Georg-August-Universität
Göttingen

Modulverzeichnis

Master-/Promotionsstudiengang "Neurowissenschaften" - referring to: Pruefungs- und Studienordnung fuer den konsekutiven internationalen Master-/Promotionsstudiengang "Neurowissenschaften" (Amtliche Mitteilungen I 29/2013 S. 878)

Module

Übersicht nach Modulgruppen

1) Master-/Promotionsstudiengang "Neurowissenschaften"

a) Studienabschnitt I (Intensivjahr)

The following modules comprising 90 C have to be passed.

aa) Theoretische Module

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

bb) Praktische Module

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

cc) Professionalisierungsbereich

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

b) Studienabschnitt II (Masterarbeit)

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

Georg-August-Universität Göttingen **Modul M.Neuro.11: Neuroanatomy, Development** *English title: Neuroanatomy, Development*	3 C

Lernziele/Kompetenzen: 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 are introduced and discussed comparatively. The module is accompanied by practical courses on histological and staining techniques.	**Arbeitsaufwand:** Präsenzzeit: 40 Stunden Selbststudium: 50 Stunden

Lehrveranstaltungen: **1. Lecture (24 h)** **2. Tutorial (16 h)**	

Prüfung: Part of comprehensive examination (§ 7 PStO) **Prüfungsanforderungen:** Knowledge and understanding of the general anatomy, development and cellular architecture of the human central nervous system and relevant non-human experimental animals.	

Zugangsvoraussetzungen: none	**Empfohlene Vorkenntnisse:** -
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr. Michael Hörner
Angebotshäufigkeit: jährlich	**Dauer:** 4 weeks
Wiederholbarkeit: einmalig	**Empfohlenes Fachsemester:**
Maximale Studierendenzahl: 20	

Georg-August-Universität Göttingen **Modul M.Neuro.12: Physiology and Basic Statistics** *English title: Physiology and Basic Statistics*	6 C

Lernziele/Kompetenzen: 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 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.	**Arbeitsaufwand:** Präsenzzeit: 56 Stunden Selbststudium: 124 Stunden

Lehrveranstaltungen: **1. Lecture (26 h)** **2. Tutorial (30 h)**	

Prüfung: Part of comprehensive examination (§ 7 PStO) **Prüfungsanforderungen:** 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 to evaluate physiological data.	

Zugangsvoraussetzungen: none	**Empfohlene Vorkenntnisse:** -
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr. Dr. Detlev Schild
Angebotshäufigkeit: jährlich	**Dauer:** 7 weeks
Wiederholbarkeit: einmalig	**Empfohlenes Fachsemester:**
Maximale Studierendenzahl: 20	

Georg-August-Universität Göttingen **Modul M.Neuro.13: Modelling, Autonomous Nervous System, Pharmacology** *English title: Modelling, Autonomous Nervous System, Pharmacology*	3 C

Lernziele/Kompetenzen:	**Arbeitsaufwand:**
The students get introduced to theoretical approaches to model nervous system function, the form and function of the autonomous nervous system and the neuro-endocrine 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.	Präsenzzeit: 38 Stunden Selbststudium: 52 Stunden

Lehrveranstaltungen:	
1. Lecture (20 h)	
2. Tutorial (18 h)	

Prüfung: Part of comprehensive examination (§ 7 PStO) **Prüfungsanforderungen:** Knowledge and understanding of modeling approaches, functional principles of the autonomous nervous system and the neuro-endocrine system and basic neuropharmacology and behavioral testing.	

Zugangsvoraussetzungen: none	**Empfohlene Vorkenntnisse:** -
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr. Fred Wolf
Angebotshäufigkeit: jährlich	**Dauer:** 4 weeks
Wiederholbarkeit: einmalig	**Empfohlenes Fachsemester:**
Maximale Studierendenzahl: 20	

Georg-August-Universität Göttingen **Modul M.Neuro.14: Molecular Biology, Development, Neurogenetics** *English title: Molecular Biology, Development, Neurogenetics*	6 C

Lernziele/Kompetenzen: 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.	**Arbeitsaufwand:** Präsenzzeit: 50 Stunden Selbststudium: 130 Stunden

Lehrveranstaltungen: **1. Lecture (26 h)** **2. Tutorial (24 h)**	

Prüfung: Part of comprehensive examination (§ 7 PStO) **Prüfungsanforderungen:** 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.	

Zugangsvoraussetzungen: none	**Empfohlene Vorkenntnisse:** -
Sprache: Englisch	**Modulverantwortliche[r]:** Dr. Nils Brose
Angebotshäufigkeit: jährlich	**Dauer:** 6 weeks
Wiederholbarkeit: einmalig	**Empfohlenes Fachsemester:**
Maximale Studierendenzahl: 20	

Georg-August-Universität Göttingen **Modul M.Neuro.15: Sensory and Motor Systems** *English title: Sensory and Motor Systems*	6 C

Lernziele/Kompetenzen: The students gain knowledge on the structure and function of major sensory systems in humans and relevant 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.	**Arbeitsaufwand:** Präsenzzeit: 40 Stunden Selbststudium: 140 Stunden

Lehrveranstaltungen: **1. Lecture (20 h)** **2. Tutorial (20 h)**	

Prüfung: Part of comprehensive examination (§ 7 PStO) **Prüfungsanforderungen:** Knowledge and understanding of sensory systems in humans and relevant experimental animals, anatomy and physiology of central motor systems, skeletal muscle and muscle control.	

Zugangsvoraussetzungen: none	**Empfohlene Vorkenntnisse:** -
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr. med. Tobias Moser
Angebotshäufigkeit: jährlich	**Dauer:** 5 weeks
Wiederholbarkeit: einmalig	**Empfohlenes Fachsemester:**
Maximale Studierendenzahl: 20	

Georg-August-Universität Göttingen **Modul M.Neuro.16: Clinical Neurosciences and Higher Brain Functions** *English title: Clinical Neurosciences and Higher Brain Functions*	6 C

Lernziele/Kompetenzen: Based on the knowledge of the previous modules, student gain insight into higher brain functions and 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.	**Arbeitsaufwand:** Präsenzzeit: 68 Stunden Selbststudium: 112 Stunden

Lehrveranstaltungen: **1. Lecture (38 h)** **2. Tutorial (30 h)**	

Prüfung: Part of comprehensive examination (§ 7 PStO) **Prüfungsanforderungen:** Knowledge and understanding higher brain functions and brain diseases including the characterization of clinical syndromes and clinical therapy options.	

Zugangsvoraussetzungen: none	**Empfohlene Vorkenntnisse:** -
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr. med. Mathias Bähr
Angebotshäufigkeit: jährlich	**Dauer:** 8 weeks
Wiederholbarkeit: einmalig	**Empfohlenes Fachsemester:**
Maximale Studierendenzahl: 20	

Georg-August-Universität Göttingen **Modul M.Neuro.21: Methods Courses: Histology & Cytochemistry** *English title: Methods Courses: Histology & Cytochemistry*	2 C

Lernziele/Kompetenzen: 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 and electron microscopy. They learn when and how to apply the various techniques appropriately.	**Arbeitsaufwand:** Präsenzzeit: 52 Stunden Selbststudium: 8 Stunden

Lehrveranstaltung: Introductory methods courses (52 h)	

Prüfung: Oral group examinations, unbenotet **Prüfungsanforderungen:** Understanding of course-related scientific hypotheses, experimental design, laboratory techniques, analysis, interpretation and presentation of research results.	

Zugangsvoraussetzungen: none	**Empfohlene Vorkenntnisse:** -
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr. Michael Hörner
Angebotshäufigkeit: jährlich	**Dauer:** 2 weeks
Wiederholbarkeit: einmalig	**Empfohlenes Fachsemester:**
Maximale Studierendenzahl: 20	

Georg-August-Universität Göttingen **Modul M.Neuro.22: Methods Courses: Electrophysiology** *English title: Methods Courses: Electrophysiology*	2 C

Lernziele/Kompetenzen: 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 living neuronal tissue for in-vivo and in-vitro recordings. The students learn when and how to apply the various techniques appropriately.	**Arbeitsaufwand:** Präsenzzeit: 46 Stunden Selbststudium: 14 Stunden

Lehrveranstaltung: Introductory methods courses (46 h)	

Prüfung: Oral group examinations, unbenotet **Prüfungsanforderungen:** Understanding of course-related scientific hypotheses, experimental design, laboratory techniques, analysis, interpretation and presentation of research results.	

Zugangsvoraussetzungen: none	**Empfohlene Vorkenntnisse:** -
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr. Michael Hörner
Angebotshäufigkeit: jährlich	**Dauer:** 2 weeks
Wiederholbarkeit: einmalig	**Empfohlenes Fachsemester:**
Maximale Studierendenzahl: 20	

Georg-August-Universität Göttingen **Modul M.Neuro.23: Methods Courses: Microscopy & Imaging** *English title: Methods Courses: Microscopy & Imaging*	2 C

Lernziele/Kompetenzen: The students get introduced to high resolution imaging techniques including confocal and non-confocal fluorescence microscopy, STED, FLIM and related techniques, relevant data acquisition and analysis procedures, and the preparation of living neuronal tissue for in-vivo and in-vitro measurements. The students learn when and how to apply the various techniques appropriately.	**Arbeitsaufwand:** Präsenzzeit: 54 Stunden Selbststudium: 6 Stunden

Lehrveranstaltung: Introductory methods courses (54 h)	

Prüfung: Oral group examinations, unbenotet **Prüfungsanforderungen:** Understanding of course-related scientific hypotheses, experimental design, laboratory techniques, analysis, interpretation and presentation of research results.	

Zugangsvoraussetzungen: none	**Empfohlene Vorkenntnisse:** -
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr. Dr. Detlev Schild
Angebotshäufigkeit: jährlich	**Dauer:** 2 weeks
Wiederholbarkeit: einmalig	**Empfohlenes Fachsemester:**
Maximale Studierendenzahl: 20	

Georg-August-Universität Göttingen **Modul M.Neuro.24: Methods Courses: Zoo-Physiology** *English title: Methods Courses: Zoo-Physiology*	2 C

Lernziele/Kompetenzen: The students get introduced to a series of different physiological experiments and approaches in different model animals 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.	**Arbeitsaufwand:** Präsenzzeit: 50 Stunden Selbststudium: 10 Stunden

Lehrveranstaltung: Introductory methods courses (50 h)	

Prüfung: Oral group examinations, unbenotet **Prüfungsanforderungen:** Understanding of course-related scientific hypotheses, experimental design, laboratory techniques, analysis, interpretation and presentation of research results.	

Zugangsvoraussetzungen: none	**Empfohlene Vorkenntnisse:** -
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr. Michael Hörner
Angebotshäufigkeit: jährlich	**Dauer:** 2 weeks
Wiederholbarkeit: einmalig	**Empfohlenes Fachsemester:**
Maximale Studierendenzahl: 20	

Georg-August-Universität Göttingen **Modul M.Neuro.25: Lab Rotations** *English title: Lab Rotations*	45 C

Lernziele/Kompetenzen: 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.	**Arbeitsaufwand:** Präsenzzeit: 720 Stunden Selbststudium: 630 Stunden

Lehrveranstaltung: Three Lab Rotations in the participating departments, chosen from different fields (240 h)	

Prüfung: 3 lab reports, unbenotet **Prüfungsanforderungen:** Understanding of course-related scientific hypotheses, experimental design, laboratory techniques, analysis, interpretation and presentation of research results.	

Zugangsvoraussetzungen: none	**Empfohlene Vorkenntnisse:** -
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr. Michael Hörner
Angebotshäufigkeit: jährlich	**Dauer:** 8 weeks
Wiederholbarkeit: einmalig	**Empfohlenes Fachsemester:**
Maximale Studierendenzahl: 20	

Georg-August-Universität Göttingen **Modul M.Neuro.31: Professional Skills in Science** *English title: Professional Skills in Science*	2 C

Lernziele/Kompetenzen: 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.	**Arbeitsaufwand:** Präsenzzeit: 26 Stunden Selbststudium: 34 Stunden

Lehrveranstaltungen: **1. Seminar / Workshop: Scientific Writing and Graphics (12 h)** **2. Seminar / Workshop: Oral Presentation of Scientific Results (6 h)** **3. Seminar / Workshop: Laboratory Safety (4 h)** **4. Seminar / Workshop: Good Scientific Practice (4 h)**	

Prüfung: Oral presentation, written scientific text, oral group examtination, unbenotet **Prüfungsanforderungen:** Demonstration of writing competence, oral presentation skills, understanding of ethical codes of conduct and knowledge of lab safety rules and regulations in a scientific context in the English language at an advanced level.	

Zugangsvoraussetzungen: none	**Empfohlene Vorkenntnisse:** -
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr. Michael Hörner
Angebotshäufigkeit: jährlich	**Dauer:** 4 weeks
Wiederholbarkeit: einmalig	**Empfohlenes Fachsemester:**
Maximale Studierendenzahl: 20	

Georg-August-Universität Göttingen **Modul M.Neuro.32: Results of the research projects** *English title: Results of the research projects*	5 C

Lernziele/Kompetenzen: 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.	**Arbeitsaufwand:** Präsenzzeit: 30 Stunden Selbststudium: 120 Stunden

Lehrveranstaltung: Seminar (30 h)	

Prüfung: Two oral presentations per student, group discussion, unbenotet **Prüfungsanforderungen:** Demonstration of adequate oral presentation skills including the critical discussion and evaluation of the data presented.	

Zugangsvoraussetzungen: none	**Empfohlene Vorkenntnisse:** -
Sprache: Englisch	**Modulverantwortliche[r]:** Prof. Dr. Michael Hörner
Angebotshäufigkeit: jährlich	**Dauer:** 8 weeks
Wiederholbarkeit: einmalig	**Empfohlenes Fachsemester:**
Maximale Studierendenzahl: 20	