHEMBIO-100144] General Chemistry

ECTS	Language	Recurrence	Exam type	Version
7	deutsch	Jedes Wintersemester	Studienleistung schriftlich	2

Events

Term	Event-No.	Events	Type	SWS	Lecturers
WS 17/18	5045		Praktikum (P)	6	Assistenten, Frank Breher, Claus Feldmann, Helmut Goesmann, Annie Powell, Peter Roesky
WS 17/18	5047		Seminar (S)	2	Helmut Goesmann

T Course: Practical in Green Biotechnology [T-CHEMBIO-107633]

Responsibility: Manfred Focke, Holger Puchta
Contained in: [M-CHEMBIO-103784] Physiological Aspects of Biotechnology

ECTS	Recurrence	Exam type	Version
5	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Learning Control / Examinations
During the practical course the contents are tested 5 times over 5 different themes.
Each test has to be absolved with min. 50 %.
If one test is absolved with less than 50 % of the points, it has to be repeated on a central date. If the test is again under 50% an oral exam has to be taken.
Furthermore a protocol has to be written, it has to follow certain minimum requirements. (the supervisor can demand improvements)

Conditions
none

Recommendations
The participation on the lecture “Physiology and Biochemistry of Plants“is strongly recommended

T Course: Practical in Microbial Diversity [T-CHEMBIO-107634]

Responsibility: Johannes Gescher
Contained in: [M-CHEMBIO-103785] Applied Biodiversity

ECTS	Recurrence	Exam type	Version
4	Jedes Sommersemester	Prüfungsleistung anderer Art	1

Conditions
none

T Course: Practical in Technical Biology [T-CHEMBIO-107638]

Responsibility: Johannes Gescher
Contained in: [M-CHEMBIO-103786] Molecular aspects of applied Biology

ECTS	Recurrence	Exam type	Version
6	Jedes Wintersemester	Prüfungsleistung anderer Art	1

Conditions
none

T Course: Presentation Techniques [T-CHEMBIO-107629]

Responsibility: Peter Nick
Contained in: [M-CHEMBIO-100151] Presentation/Structuring

ECTS	Recurrence	Exam type	Version
2	Jedes Sommersemester	Studienleistung mündlich	3

Conditions
T-CHEMBIO-107628 -Introduction to presentation techniques

Modeled Conditions
The following conditions must be met:

- The course [T-CHEMBIO-107628] *Introduction to presentation techniques* must have been started.

T Course: Protocol of the practical Molecular Biology [T-CHEMBIO-107637]

Responsibility: Reinhard Fischer, Jörg Kämper, Natalia Requena Sanchez
Contained in: [M-CHEMBIO-103786] Molecular aspects of applied Biology

ECTS	Recurrence	Exam type	Version
0	Jedes Wintersemester	Studienleistung	1

Learning Control / Examinations
A Protocol has to be written which complies scientific standards. Further Informations on http://www.biologie.kit.edu/822.php

Conditions
none

Recommendations
the participation on the tutorial is recommanded:

http://www.biologie.kit.edu/449.php

T Course: Protocol of the practical Morphology of Animals [T-CHEMBIO-107746]

Responsibility: Joachim Bentrop
Contained in: [M-CHEMBIO-103490] Orientation Exam
[M-CHEMBIO-103725] Stucture and Function of Life
[M-CHEMBIO-103751] Structural and functional Aspects of Biological Application

ECTS	Recurrence	Exam type	Version
0	Jedes Wintersemester	Studienleistung	1

Conditions
none

T Course: Statistics - Exam [T-MATH-106848]

Responsibility: Bruno Ebner, Bernhard Klar
Contained in: [M-MATH-100150] Statistics

ECTS	Recurrence	Exam type	Version
3	Jedes Wintersemester	Prüfungsleistung schriftlich	1

T Course: Statistics - Exercises [T-MATH-106849]

Responsibility: Bruno Ebner, Bernhard Klar
Contained in: [M-MATH-100150] Statistics

ECTS	Recurrence	Exam type	Version
1	Jedes Wintersemester	Studienleistung	1

Stichwortverzeichnis