

Directory of Modules

**Master-/Promotionsstudiengang
"Neurowissenschaften" - referring to: Prüfungs-
und Studienordnung für den konsekutiven
internationalen Master-/Promotionsstudiengang
"Neurowissenschaften" (Amtliche Mitteilungen
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I. Master's and Doctoral degree programme "Neurosciences"

1. Period I (intensive year)

The following modules comprising 90 C have to be passed.

a. Theoretical modules

The 6 following modules comprising 30 C have to be passed.

M.Neuro.11: Neuroanatomy, Development (3 C).....	6626
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M.Neuro.13: Modelling, Autonomous Nervous System, Pharmacology (3 C).....	6628
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b. Practical modules

The 5 following modules comprising 53 C have to be passed.

M.Neuro.21: Methods Courses: Histology & Cytochemistry (2 C).....	6632
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M.Neuro.23: Methods Courses: Microscopy & Imaging (2 C).....	6634
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c. Area of professionalisation

The 2 following modules comprising 7 C have to be passed.

M.Neuro.31: Professional Skills in Science (2 C).....	6637
M.Neuro.32: Results of the research projects (5 C).....	6638

2. Period II (Master's thesis)

A total of 30 C are awarded for passing the Master's thesis.

Georg-August-Universität Göttingen		3 C
Module M.Neuro.11: Neuroanatomy, Development		
Learning outcome, core skills: The students get an overview of the human central nervous system. The different brain parts are introduced with respect to their developmental origin. The histology and cellular composition of different brain parts is presented in conjunction with different staining techniques. Relevant experimental animal models including invertebrates are introduced and discussed comparatively. The module is accompanied by practical courses on histological and staining techniques.		Workload: Attendance time: 40 h Self-study time: 50 h
Course: Lecture (24 h)		
Course: Tutorial (16 h)		
Examination: Part of comprehensive examination (§ 7 PStO) Examination requirements: Knowledge and understanding of the general anatomy, development and cellular architecture of the human central nervous system and relevant non-human experimental animals.		
Admission requirements: none	Recommended previous knowledge: -	
Language: English	Person responsible for module: Prof. Dr. med. Jochen Staiger	
Course frequency: once a year	Duration: 4 weeks	
Number of repeat examinations permitted: once	Recommended semester:	
Maximum number of students: 20		
Additional notes and regulations: ---		
Teaching capacity provided by: Uni-Bio: 2h lecture, 2h tutorial; Med-VK: 16h lecture, 10h tutorial; Med-ENI: 4h lecture, 2h tutorial; MPI/DPZ: 2h lecture, 2h tutorial		

Georg-August-Universität Göttingen		6 C
Module M.Neuro.12: Physiology and Basic Statistics		
Learning outcome, core skills: The students get an overview on the physiological principles of nervous system and nerve cell functions, which are discussed with respect to methodological approaches to measure relevant physiological parameters. Basic statistical approaches and computer programming tools to evaluate and quantify physiological parameters are introduced. Relevant techniques to assess physiological parameters and statistically analyze in the nervous system are introduced in accompanying practical courses.		Workload: Attendance time: 56 h Self-study time: 124 h
Course: Lecture (26 h)		
Course: Tutorial (30 h)		
Examination: Part of comprehensive examination (§ 7 PStO) Examination requirements: Knowledge and understanding of physiological principles of the nervous system and nerve cells, and the physiological techniques to assess functional parameters. Understanding of statistical analysis approaches and computer programming tools to evaluate physiological data.		
Admission requirements: none	Recommended previous knowledge: -	
Language: English	Person responsible for module: Prof. Dr. Martin Göpfert	
Course frequency: once a year	Duration: 7 weeks	
Number of repeat examinations permitted: once	Recommended semester:	
Maximum number of students: 20		
Additional notes and regulations: ---		
Teaching capacity provided by: Med-VK: 14h lecture, 14h tutorial; Med-KT: 6h tutorial; MPI/DPZ: 12h lecture, 10h tutorial		

Georg-August-Universität Göttingen		3 C
Module M.Neuro.13: Modelling, Autonomous Nervous System, Pharmacology		
Learning outcome, core skills: The students get introduced to theoretical approaches to model nervous system function, the form and function of the autonomous nervous system and the neuroendocrine system. Furthermore, neuropharmacological methodologies are presented with respect to quantitative behavioral analyses. The theoretical content of this module is accompanied by practical courses on modeling techniques and assessment of animal behavior.		Workload: Attendance time: 38 h Self-study time: 52 h
Course: Lecture (20 h)		
Course: Tutorial (18 h)		
Examination: Part of comprehensive examination (§ 7 PStO) Examination requirements: Knowledge and understanding of modeling approaches, functional principles of the autonomous nervous system and the neuro-endocrine system and basic neuropharmacology and behavioral testing.		
Admission requirements: none	Recommended previous knowledge: -	
Language: English	Person responsible for module: Prof. Dr. Fred Wolf	
Course frequency: once a year	Duration: 4 weeks	
Number of repeat examinations permitted: once	Recommended semester:	
Maximum number of students: 20		
Additional notes and regulations: ---		
Teaching capacity provided by: Med-KL: 8h lecture, 8h tutorial; MPI/DPZ: 12h lecture, 10h tutorial		

Georg-August-Universität Göttingen		6 C
Module M.Neuro.14: Molecular Biology, Development, Neurogenetics		
Learning outcome, core skills: The students get an overview on cell biological mechanisms on the molecular level, principles of neurogenetics and neuroimmunology, and molecular aspects of neuronal development with respect to diseases and disease mechanisms of the nervous system.		Workload: Attendance time: 50 h Self-study time: 130 h
Course: Lecture (26 h)		
Course: Tutorial (24 h)		
Examination: Part of comprehensive examination (§ 7 PStO) Examination requirements: Knowledge and understanding of cell biological principles, neurogenetics and neuroimmunology, and neuronal development on the molecular level with respect to diseases of the nervous system.		
Admission requirements: none	Recommended previous knowledge: -	
Language: English	Person responsible for module: Prof. Dr. Nils Brose	
Course frequency: once a year	Duration: 6 weeks	
Number of repeat examinations permitted: once	Recommended semester:	
Maximum number of students: 20		
Additional notes and regulations: ----		
Teaching capacity provided by: Med-KL: 4h lecture, 4h tutorial; MPI/DPZ: 22h lecture, 20h tutorial		

Georg-August-Universität Göttingen		6 C
Module M.Neuro.15: Sensory and Motor Systems		
Learning outcome, core skills: The students gain knowledge on the structure and function of major sensory systems in humans and relevant non-human experimental animals with a focus on cell physiological aspects. In addition, the central motor systems and the anatomy, physiology and neuronal control of skeletal muscles is introduced.		Workload: Attendance time: 40 h Self-study time: 140 h
Course: Lecture (20 h)		
Course: Tutorial (20 h)		
Examination: Part of comprehensive examination (§ 7 PStO) Examination requirements: Knowledge and understanding of sensory systems in humans and relevant non-human experimental animals, anatomy and physiology of central motor systems, skeletal muscle and muscle control.		
Admission requirements: none	Recommended previous knowledge: -	
Language: English	Person responsible for module: Prof. Dr. med. Tobias Moser	
Course frequency: once a year	Duration: 5 weeks	
Number of repeat examinations permitted: once	Recommended semester:	
Maximum number of students: 20		
Additional notes and regulations: ---		
Teaching capacity provided by: Uni-Bio: 12h lecture, 12h tutorial; Med-KL: 4h lecture, 4h tutorial; MPI/DPZ: 4h lecture, 4h tutorial		

Georg-August-Universität Göttingen		6 C
Module M.Neuro.16: Clinical Neurosciences and Higher Brain Functions		
Learning outcome, core skills: Based on the knowledge of the previous modules, student gain insight into higher brain functions and human brain diseases. The focus is on the introduction of brain disease principles, description of clinical syndromes and treatment strategies including the discussion of molecular mechanisms of disease development and principles of therapeutic intervention approaches.		Workload: Attendance time: 68 h Self-study time: 112 h
Course: Lecture (38 h)		
Course: Tutorial (30 h)		
Examination: Part of comprehensive examination (§ 7 PStO) Examination requirements: Knowledge and understanding higher brain functions and human brain diseases including the characterization of clinical syndromes and clinical therapy options.		
Admission requirements: none	Recommended previous knowledge: -	
Language: English	Person responsible for module: Prof. Dr. med. Mathias Bähr	
Course frequency: once a year	Duration: 8 weeks	
Number of repeat examinations permitted: once	Recommended semester:	
Maximum number of students: 20		
Additional notes and regulations: ---		
Teaching capacity provided by: Med-VK: 1h lecture, 2h tutorial; Med-KT: 4h lecture, 4h tutorial; Med-KL: 13h lecture, 10h tutorial; Med-ENI: 1h lecture; MPI/DPZ: 19h lecture, 14h tutorial		

Georg-August-Universität Göttingen		2 C
Module M.Neuro.21: Methods Courses: Histology & Cytochemistry		
Learning outcome, core skills: The students get a practical introduction into histological techniques, classical staining procedures, tissue dissection and preparation, wax- and cryo-sectioning, immunocytochemistry, single cell staining and reconstruction, and related anatomical methods for conventional light, high-resolution and electron microscopy. They learn when and how to apply the various imaging techniques in conjunction with appropriate quantitative analysis tools.		Workload: Attendance time: 52 h Self-study time: 8 h
Course: Introductory methods courses (52 h)		
Examination: Oral group examinations, not graded Examination requirements: Understanding of course-related scientific hypotheses, experimental design, laboratory techniques, analysis, interpretation and presentation of research results.		
Admission requirements: none	Recommended previous knowledge: -	
Language: English	Person responsible for module: Prof. Dr. med. Jochen Staiger	
Course frequency: once a year	Duration: 2 weeks	
Number of repeat examinations permitted: once	Recommended semester:	
Maximum number of students: 20		
Additional notes and regulations: ---		
Teaching capacity provided by: Uni-Bio: 8h; Med-VK: 44h		

Georg-August-Universität Göttingen		2 C
Module M.Neuro.22: Methods Courses: Electrophysiology		
Learning outcome, core skills: The students get introduced to the basic practical methods of electrophysiology including current- and voltage-clamp recording configurations, data acquisition and analysis procedures, and the preparation of neuronal tissue for in-vivo and in-vitro recordings in conjunction with high-resolution imaging techniques. The students learn when and how to apply the various techniques appropriately.		Workload: Attendance time: 46 h Self-study time: 14 h
Course: Introductory methods courses (46 h)		
Examination: Oral group examinations, not graded Examination requirements: Understanding of course-related scientific hypotheses, experimental design, laboratory techniques, analysis, interpretation and presentation of research results.		
Admission requirements: none	Recommended previous knowledge: -	
Language: English	Person responsible for module: Prof. Dr. Michael Hörner	
Course frequency: once a year	Duration: 2 weeks	
Number of repeat examinations permitted: once	Recommended semester:	
Maximum number of students: 20		
Additional notes and regulations: ---		
Teaching capacity provided by: Med-VK: 6h; Med-KT: 18h; MPI/DPZ: 22h		

Georg-August-Universität Göttingen		2 C
Module M.Neuro.23: Methods Courses: Microscopy & Imaging		
Learning outcome, core skills: The students get introduced to high resolution imaging techniques including confocal and non-confocal fluorescence microscopy, STED, FLIM, MRI and related techniques, relevant data acquisition and analysis procedures, and the preparation of neuronal tissue for in-vivo and in-vitro measurements. The students learn when and how to apply the various techniques appropriately.		Workload: Attendance time: 54 h Self-study time: 6 h
Course: Introductory methods courses (54 h)		
Examination: Oral group examinations, not graded Examination requirements: Understanding of course-related scientific hypotheses, experimental design, laboratory techniques, analysis, interpretation and presentation of research results.		
Admission requirements: none	Recommended previous knowledge: -	
Language: English	Person responsible for module: Prof. Dr. Silvio Rizzoli	
Course frequency: once a year	Duration: 2 weeks	
Number of repeat examinations permitted: once	Recommended semester:	
Maximum number of students: 20		
Additional notes and regulations: ---		
Teaching capacity provided by: Med-VK: 28h; Med-KL: 6h; Med-ENI: 6h; MPI/DPZ: 14h		

Georg-August-Universität Göttingen		2 C
Module M.Neuro.24: Methods Courses: Zoo-Physiology		
Learning outcome, core skills: The students get introduced to a series of different physiological experiments and approaches in different animal preparations in a comparative way. Topics include the preparation and measurement from insect sensory and motor systems or the quantitative analysis of animal behavior. The students learn when and how to apply the various techniques appropriately.		Workload: Attendance time: 50 h Self-study time: 10 h
Course: Introductory methods courses (50 h)		
Examination: Oral group examinations, not graded Examination requirements: Understanding of course-related scientific hypotheses, experimental design, laboratory techniques, analysis, interpretation and presentation of research results.		
Admission requirements: none	Recommended previous knowledge: -	
Language: English	Person responsible for module: Prof. Dr. Martin Göpfert	
Course frequency: once a year	Duration: 2 weeks	
Number of repeat examinations permitted: once	Recommended semester:	
Maximum number of students: 20		
Additional notes and regulations: ---		
Teaching capacity provided by: Uni-Bio: 32h; MPI/DPZ: 18h		

Georg-August-Universität Göttingen Module M.Neuro.25: Lab Rotations		45 C
Learning outcome, core skills: In these individually supervised research projects, the students acquire the skills to organize a scientific project, from defining the scientific question, identifying the appropriate methods, performing the experiments, and evaluating the experiments, to presenting and discussing the results in written and oral reports. The students are encouraged to select their research projects from different research areas and methodological approaches.		Workload: Attendance time: 720 h Self-study time: 630 h
Course: Three Lab Rotations in the participating departments, chosen from different fields (8 weeks, 40 h teaching, 200 h laboratory work each)		
Examination: 3 lab reports, not graded Examination requirements: Understanding of course-related scientific hypotheses, experimental design, laboratory techniques, analysis, interpretation and presentation of research results.		
Admission requirements: none	Recommended previous knowledge: -	
Language: English	Person responsible for module: Prof. Dr. Michael Hörner	
Course frequency: once a year	Duration: 24 weeks	
Number of repeat examinations permitted: once	Recommended semester:	
Maximum number of students: 20		

Georg-August-Universität Göttingen		2 C
Module M.Neuro.31: Professional Skills in Science		
Learning outcome, core skills: The students are trained in scientific writing and oral presentation skills which enable them to adequately structure and compose scientific texts, particularly for written and oral reports on experimental findings in the field of their studies. They get introduced to the principles of good scientific practice and comprehension of adequate measures to secure ethical standards in science. In addition, the students gain an understanding of laboratory safety principles and knowledge of adequate measures and procedures to secure laboratory safety standards in a research environment. The students get also introduced to ethical and practical aspects of experimental work with animals in the laboratory.		Workload: Attendance time: 32 h Self-study time: 28 h
Course: Seminar / Workshop: Scientific Writing and Graphics (12 h) (Seminar)		
Course: Seminar / Workshop: Oral Presentation of Scientific Results (6 h) (Seminar)		
Course: Seminar / Workshop: Laboratory Safety (4 h) (Seminar)		
Course: Seminar / Workshop: Good Scientific Practice (4 h) (Seminar)		
Course: Seminar / Workshop: Ethical and practical aspects of handling experimental animals (6 h) (Seminar)		
Examination: Oral presentation, written scientific text, oral group examination, not graded Examination requirements: Demonstration of writing competence, oral presentation skills, understanding of ethical codes of conduct and knowledge of experimental work with animals, lab safety rules and regulations in a scientific context in the English language at an advanced level.		
Admission requirements: none	Recommended previous knowledge: -	
Language: English	Person responsible for module: Prof. Dr. Michael Hörner	
Course frequency: once a year	Duration: 5 weeks	
Number of repeat examinations permitted: once	Recommended semester:	
Maximum number of students: 20		
Additional notes and regulations: ----		
Teaching capacity provided by: Uni-Bio: 6h; Med-ENI: 18h; MPI/DPZ: 8h		

Georg-August-Universität Göttingen		5 C
Module M.Neuro.32: Results of the research projects		
Learning outcome, core skills: The specific skills practiced in the seminar include efficient and concise presentation of own scientific results in English, supported by presentations, development of a differentiated scientific vocabulary, and the critical discussion of the scientific data in the broader context of their relevance for current research in the neurosciences.		Workload: Attendance time: 32 h Self-study time: 118 h
Course: Seminar (32 h) (Seminar)		
Examination: Two oral presentations per student, group discussion, not graded Examination requirements: Demonstration of adequate oral presentation skills including the critical discussion and evaluation of the data presented.		
Admission requirements: none	Recommended previous knowledge: -	
Language: English	Person responsible for module: Prof. Dr. Michael Hörner	
Course frequency: once a year	Duration: 16 weeks	
Number of repeat examinations permitted: once	Recommended semester:	
Maximum number of students: 20		
Additional notes and regulations: ---		
Teaching capacity provided by: Med-ENI: 16h; MPI/DPZ: 16h		