Regulations for the  
M.Sc./Ph.D. and MD-Ph.D. Neuroscience Program  
at the Georg August University, Göttingen, Germany

Participating Faculties:  
Medicine  
Biology  
Physics

I. General Provisions

§ 1 Purview

These regulations regulate, based on the Examination Regulations for the M.Sc./Ph.D. Neurosciences Program, the content and structure of the International M.Sc. and Ph.D. Program Neurosciences Program.

§ 2 Aim of the Program

The aim of the program is to provide an intensive research oriented education in which students deepen and expand their knowledge, skills and abilities in the field of neuroscience gained in their preliminary studies in medicine, biology, psychology, physics as well as other natural sciences by participating in a graduate interdisciplinary course of study. The imparting of specialized knowledge includes training in theoretical, methodological and experimental fundamentals inherent to scientific research and thereby better qualifies students to work in practical, research and teaching oriented fields. All courses in this program are taught in English.

S_OrdN_e
§ 3 Length and Structure of Program

(1) The program is divided into academic years. An academic year begins with the respective winter semester.

(2) The Master’s Program normally takes 1.5 years to complete; the Ph.D. program normally takes 4 years.

(3) The M.Sc. / Ph.D. Programs include a common initial segment of one year. Thereafter two separate segments are offered which last 6 months for the M.Sc. program and 3 years for the doctoral program.

§ 4 Examinations

(1) The common initial segment ends with one written and two oral master’s examinations. The second segment of the Master’s Program concludes with the successful completion of the master’s thesis; the Ph.D. Program concludes with the successful completion of the doctoral examination. The rules for the examinations are stated in the “Examination Regulations for the M.Sc. and Ph.D. Neuroscience Program”.

(2) To be admitted to the Ph.D. Program a candidate must receive a total grade of C (Good) or better in the theoretical part of the master’s examination at the end of the first segment of the M.Sc./Ph.D. Program.

§ 5 Implementation of Course of Study, Plenary Body

(1) This program is the common responsibility of the participating departments of the Biology Faculty, Medical School, Max Planck Institute for Biophysical Chemistry, Max Planck Institute for Experimental Medicine, German Primate Center, Institute for Theoretical Physics and the European Neuroscience Institute (ENI); these will be referred to hereafter as the “responsible bodies”. The Biology Faculty is ultimately responsible of this interdisciplinary course of study.

(2) Teaching faculty members can, according to these regulations, include habilitated members of the participating faculties as well as other persons who have been selected according to normal academic selection procedures or their equivalent to
positions in which they have the right to do research and fulfil leadership responsibilities independently in one of the participating bodies.

(3) All faculty members who are involved with this program have the right to serve as examiners within the framework of this program.

§ 6 Recognition of Academic Performance

(1) The formal recognition of work done in laboratory courses (§ 11) is the responsibility of the laboratory instructor.

(2) Students who because of prior university training have already mastered methodological approaches taught in the initial program segment can file a request to the Program Committee asking that they not have to attend the methods course in question (§ 10). That a student has acquired the background necessary to be released from a course must be established in an oral examination given by the instruction of the methods course. The Program Committee must be informed of the result. This rule does not apply to laboratory courses according to § 11; they must be taken by every student.

§ 7 Academic Counselling

(1) Academic counselling is carried out by the participating faculty members and especially those who are members of the Program Committee.

(2) It is the responsibility of the office of the program coordinator to help each individual student in planning her/his course of study, to pass on information and to advise students with regard to questions relevant to their studies.

(3) The Academic Counselling Center of the university is responsible for issues of a more general nature, especially with respect to questions which apply to more than one academic discipline.

(4) Students are advised to seek academic counselling whenever considering changes in their individual programs and especially when beginning their studies. In addition, academic counselling should be sought when planning a course of study in a foreign country and after having failed to pass an examination.
II. First Segment of the M.Sc./Ph.D. Program

§ 8 Organization of Courses

(1) Courses are structured in a modular fashion covering a period of at least 35 weeks.

(2) Courses offered in the program are assigned credits (C) in accord with the ECTS Information Guide of the European Commission.

(3) The first segment consists of intensive practical training in participating research laboratories combined with thorough lectures, tutorials and seminars to provide students with a sound theoretical background. To successfully complete this segment of the program a minimum of 90 C must be accumulated. The following are required courses:

a. Lecture and Tutorials in Neurosciences       20 C
   A lecture on neurosciences (4 hr/ wk) on topics as described in § 9, is given by faculty members participating in the program. The 4-hour lecture runs for the entire time during the first academic year. The fundamentals needed for a clear understanding of the material covered in the lecture will be acquired in tutorials; the time scope is equivalent to that of the lecture. Within the tutorials students will be divided into small groups. Under the direction of a tutor each group will then work through relevant topics covered in the lecture.

b. Methods Course for Advanced Students in the Neurosciences   20 C
   The course “Methods in the Neurosciences”, including an accompanying seminar, will commence each year at the beginning of the winter term of the university and will be attended by all students beginning their studies in that semester. A theoretical part and practical introduction to methods applied in the neurosciences will be the major point of emphasis.

c. Laboratory work (Laboratory Rotations)       45 C
   After completion of the methods course students will attend three or four laboratory courses for a total of 24 weeks over a period of seven months (three 8-week or four 6-week blocks). A scientific report must be completed for each of these laboratory courses. This report must include (a) an introduction to the scientific context underlying the material being investigated, (b) a description of
the experiments performed, and (c) a critical assessment of the results obtained. Each report will be evaluated by the instructor of the course. For the successful completion of a laboratory course students will receive 15 credits for an 8-week course, i.e., 11.25 credits for a 6-week course.

d. Seminar 5 C

The laboratory courses are accompanied by an obligatory seminar in which each participant is required to give presentations based on two (three) of the three (four) laboratory courses.

e. Additional Electives 3 C maximum

The lecture on Molecular Biology is highly recommended as a complementary course. Other courses which are complementary or lead to a deeper understanding of this area of study include seminars on topics in clinical medicine, courses on computer programming, excursions to related industries and internships in such industries. Students present the Program Committee verification of their participation in such electives, whereupon the committee determines the appropriate number of credits to be received.

§ 9 Lecture Topics / Tutorials

(1) The faculty members stem from the following participating bodies:

Medical School, Preclinical (Med-PC)
Medical School, Clinical (Med-C)
Biology Faculty, Zoology (Uni-Zoo)
Biology Faculty, Psychology (Uni-Psy)
Institute for Theoretical Physics (Uni-Phy)
Max Planck Institute for Biophysical Chemistry (MPI-bpc)
Max Planck Institute for Experimental Medicine (MPI-em)
German Primate Center (DPZ)

(2) The current course offerings of the participating bodies can be found in Appendix 2.

(3) The lectures and tutorials provide a balanced overview of the current state of research in the neurosciences. The courses are divided into blocks which are taught by the individual participating bodies. The Program Committee determines punctually in advance of a given academic year what will be taught in the
individual blocks and how the teaching responsibilities will be divided up among the participating bodies. The current breakdown of the topics is depicted in Appendix 3.

§ 10 Methods Courses

Methods courses are taught in the following areas:

a. Neuroanatomy
Histology and development of the brain, sensory and motor systems, spinal cord and cerebellum, hippocampus, brain stem, monoamine systems, human brain, cytology and histology of invertebrates

b. Neurophysiology
Introduction to membrane physiology, neurophysiology, sensory and muscle physiology

c. Molecular Neurobiology
Modelling of neurons and synapses, cell dissociation and tissue slicing, cell cultures, fluorescence microscopy and imaging, embryo preparation, stem cells and gene transfer, histochemistry and cytochemistry, molecular neurobiology

d. Basic Statistics
Descriptive statistics, inductive statistics (Konfidenzintervalle, Testverfahren), Grundlagen der Varianzanalyse

§ 10 Laboratory Courses (Laboratory Rotations)

(1) The laboratory courses represent the most important and the most time intensive part of the program. Every student must successfully complete in 24 weeks either three 8 week or four 6 week courses. These courses last 26 full hours per week. In the final week of each course the laboratory report is completed.
(2) Each student will be supervised for more than 30% of the time during a given course by a faculty member participating in the program.

(3) To ensure a broadly based neuroscience program students will be divided equally among the participating laboratories of the responsible bodies.

III: Second Segment of M.Sc./Ph.D. Program

§ 12 Master’s Thesis

(1) Students who are admitted to the master’s segment of the program will, within four weeks after being accepted, begin a thesis project based on scientific research; each candidate will be under supervision of a participating faculty member. This laboratory research project must contain an experimental part; it will be written in English and must be presented to the Program Committee within six months. This deadline can be extended by three additional months under well-founded exceptional circumstances.

(2) Details concerning the nature and length of a master’s thesis can be found in the “Examination Regulations for the M.Sc./Ph.D. Neurosciences Program”.

§ 13 Structure and Content of Doctoral Segment of Program

(1) During the doctoral segment students primarily carry out a scientific research project in the laboratory of one of the responsible bodies.

(2) To ensure the interdisciplinary aspect of the training, special courses, internships, colloquia and seminars will, in addition, be offered. Students must acquire at least 30 credits during the doctoral segment; this can be accomplished in the following way:

a. Scientific Colloquia and Seminars

The participating bodies regularly offer scientific colloquia and seminars in which specialized topics from neurosciences are presented. Attendance is obligatory for doctoral students.

b. Courses

To complement and deepen their interdisciplinary training or to meet an actual individual need, students can, during this segment of the program, take part in
laboratory internships or specialized courses. Serving as a tutor in courses which are a part of the first segment is also considered to be an excellent opportunity for a graduate student to add more depth to her/his training.

c. International Conference
Students will take part in international conferences, at which they will present the results of their doctoral research by giving a paper or displaying a poster. The students prepare themselves in tutorials with regard to the topic of the conference.

d. Electives
These can be chosen freely by each student from the entire course offering of the university and should round off a student’s training.

(3) The research project should normally be completed within three years. Under exceptional circumstances a six-month extension can be granted. This can be done no more than two times.

(4) The candidates will be advised and counselled while working on their dissertations by a member of the doctoral committee. More detailed information about the doctoral committee, the dissertation and the disputation is to be found in the “Examination Regulations for the M.Sc./Ph.D. Neurosciences Program”.

IV Final Provisions

§ 14 Becoming Effective

These regulations become effective on the day they are made public within the university in the official information bulletin of the University of Göttingen.
Appendix 1: Overview of the responsible institutes (institutions; bodies) and current research groups (as of January 2002) in which laboratory courses can be carried out.

**Biological Faculty**

a) Neurobiology: Prof. Norbert Elsner  
b) Psychology: Prof. Gerd Lüer  
c) Psychology: Prof. Thomas Rammsayer  
d) Cell Biology: Prof. Friedrich-Wilhelm Schürmann/ PD Dr. Michael Hörner  
e) Psychologie: Prof. Michael Waldmann

**School of Medicine**

a) Neurology: Prof. Mathias Bähr  
b) Medical Statistics: Prof. Edgar Brunner  
c) Human Genetics: Prof. Wolfgang Engel  
d) Neuropaediatrics: Prof. Folker Hanefeld  
e) Molekular Pharmacology: Prof. Willhart Knepel  
f) Neuroanatomy: Prof. Krieglstein/ PD Dr. Michael Rickmann  
g) Neuro- and Sensory Physiology: Dr. Markus Missler  
h) Clinical Neurophysiology: Prof. Walter Paulus  
i) Neuro- and Sensory Physiology: Prof. Diethelm Richter  
j) Psychiatry: Prof. Eckart Rüther  
k) Molecular Neurophysiology: Prof. Detlev Schild  
l) Clinical and Experimental Endocrinology: Prof. Wolfgang Wuttke/ PD Dr. Hubertus Jarry

**Faculty of Physics**

a) Theoretical Physics: Prof. Reiner Kree  
b) Theoretical Physics: Prof. Annette Zippelius

**Max Planck Institute for Biophysical Chemistry**

a) Biomedical NMR-Research / Physikal Chemistry: Prof. Jens Frahm  
b) Molecular Cell Biology: Prof. Peter Gruss  
c) Molecular Developmental Biology: Prof. Herbert Jäckle  
d) Neurobiology: Prof. Reinhard Jahn  
e) Membrane Biophysics: Dr. Jürgen Klingauf
f) Membrane Biophysics: Prof. Erwin Neher

 g) Membrane Biophysics: PD Dr. Christian Rosenmund

 h) Membrane Biophysics: PD Dr. Ralf Schneggenburger

**Max Planck Institute for Experimental Medicine**

 a) Molecular Neurobiology: Prof. Nils Brose

 b) Neurogenetics: Prof. Klaus-Arnim Nave

 c) Molecular Biology of Neuronal Signals: Prof. Walter Stühmer

 d) Molecular and Cellular Neuropharmacology: PD Dr. Heinrich Terlau

**German Primate Center**

 a) Neurobiology: Prof. Uwe Jürgens / Prof. Eberhard Fuchs

 b) Cognitive Neurosciences: Prof. Stefan Treue

**European Neuroscience Institute**

 a) Neuroimmunology: Dr. Harald Neumann

 b) Neuroplasticity: Dr. Stephan Sigrist

 c) Neuroendokrinology: Dr. Marjan Rupnik

 d) Cell Biophysics: Dr. Fred Wouters
Appendix 2: Teaching load of the participating bodies as depicted in the class schedule; stated in academic hours (one academic hour = 45 minutes) for the whole of the initial academic year (as of January 2002). To calculate the respective number of hours of weekly instruction (SWS) for a particular course divide the total number of hours for that course by 28. Number of students: 20. Abbreviations: re: § 8

1. LECTURE. Student/Faculty Ratio: 20/1

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S hours | 20 | 54 | 8 | 8 | 4 | 18 | 22 | 16 | 12 | 162 |

S SWS | 0.71 | 1.93 | 0.29 | 0.29 | 0.14 | 0.64 | 0.79 | 0.57 | 0.43 | 5.79 |

2. TUTORIALS. Student/Faculty Ratio: 5/1

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S hours | 24 | 60 | 16 | 16 | 0 | 28 | 32 | 18 | 16 | 210 |

S SWS | 0.86 | 2.14 | 0.57 | 0.57 | 0.00 | 1.00 | 1.14 | 0.64 | 0.57 | 7.50 |
### 3. METHODS COURSES. Student/Faculty Ratio: 5/1

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### 4. LABORATORY ROTATIONS. Student/Faculty Ratio: 1/1

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### 5. SEMINARS. Student/Faculty Ratio: 20/1

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Total Export from Individual Fields into the Neuroscience Program

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Appendix 3: The following description of the instructional blocks (lectures/tutorials) coincides with the courses taught during the academic year 2001/2002.

**Block A: Neuroanatomy (4 weeks)**

**Block B: Membrane Physiology and Neurophysiology, Electrophysiological Techniques, Basic Statistics (5 weeks)**
Ion channels, Synapses, Sensory Receptor Cells, Electrophysiological Techniques, Basic Statistics

**Block C: Molecular Neurobiology (4 weeks)**
Molecular Neurobiology, Glia, Human Genetics, Neurogenetics, Developmental Neurobiology

**Block D: Methods in the Neurosciences (6 weeks)**
Neuron and Synapse Modelling, Cell Dissociation and Tissue Slicing, Cell Cultures, Fluorescence Microscopy and Imaging, Embryo Preparation, Stem Cells and Gene Transfer, Histochemistry and Cytochemistry, Molecular Neurobiology

**Block E: Neuroendocrinology and Neuropharmacology (4 weeks)**
Reproductive Neurobiology, Neuropharmacology

**Block F: Cognitive Neurosciences, Neuroethology, Behavioural Sciences (4 weeks)**
Neural Systems and Behaviour of Invertebrates, Sensorymotor Interaction, Motivation Control, Higher Perceptual Functions, Associative Learning, Multiple Memory Systems, Learning and Memory
Block G: Clinical Neuroscience, Neuropediatrics, Psychiatry (Sleep) (4 weeks)
Plasticity of Sensory Systems, Hearing and Language Acquisition, Psychiatry, Neuropediatrics, Clinical Neurophysiology

Block H: Neurogenetics, Neuroimmunology (4 weeks)
Model Systems, Developmental Neurobiology, Glia Function and Dysfunction, Neuroimmunology