

Directory of Modules

**zu der Prüfungs- und Studienordnung für
den konsekutiven Master-Studiengang
"Developmental, Neural and Behavioural
Biology" (Amtliche Mitteilungen I Nr.
42/2013 S. 1664, zuletzt geändert durch
Amtliche Mitteilungen I Nr. 35/2024 S. 840)**

Modules

M.Bio.001: Statistics for Biology using R.....	1060
M.Bio.141: Allgemeine und Angewandte Mikrobiologie.....	1062
M.Bio.142: Molekulare Genetik und mikrobielle Zellbiologie.....	1064
M.Bio.144: Zell- und Molekularbiologie von Pflanzen-Mikroben-Interaktionen.....	1065
M.Bio.146: Angewandte Methoden der Biowissenschaften.....	1066
M.Bio.149: Planung und Organisation von Industrieexkursionen.....	1067
M.Bio.150: Industrieexkursionen.....	1068
M.Bio.156: Strukturbiochemie - Schlüsselkompetenzmodul.....	1069
M.Bio.157: Biochemie und Biophysik - Schlüsselkompetenzmodul.....	1070
M.Bio.158: Enzymkatalyse und biologische Chemie - Schlüsselkompetenzmodul.....	1071
M.Bio.172: Molekulare Genetik und mikrobielle Zellbiologie.....	1072
M.Bio.176: Strukturbiochemie.....	1073
M.Bio.303: Zellbiologie.....	1074
M.Bio.304: Neurobiologie 1.....	1075
M.Bio.305: Neurobiologie 2.....	1077
M.Bio.306: Einführung in die Verhaltensbiologie.....	1078
M.Bio.307: Verhaltensbiologie.....	1080
M.Bio.308: Sozialverhalten und Kommunikation.....	1081
M.Bio.310: Systembiologie.....	1082
M.Bio.314: Zelluläre Neurobiologie - Vertiefungsmodul.....	1084
M.Bio.315: Molekulare Neurobiologie - Vertiefungsmodul.....	1085
M.Bio.316: Systemische Neurobiologie - Vertiefungsmodul.....	1087
M.Bio.317: Populations- und Verhaltensbiologie - Vertiefungsmodul.....	1088
M.Bio.318: Sozialverhalten, Kommunikation und Kognition - Vertiefungsmodul.....	1089
M.Bio.319: Humangenetik - Vertiefungsmodul.....	1090
M.Bio.320: Bioinformatik - Vertiefungsmodul.....	1091
M.Bio.321: Aktuelle Entwicklungsbiologie.....	1092
M.Bio.322: Frontiers in Neural Development.....	1094
M.Bio.323: Einführung in die Bayes'sche Inferenz und Informationstheorie.....	1096

M.Bio.331: Wissenschaftliches Projektmanagement - Vertiefungsmodul III.....	1098
M.Bio.340: Bioinformatik der Systembiologie (Schlüsselkompetenzmodul).....	1100
M.Bio.343: Zellbiologie (Schlüsselkompetenzmodul).....	1101
M.Bio.344: Neurobiologie 1 (Schlüsselkompetenzmodul).....	1102
M.Bio.346: Einführung in die Verhaltensbiologie (Schlüsselkompetenzmodul).....	1103
M.Bio.347: Verhaltensbiologie (Schlüsselkompetenzmodul).....	1104
M.Bio.350: From Vision to Action.....	1105
M.Bio.356: Motor systems.....	1106
M.Bio.357: Motor systems.....	1107
M.Bio.363: Zellbiologie (Schlüsselkompetenzmodul).....	1108
M.Bio.366: Einführung in die Verhaltensbiologie (Schlüsselkompetenzmodul).....	1109
M.Bio.371: Molekulare Grundlagen neurologischer und psychiatrischer Erkrankungen.....	1110
M.Bio.372: Matlab in Biopsychology and Neuroscience.....	1111
M.Bio.373: Visual Psychophysics - From Theory to Experiment.....	1112
M.Bio.374: Einführung in die Computermodellierung.....	1113
M.Bio.376: Laboratory Animal Course.....	1114
M.Bio.380: Zelluläre und Molekulare Immunologie - Vertiefungsmodul.....	1116
M.Bio.381: Aktuelle Entwicklungsbiologie - Vertiefungsmodul.....	1118
M.Bio.382: Frontiers in Developmental Biology - Vertiefungsmodul.....	1120
M.Bio.383: Entwicklungs- und Zellbiologie - Vertiefungsmodul.....	1121
M.Bio.392: Aktuelle Entwicklungsbiologie.....	1123
M.Bio.393: Aktuelle Entwicklungsbiologie.....	1125
M.Bio.394: Frontiers in Neural Development.....	1126
M.Bio.395: Frontiers in Neural Development.....	1128
M.CoBi.506: Linux and Python for biologists.....	1129
SK.Bio.117: Genomanalyse.....	1131
SK.Bio.307: Linux und Python für Biologiestudierende.....	1132
SK.Bio.310: Algen- und Gewässerökologie.....	1133
SK.Bio.315: Bioethik.....	1134
SK.Bio.328: Wissenschaftliche Präsentation und Kommunikation.....	1135
SK.Bio.329: Forschungspraktikum (4 Wochen).....	1136

Table of Contents

SK.Bio.331: Forschungspraktikum (8 Wochen).....	1137
SK.Bio.332: Internship for master degree students.....	1138
SK.Bio.355: Biologische Psychologie I.....	1139
SK.Bio.356: Biologische Psychologie II.....	1140
SK.Bio.357: Biologische Psychologie III.....	1141
SK.Bio.360: Einführung in die Biotechnologie.....	1142
SK.Bio.370: Molekulare Zoologie: Themen und Methoden.....	1143
SK.Bio.380: Magnetresonanztomographie: Grundprinzipien und Anwendungen.....	1145
SK.Bio.7002: Basic virology.....	1147
SK.Bio.7004: Environmental microbiology.....	1148
SK.Bio.7006: Microbiology of marine and terrestrial habitats.....	1149
SK.Bio.7007: Methods in molecular virology.....	1150
SK.Bio.7008: Molecular biology of HIV replication and pathogenesis.....	1151
SK.Bio.7009: Learning with a core facility - protein analytics using mass spectrometry.....	1152

Index by areas of study

I. Master's Degree Programme "Developmental, Neural, and Behavioral Biology"

120 C must be acquired in accordance with the following provisions.

Es müssen nach Maßgabe der nachfolgenden Bestimmungen 120 C erworben werden.

1. Professional Studies

Modules totalling at least 60 C must be successfully completed in accordance with the following provisions.

Es müssen Module im Umfang von insgesamt wenigstens 60 C nach Maßgabe der nachfolgenden Bestimmungen erfolgreich absolviert werden.

a. Core Modules

Three of the following core modules totalling 36 C must be successfully completed:

Es müssen drei der folgenden Fachmodule im Umfang von insgesamt 36 C erfolgreich absolviert werden:

M.Bio.303: Cell Biology (12 C, 14 SWS).....	1074
M.Bio.304: Neurobiology 1 (12 C, 14 SWS).....	1075
M.Bio.305: Neurobiology 2 (12 C, 14 SWS).....	1077
M.Bio.306: Introduction to Behavioral Biology (12 C, 12 SWS).....	1078
M.Bio.307: Behavioral Biology (12 C, 14 SWS).....	1080
M.Bio.308: Social Behavior and Communication (12 C, 14 SWS).....	1081
M.Bio.310: Systems Biology (12 C, 14 SWS).....	1082
M.Bio.321: Current Developmental Biology (12 C, 14 SWS).....	1092
M.Bio.322: Frontiers in Neural Development (12 C, 14 SWS).....	1094
M.Bio.323: Introduction to Bayesian Statistics and Information Theory (12 C, 12 SWS).....	1096

b. Advanced Modules

Two of the following advanced modules totalling 24 C must be successfully completed:

Es müssen zwei der folgenden Vertiefungsmodule im Umfang von insgesamt 24 C erfolgreich absolviert werden:

M.Bio.314: Research Project in Cellular Neurobiology (12 C, 20 SWS).....	1084
M.Bio.315: Research Project in Molecular Neurobiology (12 C, 20 SWS).....	1085
M.Bio.316: Research Project in Systems Neurosciences (12 C, 20 SWS).....	1087
M.Bio.317: Research Project in Population and Behavioral Biology (12 C, 20 SWS).....	1088

M.Bio.318: Research Project in Social Behavior, Communication, and Cognition (12 C, 20 SWS).....	1089
M.Bio.319: Research Project in Human Genetics (12 C, 20 SWS).....	1090
M.Bio.320: Research Project in Bioinformatics (12 C, 20 SWS).....	1091
M.Bio.380: Research Project in Cellular and Molecular Immunology (12 C, 20 SWS).....	1116
M.Bio.381: Research Project in Current Developmental Biology (12 C, 20 SWS).....	1118
M.Bio.382: Research Project in Frontiers in Developmental Biology (12 C, 20 SWS).....	1120
M.Bio.383: Research Project in Developmental and Cell Biology (12 C, 20 SWS).....	1121

2. Area of Professionalisation

Compulsory and elective modules totalling at least 30 C must be successfully completed in accordance with the following provisions.

Es müssen Pflicht- und Wahlpflichtmodule im Umfang von insgesamt wenigstens 30 C nach Maßgabe der nachfolgenden Bestimmungen erfolgreich absolviert werden.

a. Profile Module

One of the following modules, comprising at least 12 credits, must be successfully completed. Alternatively, a subject module under No. 1. a. that has not yet been taken, any core module from the Master's programme "Molecular Life Sciences: Microbiology, Biotechnology and Biochemistry", or a module from the Master's programme "Biodiversity: Ecology, Evolution, and Conservation" may be taken.

If the profile module is to be composed of several modules (but no more than three) or if modules outside the Faculty of Biology and Psychology are to be taken, this requires the approval of the Examination Board.

Es muss eins der folgenden Module im Umfang von mindestens 12 C erfolgreich absolviert werden. Stattdessen kann ein noch nicht belegtes Fachmodul nach Nr. 1 Buchstabe a. oder ein beliebiges Fachmodul des Master-Studiengangs "Molecular Life Sciences: Microbiology, Biotechnology and Biochemistry" oder ein Modul des Master-Studiengangs "Biodiversity: Ecology, Evolution, and Conservation" belegt werden.

Soll das Profilmodul aus mehreren Modulen zusammengesetzt werden (jedoch nicht mehr als 3 Module) oder sollen Module außerhalb der Fakultät für Biologie und Psychologie belegt werden, bedarf dies der Genehmigung durch die Prüfungskommission.

SK.Bio.331: Research internship (8 weeks) (12 C, SWS).....	1137
--	------

b. Elective Modules

A total of at least 6 C credits must be successfully completed. Students may choose modules from the elective modules of "Key Competencies" listed under No. 2. c. as well as the modules listed below, provided these have not already been completed in another area. A reasoned application for the recognition of further modules, e.g. from the range offered by the faculties of mathematics and natural sciences, may be submitted to the Examination Board.

Es müssen Module im Umfang von insgesamt wenigstens 6 C erfolgreich absolviert werden. Dabei können Wahlmodule der "Key Competencies" nach Nr. 2 Buchstabe c. sowie nachfolgende Module gewählt werden, sofern sie noch nicht in einem anderen Bereich absolviert wurden. Die Anerkennung weiterer Module, z.B. aus dem Angebot der mathematisch-naturwissenschaftlichen Fakultäten kann bei der Prüfungskommission begründet beantragt werden.

M.Bio.001: Statistics for Biology using R (6 C, 4 SWS).....	1060
M.Bio.141: General and Applied Microbiology (3 C, 3 SWS).....	1062
M.Bio.142: Molecular Genetics and Microbial Cell Biology (3 C, 3 SWS).....	1064
M.Bio.144: Molecular Cell Biology of Plant-Microbe Interactions and Stress Adaptation (3 C, 3 SWS).....	1065
M.Bio.146: Applied Methods of Biosciences (3 C, 5 SWS).....	1066
M.Bio.156: Structural Biochemistry (3 C, 3 SWS).....	1069
M.Bio.157: Biochemistry and Biophysics (3 C, 3 SWS).....	1070
M.Bio.158: Enzyme Catalysis and Biological Chemistry (3 C, 3 SWS).....	1071
M.Bio.172: Molecular Genetics and Microbial Cell Biology (6 C, 4 SWS).....	1072
M.Bio.176: Structural Biochemistry (6 C, 4 SWS).....	1073
M.Bio.340: Systems Biology (3 C, 2 SWS).....	1100
M.Bio.343: Cell Biology (6 C, 3 SWS).....	1101
M.Bio.344: Neurobiology 1 (3 C, 2 SWS).....	1102
M.Bio.346: Introduction to Behavioral Biology (6 C, 4 SWS).....	1103
M.Bio.347: Behavioral Biology (6 C, 4 SWS).....	1104
M.Bio.350: From Vision to Action (3 C, 2 SWS).....	1105
M.Bio.356: Motor Systems (6 C, 4 SWS).....	1106
M.Bio.357: Motor Systems (3 C, 2 SWS).....	1107
M.Bio.363: Cell Biology (3 C, 2 SWS).....	1108
M.Bio.366: Introduction to Behavioral Biology (3 C, 3 SWS).....	1109
M.Bio.371: Molecular Basis of Neurological Diseases (2 C, 2 SWS).....	1110
M.Bio.372: Matlab in Biopsychology and Neuroscience (3 C, 2 SWS).....	1111
M.Bio.373: Visual Psychophysics - From Theory to Experiment (3 C, 2 SWS).....	1112
M.Bio.374: Introduction to Computer Modelling (2 C, 2 SWS).....	1113
M.Bio.376: Laboratory Animal Course (2 C).....	1114
M.Bio.392: Current Developmental Biology (6 C, 4 SWS).....	1123
M.Bio.393: Current Developmental Biology (3 C, 3 SWS).....	1125
M.Bio.394: Frontiers in Neural Development (6 C, 4 SWS).....	1126
M.Bio.395: Frontiers in Neural Development (3 C, 3 SWS).....	1128
M.CoBi.506: Linux and Python for biologists (5 C, 3 SWS).....	1129

SK.Bio.117: Genome analysis (3 C, 2 SWS).....	1131
SK.Bio.307: Linux and Python for biologists (4 C, 3 SWS).....	1132
SK.Bio.310: Ecology of algae (3 C, 2 SWS).....	1133
SK.Bio.355: Biological psychology I (3 C, 2 SWS).....	1139
SK.Bio.356: Biological psychology II (3 C, 2 SWS).....	1140
SK.Bio.357: Biological psychology III (3 C, 2 SWS).....	1141
SK.Bio.360: Introduction to biotechnology (3 C, 2 SWS).....	1142
SK.Bio.370: Molecular zoology: Topics and methods (6 C, 8 SWS).....	1143
SK.Bio.380: Magnetic Resonance Imaging: Principles and Applications (6 C, 4 SWS).....	1145
SK.Bio.7002: Basic virology (3 C, 2 SWS).....	1147
SK.Bio.7004: Environmental microbiology (3 C, 2 SWS).....	1148
SK.Bio.7006: Microbiology of marine and terrestrial habitats (6 C, 6 SWS).....	1149
SK.Bio.7007: Methods in molecular virology (3 C, 2 SWS).....	1150
SK.Bio.7008: Molecular biology of HIV replication and pathogenesis (2 C, 1 SWS).....	1151
SK.Bio.7009: Learning with a core facility - protein analytics using mass spectrometry (3 C, 3 SWS).....	1152

c. Key Competencies

Students must complete modules totalling 12 credits, including the compulsory module M.Bio.331. Modules from the university-wide key competencies programme are suitable for this purpose, as are the following modules, provided they have not already been completed in another area.

Es müssen Module im Umfang von insgesamt 12 C absolviert werden, darunter das Pflichtmodul M.Bio.331. Hierbei eignen sich Module des universitätsweiten Schlüsselkompetenzangebots sowie folgende Module, sofern sie noch nicht in einem anderen Bereich absolviert wurden.

M.Bio.331: Scientific Project Management (6 C, 5 SWS) - Pflichtmodul.....	1098
M.Bio.149: Planning and Organisation of Industry Excursions (3 C, 2 SWS).....	1067
M.Bio.150: Industry Excursions (3 C, 5 SWS).....	1068
SK.Bio.315: Bioethics (3 C, 2 SWS).....	1134
SK.Bio.328: Scientific presentation and communication (3 C, SWS).....	1135
SK.Bio.329: Research internship (4 weeks) (6 C, SWS).....	1136
SK.Bio.331: Research internship (8 weeks) (12 C, SWS).....	1137
SK.Bio.332: Internship for master degree students (8 C).....	1138

3. Master's Thesis

The successful completion of the Master's thesis earns 30 C.

Durch die erfolgreiche Anfertigung der Masterarbeit werden 30 C erworben.

Georg-August-Universität Göttingen Module M.Bio.001: Statistics for Biology using R	6 C 4 WLH
Learning outcome, core skills: Students understand the concept of a random variable and its relation to empirical research in the bio-sciences. They understand probability distributions, distribution parameters like mean and variance and the difference between true values of these parameters and their estimates from samples. They understand the logic behind null-hypothesis tests. They understand the difference between parametric and non-parametric tests. They are able to select a suitable test for two-sample problems concerning the mean and the median, and to solve linear and multilinear regression problems. They are able to perform these analyses in R. Contents: 1. why statistics is necessary in bio-sciences 2. random variables, random variates (realizations), sampling 3. probability distributions and probability density functions, cumulative probability functions 4. descriptive statistics: measures of central tendencies, i.e. mean, mode(s), median; measures of variance; true values the difference between distribution parameters and their sample-based estimates 5. confidence intervals based on the bootstrap 6. statistical hypotheses, the corresponding null-hypotheses, the logic of null-hypothesis significance tests (NHSTs). 7. permutation testing for comparing means – unpaired tests 8. permutation testing for comparing means – paired tests. 9. correlation and univariate (linear) regression, resampling tests for univariate regression 10. the logic of parametric null hypothesis testing 11. parametric tests for multivariate regression 12. parametric tests for analysis of variance (ANOVA) parametric tests	Workload: Attendance time: 56 h Self-study time: 124 h
Course: Statistics for Biology using R (Lecture)	2 WLH
Examination: Written E-examination in ILIAS (90 minutes) Examination prerequisites: Regular participation in the tutorial sessions	6 C
Course: Statistics for Biology using R (Tutorial)	2 WLH
Examination requirements: • Formulating nullhypotheses and alternative hypotheses and understanding their meaning • Loading and selecting data for analysis in R • running multiple regression in R • being able to interpret the output of lm() in R • Interpreting p-values, regression coefficients, R and F-values correctly	

- | | |
|---|--|
| <ul style="list-style-type: none"> • Transferring the outcomes of an analysis in R into a written text describing the statistical findings | |
|---|--|

Admission requirements: For master students only. The modules M.Bio.001 and B.Bio.107 are mutually exclusive.	Recommended previous knowledge: none
Language: English	Person responsible for module: Prof. Dr. Michael Wibrat
Course frequency: each winter semester	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester: from 1
Maximum number of students: 65	

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) <i>Contents:</i> • 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) <i>Contents:</i> • 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.146: Applied Methods of Biosciences		3 C 5 WLH
Learning outcome, core skills: Students can select and apply appropriate analytical methods from the fields of molecular biology, biochemistry and molecular life sciences – such as DNA analysis, genomics, proteomics, natural product analysis and imaging techniques – to address specific scientific questions. They carry out the methods independently, operate modern equipment professionally and systematically document their experimental procedures and results. In addition, they reflect on the methodological principles, limitations and applications of the techniques used in a scientific context.		Workload: Attendance time: 70 h Self-study time: 20 h
Course: Applied Methods of Biosciences (Practical course) methods course from the faculty's range of options		5 WLH
Examination: Minutes / Lab report (max. 20 pages), not graded Examination requirements: Students prepare a scientific report in which they describe in detail the chosen method, the experimental procedure, the data analysis and the interpretation of the results. The examination assesses the technical accuracy, methodological independence, quality of data interpretation and structured and scientific presentation in the report. In addition, the ability to critically reflect on the chosen method and its application is examined.		3 C
Admission requirements: none	Recommended previous knowledge: none	
Language: English	Person responsible for module: PD Dr. Michael Hoppert	
Course frequency: winter and summer semester, on demand	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	

Georg-August-Universität Göttingen Module M.Bio.149: Planning and Organisation of Industry Excursions		3 C 2 WLH
Learning outcome, core skills: Students plan and organise visits to companies that employ microbiologists or biochemists, taking into account career prospects in the discipline. Together with their supervisor, they select suitable companies, consider their relevance for academic and professional development, draw up a structured visit plan, organise appointments and prepare the content for a specialist symposium. In addition, they reflect on the professional fields of application and career paths in the field of microbiology and biochemistry in the context of their own study and career planning.		Workload: Attendance time: 28 h Self-study time: 62 h
Course: Preparation of a 3 day excursion (during lecture free time after winter semester) preliminary meeting during first lecture of M.Bio.102		2 WLH
Examination: Minutes / Lab report, not graded Examination prerequisites: Certified schedule of the excursion Examination requirements: Students present the selected companies, justify their technical and professional relevance, and present the organisational process of the tour or symposium. They reflect on career prospects in microbiology and biochemistry in the context of their own study and career planning. The examination assesses, in particular, the technical basis for the selection, the quality of planning, and reflection on career development paths.		3 C
Admission requirements: Participation in M.Bio.102	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Kai Heimel	
Course frequency: each winter semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 8		

Georg-August-Universität Göttingen Module M.Bio.150: Industry Excursions		3 C 5 WLH
Learning outcome, core skills: Students can recognise and reflect on the working environment and hiring requirements in industrial facilities in the field of molecular life sciences and/or pharmaceutical companies. They document their findings from the company visits by summarising technical processes, professional activities and organisational structures. They also reflect on the relevance of the industrial field of work for their own technical and professional development.		Workload: Attendance time: 70 h Self-study time: 20 h
Course: Industry Excursions 3 day excursion (during lecture free time after winter semester), preliminary meeting during first lecture of M.Bio.102		5 WLH
Examination: Minutes / Lab report (max. 20 pages), not graded Examination prerequisites: Participation in preliminary meetings, preparatory seminar and excursions Examination requirements: The students jointly compile a scientifically sound report on their visit to the company, covering technical content, work processes and career prospects in the respective working field. The examination assesses the technical accuracy, the structure of the report and the reflection on the professional relevance of the visit. The group work is assessed on the basis of individual contributions and the technical independence of the participants.		3 C
Admission requirements: participation in M.Bio.102	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Kai Heimel	
Course frequency: each winter semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 30		

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.303: Cell Biology		12 C 14 WLH
Learning outcome, core skills: Students are able to explain and contextualise the molecular organisation of the cell, processes of cell proliferation, differentiation, and cell death, as well as mechanisms of cell communication. They independently plan and conduct molecular biological experiments using cultured cells and apply genetic, transgenic, and reverse-genetic methods to study gene function. They establish and maintain cell lines under sterile conditions and apply modern cell culture techniques. They use relevant databases for in silico sequence analysis and conduct targeted literature research. They critically analyse experimental results, document their work in ongoing laboratory protocols, and present interim findings in a structured, scientifically sound format. They discuss their results in a scientific discourse and integrate current research findings into their work.		Workload: Attendance time: 196 h Self-study time: 164 h
Course: Molecular Cell Biology (Lecture)		2 WLH
Course: Topics in Molecular Cell Biology (Seminar)		1 WLH
Examination: Written examination (90 minutes) Examination prerequisites: Seminar presentation (ca. 15 min); brief protocols on the experiments, as well as a presentation and discussion of the provisional results (ca. 15 min)		12 C
Course: Methods Course with Tutorial on Cell Biology 5-week block course, 3 days a week		11 WLH
Examination requirements: Students demonstrate their knowledge through a written examination assessing theoretical foundations, methodological approaches, and applications in cell biology. They present their work in a seminar talk, where they communicate their experimental design, interim results, and interpretation, followed by a discussion. Assessment evaluates scientific depth, quality of documentation, clarity of presentation, and communication skills in scientific discussion.		
Admission requirements: cannot be combined with M.Bio.343 or M.Bio.363	Recommended previous knowledge: none	
Language: English	Person responsible for module: PD Dr. Gerd Vorbrüggen	
Course frequency: each winter semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 12		

Georg-August-Universität Göttingen Module M.Bio.304: Neurobiology 1		12 C 14 WLH
Learning outcome, core skills: Students are able to independently apply fundamental methods of molecular, cellular, and systems neuroscience and implement them in research practice. They conduct experiments in the fields of neurogenetics, neuroanatomy, neurophysiology, and neuroethology, including the analysis of gene expression patterns, neuronal tracing techniques, electrophysiological recordings, biomechanical measurements, and behavioural analyses or screening methods. They document their experimental procedures systematically, critically analyse data, and interpret results within a scientific context. They present their work in a structured, scientifically sound format and communicate their findings clearly and effectively.		Workload: Attendance time: 196 h Self-study time: 164 h
Course: From Gene to Behaviour (Lecture)		2 WLH
Examination: Written examination (120 minutes) Examination prerequisites: Presentation of the results of the practical work in the form of a talk, taking into account current literature (approx. 15 min)		12 C
Course: Methods Course Basics of Neurobiology <i>Contents:</i> Experiments in the fields of neurogenetics, neuroanatomy, neurophysiology and neuroethology; analysis of gene expression patterns, neural tracing techniques, electrophysiological recordings, biomechanical measurements and behavioural analyses or screening methods.		12 WLH
Examination requirements: Students demonstrate their knowledge through a written examination assessing theoretical foundations, methodological approaches, and applications in neuroscience. They present their experimental results in a scientific talk, clearly communicating their methodology, findings, and interpretation. Assessment evaluates scientific depth, quality of presentation, clarity of argumentation, and communication skills in scientific dissemination.		
Admission requirements: cannot be combined with M.Bio.344	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.305: Neurobiology 2		12 C 14 WLH
Learning outcome, core skills: Students are able to independently plan, conduct, and document neuroscience research projects, developing experimental approaches and applying them with scientific rigor. They acquire in-depth knowledge of current concepts and research questions in neuroscience and integrate the latest research findings and scientific literature into their work. They critically analyse and interpret experimental results, reflect on methodological choices, and present their findings in a clear, scientifically sound format. They create a scientific poster that clearly and effectively communicates the research question, methodology, results, and interpretation, and discuss their work in an oral presentation.		Workload: Attendance time: 196 h Self-study time: 164 h
Course: Current Questions and Concepts in Neurosciences (Lecture)		2 WLH
Examination: Written examination (120 minutes) Examination prerequisites: presentation of results of practical work in form of a poster presentation (ca. 90 min)		12 C
Course: Advanced Methods Course in Neurobiology		12 WLH
Examination requirements: Students demonstrate their theoretical knowledge through a written examination assessing foundational concepts, research approaches, and methodological principles. They present their practical work in a scientific poster and defend their results in an oral discussion, explaining their methodology, findings, and scientific significance. Assessment evaluates scientific depth, quality of the poster presentation, clarity of communication, and effectiveness in the discussion.		
Admission requirements: M.Bio.304	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. André Fiala	
Course frequency: each summer 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.306: Introduction to Behavioral Biology		12 C 12 WLH
Learning outcome, core skills: Students are able to explain and apply 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 apply core methods in behavioural biology, such as observation, data collection, statistical analysis, and experimental design, and document their work systematically. They plan and conduct simple, quantitatively oriented behavioural studies, collect data under supervision, and analyse them using appropriate statistical methods. They present scientific content in a structured, scientifically sound manner - both in writing and orally - and critically discuss results within a scientific discourse. They actively contribute to scholarly discussions and analyse complex topics from multiple perspectives, apply effective communication strategies to support collaborative work. They acquire leadership and didactic skills required for a structured scientific seminar discussion ensuring clear and effective communication among their peers including scientific reasoning and interpretation of findings.		Workload: Attendance time: 196 h Self-study time: 164 h
Course: Introduction to Behavioral Biology (Lecture)		3 WLH
Examination: Written examination (90 minutes) Examination prerequisites: Regular participation in seminar and methods course; seminar presentation (ca. 30 min)		12 C
Course: Concepts of Behavioral Biology (Seminar)		1 WLH
Course: Methods Course: Methods in Behavioral Biology		8 WLH
Examination requirements: Students demonstrate their knowledge through a written examination assessing theoretical foundations, methodological approaches, and applications in behavioural biology with special emphasis on behavioural ecology, sociobiology and cognition. They structure and lead a discussion on a pre-assigned recent publication in behavioral biology in an inverted classroom, guide others through their scientific arguments and ensure critical evaluation. Assessment evaluates scientific depth, quality of data analysis, clarity of presentation, and communication skills in scientific discussion.		
Admission requirements: cannot be combined with M.Bio.346 or M.Bio.366	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:	Recommended semester:	

twice	
Maximum number of students: 12	

Georg-August-Universität Göttingen Module M.Bio.307: Behavioral Biology		12 C 14 WLH
Learning outcome, core skills: Students are able to explain and apply evolutionary approaches to behavioural analysis to investigate biological questions in behavioural biology. They independently plan and conduct simple behavioural biology projects and experiments, systematically document methodology and results, and analyse quantitative data using appropriate technical tools. They present scientific content in a structured, scientific manner, discuss it critically within a scientific discourse, and reflect on their work in the context of current research.		Workload: Attendance time: 196 h Self-study time: 164 h
Course: Behavioural Biology (Lecture)		3 WLH
Examination: Written examination (90 minutes) Examination prerequisites: regular and active participation, oral presentation within the seminar (ca. 15 min)		12 C
Course: Seminar on Behavioural Biology (Seminar)		1 WLH
Course: Practical Course in Behavioural Biology		10 WLH
Examination requirements: Students demonstrate their knowledge through a written examination assessing theoretical foundations, experimental design, and data analysis. Additionally, active seminar participation and the delivery of a scientific presentation are assessed as core components of the evaluation.		
Admission requirements: M.Bio.306; cannot be combined with M.Bio.347	Recommended previous knowledge: none	
Language: English	Person responsible for module: Dr. Claudia Fichtel	
Course frequency: each summer semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester: from 2	
Maximum number of students: 10		

Georg-August-Universität Göttingen Module M.Bio.308: Social Behavior and Communication		12 C 14 WLH
Learning outcome, core skills: Students are able to explain fundamental concepts of social behaviour, communication, and cognition in animals, particularly primates, and place them within a historical research context. They independently plan and conduct behavioural biology studies, apply comparative analyses, computer-assisted behavioural data recording, and statistical methods, and document their work systematically. They apply project management principles, integrate current research findings into their work, and present scientific content in a structured, scientifically sound manner - both in writing and orally. They actively participate in the seminar, contribute through critical questions and well-founded input, and deliver a scientific presentation.		Workload: Attendance time: 196 h Self-study time: 164 h
Course: Social Behavior and Communication (Lecture)		2 WLH
Course: Seminar on Social Behavior and Communication (Seminar)		2 WLH
Course: Methods Course in Social Behavior and Communication including a two-week excursion		10 WLH
Examination: Protocol on the methods course (max. 20 pages) [70% of the overall grade] and seminar presentation (ca. 15 minutes) [30% of the overall grade] Examination prerequisites: Regular participation in seminar and methods course		12 C
Examination requirements: Students demonstrate their competences through a structured report covering the research question, methodology, data analysis, results, and interpretation, as well as a scientific presentation in the seminar. Active seminar participation - including preparation, discussion, and engagement - is assessed as a core component of the evaluation. Assessment evaluates scientific depth, quality of documentation, clarity of presentation, and communication skills in the scientific discussion.		
Admission requirements: M.Bio.306	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Julia Fischer Prof. Dr. Julia Ostner	
Course frequency: each summer semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 12		

Georg-August-Universität Göttingen Module M.Bio.310: Systems Biology		12 C 14 WLH
Learning outcome, core skills: Students are able to formally describe, model, analyse, and simulate complex interactions within living systems across multiple levels of abstraction—from molecules and cells to organs. They identify and interpret biomolecular networks such as metabolic, signal transduction, and gene regulatory networks, and apply graph-based abstraction models (e.g. Entity-Interaction Graphs, Boolean Networks, Petri Nets). They apply fundamental concepts of graph theory - including path analysis, clustering coefficient, and centrality - to biomolecular networks and integrate them into the analysis of biological systems. They explain high-throughput experimental methods and their application in network analysis, and conduct simulations of molecular networks using selected case studies. Furthermore, they present their findings in a scientific seminar presentation and document their work in a structured laboratory report. 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: 147 h Self-study time: 213 h
Course: Bioinformatics of Systems Biology (Lecture)		2 WLH
Examination: Oral examination (approx. 30 minutes)		6 C
Course: Exercises on Bioinformatics of Systems Biology (Exercise)		2 WLH
Course: Seminar on Bioinformatics of Systems Biology (Seminar)		1 WLH
Course: Methods Course Modelling and Analysis of Biological Systems (Internship) 3-week block course		9 WLH
Examination: Minutes / Lab report (max. 10 pages) Examination prerequisites: Seminar presentation (approx. 30 min); regular participation in exercise, seminar and methods course		6 C
Examination requirements: Students demonstrate their competences through an oral examination on the lecture content, a scientific seminar presentation on an independently researched topic, and a structured laboratory report on the modelling, analysis, and simulation of biomolecular networks. The oral exam assesses theoretical understanding, the ability to analyse and integrate complex systems, and the application of modelling concepts. The presentation and report are evaluated for scientific quality, methodological clarity, critical reflection, and structured communication.		
Admission requirements: cannot be combined with M.Bio.340		Recommended previous knowledge: none

Language: English	Person responsible for module: Prof. Dr. Tim Beißbarth
Course frequency: each summer semester; irregularly	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester:
Maximum number of students: 20	
Additional notes and regulations: Max. number of students per programme: 10 DNB + 10 CoBi	

Georg-August-Universität Göttingen Module M.Bio.314: Research Project in Cellular Neurobiology		12 C 20 WLH
Learning outcome, core skills: Students are able to independently plan, conduct, and document scientific experiments in the fields of cellular and general neuroscience. They carry out experiments with precision, systematically record experimental procedures and results, and ensure scientific accuracy in documentation. They evaluate the advantages and limitations of different data analysis methods and select the most appropriate approaches. They conduct thorough research on foundational textbook knowledge and current specialist literature, integrate findings into their work, and critically discuss their results within a scientific context. They present their work in a structured, scientifically sound laboratory report. They actively contribute through critical questions and well-founded input to scientific discussions and analyse complex topics from multiple perspectives.		Workload: Attendance time: 280 h Self-study time: 80 h
Course: Research Project 7 weeks, time and date upon individual agreement		20 WLH
Course: Departmental Seminar		
Examination: Oral Presentation (approx. 30 minutes) Examination prerequisites: certified protocol (max. 15 pages), active participation in 75% of the department's seminars over the duration of practical work		12 C
Examination requirements: Students demonstrate their competences through an oral examination, in which they defend their experimental work, methodology, results, and interpretation. They submit a structured laboratory report covering the research question, methodology, data analysis, discussion, and conclusions. Assessment evaluates scientific depth, methodological rigor, quality of documentation, clarity of argumentation, and communication skills during the oral examination.		
Admission requirements: M.Bio.304 or M.Bio.305	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Martin Göpfert	
Course frequency: each semester	Duration: 1 - 2 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 10		

Georg-August-Universität Göttingen Module M.Bio.315: Research Project in Molecular Neurobiology		12 C 20 WLH
Learning outcome, core skills: Students are able to independently plan, conduct, and document a scientific experiment in the field of molecular neuroscience and neurogenetics. They carry out experiments with precision, systematically record experimental procedures and results, and ensure scientific accuracy in documentation. They evaluate the advantages and limitations of different data analysis methods and select the most appropriate approaches. They conduct thorough research on foundational textbook knowledge and current specialist literature, integrate findings into their work, and critically discuss their results within a scientific context. 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. They produce structured laboratory reports that cover the research question, methodology, results, interpretation, and reflection.		Workload: Attendance time: 280 h Self-study time: 80 h
Course: Research Project 7 weeks, time and date upon individual agreement		20 WLH
Course: Departmental Seminar		
Examination: Oral Presentation (approx. 30 minutes) Examination prerequisites: certified protocol (max. 15 pages), active participation in 75% of the department's seminars over the duration of practical work		12 C
Examination requirements: Students submit a scientific laboratory report that includes the research question, methodology, experimental execution, data analysis, interpretation, and discussion of results. The oral examination allows for in-depth discussion and defense of the work, during which students explain their methodology, discuss findings, and reflect critically on their research in front of academic peers. Assessment evaluates scientific depth, quality of documentation, clarity of argumentation, and communication skills during the oral presentation.		
Admission requirements: M.Bio.304 or M.Bio.305	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. André Fiala	
Course frequency: each semester	Duration: 1 oder 2	
Number of repeat examinations permitted:	Recommended semester:	

twice	
Maximum number of students: 7	

Georg-August-Universität Göttingen Module M.Bio.316: Research Project in Systems Neurosciences		12 C 20 WLH
Learning outcome, core skills: Students are able to independently plan, conduct, and document scientific experiments in the field of systems neuroscience. They carry out experiments with precision, systematically record experimental procedures and results, and ensure scientific accuracy in documentation. They evaluate the advantages and limitations of different data analysis methods and select the most appropriate approaches. They conduct thorough research on foundational textbook knowledge and current specialist literature, integrate findings into their work, and critically discuss their results within a scientific context. They actively contribute to scholarly discussions, analyse complex topics from multiple perspectives, and apply effective communication strategies to support collaborative work. They present their work in a structured, scientifically sound laboratory report.		Workload: Attendance time: 280 h Self-study time: 80 h
Course: Research Project 7 weeks, time and date upon individual agreement		20 WLH
Course: Departmental Seminar		
Examination: Oral Presentation (approx. 30 minutes) Examination prerequisites: certified protocol (max. 15 pages), active participation in 75% of the department's seminars over the duration of practical work		12 C
Examination requirements: Students demonstrate their competences through an oral examination, in which they defend their experimental work, methodology, results, and interpretation. They submit a structured laboratory report covering the research question, methodology, data analysis, discussion, and conclusions. Assessment evaluates scientific depth, methodological rigor, quality of documentation, clarity of argumentation, and communication skills during the oral examination.		
Admission requirements: M.Bio.304 or M.Bio.305 or M.Bio.306 or M.Bio.307 or M.Bio.308	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Stefan Treue	
Course frequency: each semester	Duration: 1 - 2 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 8		

Georg-August-Universität Göttingen Module M.Bio.317: Research Project in Population and Behavioral Biology		12 C 20 WLH
Learning outcome, core skills: Students are able to independently plan, conduct, and document scientific experiments in the fields of population and behavioural biology, as well as sociobiology. They carry out experiments with precision, systematically record experimental procedures and results, and ensure scientific accuracy in documentation. They evaluate the advantages and limitations of different data analysis methods and select the most appropriate approaches. They conduct thorough research on foundational textbook knowledge and current specialist literature, integrate findings into their work, and critically discuss their results within a scientific context. They present their work in a structured, scientifically sound laboratory report.		Workload: Attendance time: 280 h Self-study time: 80 h
Course: Research Project 7 weeks, time and date upon individual agreement		20 WLH
Examination: Oral Presentation (approx. 30 minutes) Examination prerequisites: certified protocol (max. 15 pages)		12 C
Examination requirements: Students demonstrate their competences through an oral examination, in which they defend their experimental work, methodology, results, and interpretation. They submit a structured laboratory report covering the research question, methodology, data analysis, discussion, and conclusions. Assessment evaluates scientific depth, methodological rigor, quality of documentation, clarity of argumentation, and communication skills during the oral examination.		
Admission requirements: M.Bio.306, M.Bio.307	Recommended previous knowledge: M.Bio.308	
Language: English	Person responsible for module: Prof. Dr. Peter Michael Kappeler	
Course frequency: each semester	Duration: 1 - 2 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 8		

Georg-August-Universität Göttingen Module M.Bio.318: Research Project in Social Behavior, Communication, and Cognition		12 C 20 WLH
Learning outcome, core skills: Students are able to independently plan, conduct, and document scientific experiments in the fields of social behaviour, communication, and cognition in mammals. They carry out experiments with precision, systematically record experimental procedures and results, and ensure scientific accuracy in documentation. They apply statistical methods for data analysis, evaluate the advantages and limitations of different analytical approaches, and select the most appropriate methods. They conduct thorough research on foundational textbook knowledge and current specialist literature, integrate findings into their work, and critically discuss their results within a scientific context. They work collaboratively in a team, coordinate tasks, share responsibility, and contribute collectively to the quality of the research. They present their work in a structured, scientifically sound laboratory report.		Workload: Attendance time: 280 h Self-study time: 80 h
Course: Research Project 7 weeks, time and date upon individual agreement		20 WLH
Examination: Oral Presentation (approx. 30 minutes) Examination prerequisites: certified protocol (max. 15 pages)		12 C
Examination requirements: Students demonstrate their competences through an oral examination, in which they defend their experimental work, methodology, results, and interpretation. They submit a structured laboratory report covering the research question, methodology, data analysis, discussion, and conclusions. Assessment evaluates scientific depth, methodological rigor, quality of documentation, clarity of argumentation, and communication skills during the oral examination.		
Admission requirements: M.Bio.306, M.Bio.308	Recommended previous knowledge: M.Bio.307	
Language: English	Person responsible for module: Prof. Dr. Julia Fischer	
Course frequency: each semester	Duration: 1 - 2 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 5		

Georg-August-Universität Göttingen Module M.Bio.319: Research Project in Human Genetics		12 C 20 WLH
Learning outcome, core skills: Students are able to independently plan, conduct, and document scientific experiments in the field of Human Genetics. They carry out experiments with precision, systematically record experimental procedures and results, and ensure scientific accuracy in documentation. They evaluate the advantages and limitations of different data analysis methods and select the most appropriate approaches. They conduct thorough research on foundational textbook knowledge and current specialist literature, integrate findings into their work, and critically discuss their results within a scientific context. They present their work in a structured, scientifically sound format.		Workload: Attendance time: 280 h Self-study time: 80 h
Course: Research Project 9 weeks, time and date upon individual agreement		20 WLH
Examination: Oral Presentation (approx. 30 minutes) Examination prerequisites: scientific presentation and discussion of results in form of a scientific publication (max. 20 pages)		12 C
Examination requirements: Students submit a scientific publication covering the research question, methodology, results, discussion, and conclusions. The oral examination allows for in-depth discussion and defence of the work, during which students explain their methodology, discuss findings, and reflect critically on their research in front of academic peers. Assessment evaluates the scientific quality of the publication, clarity of argumentation, methodological rigor, and communication skills during the oral presentation.		
Admission requirements: M.Bio.303 or M.Bio.304 or M.Bio.321	Recommended previous knowledge: none	
Language: English	Person responsible for module: PD Dr. rer. nat. Anja Uhmman	
Course frequency: each semester	Duration: 1 - 2 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 3		

Georg-August-Universität Göttingen Module M.Bio.320: Research Project in Bioinformatics		12 C 20 WLH
Learning outcome, core skills: Students are able to independently plan, execute, and document a bioinformatics project, which may involve the development or analysis of software, automation of data processing workflows, or the analysis of biological data using bioinformatics methods. They apply appropriate programming and analytical tools, structure data, implement algorithms or scripts, and interpret results within a biological context. They document their work in a structured, scientifically sound laboratory report and present their findings in an oral examination. 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: 280 h Self-study time: 80 h
Course: Research Project 9 weeks, time and date upon individual agreement		20 WLH
Course: Departmental Seminar		
Examination: Oral Presentation (approx. 30 minutes) Examination prerequisites: Certified protocol (max. 15 pages), active participation in 75% of the department's seminars over the duration of practical work		12 C
Examination requirements: Students submit a laboratory report that includes project objectives, methodology, implementation, data analysis, and interpretation of results. The oral examination allows for in-depth discussion and defense of the work, during which students explain their approach, discuss findings, and reflect critically on methodological choices in front of academic peers. Assessment evaluates scientific depth, independence, quality of documentation, clarity of presentation, and communication skills during the oral discussion.		
Admission requirements: M.Bio.310	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Tim Beißbarth	
Course frequency: each semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 2		

Georg-August-Universität Göttingen Module M.Bio.321: Current Developmental Biology		12 C 14 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 independently conduct molecular biological, genetic, and embryological experiments to study developmental processes, applying methods for gene function analysis and embryo manipulation. They perform molecular and histological analyses of induction and cell interaction processes and interpret results within a biological context. They use publicly accessible databases for <i>in silico</i> sequence analysis and model system-specific resources and integrate current research findings into their work. They critically analyse experimental data, document their work systematically, and present their findings in a structured, scientifically sound format. They actively contribute to scientific discussions, ask critical questions, and integrate current research findings into their arguments.		Workload: Attendance time: 196 h Self-study time: 164 h
Course: Current Developmental Biology (Lecture)		2 WLH
Examination: Written examination (90 minutes) Examination prerequisites: Seminar presentation of a publication (ca. 20 min); scientific presentation and discussion of experimental data		12 C
Course: Exercises and Deepening of Lecture Content (Tutorial)		1 WLH
Course: Current Topics in Developmental Biology (Seminar)		1 WLH
Course: Current Techniques in Developmental Biology (Practical course)		10 WLH
Examination requirements: Students deliver a scientific seminar presentation on a current publication and discuss results in a scientific discourse, explaining methodology, findings, and interpretation. Assessment evaluates scientific depth, quality of data analysis, clarity of presentation, and in person communication skills in scientific discussion. 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.392 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:	Recommended semester:	

twice	1 - 3
Maximum number of students: 20	

Georg-August-Universität Göttingen Module M.Bio.322: Frontiers in Neural Development		12 C 14 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 and carry out selected genetic, molecular, and cell biological experiments—e.g. in insects (e.g. mutant analysis, transgenic approaches, fluorescent immunohistochemistry, brain preparation and imaging) or in vertebrates (e.g. in vivo imaging, organoids, cell culture). They use state of the art imaging approaches and apply scientific open source software for image processing. They critically analyse experimental data, discuss results in a scientific context, and perform scientific presentations.		Workload: Attendance time: 190 h Self-study time: 170 h
Course: Development and Evolution of the Nervous System (Lecture)		2 WLH
Examination: Written examination (90 minutes) Examination prerequisites: Regular participation in seminar and methods course. Seminar presentation and discussion of cutting edge experimental approaches. Design, presentation and discussion of self-developed experimental approaches.		12 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
Course: Methods Course Development of the Nervous System (Practical course)		10 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.394 or M.Bio.395	Recommended previous knowledge:	
Language:	Person responsible for module:	

English	Prof. Dr. Gregor Bucher
Course frequency: each summer semester	Duration: 1 semester[s]
Number of repeat examinations permitted: twice	Recommended semester: 2
Maximum number of students: 12	

Georg-August-Universität Göttingen Module M.Bio.323: Introduction to Bayesian Statistics and Information Theory		12 C 12 WLH
Learning outcome, core skills: Students are able to explain and apply the fundamentals of Bayesian statistics, including the Bayesian concept of probability, parameter estimation, and the interpretation of Bayesian credible intervals as the Bayesian equivalent of confidence intervals. They select and justify appropriate prior distributions based on prior knowledge and analyse their impact on results. They conduct Bayesian hypothesis and model tests and apply Markov Chain Monte Carlo (MCMC) methods for estimating complex models. They solve statistical problems in practical computer-based exercises, programme simple Bayesian models, and interpret results in the context of data. They integrate concepts from information theory into their analysis and are able to clearly present complex relationships in scientific discourse. They actively contribute to scholarly discussions, analyse complex topics from multiple perspectives, and apply effective communication strategies to support collaborative work.		Workload: Attendance time: 195 h Self-study time: 165 h
Course: Introduction to Bayesian Statistics and Information Theory (Lecture)		3 WLH
Course: Classical Problems in Bayesian Inference (Seminar)		1 WLH
Course: Programming Course Introduction to Bayesian Statistics and Information Theory		8 WLH
Examination: Written examination (90 minutes) Examination prerequisites: regular participation, seminar presentation		12 C
Examination requirements: Students demonstrate their knowledge through a written examination assessing theoretical foundations, applications, and interpretations of Bayesian statistics. They submit a programming project documenting the implementation of Bayesian methods on the computer and present their work in a scientific seminar presentation. Assessment evaluates scientific depth, quality of programming, clarity of presentation, and communication skills in scientific discussion.		
Admission requirements: experience with at least one programming language; basic computer skills	Recommended previous knowledge: fundamentals of probability theory	
Language: English	Person responsible for module: Prof. Dr. Michael Wibral	
Course frequency: each winter semester	Duration:	
Number of repeat examinations permitted: twice	Recommended semester:	

Maximum number of students:	
------------------------------------	--

10	
----	--

Georg-August-Universität Göttingen Module M.Bio.331: Scientific Project Management		6 C 5 WLH
Learning outcome, core skills: After attending at least 14 research colloquia or symposia on the Göttingen Campus, students are able to independently summarise current issues in the respective fields, critically evaluate them and articulate their relevance to their own research interests. They can develop a complete research proposal for their planned Master's thesis according to good scientific practice: formulating clear research hypotheses, designing appropriate sampling and study plans, selecting suitable analytical methods, outlining expected results and producing a realistic timetable and resource plan. They are capable of presenting the research proposal convincingly, employing scientific argumentation structures, answering questions competently and defending the project before an expert audience. They master the written presentation of scientific content (research application, literature review, methodology) according to the standards of scholarly journals and funding bodies and can reflect on the principles of project and grant management.		Workload: Attendance time: 70 h Self-study time: 110 h
Course: Good Scientific Practice (e-learning course)		1 WLH
Course: Center or Institute Colloquia Colloquia given by invited guest speakers as part of the colloquia, seminar series and symposia held at the Göttingen Campus are recognised.		1 WLH
Course: Preparation of a research proposal for the Master's thesis		3 WLH
Examination: Oral Presentation (approx. 20 minutes) Examination prerequisites: Proof of attendance of at least 14 scientific colloquia, as well as proof of successful completion of the e-learning course "Good Scientific Practice". Certified research proposal (max. 20 pages) for the Master's thesis.		6 C
Examination requirements:		
Admission requirements: Two advanced modules; colloquia can be attended from the first semester onwards without any entry requirements.	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Ernst Anton Wimmer	
Course frequency: each semester	Duration: 1 - 2 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students:		

32	
----	--

Additional notes and regulations:

Module is usually supervised and examined by the first supervisor of the Master's thesis.

Georg-August-Universität Göttingen Module M.Bio.340: Systems Biology		3 C 2 WLH
Learning outcome, core skills: Students are able to formally describe, model, analyse, and simulate complex interactions within living systems across multiple levels of abstraction - from molecules and cells to organs. They identify and interpret biomolecular networks such as metabolic, signal transduction, and gene regulatory networks, and apply graph-based abstraction models (e.g. Entity-Interaction Graphs, Boolean Networks, Petri Nets). They apply fundamental concepts of graph theory - including path analysis, clustering coefficient, and centrality - to biomolecular networks and integrate them into the analysis of biological systems. They explain high-throughput experimental methods and their application in network analysis and can reflect on the results within a scientific context.		Workload: Attendance time: 42 h Self-study time: 48 h
Course: Bioinformatics of Systems Biology (Lecture)		2 WLH
Examination: Oral examination (approx. 30 minutes)		3 C
Examination requirements: Students demonstrate their knowledge through an oral examination, in which they explain and critically discuss complex modelling approaches, analytical methods, and applications in network bioinformatics. The exam assesses depth of understanding, the ability to integrate concepts from modelling, graph theory, and experimental data analysis, and scientific reasoning. It evaluates clarity of presentation, logical structure of arguments, and critical reflection on methodological and biological implications.		
Admission requirements: none	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Tim Beißbarth	
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.343: Cell Biology		6 C 3 WLH
Learning outcome, core skills: Students are able to explain and contextualise the molecular organisation of the cell, processes of cell proliferation, differentiation, and cell death, as well as mechanisms of cell communication. They critically analyse scientific data, integrate it into a scientific discourse, and present it in a structured, scientifically sound manner. They conduct targeted literature research, evaluate the quality and relevance of sources, and integrate current research findings into their arguments. They present their insights clearly, precisely, and convincingly - particularly in a scientific seminar presentation - and are able to argue effectively in a discussion.		Workload: Attendance time: 42 h Self-study time: 138 h
Course: Molecular Cell Biology (Lecture)		2 WLH
Examination: Written examination (90 minutes) Examination prerequisites: Seminar presentation (ca. 15 min)		6 C
Course: Topics in Molecular Cell Biology (Seminar)		1 WLH
Examination requirements: Students demonstrate their knowledge through a written examination assessing theoretical foundations, methodological approaches, and applications in cell biology. They present a scientific topic in the seminar as a presentation, analysing and critically discussing research findings. Assessment evaluates scientific depth, quality of argumentation, clarity of presentation, and communication skills in scientific discussion.		
Admission requirements: cannot be combined with M.Bio.303 or M.Bio.363	Recommended previous knowledge: none	
Language: English	Person responsible for module: PD Dr. Gerd Vorbrüggen	
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.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.346: Introduction to Behavioral Biology		6 C 4 WLH
Learning outcome, core skills: Students are able to explain fundamental concepts in behavioural biology - particularly in the fields of behavioural ecology, sociobiology, and cognition - at an advanced level and place them within a scientific context, with special attention to the quantitative aspects of behavioural research. They critically analyse scientific questions and research findings in behavioural biology and integrate current literature into their arguments. They present scientific content in a structured, scientifically sound manner - both in writing and orally - and critically discuss results within a scientific discourse. They actively contribute to scholarly discussions and analyse complex topics from multiple perspectives, apply effective communication strategies to support collaborative work. They acquire leadership and didactic skills required for a structured scientific seminar discussion ensuring clear and effective communication among their peers including scientific reasoning and interpretation of findings.		Workload: Attendance time: 56 h Self-study time: 124 h
Course: Introduction to Behavioral Biology (Lecture)		3 WLH
Examination: Written examination (90 minutes) Examination prerequisites: Regular participation in seminar; seminar presentation (ca. 30 min)		6 C
Course: Concepts of Behavioral Biology (Seminar)		1 WLH
Examination requirements: Students demonstrate their knowledge through a written examination assessing theoretical foundations, methodological approaches, and applications in behavioural biology with special emphasis on behavioural ecology, sociobiology and cognition. They structure and lead a discussion on a pre-assigned recent publication in behavioral biology in an inverted classroom, guide others through their scientific arguments and ensure critical evaluation. Assessment evaluates scientific depth, quality of data analysis, clarity of presentation, and communication skills in scientific discussion.		
Admission requirements: cannot be combined with M.Bio.306 or M.Bio.366	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: 14		

Georg-August-Universität Göttingen Module M.Bio.347: Behavioral Biology		6 C 4 WLH
Learning outcome, core skills: Students are able to explain and apply the principles of the evolutionary approach to behavioural analysis to address biological questions in behavioural biology. They present scientific content in a structured, scientific manner - both in writing and orally - and critically discuss results within a scientific discourse. They actively participate in the seminar, deliver a scientific presentation, and contribute meaningfully through critical questions and well-founded input. They independently research current research topics and integrate scientific literature into their arguments.		Workload: Attendance time: 56 h Self-study time: 124 h
Course: Behavioural Biology (Lecture)		3 WLH
Examination: Written examination (90 minutes) Examination prerequisites: regular and active participation, oral presentation within the seminar (ca. 15 min)		6 C
Course: Seminar on Behavioural Biology (Seminar)		1 WLH
Examination requirements: Students demonstrate their knowledge through a written examination assessing theoretical foundations, methodological approaches, and applications in behavioural biology. Additionally, active seminar participation and the delivery of a scientific presentation are assessed as core components of the assessment. The examination evaluates scientific depth, quality of presentation, clarity of argumentation, and communication skills in scientific discussion.		
Admission requirements: M.Bio.306, M.Bio-NF.306 or M.Bio.346; cannot be combined with M.Bio.307 or M.Bio-NF.307	Recommended previous knowledge: none	
Language: English	Person responsible for module: Dr. Claudia Fichtel	
Course frequency: each summer semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 12		

Georg-August-Universität Göttingen Module M.Bio.350: From Vision to Action		3 C 2 WLH
Learning outcome, core skills: Students are able to explain and critically reflect on the current scientific knowledge of the visual system in primates, including humans and non-human primates. They analyse the structure and function of visual and visuo-motor systems at an advanced level and integrate neurobiological, functional, and evolutionary aspects into their explanations. They apply scientific concepts of visual perception, signal processing, and motor integration and can discuss these within the context of current research findings. They present their insights in a structured, scientifically sound manner and are able to clearly and precisely communicate complex relationships.		Workload: Attendance time: 28 h Self-study time: 62 h
Course: From Vision to Action (Lecture)		2 WLH
Examination: Written examination (75 minutes)		3 C
Examination requirements: Students demonstrate their knowledge through a written examination assessing theoretical foundations, functional mechanisms, and current research findings in the visual and visuo-motor system. The exam evaluates the ability to analyse complex neurobiological processes, integrate concepts from neuroanatomy, physiology, and evolution, and critically reflect on scientific approaches. It is designed to assess factual accuracy, logical reasoning, and depth of scientific reflection.		
Admission requirements: none	Recommended previous knowledge: a basic understanding of neurobiology gained through attendance at the lecture "Cognitive Neuroscience" (Biology), "Biopsychology" (Psychology) or a comparable lecture	
Language: English	Person responsible for module: Prof. Dr. Alexander Gail	
Course frequency: each winter semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 50		

Georg-August-Universität Göttingen Module M.Bio.356: Motor Systems		6 C 4 WLH
Learning outcome, core skills: Students are able to explain and compare the anatomy and physiology of cortical and subcortical structures, the spinal cord, and neuromuscular activation in the motor system of primates, including humans and non-human primates. They analyse mechanisms of motor planning, motor control, and the development of brain-machine interfaces at an advanced level and integrate these into a scientific context. They explain pathological changes in the motor system and their impact on motor function. They apply scientific research approaches, conduct in-depth literature research on current findings, and present their insights in a structured, scientifically sound seminar presentation. They defend their arguments and scientific evaluation in an oral examination.		Workload: Attendance time: 56 h Self-study time: 124 h
Course: Motor Systems (Lecture)		2 WLH
Course: Seminar on Motor Systems (Seminar)		2 WLH
Examination: Oral examination (approx. 15 minutes) Examination prerequisites: seminar presentation (ca. 30 min)		6 C
Examination requirements: Students demonstrate their competences through scientific seminar presentations on current topics in primate motor systems, including critical discussion of the literature. An oral examination follows, in which they explain and critically discuss the structure and function of the motor system, mechanisms of motor control, and applications such as brain-machine interfaces. Assessment evaluates scientific depth, quality of presentation, clarity of argumentation, and communication skills in the oral discussion.		
Admission requirements: cannot be combined with M.Bio.357	Recommended previous knowledge: a basic understanding of neurobiology gained through attendance at the lecture "Cognitive Neuroscience" (Biology), "Biopsychology" (Psychology) or a comparable lecture	
Language: English	Person responsible for module: Prof. Dr. Hansjörg Scherberger	
Course frequency: each summer semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 30		

Georg-August-Universität Göttingen Module M.Bio.357: Motor Systems		3 C 2 WLH
Learning outcome, core skills: Students are able to explain and compare the anatomy and physiology of cortical and subcortical structures, the spinal cord, and neuromuscular activation in the motor system of primates, including humans and non-human primates. They analyse mechanisms of motor planning, motor control, and the development of brain-machine interfaces at an advanced level and integrate these into a scientific context. They explain pathological changes in the motor system and their impact on motor function. They apply scientific concepts, integrate current research findings, and are able to clearly and precisely present complex relationships in scientific discourse.		Workload: Attendance time: 28 h Self-study time: 62 h
Course: Motor Systems (Lecture)		2 WLH
Examination: Oral examination (approx. 15 minutes)		3 C
Examination requirements: Students demonstrate their knowledge through an oral examination, in which they explain and critically discuss the structure and function of the motor system, mechanisms of motor control, and applications of brain-machine interfaces. The exam assesses the ability to analyse complex neurobiological processes, integrate concepts from anatomy, physiology, and neurotechnology, and engage in scientific reasoning. It evaluates scientific depth, logical structure of arguments, and clarity of presentation.		
Admission requirements: cannot be combined with M.Bio.356	Recommended previous knowledge: a basic understanding of neurobiology gained through attendance at the lecture "Cognitive Neuroscience" (Biology), "Biopsychology" (Psychology) or a comparable lecture	
Language: English	Person responsible for module: Prof. Dr. Hansjörg Scherberger	
Course frequency: each summer semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: not limited		

Georg-August-Universität Göttingen Module M.Bio.363: Cell Biology		3 C 2 WLH
Learning outcome, core skills: Students are able to explain and contextualise the molecular organisation of the cell, processes of cell proliferation, differentiation, and cell death, as well as mechanisms of cell communication. They analyse complex cellular processes, integrate current research findings, and are able to clearly and precisely present the relationships between structure, function, and regulation in cells. They apply scientific concepts, reflect on biological mechanisms, and can critically discuss complex relationships in a scientific discourse.		Workload: Attendance time: 28 h Self-study time: 62 h
Course: Molecular Cell Biology (Lecture)		2 WLH
Examination: Written examination (90 minutes)		3 C
Examination requirements: Students demonstrate their knowledge through a written examination assessing theoretical foundations, functional relationships, and applications in cell biology. The exam evaluates the ability to analyse complex biological processes, integrate concepts from cell structure, function, and regulation, 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.303 or M.Bio.343	Recommended previous knowledge: none	
Language: English	Person responsible for module: PD Dr. Gerd Vorbrüggen	
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.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		2 C
Module M.Bio.371: Molecular Basis of Neurological Diseases		2 WLH
Learning outcome, core skills: Students are able to explain core concepts in molecular and cellular neuroscience using neurological diseases as examples, and place them within biological and clinical contexts. They discuss the genetic, molecular, and cellular bases of diseases, the affected brain structures, animal models, and current therapeutic approaches. 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 using supportive slides and are able to engage in scientific discussion, answer questions, and reflect critically.		Workload: Attendance time: 14 h Self-study time: 46 h
Course: Molecular Basis of Neurological Diseases (Seminar) The students familiarize themselves with a given topic in order to present it in a block seminar. If requested, the students will be coached by a supervisor regarding selection and understanding of literature and preparation of the presentation.		2 WLH
Examination: Oral Presentation (approx. 60 minutes) Examination prerequisites: Regular participation in the block seminar		2 C
Examination requirements: Students demonstrate their competences through a scientific seminar presentation on an independently researched topic in the field of molecular basis of neurological diseases, followed by a discussion. Assessment evaluates scientific depth, quality of literature selection, clarity of presentation and slides, structure of argumentation, and communication skills in scientific discourse. The ability to independently process scientific knowledge and critically reflect on published findings is also assessed.		
Admission requirements: none	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Hauke Werner	
Course frequency: each summer semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: once	Recommended semester:	
Maximum number of students: 12		
Additional notes and regulations: Participants contact the organizer of the module (hauke@mpinat.mpg.de) in a timely manner for matching seminar topic and supervisor.		

Georg-August-Universität Göttingen		3 C
Module M.Bio.372: Matlab in Biopsychology and Neuroscience		2 WLH
Learning outcome, core skills: Students are able to understand and apply fundamental concepts and functions of MATLAB, particularly in the context of psychophysical and neuroscience applications. They can read and interpret existing MATLAB code critically and understand its functionality within a scientific context. They independently develop MATLAB programs to address research questions, implementing algorithms, data processing, visualization, and simulations. They document their programs in a structured manner and apply best practices in programming to produce scientifically sound and reproducible results.		Workload: Attendance time: 28 h Self-study time: 62 h
Course: Matlab in Biopsychology and Neuroscience (Lecture)		1 WLH
Course: Tutorial on Matlab in Biopsychology and Neuroscience (Tutorial)		1 WLH
Examination: Written examination (90 minutes) Examination prerequisites: regular participation at tutorials and completion of the exercises		3 C
Examination requirements: Students demonstrate their competences through a written examination assessing theoretical foundations, programming skills, and the application of MATLAB in psychophysics and neuroscience. The exam evaluates the ability to analyse existing code, understand program logic, and develop simple programs for data analysis or simulation. It is designed to assess factual accuracy, logical structure of solutions, and the application of programming principles.		
Admission requirements: none	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Alexander Gail	
Course frequency: each summer semester; first half of semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 20		
Additional notes and regulations: The event is suitable for highly motivated Bachelor's and Master's students of Psychology, Biology and Physics who have an above-average interest in research.		

Georg-August-Universität Göttingen		3 C
Module M.Bio.373: Visual Psychophysics - From Theory to Experiment		2 WLH
Learning outcome, core skills: Students are able to explain and apply the fundamentals of psychophysics to investigate human sensorimotor performance. They critically evaluate psychophysical studies, assessing methodological approaches, data quality, and interpretative validity. They independently plan and conduct small-scale psychophysical experiments, applying appropriate measurement techniques, experimental designs, and statistical analyses. They document their work systematically and interpret results within a scientific context. They integrate theoretical knowledge with practical application and are able to clearly and precisely present complex relationships in scientific form.		Workload: Attendance time: 28 h Self-study time: 62 h
Course: Basics of Psychophysics		1 WLH
Course: Methods Course Advanced Psychophysics practical course in computer lab		1 WLH
Examination: Written examination (60 minutes) Examination prerequisites: regular participation in methods course		3 C
Examination requirements: Students demonstrate their knowledge through a written examination assessing theoretical foundations, methodological approaches, and applications in psychophysics. The exam evaluates the ability to critically assess studies, apply measurement techniques, and interpret results. It is designed to assess factual accuracy, logical reasoning, and depth of scientific reflection.		
Admission requirements: A prerequisite is prior attendance at the lecture "Biologische Psychologie II"/"Kognitive Neurowissenschaften" or an equivalent course.	Recommended previous knowledge: Attendance at the course M.Bio.372 "Matlab in Biopsychology and Neuroscience" during the first half of the summer term is strongly recommended.	
Language: English	Person responsible for module: Prof. Dr. Stefan Treue	
Course frequency: each summer semester; second half of term	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 20		
Additional notes and regulations: The module is suitable for highly motivated Bachelor's and Master's students of Psychology, Biology and Physics who have an above-average interest in research.		

Georg-August-Universität Göttingen Module M.Bio.374: Introduction to Computer Modelling		2 C 2 WLH
Learning outcome, core skills: Students are able to explain and apply core concepts of computer modelling in evolutionary biology, behavioral ecology, sociobiology, and cognition, particularly in the context of cooperative behavior in humans. They independently design and implement computer models to address self-chosen scientific questions, selecting appropriate algorithms, parameters, and simulation scenarios. They programme models using a suitable programming language, critically analyze the results, and interpret them within a biological and evolutionary context. They document their work in a structured, scientifically sound report and present their findings in a clear, precise, and convincing manner. They code and learn how to use Artificial Intelligence for correcting and completing their code.		Workload: Attendance time: 24 h Self-study time: 36 h
Course: Developing and Creating Evolutionary Computer Models (Exercise)		1,5 WLH
Course: Introduction to Computer Modeling and Human Cooperative Behavior (Seminar)		0,5 WLH
Examination: Minutes / Lab report (max. 4 pages), not graded Examination prerequisites: Short presentation (ca. 10 min)		2 C
Examination requirements: Students submit a structured laboratory report covering the modeling rationale, programming approach, simulation results, and interpretation. They deliver a scientific short presentation in which they clearly and effectively communicate their modeling method, research question, and findings. The examination assesses the depth of knowledge, the quality of the programming, the clarity of the presentation and the ability to communicate effectively in an academic setting.		
Admission requirements: none	Recommended previous knowledge: none	
Language: English, German	Person responsible for module: Prof. Dr. Dirk Semmann	
Course frequency: each winter semester	Duration:	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 14		

Georg-August-Universität Göttingen Module M.Bio.376: Laboratory Animal Course		2 C
Learning outcome, core skills: Students are able to explain the key theoretical principles of laboratory animal science and animal welfare. They plan animal experiments in compliance with animal protection legislation and prepare applications according to the Animal Welfare Act. They apply the 3R principles (Replacement, Reduction, Refinement) and design alternatives to animal experiments. They evaluate the ethical and scientific aspects of animal experimentation and integrate these into research planning.		Workload: Attendance time: 0 h Self-study time: 60 h
Course: Laboratory Animal Course (e-learning on ILIAS) () <i>Contents:</i> • Survey of the national legislation regarding animal use for scientific purposes; licensing; inspection • Biology of laboratory animals (comparative anatomy and physiology of mice and rats; care and housing; reproduction and breeding; animal wellbeing and stress; nutrition); Ethology of rats and mice; Handling of laboratory animals; Genetic standardization; genotype - environment interactions; inbred strains; outbred strains; creation and breeding of transgenic animals; genetic characterization; genetic quality control; Recognition, assessment and control of pain and suffering in laboratory animals; Standardization in laboratory animal facilities; Environmental improvement • Health monitoring and prevention of diseases; quarantine, hygiene; Diseases of laboratory animals; Impact of diseases on experimental results • The 3R's; Examples for alternatives to animal use • Effectiveness of different methods of anesthesia; narcotics and analgesic		
Examination: Written examination multiple choice (30 minutes), not graded		
Examination requirements: Students demonstrate their knowledge through a multiple-choice examination assessing theoretical foundations, ethical considerations, and applications in animal experimentation. The assessment evaluates the ability to apply animal protection regulations, plan experiments, and assess alternatives. It is designed to assess factual accuracy, logical decision-making, and depth of scientific and ethical reflection.		
Admission requirements: none	Recommended previous knowledge: none	
Language: English	Person responsible for module: Dean of studies	
Course frequency: each semester	Duration:	
Number of repeat examinations permitted: twice	Recommended semester: from 1	

Maximum number of students:	
------------------------------------	--

7	
---	--

Georg-August-Universität Göttingen Module M.Bio.380: Research Project in Cellular and Molecular Immunology		12 C 20 WLH
Learning outcome, core skills: Students are able to understand, conduct, and critically interpret immunological research projects. Upon instruction, they independently apply fundamental and advanced methods of current immunological research, including cellular and molecular techniques such as flow cytometry, ELISA, immunofluorescence, cell culture, and molecular biological assays. They document experimental procedures systematically, conduct critical data analysis, and present results in a scientifically sound format. They use publicly accessible resources (e.g. databases, publication platforms, repositories) for planning, conducting, and interpreting their research. They present their findings in a structured short report and defend it in an oral examination. 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: 280 h Self-study time: 80 h
Course: Research Project 7 weeks, time and date upon individual agreement		20 WLH
Course: Departmental Seminar		
Examination: Oral Presentation (approx. 30 minutes) Examination prerequisites: active participation in 75% of the department's seminars over the duration of practical work; scientific presentation and discussion of results in form of a short report; by arrangement, a short presentation at the department's seminar		12 C
Examination requirements: Students submit a scientific short report (maximum 10 pages) covering the research question, methodology, results, discussion, and conclusions. The oral examination allows for in-depth discussion and defense of the work, during which students explain their methodology, discuss findings, and reflect critically on their research in front of academic peers. The assessment evaluates the scientific quality of the report, clarity of argumentation, methodological rigor, and communication skills during the oral presentation.		
Admission requirements: M.Bio.303 or M.MM.101	Recommended previous knowledge: none	
Language: English	Person responsible for module: Dr. rer. nat. Niklas Engels	
Course frequency: each semester	Duration: 1 semester[s]	
Number of repeat examinations permitted:	Recommended semester:	

twice	
Maximum number of students: 4	

Georg-August-Universität Göttingen Module M.Bio.381: Research Project in Current Developmental Biology		12 C 20 WLH
Learning outcome, core skills: Students are able to independently plan, conduct, and document scientific experiments in the field of current developmental biology. They carry out experiments with precision, systematically record experimental procedures and results, and ensure scientific accuracy in documentation. They evaluate the advantages and limitations of different data analysis methods and select the most appropriate approaches. They conduct thorough research on foundational textbook knowledge and current specialist literature, integrate findings into their work, and critically discuss their results within a scientific context. They actively contribute to scholarly discussions, analyse complex topics from multiple perspectives, and apply effective communication strategies to support collaborative work. They present their work in a structured, scientifically sound laboratory report.		Workload: Attendance time: 280 h Self-study time: 80 h
Course: Research Project 9 weeks, time and date upon individual agreement		20 WLH
Course: Departmental Seminar		
Examination: Oral Presentation (approx. 30 minutes) Examination prerequisites: active participation in 75% of the department's seminars over the duration of practical work; scientific presentation and discussion of results of research project in form of a scientific publication (max. 10 pages)		12 C
Examination requirements: Students submit a scientific short report in the style of a scientific publication and prepare a presentation for the oral examination covering the research question, methodology, results, discussion, and conclusions. The oral examination allows for in-depth discussion and defence of the work, during which students explain their methodology, discuss findings, and reflect critically on their research in front of academic peers. Assessment evaluates the scientific quality of the report, clarity of argumentation, methodological rigor, and communication skills during the oral presentation.		
Admission requirements: M.Bio.321 or M.Bio.322	Recommended previous knowledge: none	
Language: English	Person responsible for module: Prof. Dr. Ernst Anton Wimmer	
Course frequency: each semester	Duration: 1 oder 2	

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

Georg-August-Universität Göttingen Module M.Bio.382: Research Project in Frontiers in Developmental Biology		12 C 20 WLH
Learning outcome, core skills: Students are able to independently plan, conduct, and document a scientific experiment in the field of Neural Developmental Biology. They carry out experiments with precision, systematically record experimental procedures and results, and ensure scientific accuracy in documentation. They evaluate the advantages and limitations of different data analysis methods and select the most appropriate approaches. They conduct thorough research on foundational textbook knowledge and current specialist literature, integrate findings into their work, and critically discuss their results within a scientific context. 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. They present their work in a structured, scientifically sound short publication and defend it in an oral examination.		Workload: Attendance time: 280 h Self-study time: 80 h
Course: Research Project 9 weeks, time and date upon individual agreement		WLH
Course: Departmental Seminar		
Examination: Oral Presentation (approx. 30 minutes) Examination prerequisites: active participation in 75% of the department's seminars over the duration of practical work; scientific presentation and discussion of results in form of a scientific publication (max. 10 pages)		12 C
Examination requirements:		
Admission requirements: M.Bio.321 or M.Bio.322	Recommended previous knowledge: M.Bio.321 and M.Bio.322	
Language: English	Person responsible for module: Prof. Dr. Gregor Bucher	
Course frequency: each semester	Duration: 1 - 2 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students: 10		

Georg-August-Universität Göttingen Module M.Bio.383: Research Project in Developmental and Cell Biology		12 C 20 WLH
Learning outcome, core skills: Students are able to independently plan, conduct, and document scientific experiments in the field of developmental cell biology. They carry out experiments with precision, systematically record experimental procedures and results, and ensure scientific accuracy in documentation. They evaluate the advantages and limitations of different data analysis methods and select the most appropriate approaches. They conduct thorough research on foundational textbook knowledge and current specialist literature, integrate findings into their work, and critically discuss their results within a scientific context. They present their work in a structured, scientifically sound format. They actively contribute to scholarly discussions and analyse complex topics from multiple perspectives, apply effective communication strategies to support collaborative work.		Workload: Attendance time: 280 h Self-study time: 80 h
Course: Research Project 9 weeks, time and date upon individual agreement		WLH
Course: Departmental Seminar		
Examination: Oral Presentation (approx. 30 minutes) Examination prerequisites: active participation in 75% of the department's seminars over the duration of practical work; scientific presentation and discussion of results in form of a scientific publication (max. 10 pages)		12 C
Examination requirements: Students submit a scientific short publication (maximum 10 pages) covering the research question, methodology, results, discussion, and conclusions. The oral examination allows for in-depth discussion and defence of the work, during which students explain their methodology, discuss findings, and reflect critically on their research in front of academic peers. Assessment evaluates the scientific quality of the publication, clarity of argumentation, methodological rigor, and communication skills during the oral presentation.		
Admission requirements: M.Bio.303	Recommended previous knowledge: none	
Language: English	Person responsible for module: PD Dr. Gerd Vorbrüggen	
Course frequency: each semester	Duration: 1 - 2 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester:	
Maximum number of students:		

6	
---	--

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 <i>in silico</i> 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.CoBi.506: Linux and Python for biologists		5 C 3 WLH
Learning outcome, core skills: After successful completion of the module, students have basic knowledge of the Linux operating system as well as basic programming skills in Python or comparable languages.		Workload: Attendance time: 42 h Self-study time: 108 h
Course: Linux and Python for biologists <i>Contents:</i> The practical course "Linux and Python for Biologists and Physicians" teaches basic knowledge of the Linux operating system and programming in Python with special emphasis on bioinformatics applications. Linux and Python are necessary basics for all further activities in the field of bioinformatics. The skills taught in the lab are therefore essential for many computer-based activities in science and industry. In this course, the basics of Unix-based operating systems are introduced first. The focus is on the safe operation of the Unix shell and the use of basic Bash commands. In addition, simple concepts of data processing in the shell are introduced and simple Bash scripts are presented. The Python programming language is then comprehensively introduced. This includes 1) the basics of programming and its syntax in Python (data types, control structures, functions, etc.), 2) advanced concepts of programming with a focus on bioinformatics (containers, iterators, external modules, etc.), and 3) processing and visualizing data using Python. Examples from biology will be used to illustrate the concepts and apply them in exercises. No programming knowledge is assumed. The primary goal of this course is for students to feel confident using Linux and Python and to be able to independently process and visualize data from their subject area appropriately.		3 WLH
Examination: Practical examination with oral presentation (20min), not graded Examination prerequisites: three small project works covering the topics of the respective week		
Examination requirements: Independent work with the command line interpreter under the Linux operating system; creation of small programs in the Python programming language (reading data from files, creating suitable data structures, handling regular expressions, implementation of simple algorithms)		
Admission requirements: none	Recommended previous knowledge: B.Bio.113	
Language: English, German	Person responsible for module: Dr. Sophie de Vries	
Course frequency: each winter semester	Duration: 1 semester[s]	

Number of repeat examinations permitted: twice	Recommended semester: 1 - 4
Maximum number of students: 20	

Georg-August-Universität Göttingen		3 C
Module SK.Bio.117: Genome analysis		2 WLH
Learning outcome, core skills: Die Studierenden lernen grundlegende Methoden der Genomanalyse kennen. Nach erfolgreicher Teilnahme an diesem Modul verfügen sie über Grundkenntnisse in den Bereichen Genomsequenzierung, Funktion und Struktur von Genomen und Algorithmen zur bioinformatischen Genomanalyse.		Workload: Attendance time: 28 h Self-study time: 62 h
Course: Genomanalyse (Lecture) nach Absprache als Online-Veranstaltung oder in Präsenz		2 WLH
Examination: Written examination (90 minutes) Examination requirements: Grundlegende Methoden der Genomanalyse, insbesondere Genomassemblierung, Sequenzalignment, und grundlegende Algorithmen zur Rekonstruktion phylogenetischer Bäume auf der Grundlage von Genomsequenzen.		3 C
Admission requirements: none	Recommended previous knowledge: grundlegende Programmierkenntnisse wie beispielsweise aus dem LINUX/Python-Kurs (SK.Bio.307) oder anderen Programmierkursen	
Language: German	Person responsible for module: Prof. Dr. Jan de Vries	
Course frequency: each summer semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester: 3 - 6	
Additional notes and regulations: Das Modul kann nicht in Kombination mit B.Bio.117 oder B.Bio-NF.117 belegt werden.		

Georg-August-Universität Göttingen		4 C
Module SK.Bio.307: Linux and Python for biologists		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 und Python für Biologen (Internship) The course will take place online. <i>Course frequency:</i> 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; in vorlesungsfreier Zeit	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.310: Ecology of algae		3 C 2 WLH
Learning outcome, core skills: Nach erfolgreichem Absolvieren des Moduls besitzen die Studierenden Kenntnis der Diversität von Algen und Cyanobakterien in unterschiedlichen Gewässertypen und ihre Veränderung in Bezug auf verschiedene Umweltfaktoren. Sie sind in der Lage Algengruppen aus Gewässerproben zu identifizieren und den Gewässerzustand einzuordnen.		Workload: Attendance time: 30 h Self-study time: 60 h
Course: Seminar (1 Kurstag) (Seminar)		
Course: Exkursion		
Course: Algenkurs (4 Kurstage)		
Examination: Oral Report (approx. 15 minutes) Examination requirements: Fachinhalt der Seminarvorträge, insbesondere in Bezug auf Verständnis der Diversität von Algen und deren Veränderung in unterschiedlichen Gewässertypen ; Fachvortrag (Sprache und Verständlichkeit der Präsentation, Herstellung eines Bezugs des spezifischen fachlichen Inhalts zu fachübergreifenden Fragestellungen wie z.B. Morphologie und Phylogenie der Algen, Differenzierung unterschiedlicher Gewässertypen, Diskussion)		3 C
Admission requirements: none	Recommended previous knowledge: Biologische Grundkenntnisse, B.Bio.127	
Language: German	Person responsible for module: Prof. Dr. Thomas Friedl	
Course frequency: each summer semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester: 6	
Maximum number of students: 20		

Georg-August-Universität Göttingen Module SK.Bio.315: Bioethics		3 C 2 WLH
Learning outcome, core skills: Anhand der Lektüre und Diskussion von Texten zu ausgewählten Themen der Bioethik (z. B. Tierethik, Umweltethik, Medizinethik, Gen-Ethik, Forschungsethik) sowie einer allgemeinen Einführung in die Ethik, in moralisches Argumentieren und in die Methoden der Angewandten Ethik erhalten die Studierenden einen Einblick in die moralischen Fragestellungen und Probleme, die sich aus der Anwendung der in ihrem Studium vermittelten naturwissenschaftlichen Kenntnisse und Techniken ergeben, und lernen, wie man über diese moralischen Probleme auf rationale Weise diskutieren kann.		Workload: Attendance time: 28 h Self-study time: 62 h
Course: Bioethik (Seminar)		2 WLH
Examination: Written examination (120 minutes) Examination prerequisites: regelmäßige Teilnahme am Seminar Examination requirements: Kenntnis der im Seminar behandelten Themen der Bioethik. Sachgemäße und differenzierte Erörterung der im Seminar behandelten moralischen Fragestellungen und Probleme sowohl allgemein als auch in der Anwendung auf konkrete Anwendungsbeispiele. Transferrfähigkeit der moralischen Argumentation auf im Seminar nicht behandelte moralische Probleme der Bioethik.		3 C
Admission requirements: BSc Bio: mind. 30 Credits aus dem ersten Studienabschnitt	Recommended previous knowledge: none	
Language: German	Person responsible for module: Dr. habil. Jörg Schroth	
Course frequency: each semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester: 3 - 6	
Maximum number of students: 80		

Georg-August-Universität Göttingen Module SK.Bio.328: Scientific presentation and communication		3 C
Learning outcome, core skills: The students systematically summarise their research results and present them to an expert audience within the framework of a scientific conference. They are able to represent their own research project in disciplinary and interdisciplinary discourse and deepen their knowledge of representing their own positions in controversial discussions and constructively countering criticism. They develop contacts in the international scientific community and get to know new research and subject areas.		Workload: Attendance time: 28 h Self-study time: 62 h
Course: Active participation in a scientific conference		
Examination: Talk or poster presentation and discussion (15 minutes), not graded Examination requirements: The students give a lecture or poster presentation at a scientific conference (national or international) according to the specifications of the respective conference.		3 C
Admission requirements: none	Recommended previous knowledge: none	
Language: German, English	Person responsible for module:	
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.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: Forschungspraktikum		
Examination: Ergebnisprotokoll in Form eines wissenschaftlichen Fachartikels (max. 5 Seiten), not graded Examination prerequisites: Erfolgreiche Teilnahme an einem mindestens 4-wöchigen Praktikum (160 Std.), Vortrag an der aufnehmenden Institution (entspr. den Gepflogenheiten vor Ort, mind. aber 20 min).		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: Forschungspraktikum		
Examination: Ergebnisprotokoll in Form eines wissenschaftlichen Fachartikels (max. 5 Seiten), not graded Examination prerequisites: Erfolgreiche Teilnahme an einem mindestens 8-wöchigen Praktikum (320 Std.), Vortrag an der aufnehmenden Institution (entspr. den Gepflogenheiten vor Ort, mind. aber 20 min).		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.332: Internship for master degree students		8 C
Learning outcome, core skills: After successful completion of the module ... - the student will have gained insights into the professional practice of biologists and experience in the practical application of methods and techniques as well as the practical implementation of theoretical knowledge in operational processes. - the student is familiar with the interrelationships and interactions of a company with authorities, suppliers, customers, marketing, sales, logistics, administration and research (external and internal) and can reflect on these. - the student is able to establish a connection to his/her previous studies and further study intentions.		Workload: Attendance time: 0 h Self-study time: 240 h
Course: Internship (240 hours) <i>Contents:</i> The work placement must be completed during the course of study at a facility, institution or company outside the University of Göttingen as described above. The contents are therefore largely determined by the same and in consultation with the student.		
Examination: Internship report (max. 15 pages), not graded		8 C
Examination requirements: The report contains information on the objectives, structure, range of activities, etc., of the institution at which the work placement was carried out as well as information on the activities carried out during the work placement. The report concludes with a critical review and reflection on the activities carried out and the host institution.		
Admission requirements: none	Recommended previous knowledge: none	
Language: German, English	Person responsible for module: Alle Dean of studies	
Course frequency: each semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester: 2 - 4	
Maximum number of students: not limited		

Georg-August-Universität Göttingen Module SK.Bio.355: Biological psychology I		3 C 2 WLH
Learning outcome, core skills: Die Studierenden sind in der Lage zentrale Konzepte und Forschungsmethoden der Biopsychologie; Neuro-, Sinnes- und Motorphysiologie, Lernen, Gedächtnis, Aufmerksamkeit, Psychopathologie und Sexualität zu überblicken. Neben dem Wissenserwerb lernen die Studierenden analytisch zu denken, methodisch zu reflektieren sowie kritisch wissenschaftliche Theorien auf die ihnen zu Grunde liegenden empirische Befunde zu untersuchen.		Workload: Attendance time: 28 h Self-study time: 62 h
Course: Biopsychologie I (Lecture)		2 WLH
Examination: Written examination (30 minutes) Examination requirements: Die Studierenden erbringen den Nachweis, dass sie in der Lage sind, zentrale Konzepte und Forschungsmethoden der Biopsychologie; Neuro-, Sinnes- und Motorphysiologie, Lernen, Gedächtnis, Aufmerksamkeit, Psychopathologie und Sexualität zu überblicken.		3 C
Admission requirements: Für 2-F-BA: mindestens 20 C aus den Orientierungsmodulen	Recommended previous knowledge: Grundkenntnisse in Biologie	
Language: German	Person responsible for module: Prof. Dr. Stefan Treue	
Course frequency: each winter semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester: 3 - 5	
Maximum number of students: 100		

Georg-August-Universität Göttingen		3 C
Module SK.Bio.356: Biological psychology II		2 WLH
Learning outcome, core skills: Nach Abschluss des Moduls besitzen die Studierenden ein Verständnis der zentralen Verarbeitung von Sinnesinformationen und der Generierung von motorischem Verhalten. Sie erwerben Kenntnisse in den Themengebieten Hormone, Stress, Aufmerksamkeit, Chronobiologie, Homöostase, Emotionen und Sprache.		Workload: Attendance time: 28 h Self-study time: 62 h
Course: Biologische Psychologie II (Lecture)		2 WLH
Examination: Written examination (30 minutes) Examination requirements: Die Studierenden sollen das in der Vorlesung vermittelte Grundwissen der Biopsychologie beherrschen können. Sie sollen die Fähigkeit besitzen, über die gelernten Fakten hinaus Zusammenhänge des Erwerbens von kognitiven Fähigkeiten, Verhaltensmustern und biologischen Grundlagen der Neurobiologie zu verstehen und darzustellen sowie das erworbene Wissen auf neue Situationen anzuwenden.		3 C
Admission requirements: Für 2-F-BA: mindestens 20 C aus den Orientierungsmodulen	Recommended previous knowledge: SK.Bio.355 Grundkenntnisse der Neurobiologie	
Language: German	Person responsible for module: Prof. Dr. Stefan Treue	
Course frequency: each winter semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester: 3 - 5	
Maximum number of students: 100		
Additional notes and regulations: Das Modul kann nicht in Kombination mit B.Bio.130 belegt werden.		

Georg-August-Universität Göttingen Module SK.Bio.357: Biological psychology III		3 C 2 WLH
Learning outcome, core skills: Die Studierenden erwerben Kenntnisse zu erweiterten Grundlagen und Konzepten der neurowissenschaftlichen Biopsychologie in den Bereichen Entwicklung des Nervensystems, Neuroplastizität, Schmerz, Multisensorische Integration, Sensomotorik, Sensorische Informationsverarbeitung, Entscheidungsverhalten, Exekutive Funktionen, Aufmerksamkeit, Psychopharmakologie, Psychopathologie.		Workload: Attendance time: 28 h Self-study time: 62 h
Course: Biologische Psychologie III (Lecture)		2 WLH
Examination: Written examination (60 minutes) Examination requirements: Die Studierenden erbringen den Nachweis, dass sie die oben genannten Lernziele erreicht haben.		3 C
Admission requirements: none	Recommended previous knowledge: SK.Bio.355, SK.Bio.356	
Language: German	Person responsible for module: Prof. Dr. Alexander Gail	
Course frequency: each winter semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester: 3 - 5	
Maximum number of students: 20		

Georg-August-Universität Göttingen		3 C
Module SK.Bio.360: Introduction to biotechnology		2 WLH
Learning outcome, core skills: Nach der Teilnahme an der Vorlesung sollen Studierende über grundlegende Kenntnisse der molekularen Genetik (Pro- und Eukaryoten, Aufbau RNA und DNA, Replikation, Transkription, Translation, Genexpression) verfügen sowie Techniken der Molekularbiologie (Klonierung, PCR und cDNA-Synthese, Sequenzierung, Hybridisierungstechniken, Antibiotika) und der Biochemie (Proteinproduktion und -aufreinigung, Elektrophorese, Nachweismethoden) kennen, die es ihnen erlauben, aktuelle Themengebiete der Molekularbiologie zu verstehen. Sie haben verschiedene biotechnologische Anwendungsbeispiele aus der grünen und roten Gentechnik sowie zu land- und wasserlebenden Tieren kennen gelernt und können die Relevanz aktueller molekularbiologischer Themen beurteilen.		Workload: Attendance time: 30 h Self-study time: 60 h
Course: Genetik und Biotechnologie (Lecture)		2 WLH
Examination: Written examination (90 minutes) Examination requirements: Theoretische Grundlagen zum Verständnis von aktuellen Themen aus der Genetik und Biotechnologie.		3 C
Admission requirements: none	Recommended previous knowledge: none	
Language: German	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: 3 - 5	
Maximum number of students: 10		
Additional notes and regulations: Ausschluss: Nicht belegbar in Kombination mit B.Bio.129 (für Studierende im BSc Biologie/Biodiversität) oder mit M.Bio.203 (für Studierende im Master of Education mit Fach Biologie)		

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 semester; 3 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.380: Magnetic Resonance Imaging: Principles and Applications		6 C 4 WLH
Learning outcome, core skills: Die Studierenden erlangen Kenntnisse über die generellen physikalischen Grundlagen der MRT (NMR, Bildgebung, Kontraste), die verschiedenen MRT Modalitäten (MR-Spektroskopie, strukturelle MRI, funktionelle MR, Echtzeit-MR), Spezifika der MRT beim Tier, Tiermodelle, strukturelle und funktionelle MRT beim Menschen, Analysemethoden der aufgaben-basierten funktionellen MRT (Preprocessing, uni- und multivariate Analyseansätze), resting-state funktionelle MRT, interventionelle MRT und Kombination der Methoden in der multimodalen MRT. Nach Abschluss des Moduls haben die Studierenden das Wissen und das Verständnis für die zugrunde liegenden Mechanismen und Konzepte sowohl der MRT-Messtechniken, als auch der Analysemethoden entwickelt. Dies beinhaltet das Wissen über die angemessene Anwendung und die Grenzen der Methoden und Analysen. Die Studierenden sind in der Lage, im Transfer die Angemessenheit von wissenschaftsjournalistischen und Medienberichten über MRT-Studien und deren Ergebnisse fundiert beurteilen zu können.		Workload: Attendance time: 56 h Self-study time: 124 h
Course: Einführung in Prinzipien und Anwendungen der MRT (Lecture) <i>Contents:</i> Grundprinzipien sowohl der unterschiedlichen MRT-Modalitäten als auch der verschiedenen MRT-Analyseansätze		2 WLH
Course: MRT in Biologie und Psychologie (Seminar) <i>Contents:</i> Vorstellung und Diskussion der angemessenen Passung von MR-Methodik, Analyse und wissenschaftlichen Fragestellung an entsprechenden Literaturbeispielen.		2 WLH
Examination: Written examination (120 minutes) Examination prerequisites: Regelmäßige Teilnahme am Seminar und Vortrag (ca. 20 Minuten) mit anschließender Diskussion (ca. 10 Minuten)		6 C
Examination requirements: Verständnis und wissenschaftliche Darstellung von Themen der MRT		
Admission requirements: none	Recommended previous knowledge: none	
Language: German	Person responsible for module: Prof. Dr. Susann Boretius	
Course frequency: each summer semester	Duration: 1 semester[s]	
Number of repeat examinations permitted: twice	Recommended semester: 4	

Maximum number of students:	
------------------------------------	--

24	
----	--

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 vaccination, 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.7006: Microbiology of marine and terrestrial habitats		6 C 6 WLH
Learning outcome, core skills: The students will experience microbial life in extreme environments. Destinations for this excursion will be deep biosphere habitats, hydrothermal springs and marine environments, influenced by rapidly changing salinity (Northern Apennines, Tuscany, Giglio Island). Environmental parameters will be recorded on site, microbial diversity will be estimated and samples for analysis of environmental DNA will be taken and prepared in the field. The aim is the evaluation of microbial diversity and correlation with environmental parameters in a specific site. Students will learn methods for field studies and basic techniques in environmental microbiology. They will gain knowledge in microbial diversity in a specific habitat and in adaptations of microbes in extreme environments.		Workload: Attendance time: 84 h Self-study time: 96 h
Course: Preparatory seminar		1 WLH
Course: Microbiology of marine and terrestrial habitats (Excursion) <i>Course frequency:</i> block (2 weeks) each summer semester		5 WLH
Examination: written report (max. 20 pages) Examination prerequisites: seminar talk, reviewing a focused topic in environmental microbiology related to the excursion, 20 minutes		6 C
Examination requirements: Knowledge on • field work and data processing related to environmental microbiology (sampling, assessment of environmental parameters, sample preparation for diversity analysis) • biotic and abiotic factors shaping a specific habitat • key microbial communities in various environments		
Admission requirements: B.Bio.118, SK.Bio.7004 no requirements needed for students of the MSc MB programme		Recommended previous knowledge: none
Language: English		Person responsible for module: Prof. Dr. Rolf Daniel PD. Dr. Michael Hoppert
Course frequency: each summer semester		Duration: 1 semester[s]
Number of repeat examinations permitted: twice		Recommended semester:
Maximum number of students: 6		

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		