July 2026

Courses in English for Incoming students

The following courses are open for incoming exchange students of the Faculty of Biology. They are given in English; a language proof of is not required but we strongly recommend English knowledge of at least level B2, better still C1, in order to be able to follow the courses sufficiently well.

You can select the courses as Bachelor or Master student if you meet subject specific requirements indicated under 'remarks'. As a bachelor's student, please be aware that the master's courses are at a correspondingly higher level!

Information about the modules (content, workload, prerequisites etc.) can be found in the directory of modules below. Inform yourself carefully before choosing a module. In the case of 'block courses', sessions take place every day for the whole day over a specific period (e.g. one or three weeks).

In addition, check the semester dates using our Course Catalogue "EXA" whilst choosing a module in order to avoid overlap of lectures and courses. Our "Guide for exchange students" contains information on using EXA. In case the semester dates are not available yet, simply contact us.

University Course Catalouge (EXA)

Guide for exchange students of biology

Courses available in winter term

Acronyms for course type: L = lecture, P = practical course, T = tutorial, S = seminar

Module-No.	Title	ECTS	Type	Remarks	Level (B=Bachelor, M=Master)
M.Bio.141	General and applied microbiology	3	L		M
M.Bio.142	Molecular genetics and microbial cell biology	3	L		M
M.Bio.158	Enzyme catalysis and biological chemistry	3	L		M
M.Bio.172	Molecular genetics and microbial cell biology	6	L, S		M
M.Bio.344	Neurobiology 1	3	L		M
M.Bio.366	Introduction to behavioral biology	3	L		M
M.Bio.392	Current Developmental Biology	6	L, T, S		M
M.Bio.393	Current Developmental Biology	3	L, T		M
M.Biodiv.403	Vegetation ecology and vegetation history	6	L, S		M
M.Biodiv.404	Animal ecology	6	L, S		M
M.Biodiv.425	Evolution of embryophyta	6	L, S		M
M.Biodiv.430	Project study in palaeoecology and palynology	6	S, P	Individual Lab Project*	B, M
M.Biodiv.462	Assessing the genetic biodiversity of algae and cyanobacteria – a practical lab course	6	L, P	Individual Lab Project*	M
M.Biodiv.470	Morphology of animals: Microscopical methods in comparative morphology	6	L, P	as block course in Oct/Nov	M
M.Biodiv.479	Phylogenomics	6	L, P	as block course in January	M
M.Biodiv.482	Field studies in conservation biology	6	S, P	Individual Lab Project*	B, M
M.Biodiv.605	Project studies in animal evolution and biodiversity	6	S, P	Individual Lab Project*	B, M
M.CoBi.541	Bioinformatics and its areas of application	4	L		M
M.INC.1003	Animal Conservation	6	L		M
SK.Bio.305	Biostatistics with R	3	T	as block course in March	B, M
SK.Bio.307	Linux and Python for biologists	4	P	Block course in March	B, M
SK.Bio.329	Research internship (4 weeks)	6	P	Individual Lab Project*	B, M
SK.Bio.331	Research internship (8 weeks)	12	P	Individual Lab Project*	B, M
SK.Bio.7002	Basic virology	3	L		B, M
SK.Bio.7004	Environmental microbiology	3	L, P	requires knowledge in microbiology	B, M

SK.Bio.7007	Methods in Molecular Virology	3	S	requires basic knowledge in virology	B, M
SK.Bio.7008	Molecular basis of HIV replication and pathogenesis	3	L		B, M
SK.Bio.7009	Learning with a core facility - protein analytics using mass spectrometry	3	P	Block course in September	B, M

Courses available in summer term

Acronyms for course type: L = lecture, P = practical course, T = tutorial, S = seminar

Module-No.	Title	ECTS	Type	Remarks	Level (B=Bachelor, M=Master)
M.Bio.144	Cellular and molecular biology of plant-microbe interactions	3	L		M
M.Bio.156	Structural biochemistry	3	L		M
M.Bio.157	Biochemistry and Biophysics	3	L		M
M.Bio.176	Structural biochemistry	6	L, S		M
M.Bio.394	Frontiers in Neural Development	6	L, T, S		M
M.Bio.395	Frontiers in Neural Development	3	L, T		M
M.Biodiv.430	Project study in palaeoecology and palynology	6	S, P	Individual Lab Project*	B, M
M.Biodiv.434	Introduction to the history of cultivated plants	6	L, S	as block course	M
M.Biodiv.437	Methods in paleoecology	6	L, P		M
M.Biodiv.446	Molecular zoology and insect biotechnology	6	L, S, P	as block course	M
M.Biodiv.462	Assessing the genetic biodiversity of algae and cyanobacteria – a practical lab course	6	L, P	Individual Lab Project*	M
M.Biodiv.482	Field studies in conservation biology	6	S, P	Individual Lab Project*	B, M
M.Biodiv.491	Next generation sequencing for evolutionary biology	6	L, S, P	as block course in September	M
M.Biodiv.605	Project studies in animal evolution and biodiversity	6	S, P	Individual Lab Project*	B, M
SK.Bio.305	Biostatistics with R	3	T	Weekly course during summer semester or as block course in March	B, M
SK.Bio.307	Linux and Python for biologists	4	P	Block course in March	B, M
SK.Bio.329	Research internship (4 weeks)	6	P	Individual Lab Project*	B, M
SK.Bio.331	Research internship (8 weeks)	12	P	Individual Lab Project*	B, M
SK.Bio.370	Molecular zoology: Topics and methods	6	L, S, P	as block course in April	B, M
SK.Bio.7001	Neurobiology I	6	L, S		B, M
SK.Bio.7002	Basic virology	3	L		B, M
SK.Bio.7007	Methods in Molecular Virology	3	S	requires basic knowledge in virology	B, M
SK.Bio.7008	Molecular basis of HIV replication and pathogenesis	3	L		B, M
SK.Bio.7009	Learning with a core facility - protein analytics using mass spectrometry	3	P	Block course in September	B, M
SK.Bio-NF.7001	Neurobiology I	3	L		B, M

* Individual Lab project: requires a self-organised supervising working group. More Information in the Guide for incoming exchange students of biology under “2.3.2 Laboratory Project”.

For some modules, there are specific contact persons for individual projects:

- M.Biodiv.430: Prof. Hermann Behling Hermann.Behling@biologie.uni-goettingen.de
- M.Biodiv.462: Prof. Thomas Friedl tfriedl@uni-goettingen.de
- M.Biodiv.482: Prof. Johannes Kamp johannes.kamp@uni-goettingen.de
- M.Biodiv.605: Prof. Christoph Bleidorn christoph.bleidorn@biologie.uni-goettingen.de or Prof. Maria Teresa Aguado aguadomolina@uni-goettingen.de

Georg-August-Universität
Göttingen

Directory of Modules

Courses for Incomings

Index by areas of study

I. Courses in English for Incoming students

Georg-August-Universität Göttingen **Module M.Bio.141: General and Applied Microbiology**	3 C 3 WLH

Learning outcome, core skills: Students are able to analyse evolutionary processes and phylogenetic systems of bacteria and archaea, and describe and interpret their morphological and cellular characteristics. They analyse microbial communities and biocoenoses, as well as molecular regulatory mechanisms such as transcription, translation, post-translational control, signal transduction, and genetic networks. They explain the principles of microbial development, the mechanisms of pathogenicity in key pathogens, and the development of novel antimicrobial agents. Furthermore, they can explain the metabolic diversity of bacteria and archaea and its relevance for biotechnological applications and industrial microbiology.	**Workload:** Attendance time: 42 h Self-study time: 48 h

Course: General and Applied Microbiology (Lecture) *Contents*: • Evolution and phylogenetic system • Morphology and cell biology • Communities and biocoenosis of bacteria and archaea • Gene expression and molecular control (transcription, translation) • Posttranslational control, protein stability and proteomics • Genetic networks • Molecular switches and signal transduction • Microbial developmental biology • Mechanisms of pathogenicity of important pathogens • Development of new antimicrobial agents • Diversity of the metabolism in bacteria and archaea as basis for biotechnological applications • Industrial microbiology	3 WLH
Examination: Written examination (90 minutes)	3 C

Examination requirements: Students demonstrate their knowledge through a written examination covering core topics in evolution, cell biology, molecular biology, and microbiology. The exam assesses theoretical understanding, the ability to analyse and integrate biological processes, and the application of concepts in the context of biotechnology, medicine, and ecology. It evaluates factual accuracy, logical argumentation, and critical reflection on interrelationships within the subject area.	

Admission requirements: cannot be combined with M.Bio.101	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Jörg Stülke
Course frequency: each winter semester	**Duration:** 1 semester[s]

Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 10	

Georg-August-Universität Göttingen **Module M.Bio.142: Molecular Genetics and Microbial Cell Biology**	3 C 3 WLH

Learning outcome, core skills: Students are able to analyse molecular biological and cellular processes in model systems of molecular mycology (yeasts and filamentous fungi) using case studies and explain underlying genetic mechanisms. They independently research a scientific topic to the level of a literature review, synthesise current research literature, in a structured critical manner. They also reflect on the biological and methodological implications within the context of contemporary research.	**Workload:** Attendance time: 42 h Self-study time: 48 h

Course: Molecular Genetics and Microbial Cell Biology (Lecture)	3 WLH
Examination: Written examination (90 minutes)	3 C

Examination requirements: The assessment consists of a written examination that evaluates students' understanding of molecular genetics and cell biology in microbial model organisms, as well as their ability to critically analyse and synthesise scientific content. The exam includes tasks on case study analysis, explanation of genetic mechanisms, and evaluation of current research findings. Performance is assessed based on factual accuracy, argumentative strength, and depth of content.	

Admission requirements: cannot be combined with M.Bio.102 or M.Bio.172	**Recommended previous knowledge:** • Watson, Molecular Biology of the Gene, Pearson, 7th Edition; • Alberts, Molecular Biology of the Cell, Wiley, 7th Edition
Language: English	**Person responsible for module:** Prof. Dr. Stefanie Pöggeler
Course frequency: each winter semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 10	

Georg-August-Universität Göttingen **Module M.Bio.144: Molecular Cell Biology of Plant-Microbe Interactions and Stress Adaptation**	3 C 3 WLH

Learning outcome, core skills: Upon completion of the module, students will be familiar with fundamental concepts of plant-microbe interactions at the cellular and molecular level and with plant adaptation mechanisms to abiotic stress factors. They will understand the results of current and relevant publications and will be able to critically evaluate them.	**Workload:** Attendance time: 42 h Self-study time: 48 h

Course: Plant-Microbe Interactions (Lecture) *Contents*: • Plant-microbe interactions: models, defense mechanisms, PAMP- and effector-induced immunity • Resistance to biotrophic and necrotrophic pathogens • Hormone-dependent signaling pathways, systemically acquired resistance • Plant responses to abiotic stress (drought, heat) • Gene regulatory networks, stress memory	3 WLH
Examination: Written examination (54 minutes)	3 C

Examination requirements: The exam tests the extent to which students understand the basic concepts and analytical methods of plant-microbe interactions and plant adaptation mechanisms to abiotic stress factors and can summarize them concisely.	

Admission requirements: cannot be combined with M.Bio.104	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Volker Lipka
Course frequency: each summer semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 10	

Georg-August-Universität Göttingen **Module M.Bio.156: Structural Biochemistry**	3 C 3 WLH

Learning outcome, core skills: Students are able to analyse the structure and function of biological macromolecules, particularly proteins, and explain the relationships between structure, folding, and function. They describe structure-function relationships in protein-protein and protein-nucleic acid interactions, apply principles of molecular recognition, and explain approaches to structure-based drug design.	**Workload:** Attendance time: 42 h Self-study time: 48 h

Course: Structural Biochemistry (Lecture)	3 WLH
Examination: Written examination (90 minutes)	3 C

Examination requirements: The written examination tests the students' knowledge of structure-function relationships, protein interactions and structure-based drug design.	

Admission requirements: cannot be combined with M.Bio.106 or M.Bio.176	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Ralf Ficner
Course frequency: each summer semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 10	

Georg-August-Universität Göttingen **Module M.Bio.157: Biochemistry and Biophysics**	3 C 3 WLH

Learning outcome, core skills: Students are able to describe the structure, function, and biophysics of selected biomolecule classes and explain the role of lipids as signalling molecules, as well as the significance of secondary metabolites in plant metabolism. They analyse primary and secondary metabolism, identify functions and regulation of enzymes in lipid metabolism, and evaluate biotechnological approaches for modifying storage compounds.	**Workload:** Attendance time: 42 h Self-study time: 48 h

Course: Biochemistry and Biophysics (Lecture)	3 WLH
Examination: Written examination (90 minutes)	3 C

Examination requirements: Students describe the structure and function of biomolecules, analyse metabolic pathways and the role of lipids and secondary metabolites, identify enzyme functions in lipid metabolism, and evaluate biotechnological approaches. The examination is written and tests understanding, analysis, and critically evaluation using case studies and data.	

Admission requirements: cannot be combined with M.Bio.107	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Ivo Feußner
Course frequency: each summer semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:** 2
Maximum number of students: 10	

Georg-August-Universität Göttingen **Module M.Bio.158: Enzyme Catalysis and Biological Chemistry**	3 C 3 WLH

Learning outcome, core skills: Students are able to explain and apply catalytic mechanisms of enzymes, the function of macromolecular complexes such as the ribosome, and the principles of biocatalysis, reaction kinetics, and thermodynamics of biochemical processes. They analyse chemical model systems of enzymes, describe strategies for bio-oligomer and ligand synthesis, and apply ligation techniques and array technologies in research contexts. They acquire in-depth knowledge of current topics in enzymology and bio-(organ)chemistry and are able to reflect on and integrate these into a scientific context.	**Workload:** Attendance time: 42 h Self-study time: 48 h

Course: Enzyme Catalysis and Biological Chemistry (Lecture)	3 WLH
Examination: Written examination (90 minutes)	3 C

Examination requirements: Students demonstrate their knowledge and application skills through a written examination that assesses theoretical foundations, reaction mechanisms, methodological approaches, and current research trends. The exam evaluates the ability to analyse complex biochemical processes, critically assess scientific concepts, and integrate recent research findings into scientific discourse. It is designed to assess factual accuracy, logical reasoning, and depth of scientific reflection.	

Admission requirements: cannot be combined with M.Bio.108	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Kai Tittmann
Course frequency: each winter semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 10	

Georg-August-Universität Göttingen **Module M.Bio.172: Molecular Genetics and Microbial Cell Biology**	6 C 4 WLH

Learning outcome, core skills: Students are able to analyse molecular biological and cellular processes in model systems of molecular mycology (yeasts and filamentous fungi) using case studies and explain the underlying genetic mechanisms. They independently research a specific topic in molecular genetics and microbial cell biology to the level of a scientific review, integrate current research literature, and present their finding in a structured, critical, and scientifically sound manner. They analyse complex topics from multiple perspectives, communicate effectively in collaborative settings, and develop well-reasoned, constructive solutions together.	**Workload:** Attendance time: 56 h Self-study time: 124 h

Course: Molecular Genetics and Microbial Cell Biology (Lecture)	3 WLH

Course: Seminar on Molecular Genetics and Microbial Cell Biology (Seminar)	1 WLH

Examination: Written examination (90 minutes) **Examination prerequisites:** Regular participation in seminar; successful seminar presentation (ca. 15 minutes). The seminar presentation can earn up to 10% of the total points for the exam in advance.	6 C

Examination requirements: Students demonstrate their competences through a written exam covering the lecture content, assessing their theoretical understanding of molecular genetics and cell biology, and a scientific seminar presentation on an independently researched topic. The presentation is assessed for depth of content, scientific structure, critical analysis of literature, and clarity of communication. Both components are evaluated jointly and reflect the student's subject-specific, analytical, and presentation skills.	

Admission requirements: cannot be combined with M.Bio.102 or M.Bio.142	**Recommended previous knowledge:** • Watson, Molecular Biology of the Gene, Pearson, 7th Edition; • Alberts, Molecular Biology of the Cell, Wiley, 7th Edition
Language: English	**Person responsible for module:** Prof. Dr. Stefanie Pöggeler
Course frequency: each winter semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 6	

Georg-August-Universität Göttingen **Module M.Bio.176: Structural Biochemistry**	6 C 4 WLH

Learning outcome, core skills: Students are able to analyse the structure and function of biological macromolecules, particularly proteins, and explain the relationships between structure, folding, and function. They describe structure-function relationships in protein-protein and protein-nucleic acid interactions, apply principles of molecular recognition, and explain approaches to structure-based drug design. Students actively contribute to scholarly discussions, and reflect on recent developments in biochemistry. They analyse complex topics from multiple perspectives, apply effective communication strategies to support collaborative work, present well-reasoned arguments, and work jointly to develop informed and constructive solutions.	**Workload:** Attendance time: 56 h Self-study time: 124 h

Course: Structural Biochemistry (Lecture)	3 WLH

Course: Seminar on Structural Biochemistry (Seminar)	1 WLH

Examination: Written examination on content of lecture (90 min) [80% of overall grade]; seminar presentation (ca. 15 min) [20% of overall grade] **Examination prerequisites:** regular participation in seminar	6 C

Examination requirements: In a scientific seminar presentation, students critically analyse current publications in the field of structural biochemistry and molecular recognition. A written examination tests their knowledge of structure-function relationships, protein interactions and structure-based drug design.	

Admission requirements: cannot be combined with M.Bio.106 or M.Bio.156	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Ralf Ficner
Course frequency: each summer semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 5	

Georg-August-Universität Göttingen **Module M.Bio.344: Neurobiology 1**	3 C 2 WLH

Learning outcome, core skills: Students are able to explain and apply fundamental methods in molecular, cellular, and systems neuroscience to address scientific questions in neuroscience.They describe core experimental approaches - such as genetic manipulation, electrophysiology, imaging, cell culture, and data analysis - and evaluate their application in research practice. They integrate current research findings into their explanations and are able to clearly and precisely present complex relationships between structure, function, and regulation in the nervous system. They apply scientific concepts, reflect on methodological choices, and can contribute meaningfully to scientific discussions.	**Workload:** Attendance time: 28 h Self-study time: 62 h

Course: From Gene to Behaviour (Lecture)	2 WLH
Examination: Written examination (60 minutes)	3 C

Examination requirements: Students demonstrate their knowledge through a written examination assessing theoretical foundations, methodological approaches, and applications in neuroscience. The exam evaluates the ability to analyse complex biological processes, integrate concepts from molecular and cellular biology, and engage in scientific reasoning. It is designed to assess factual accuracy, logical structure of arguments, and depth of scientific reflection.	

Admission requirements: cannot be combined with M.Bio.304	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Martin Göpfert
Course frequency: each winter semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 27	

Georg-August-Universität Göttingen **Module M.Bio.366: Introduction to Behavioral Biology**	3 C 3 WLH

Learning outcome, core skills: Students are able to explain and contextualise fundamental concepts in behavioural biology - particularly in the fields of behavioural ecology, sociobiology, and cognition - with special attention to the quantitative aspects of behavioural research. They describe core methods in behavioural biology, analyse their application in research practice, and evaluate their advantages and limitations in relation to scientific questions. They present scientific content in a structured, scientifically sound manner - particularly in writing - and are able to clearly and precisely communicate complex relationships. They integrate current research findings into their arguments and can contribute meaningfully to scientific discussions.	**Workload:** Attendance time: 42 h Self-study time: 48 h

Course: Introduction to Behavioral Biology (Lecture)	3 WLH
Examination: Written examination (90 minutes)	3 C

Examination requirements: Students demonstrate their knowledge through a written examination assessing theoretical foundations, methodological approaches, and applications in behavioural biology. The exam evaluates the ability to analyse complex biological processes, integrate concepts from behavioural ecology, sociobiology, and cognition, and engage in scientific reasoning. It is designed to assess factual accuracy, logical structure of arguments, and clarity of presentation.	

Admission requirements: cannot be combined with M.Bio.306 or M.Bio.346	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Dr. Oliver Schülke
Course frequency: each winter semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 4	

Georg-August-Universität Göttingen **Module M.Bio.392: Current Developmental Biology**	6 C 4 WLH

Learning outcome, core skills: Students are able to explain and apply the theoretical principles of developmental genetics, developmental biochemistry, and developmental biology, particularly in the context of morphogenetic processes and pattern formation. They analyse methods for determining gene function and embryo manipulation and can critically evaluate their application in research. They can use publicly accessible databases for *in silico* sequence analysis and model system-specific resources. They explain fundamental aspects of the evolution of developmental processes and can place them within a scientific context.They conduct targeted literature research, select relevant information, and prepare it for a scientific presentation. They present their work in a clear, structured, and convincing manner and are able to engage in scientific discussion, answer questions, and reflect critically.	**Workload:** Attendance time: 56 h Self-study time: 124 h

Course: Current Developmental Biology (Lecture)	2 WLH
Examination: Written examination (90 minutes) **Examination prerequisites:** Seminar presentation of a publication (ca. 20 min)	6 C

Course: Exercises and Deepening of Lecture Content (Tutorial)	1 WLH

Course: Current Topics in Developmental Biology (Seminar)	1 WLH

Examination requirements: Students present a current scientific publication in a seminar talk, explaining the research question, methodology, results, and interpretation, followed by a discussion. Assessment evaluates scientific depth, quality of literature selection, clarity of presentation, structure of argumentation, and communication skills in scientific discourse. Students finally demonstrate their knowledge through a written examination assessing theoretical foundations, methodological approaches, and applications in developmental biology.	

Admission requirements: cannot be combined with M.Bio.321 or M.Bio.393	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Ernst Anton Wimmer
Course frequency: each winter semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students:	

5	

Georg-August-Universität Göttingen **Module M.Bio.393: Current Developmental Biology**	3 C 3 WLH

Learning outcome, core skills: Students are able to explain and apply the theoretical principles of developmental genetics, developmental biochemistry, and developmental biology, particularly in the context of morphogenetic processes and pattern formation. They analyse methods for determining gene function and embryo manipulation and can critically evaluate their application in research. They explain fundamental aspects of the evolution of developmental processes and can place them within a scientific context. They integrate current research findings into their arguments and are able to clearly and precisely present complex relationships in scientific discourse.	**Workload:** Attendance time: 42 h Self-study time: 48 h

Course: Current Developmental Biology (Lecture)	2 WLH
Course: Exercises and Deepening of Lecture Content (Tutorial)	1 WLH
Examination: Written examination (90 minutes)	3 C

Examination requirements: Students demonstrate their knowledge through a written examination assessing theoretical foundations, methodological approaches, and applications in developmental biology. The exam evaluates the ability to analyse complex biological processes, integrate concepts from genetics, biochemistry, and developmental biology, and engage in scientific reasoning. It is designed to assess factual accuracy, logical structure of arguments, and depth of scientific reflection.	

Admission requirements: cannot be combined with M.Bio.321 or M.Bio.392	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Ernst Anton Wimmer
Course frequency: each winter semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 5	

Georg-August-Universität Göttingen **Module M.Bio.394: Frontiers in Neural Development**	6 C 4 WLH

Learning outcome, core skills: Students are able to explain and compare the principles and mechanisms of neural development in insects and vertebrates, including neuroectodermal regionalization, axon guidance, development of neural stem cells and glia. They can explain fundamental aspects of the evolution of neural development. They know the strength and weaknesses of model systems in neurodevelopmental biology and are able to choose model systems according to the scientific question. They independently design experimental approaches to address scientific questions using modern methods. They critically discuss data in a scientific context, and perform scientific presentations.	**Workload:** Attendance time: 50 h Self-study time: 130 h

Course: Development and Evolution of the Nervous System (Lecture)	2 WLH
Examination: Written examination (90 minutes) **Examination prerequisites:** Regular participation in seminar. Seminar presentation and discussion of cutting edge experimental approaches. Design, presentation and discussion of self-developed experimental approaches.	6 C

Course: Exercises and Consolidation of Lecture "Development and Evolution of the Nervous System" (Tutorial)	1 WLH

Course: Seminar on Conception of Experiments with Modern Methods (Seminar)	1 WLH

Examination requirements: Students demonstrate their knowledge through a written examination assessing theoretical foundations, experimental concepts, and biological mechanisms. They present their independently developed experimental approaches in a scientific seminar and defend them in a subsequent oral discussion, explaining their methodology and scientific aims. Assessment evaluates scientific depth, methodological creativity, quality of data analysis, and communication skills in the scientific discussion.	

Admission requirements: cannot be combined with M.Bio.322 or M.Bio.395	**Recommended previous knowledge:** a basic understanding of developmental biology (e.g. module M.Bio.321 or relevant textbook chapters on insect and vertebrate developmental biology)
Language: English	**Person responsible for module:** Prof. Dr. Gregor Bucher
Course frequency: each summer semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted:	**Recommended semester:**

twice	
Maximum number of students: 5	

Georg-August-Universität Göttingen **Module M.Bio.395: Frontiers in Neural Development**	3 C 3 WLH

Learning outcome, core skills: Students are able to explain and compare the principles and mechanisms of neural development in insects and vertebrates, including neuroectodermal regionalization, axon guidance, development of neural stem cells and glia. They can explain fundamental aspects of the evolution of neural development. They know the strength and weaknesses of model systems in neurodevelopmental biology and are able to choose model systems according to the scientific question.	**Workload:** Attendance time: 42 h Self-study time: 48 h

Course: Development and Evolution of the Nervous System (Lecture)	2 WLH
Course: Exercises and Consolidation of Lecture "Development and Evolution of the Nervous System" (Tutorial)	1 WLH
Examination: Written examination (90 minutes)	3 C

Examination requirements: Students demonstrate their knowledge through a written examination assessing theoretical foundations, experimental concepts, and biological mechanisms.	

Admission requirements: cannot be combined with M.Bio.322 or M.Bio.394	**Recommended previous knowledge:** a basic understanding of developmental biology (e.g. module M.Bio.321 or relevant textbook chapters on insect and vertebrate developmental biology)
Language: English	**Person responsible for module:** Prof. Dr. Gregor Bucher
Course frequency: each summer semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 5	

Georg-August-Universität Göttingen **Module M.Biodiv.403: Vegetation ecology and vegetation history**	6 C 4 WLH

Learning outcome, core skills: The students acquire knowledge and a profound understanding of temporal and spatial vegetation patterns; one focus lies on biomes, climate zones and other large-scale vegetation areas, another focus lies on biological and geobotanical principles and basics on different scale levels and in different natural environments. Perception and knowledge in basic and applied fields of advanced vegetation ecology, vegetation history, sociology and chorology of plants, conception and reception of scientific papers; presentation skills.	**Workload:** Attendance time: 56 h Self-study time: 124 h

Course: Vegetation ecology and vegetation history (Lecture)	2 WLH

Course: Modern issues of vegetation science in agricultural landscapes (Seminar)	2 WLH
Examination: Seminar talk (30 minutes)	6 C

Examination requirements: Knowledge of temporal and spatial vegetation patterns with focus on biomes, climate zones and other large-scale vegetation areas.	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Hermann Friedrich Behling
Course frequency: each summer semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 16	

Georg-August-Universität Göttingen **Module M.Biodiv.404: Animal ecology**	6 C 4 WLH

Learning outcome, core skills: The lecture presents principles and theories of ecology and introduces current topics of ecological research. Topics include population ecology, interactions in animal communities, food webs, biodiversity and ecological theories.The seminar covers current topics of ecological and evolutionary research. In the seminar the students acquire advanced knowledge of methods and strategies to analyze ecological communities. Knowledge of ecological theories and modelling. Principles of animal populations and food webs. Experimental and statistical methods for the analysis of animal communities. Knowledge of current topics of animal ecological and evolutionary biology research.	**Workload:** Attendance time: 56 h Self-study time: 124 h

Course: Topics of animal ecology and evolution (Seminar)	2 WLH

Course: Animal ecology (Lecture)	2 WLH
Examination: Written examination (90 minutes) **Examination prerequisites:** Seminar talk (approx. 20 Minutes) **Examination requirements:** Knowledge of ecological principles and theories, population models. Functional responses, analysis and modelling of biotic interactions and food webs. Biodiversity and ecosystem functioning.	6 C

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Stefan Scheu
Course frequency: each winter semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 40	

Georg-August-Universität Göttingen **Module M.Biodiv.425: Evolution of embryophyta**	6 C 4 WLH

Learning outcome, core skills: Students are familiarised with latest research in the area of organismic evolution of embryophytes through the study, presentation and discussion of current case studies on speciation, evolutionary history, chromosomal and genomic evolution, reproductive biology, evolution of characteristics and coevolution. They gain an overview of new theoretical and methodical research approaches to understanding the evolution of plants. They gain the ability to develop evolutionary biology hypotheses and can select suitable model systems and methods to test hypotheses. Students learn the practical skills of presentation, interpretation and discussion of results (in scientific English). They can describe and understand evolutionary processes, hypotheses and methods and give examples for case studies of land plants. They are capable of giving presentations in English and discussing scientific results in English.	**Workload:** Attendance time: 56 h Self-study time: 124 h

Course: Speciation and evolution of land plants (Lecture) *Course frequency:* each winter semester	2 WLH

Course: Plant systematics and phycology (Seminar) *Course frequency:* each semester	2 WLH

Examination: Written examination (70% of the overall grade) (60 minutes) **Examination prerequisites:** Participation in seminar and oral presentation (approx. 45 min) (30% of the overall grade) **Examination requirements:** In the written examination students demonstrate their abilities to understand and discuss evolutionary processes and hypotheses as well as their knowledge of case studies of land plants. In the seminar they must give a talk in scientific English and present the new results of research from the literature or from their own Master thesis.	6 C

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Elvira Hörandl
Course frequency: Lecture: each winter semester; Seminar: each semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 15	

Georg-August-Universität Göttingen **Module M.Biodiv.430: Project study in palaeoecology and palynology**	6 C 8 WLH

Learning outcome, core skills: In-depth study of pollen analysis and palaeoecologically working methods, independent determination and documentation of pollen and spore types, preparation, presentation and evaluation of palaeoecologically data, use of software, familiarisation with current palaeoecologically topics. Independent, problem- and research-oriented pollen analysis studies as part of a small research project in the field of vegetation history, climate and environmental history, as well as scientific discussion of palaeoecologically topics, written and oral presentation of results.	**Workload:** Attendance time: 112 h Self-study time: 68 h

Course: Current topics in palynology and climate dynamics (Seminar)	2 WLH

Course: Palaeoecology / Palynology (Exercise)	6 WLH

Examination: Lab report (max. 10 pages) **Examination prerequisites:** Seminar talk (approx. 15 Min.) **Examination requirements:** Knowledge of pollen and spore types; pollen analytical and palaeoecologically working methods. Fundamentals of palaeoecologically and ecology and the reconstruction of climatic events in the Quaternary on the basis of pollen diagrams and palaeoecologically.	6 C

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Hermann Friedrich Behling
Course frequency: winter or summer semester, on demand	**Duration:** 1 semester[s]
Number of repeat examinations permitted: once	**Recommended semester:**
Maximum number of students: 10	

Georg-August-Universität Göttingen **Module M.Biodiv.434: Introduction to the history of cultivated plants**	3 C 4 WLH

Learning outcome, core skills: The students acquire knowledge about the emergence of cultivated plants from wild plants (from wildtype to high-yielding crop plant): morphological changes, genetic principles, chronological processes of the dispersal history starting from the centers of origin/ manifolds. The students become acquainted with the tasks, methods and results related to research in vegetation history and archaeobotany (agricultural history). Upon completion of the module, students have the professional expertise to (microscopically) identify and address fossil plant remains or macro-remains (charred, not charred) and are able to microscopically identify wood species (carbonized, not caronized). They possess the ability to ecologically interpret species spectra for the reconstruction of the palaeo-environment.	**Workload:** Attendance time: 56 h Self-study time: 34 h

Course: Introduction to the history of cultivated plants (Lecture)	1 WLH

Course: Practical course of the history of cultivated plants - microscopic identification of subfossil plant remains (Exercise,Seminar)	3 WLH

Examination: Minutes / Lab report (max. 10 pages) **Examination requirements:** Knowledge of the emergence of high-yielding crops from wild plants. Skills for the identification of fossil plant residues or macro-remains and the ecological interpretation of species spectra for the paleo-environmental reconstruction.	3 C

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Hermann Friedrich Behling
Course frequency: each summer semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 10	

Georg-August-Universität Göttingen **Module M.Biodiv.437: Methods in palaeoecology**	6 C 8 WLH

Learning outcome, core skills: The students learn different methods of palaeoecology: e.g. analysis of tree rings, charcoal, algae, diatoms, ostracods, dinoflagellates, non-pollen palynomorphs (NPPs), amoebae, sediment parameters, etc. They acquire knowledge of different palaeoecological parameters in relation to the environment, vegetation, climate and human settlement history and their evaluation in the context of global change research. They learn methods of visualisation and analysis and how to use modern software. Students learn about the wide range of possible applications using current palaeoecological topics as examples. Ability to assess the possible applications of palaeoecological analyses in environmental, vegetation and climate history and archaeological investigations. Independent implementation of smaller, problem- and research-oriented palaeoecological studies in the field of environmental, vegetation and climate history. Scientific analysis of palaeoecological topics in global change research, presentation of results.	**Workload:** Attendance time: 112 h Self-study time: 68 h

Course: Methods in palaeoecology (Lecture)	1 WLH
Course: Methods in palaeoecology (Exercise)	5 WLH

Course: Current research results in palaeoecology and palynology (Seminar)	2 WLH

Examination: Oral Presentation (approx. 20 minutes) **Examination requirements:** Presentation of the results of practical work	6 C

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Hermann Friedrich Behling
Course frequency: each summer semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 15	

Georg-August-Universität Göttingen **Module M.Biodiv.446: Molecular zoology and insect-biotechnology**	6 C 8 WLH

Learning outcome, core skills: The module is aimed at students who want to gain in-depth knowledge of molecular genetic work in theory and practice. Relevant methods and experimental planning are taught theoretically and practically. Selected topics of molecular zoology are treated in depth in lectures and on the basis of current publications. Current developments of molecular methods in pest control and insect biotechnology will be covered. Learning objectives: • Application, experimental strategies and evaluation of different molecular biological methods. • Gene function analysis in zoology: how to identify relevant genes and how to study their function in model and non-model organisms? (including genetic screens, reverse genetics (RNAi), genome editing (CRISPR/Cas9), transgenesis) • Knowledge of databases of DNA, protein and gene function • Identification of orthologous genes in different species • Establishment of new molecular genetic model systems for zoological questions • Advanced discussion of current research topics in molecular zoology • Advanced discussion of recent approaches in insect biotechnology using molecular genetic methods (including pest control). Students should be able to: • design experimental strategies for the identification and analysis of gene function in non-model organisms • design the establishment of new molecular genetic model systems • be able to present and assess scientific questions on selected topics of molecular zoology.	**Workload:** Attendance time: 112 h Self-study time: 68 h

Course: Gene function analysis in diverse animals and applications in pest control (Lecture) *Contents*: molecular genetic methods; gene fuction analysis; selected topics from molecular zoology; most recent developments in insect biotechnology	2 WLH
Course: Topics of molecular zoology and insect biotechnology (Seminar)	2 WLH

Course: Molecular zoology and insect biotechnology (Exercise)	4 WLH

Examination: Oral Presentation (approx. 20 minutes)	6 C

Examination requirements: The students should be able to apply the contents and methods listed as “core skills” to new questions.	

Admission requirements: none	**Recommended previous knowledge:** none

Language: English	**Person responsible for module:** Dr. Vera Sophie Terblanche Prof. Dr. Gregor Bucher
Course frequency: each summer semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 8	

Additional notes and regulations:
The modules B.Biodiv.370 and M.Biodiv.446 are mutually exclusive.

Georg-August-Universität Göttingen **Module M.Biodiv.462: Assessing the genetic biodiversity of algae and cyanobacteria – a practical lab course**	6 C 8 WLH

Learning outcome, core skills: After completing this module, students have knowledge of and expertise in state-of-the art DNA sequence analysis methods for detecting changes in the biodiversity of algae and cyanobacteria from environmental samples (freshwater creek benthos or surface soils of forests, grass and arable land) at the species and genotypic resolution. The students have skills in • independent molecular analyses, incl. DNA extraction from various environmental materials (e.g., soil, rock surface biofilms), PCR amplification using various genetic markers, amplicon-based NGS metabarcoding, DNA sequence phylogenetic analyses • employment of bioinformatic analyses for the refinement of raw DNA sequences from paired-end approach, development of taxon tables to show the distribution of Amplicon Sequence Variants along environmental gradients and identification of species and genotypes by sequence comparisons • basic statistical analyses of the data and common methods for the visualization of the results • microscopy of algae and cyanobacteria, establishment of pure culture strains and their analyses using DNA sequencing and phylogenetic methods	**Workload:** Attendance time: 112 h Self-study time: 68 h

Course: Biodiversity and evolution of algae (Lecture)	2 WLH

Course: Molecular methods for determining biodiversity using the example of algae (Practical course)	6 WLH

Examination: Report (max. 15 pages) and oral presentation (approx. 20 minutes) **Examination requirements:** Knowledge of DNA methods for the analysis of the biodiversity of algae and cyanobacteria incl. standard bioinformatic and phylogenetic analyses	6 C

Admission requirements: none	**Recommended previous knowledge:** none
Language: English, German	**Person responsible for module:** Prof. Dr. Thomas Friedl
Course frequency: each semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 6	

Georg-August-Universität Göttingen **Module M.Biodiv.470: Morphology of animals: Microscopical methods in comparative morphology**	6 C 8 WLH

Learning outcome, core skills: Microscopical techniques, in particular Confocal Laser Scanning Microscopy (CLSM), Serial Block Face Scanning Electron Microscopy (SBFSEM) and Scanning Electron Microscopy (SEM) reveal diverse and detailed insights into the morphology of various organisms. By applying different microscopical techniques a broad spectrum of characters can be studied, ranging from surface structures, organ systems, tissues, cell types to the ultrastructure of cell organelles. With help of selected specimens the theory and methodology of the three mentioned microscopical techniques are explained while addressing the advantages, limits and disadvantages of each technique. We offer the possibility to investigate self-designed studies and/or current scientific topics of the department. The aim of this module is to become familiar with various microscopical techniques, to gain skills and expertise in methods, and to achieve a minimum of experience in operating the different types of microscopes.	**Workload:** Attendance time: 112 h Self-study time: 68 h

Course: Introduction into microscopical methods and preparation techniques (Lecture)	2 WLH

Course: Comparative microscopical investigations of animal tissues and organ systems (Exercise)	6 WLH

Examination: Oral examination (approx. 20 minutes) **Examination requirements:** Theoretical basics of various microscopical techniques and practical skills in preparation of specimens for these techniques; characterization of organ systems, tissues and cell types, ultrastructure of cells; 3D-visualisation	6 C

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Dr. rer. nat. Christian Andreas Fischer Dr. Conrad Helm
Course frequency: each winter semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:** 1
Maximum number of students: 6	

Georg-August-Universität Göttingen **Module M.Biodiv.479: Phylogenomics**	6 C 6 WLH

Learning outcome, core skills: The research field of phylogenomics comprises the utilization of genome and transcriptome data for the inference of phylogenetic trees. In this modul students will be introduced to the theoretical and practical knowledge of how to assemble genomes and transcriptomes and their annotation. Moreover, techniques to search for genes in such data will be presented (e.g., BLAST, hidden markov models). Additionally, the students will work with different alignment- and read mapping methods. Based on the assembled datasets different tree reconstruction methods will be conducted (Neighbor Joining, Maximum Parsimony, Maximum Likelihood, Bayesian Inference) and critically discussed. Within an accompanying seminar actual studies in the field of evolutionary genomics are presented and discussed. Students get an introduction into the Linux environment and the installation of all programs will be done independently. The command line will be mainly used for all analyses. Students will learn to perform genome-scale analyses for the reconstruction of phylogenetic trees. Within a seminar students will present recently published genomic studies in English language. In the last week, datasets will be analysed independently and results will be summarized as poster, which will be presented within a short talk.	**Workload:** Attendance time: 84 h Self-study time: 96 h

Course: Introduction to phylogenomics (Lecture)	1 WLH
Course: Introduction to phylogenomics (Seminar) This course is open for students of the double degree programme at the partner universities. The sessions of this course might be conducted in a remote format like online video conference.	1 WLH

Course: Introduction to phylogenomics (Exercise)	4 WLH

Examination: Short talk (approx. 15 minutes) and poster presentation	6 C

Examination requirements: Knowledge of how to reconstruct phylogenetic trees using genomic and transcriptomics data. Critical discussion of phylogenetic analyses and overview of actual controversies.	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Christoph Bleidorn Dr. Joëlle van der Sprong
Course frequency: each summer semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:** 1
Maximum number of students:	

15	

Georg-August-Universität Göttingen **Module M.Biodiv.482: Field studies in conservation biology**	6 C 4 WLH

Learning outcome, core skills: M.Biodiv.482 is a flexible module that allows for targeted ECTS credit collection. Credits will be awarded for one of the following activities: • An individual student research project, practical or internship, e.g. with a conservation NGO, in conservation administration or at a research institution. The project needs to be agreed with staff of the Conservation Biology department beforehand. • A tailored research project offered by members of the Conservation Biology Department, e.g. via https://uni-goettingen.de/en/join+us/129605.html. Students will acquire knowledge of ecosystems, species, conservation approaches, they will be involved in practical work of conservation practitioners (individual student project), or they will be trained individually in data collection, analysis and publication (internal research project).	**Workload:** Attendance time: 56 h Self-study time: 124 h

Course: Field studies in conservation biology (Exercise) *Contents*: One of the following options: • Self-organized internship • Individual research project	4 WLH
Examination: Written protocol, internship report or research project report (max. 20 pages)	6 C

Examination requirements: Students are able to plan an internship or a research project. They are familiar with data collection and analysis protocols and understand the presentation of data. They are able to comprehensively summarize the outcome of an internship, or an individual research project. For research internships and individual research projects, reports can be submitted in the form of a peer-review paper.	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Johannes Kamp
Course frequency: each semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 15	

Georg-August-Universität Göttingen **Module M.Biodiv.491: Next generation sequencing for evolutionary biology**	6 C 4 WLH

Learning outcome, core skills:	**Workload:**
The students acquire knowledge of the various systems and techniques for “next generation sequencing”. The focus of the module lies on the fast developing field of bioinformatics and data analysis (dry lab). Corresponding wet lab methods are explained and discussed. The students learn the different possible applications for “next generation sequencing” data in evolutionary biology of animals and plants, for example biodiversity, phylogenomics, evolution of traits, adaption, phylogeography, population genetics and hybridization. They get an overview of the theory and gain practical experiences in this research area. They acquire the competence to choose suitable methods for evolutionary questions and to test hypotheses on non-model organisms. The students are able to list the differences and (dis)advantages of various “next generation sequencing” methods and to select suitable methods to analyze specific evolutionary questions by use of non-model organisms. They are able to compare and analyze the raw data of “next generation sequencing” and to annotate genes of an assembled genome. The students shall present and discuss case studies from the field of “next generation sequencing” during the seminar in scientific English	Attendance time: 56 h Self-study time: 124 h

Course: M.Biodiv.491-1 Next generation sequencing: methods, data analysis and applications (Lecture)	0,5 WLH
Course: M.Biodiv.491-2 Next generation sequencing: examples of botanical and zoological studies (Seminar)	0,5 WLH

Course: M.Biodiv.491-3 Analysis of next generation sequencing data (Exercise)	3 WLH

Examination: Oral presentation (20 minutes) **Examination requirements:** Knowledge of the various applications of "next generation sequencing" in evolutionary biology of animals and plants. Overview of the theory and practical experiences in this new research area.	6 C

Admission requirements: none	**Recommended previous knowledge:** Knowledge of the various applications of "next generation sequencing" in evolutionary biology of animals and plants. Overview of the theory and practical experiences in this research area.
Language: English	**Person responsible for module:** Dr. Natascha Dorothea Wagner
Course frequency: each summer semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted:	**Recommended semester:**

twice	
Maximum number of students: 10	

Georg-August-Universität Göttingen **Module M.Biodiv.605: Project studies in animal evolution and biodiversity**	6 C 4 WLH

Learning outcome, core skills: Consolidation of morphological and molecular approaches for evolutionary biology research in zoology. Introduction to the daily routine of work in a scientific laboratory with research questions, and their planning and conceptualization. Insights into the planning and writing of scientific publications. The scientific work might be carried out in the laboratory, outdoor and/or in research stations. Independent execution and planning of research studies. Interpretation, visualization and presentation of scientific results. Scientific discussion of current topics in animal evolution and biodiversity.	**Workload:** Attendance time: 56 h Self-study time: 124 h

Course: Research project (Exercise)	3 WLH

Course: Current topics in Animal Evolution and Biodiversity (Seminar)	1 WLH

Examination: Presentation (approx. 15-20 min.) and protocol in the form of a scientific publication (max. 15 pages)	6 C

Examination requirements: Elaboration and design of a scientific project and its implementation.	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Christoph Bleidorn Prof. Dr. Maria Teresa Aguado
Course frequency: each semester; after consultation	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 4	

Georg-August-Universität Göttingen **Module M.CoBi.541: Bioinformatics and its areas of application**	4 C 3 WLH

Learning outcome, core skills: The students will acquire knowledge on a diverse range of topics - both applied as well as purely bioinformatical. For this, there will be research-oriented lectures. On the applied side, these topics prominently feature - but are not limited to - the different types of "omics"-approaches available to answer biological questions (genomics, transcriptomics, phylogenomics, metabolomics, proteomics, CHIP-Seq, comparative genomics, phenomics etc). They will learn about feasibility and different approaches to data analysis. Furthermore, students will learn about the digitization of the biological sciences, featuring aspescts such as machine readable phenotypic annotation of morphology, phenotypic database, biological image analysis and more. Finally, the students will acquire knowledge on algorithmic and statistical aspects of bioinformatics, featuring the latest developments and challenges in the development of new bioinformatic tools for life sciences.	**Workload:** Attendance time: 42 h Self-study time: 78 h

Course: Bioinformatics and its areas of application (Lecture) *Contents*: This course provides an appetizer of the various applications and uses of bioinformatics - especially those represented by research on Göttingen Campus.	3 WLH
Examination: Term Paper (max. 10 pages), not graded **Examination requirements:** Students show that they gained an overview of the diversity of areas of application for algorithmic and applied bioinformatics - including tools for computational biology to solve biological questions - as well as in depth knowledge on a topic of choice for the essay.	4 C

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Jan de Vries
Course frequency: each winter semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:** 1
Maximum number of students: 15	

Georg-August-Universität Göttingen **Module M.INC.1003: Animal Conservation**	6 C 4 WLH

Learning outcome, core skills: In the lecture "Animal ecology" students will learn about advanced principles and theories of ecology and will be introduced to current topics of ecological research. Focus in this lecture are e.g. models of populations, functional reactions, experimental analyses and modelling of interactions and food webs, macro-ecological correlations and theories. The module part "Origins of Conservation Biology" addresses the development of Conservation Biology as scientific field. It shows how important findings from Animal Ecology and Biogeography have shaped our understanding of human impact on animal communities and populations.	**Workload:** Attendance time: 56 h Self-study time: 124 h

Course: Animal Ecology (Lecture)	2 WLH
Examination: Written examination (90 minutes)	3 C

Course: Origins of Conservation Biology (Lecture)	2 WLH
Examination: Written examination (90 minutes)	3 C

Examination requirements: Knowledge of basic principles and theories of ecology, population models, functional reactions, analyses and modelling of organismic interactions and food webs as well as macro-ecological correlations. Understanding of Animal Ecology and Biogeography as basis for the development of Conservation Biology, knowledge on results of major studies carried out at community and population level.	

Admission requirements: none	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. rer. nat. Matthias Waltert
Course frequency: each winter semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 10	

Georg-August-Universität Göttingen **Module SK.Bio-NF.7001: Neurobiology**	3 C 2 WLH

Learning outcome, core skills: The students should acquire comprehension in form and function of neurons and their anatomical and physiological features (genetics, subcellular organization, resting membrane potential, action potential generation, stimulus conduction, transmitter release, ion channels, receptors, second messenger cascades, axonal transport). The students acquire knowledge of the physiological basics of sensory systems (olfactory, gustatory, acoustic, mechanosensory and visual perception) as well as motor control. Based on this the students educe understanding for the relation between neuronal circuits and simple modes of behavior (central pattern generators, reflexes, and taxis movements). The students should conceptually learn how neuronal connections are modified by experience (cellular mechanisms of learning and memory) and should learn different types of modification of behavior based on experience and neuronal substrates. The students should acquire fundamental insight into the organization and function of brains and autonomous nervous systems of mammals and invertebrates. The neurobiological basis of behavioral control (orientation, communication, circadian rhythm and sleep as well as motivation and metabolism) is explained. The students will learn physiological and cellular mechanisms of aging and of neurodegenerative diseases.	**Workload:** Attendance time: 30 h Self-study time: 60 h

Course: Neurobiology (Lecture)	2 WLH
Examination: Written examination (90 minutes)	3 C

Examination requirements: The students should have the ability to assess coherence and facts of statements from the field of neurobiology; they should be able to answer questions on the structure and function of neurons and neuronal circuits. Furthermore they should be able to describe and compare neuronal basics of behavioral control, their experience-dependent modification and conceptual mechanisms of complex behavior; they should be able to describe and compare physiological mechanisms of sensory perception and different sensory modalities; they should be able to describe physiological and cellular mechanisms of aging and of neurodegenerative diseases.	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge in Biology
Language: English	**Person responsible for module:** Prof. Dr. Andrè Fiala
Course frequency: each summer semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:** 4 - 6
Maximum number of students: 30	

Additional notes and regulations:
The combination of this module with module SK.Bio.7001 is not possible.

Georg-August-Universität Göttingen **Module SK.Bio.305: Biostatistics with R**	3 C 2 WLH

Learning outcome, core skills: After successful completion of the module, the students are able to deal with the open statistics programming language R and to apply this language to biological data. They gained the ability to apply statistical methods like descriptive statistics, parametric and non-parametric two-random-sample tests, Chi-Quadrat test, correlation analysis, linear regression analysis and ANOVA.	**Workload:** Attendance time: 30 h Self-study time: 60 h

Course: Einführung in die Biostatistik mit R (Seminar)	2 WLH
Examination: Written examination (90 minutes) **Examination prerequisites:** continuous participation in the course; solved exercises **Examination requirements:** Independent analysis of biological data with the help of the programming language R; evaluation and practical application of basic statistical testing methods.	3 C

Admission requirements: none	**Recommended previous knowledge:** basic knowledge in mathematics and statistics
Language: German	**Person responsible for module:** Prof. Dr. Tim Beißbarth
Course frequency: each winter semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:** 5 - 6
Maximum number of students: 23	

Georg-August-Universität Göttingen **Module SK.Bio.307: Linux and Python for biologists**	4 C 3 WLH

Learning outcome, core skills: After successfully completing the module, students have basic knowledge of the Linux operating system and basic programming skills in Python or comparable languages.	**Workload:** Attendance time: 56 h Self-study time: 64 h

Course: Linux and Python for biologists (Internship) The course will take place online. *Course frequency:* Block course during the lecture free time	3 WLH
Examination: Written examination, not graded **Examination requirements:** Independent work with the command line interpreter under the Linux operating system; creation of small programmes in the Python programming language (reading data from files, creating suitable data structures, dealing with regular expressions, implementation of simple algorithms).	4 C

Admission requirements: none	**Recommended previous knowledge:** B.Bio.113
Language: German, English	**Person responsible for module:** Dr. Sophie de Vries
Course frequency: each winter semester; during the lecture free time	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:** 5 - 6
Maximum number of students: 30	

Additional notes and regulations: The module cannot be taken in combination with B.Bio.117.

Georg-August-Universität Göttingen **Module SK.Bio.329: Research internship (4 weeks)**	6 C

Learning outcome, core skills: After successful completion of the module, the student can... • demonstrate in-depth knowledge of current topics and research focuses in biology at an institution (MPI, institute abroad, etc.) with special consideration of modern methods • carry out the work carried out independently in connection with current research projects • document and record experiments and theoretical work related to current research projects in accordance with the usual standards.	**Workload:** Attendance time: 160 h Self-study time: 20 h

Course: Research internship	
Examination: Results report in the form of a scientific article (max. 5 pages), not graded **Examination prerequisites:** Successful participation in an internship of at least 4 weeks (160 hours), presentation at the host institution (according to local practice, but at least 20 minutes).	6 C

Examination requirements: Competent presentation of the research approach, the state of research, the methodology used and the results, discussion skills and critical thinking beyond one's own field of work	

Admission requirements: none	**Recommended previous knowledge:** none
Language: German, English	**Person responsible for module:** Dean of studies
Course frequency: each semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Georg-August-Universität Göttingen **Module SK.Bio.331: Research internship (8 weeks)**	12 C

Learning outcome, core skills: After successful completion of the module, the student can... • demonstrate in-depth knowledge of current topics and research focuses in biology at an institution (MPI, institute abroad, etc.) with special consideration of modern methods • carry out the work carried out independently in connection with current research projects • document and record experiments and theoretical work related to current research projects in accordance with the usual standards.	**Workload:** Attendance time: 320 h Self-study time: 40 h

Course: Research internship (8 weeks / 320 hours)	
Examination: Results report in the form of a scientific article (max. 5 pages), not graded **Examination prerequisites:** Successful participation in an internship of at least 8 weeks (320 hours), presentation at the host institution (according to local practice, but at least 20 minutes).	12 C

Examination requirements: Competent presentation of the research approach, the state of research, the methodology used and the results, discussion skills and critical thinking beyond one's own field of work	

Admission requirements: none	**Recommended previous knowledge:** none
Language: German, English	**Person responsible for module:** Studiendekanin / Studiendekan
Course frequency: each semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: not limited	

Georg-August-Universität Göttingen **Module SK.Bio.370: Molecular zoology: Topics and methods**	6 C 8 WLH

Learning outcome, core skills: Molecular methods have become indispensable in zoology. This module addresses students who want to learn experimental approaches to molecular genetic investigations and to acquire the relevant skills for practical laboratory work. Additionally, it provides an overview of various current issues of molecular zoology and the application of molecular methods in insect pest control and insect biotechnology. Learning outcome: • basic knowledge of molecular work and different experimental approaches (i.a. DNA work, cloning, sequencing, sequence analysis). • basics of gene function in animals • methods of gene function analysis (i.a. genetic screens, reverse genetics (RNAi), genome editing (CRISPR / Cas9), transgenesis) • advantages and disadvantages of different molecular model systems • overview of current research topics of molecular zoology (i.a. evolution and development (“EvoDevo”), “EcoDevo”, sex determination, molecular communication, chronobiology) • molecular methods in insect biotechnology • After completing the module, the students should be able to: • design and perform molecular biological experiments (i.a. DNA extraction, plasmid preparation, PCR, restriction digestion, cloning). • handle databases with information on gene structure and gene function. • choose appropriate model systems and methods for certain zoological questions and develop experimental strategies.	**Workload:** Attendance time: 112 h Self-study time: 68 h

Course: Gene function analysis in diverse animals and applications in pest control (Lecture)	1 WLH
Course: Current research in molecular zoology and biotechnology (Seminar)	1 WLH
Course: Introduction to molecular work and methods for gene function studies (Exercise)	6 WLH
Examination: Lecture (approx. 30 minutes) **Examination prerequisites:** Regular participation in the practical course **Examination requirements:** Understanding and scientific presentation of topics of molecular zoology in a talk (20 minutes) followed by a discussion (about 10 minutes).	6 C

Admission requirements: B.Bio.102, B.Bio.105, B.Bio.106	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Gregor Bucher

Course frequency: each summer semester3 weeks block course	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:** 5
Maximum number of students: 5	

Additional notes and regulations:

The combination of this module with module B.Biodiv.370 or M.Biodiv.446 is not possible.

The module takes place as a three-week block course.

Georg-August-Universität Göttingen **Module SK.Bio.7001: Neurobiology**	6 C 4 WLH

Learning outcome, core skills: The students should acquire comprehension in form and function of neurons and their anatomical and physiological features (genetics, subcellular organization, resting membrane potential, action potential generation, stimulus conduction, transmitter release, ion channels, receptors, second messenger cascades, axonal transport). The students acquire knowledge of the physiological basics of sensory systems (olfactory, gustatory, acoustic, mechanosensory and visual perception) as well as motor control. Based on this the students educe understanding for the relation between neuronal circuits and simple modes of behavior (central pattern generators, reflexes, and taxis movements). The students should conceptually learn how neuronal connections are modified by experience (cellular mechanisms of learning and memory) and should learn different types of modification of behavior based on experience and neuronal substrates. The students should acquire fundamental insight into the organization and function of brains and autonomous nervous systems of mammals and invertebrates. The neurobiological basis of behavioral control (orientation, communication, circadian rhythm and sleep as well as motivation and metabolism) is explained. The students will learn physiological and cellular mechanisms of aging and of neurodegenerative diseases.	**Workload:** Attendance time: 30 h Self-study time: 150 h

Course: Neurobiology (Lecture)	2 WLH
Course: Neurobiology (Seminar)	2 WLH
Examination: Written examination (90 minutes) **Examination prerequisites:** regular seminar participation and oral presentation (not graded)	6 C

Examination requirements: The students should have the ability to assess coherence and facts of statements from the field of neurobiology; they should be able to answer questions on the structure and function of neurons and neuronal circuits. Furthermore they should be able to describe and compare neuronal basics of behavioral control, their experience-dependent modification and conceptual mechanisms of complex behavior; they should be able to describe and compare physiological mechanisms of sensory perception and different sensory modalities; they should be able to describe physiological and cellular mechanisms of aging and of neurodegenerative diseases.	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge in Biology
Language: English	**Person responsible for module:** Prof. Dr. Andrè Fiala
Course frequency: each summer semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:** 4 - 6

Maximum number of students: 30	

Georg-August-Universität Göttingen **Module SK.Bio.7002: Basic virology**	3 C 2 WLH

Learning outcome, core skills: The students will become familiar with the architecture of viruses and will learn how these agents replicate and evade the immune response of the host. Moreover, it will be discussed how viruses cause disease and how this process can be prevented by antivirals and vaccines. The lectures will focus on important human pathogens, including HIV, influenza and herpesviruses. Upon successful completion of the module, the students will be able to classify viruses and will have an understanding of central mechanisms underlying virus replication and pathogenesis and their inhibition by therapy and vaccination.	**Workload:** Attendance time: 28 h Self-study time: 62 h

Course: Basic Virology (Lecture)	2 WLH
Examination: Written examination (45 minutes)	3 C

Examination requirements: The students must assess whether statements regarding basic aspects of virology, including virus classification, viral replication, virus-host interactions, pathogenesis, immune evasion and antiviral therapy and vacciantion, are correct.	

Admission requirements: none	**Recommended previous knowledge:** Basic knowledge in Biology
Language: English	**Person responsible for module:** Prof. Dr. Stefan Pöhlmann
Course frequency: each semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:** 3 - 6
Maximum number of students: 100	

Georg-August-Universität Göttingen **Module SK.Bio.7004: Environmental microbiology**	3 C 2 WLH

Learning outcome, core skills: The students will acquire a comprehensive understanding of basic microbial processes in the environment. Students will learn how microorganisms are effective in biogeochemical cycles and how these cycles evolved in Earth's history and shaped our biosphere. They will gain knowledge about important microbial habitats (terrestrial/ aquatic/extreme), and their microbial diversity. They will be introduced in the application of microorganisms in bioremediation and environmental biotechnology.	**Workload:** Attendance time: 28 h Self-study time: 62 h

Course: Environmental microbiology (Lecture)	2 WLH
Examination: Oral Presentation (approx. 5 minutes)	3 C

Examination requirements: Revising a specific topic in environmental microbiology, compilation of data and preparation/short presentation of a scientific poster.	

Admission requirements: B.Bio.118	**Recommended previous knowledge:** none
Language: English	**Person responsible for module:** Prof. Dr. Rolf Daniel PD Dr. Michael Hoppert
Course frequency: each winter semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:** 5 - 6
Maximum number of students: 25	

Georg-August-Universität Göttingen **Module SK.Bio.7007: Methods in molecular virology**	3 C 2 WLH

Learning outcome, core skills: The students are introduced to the repertoire of methods used in virological research and diagnostics. The course focuses on current developments and seminal experiments from the past. The students will train their ability to extract scientific methods from the literature by themselves and to devise their own strategies to tackle a scientific problem. Students are encouraged to develop their own strategies to solve a specific problem and to discuss their strategies with their fellow students. The students are encouraged to come up with alternative approaches. The students' solutions are compared to published techniques, which are presented in the form of a short talk by a student or the teacher.	**Workload:** Attendance time: 28 h Self-study time: 62 h

Course: Methods in molecular virology (Seminar)	2 WLH
Examination: Lecture (approx. 30 minutes), not graded **Examination prerequisites:** Regular participation in the seminar	3 C

Examination requirements: Understanding and scientific presentation of methods in molecular virology in a seminar talk (approx. 20 minutes) with subsequent discussion (approx. 10 minutes).	

Admission requirements: none	**Recommended previous knowledge:** basic knowledge in virology (e.g. SK.Bio.7002), basic knowledge in molecular biology
Language: English	**Person responsible for module:** Dr. Alexander Hahn
Course frequency: each semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:** 4 - 6
Maximum number of students: 15	

Georg-August-Universität Göttingen **Module SK.Bio.7008: Molecular biology of HIV replication and pathogenesis**	2 C 1 WLH

Learning outcome, core skills: The students will learn the molecular mechanisms underlying the different steps of HIV replication, including entry, reverse transcription, genome integration, gene expression, assembly, release and maturation. Moreover, innate antiviral defenses and viral countermeasures will be discussed. In addition, insights into humoral immune responses against HIV and challenges associated with the generation of an effective vaccine will be provided. Finally, concepts and components of antiretroviral therapy will be introduced and the zoonotic origin of HIV will be discussed. Students attending the lectures will acquire an understanding of central mechanisms underlying HIV replication and pathogenesis and their blockade by immune responses and antiviral therapy.	**Workload:** Attendance time: 14 h Self-study time: 46 h

Course: Molecular biology of HIV replication and pathogenesis (Lecture)	1 WLH
Examination: Written examination (45 minutes)	2 C

Examination requirements: The students should be able to respond to questions concerning basic aspects of HIV replication, pathogenesis, immune responses and antiviral therapy.	

Admission requirements: none	**Recommended previous knowledge:** SK.Bio.7002
Language: English	**Person responsible for module:** Prof. Dr. Stefan Pöhlmann
Course frequency: each semester	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:**
Maximum number of students: 30	

Georg-August-Universität Göttingen **Module SK.Bio.7009: Learning with a core facility - protein analytics using mass spectrometry**	3 C 3 WLH

Learning outcome, core skills: In the first part of the course, the students get an introduction to the analysis of proteins using liquid chromatography-coupled mass spectrometry (LCMS), and they will prepare peptide samples themselves for this analysis technique in a practical part. Protein samples derive from current projects of different research groups at the Göttingen Campus. In the second part, the students will learn how to analyze the LCMS raw data for identification and relative quantification of proteins. Approaches for the statistical validation of the results will be introduced. The students will get the opportunity to analyze data on their own with state-of-the-art software tools. They will present their results of their project to their fellow students in a concluding seminar at the end of the course.	**Workload:** Attendance time: 40 h Self-study time: 50 h

Course: Protein analytics using mass spectrometry (Course) Practical course and data analysis software training are supervised by members of two core facilities – LCMS Protein Analytics and Medical Biometry and Statistical Bioinformatics	3 WLH
Examination: Oral Presentation (approx. 15 minutes), not graded **Examination prerequisites:** Regular participation in the practical course	3 C

Examination requirements: The students should present the results of their experiment in English.	

Admission requirements: none	**Recommended previous knowledge:** B.Bio.129 or B.Bio.118 or B.Bio.112 or equivalent Practical experience with protein techniques (e.g. SDS-PAGE)
Language: English	**Person responsible for module:** Dr. Oliver Valerius
Course frequency: winter or summer semester, on demand	**Duration:** 1 semester[s]
Number of repeat examinations permitted: twice	**Recommended semester:** 5 - 6
Maximum number of students: 20	