

Study Regulations for the international Master's Program in Computational Neuroscience at the the Humboldt University of Berlin and the Technical University of Berlin

of 26th September 2005

On the basis of § 74 sub-sec. 1 in connection with § 71 sub-sec. 1 no. 1 of the Law on universities in the Land of Berlin (Berlin Higher Education Act, *Berliner Hochschulgesetz – BerlHG*), as amended by the Amendment Act of 21st April 2005 (GVBl. [Gesetz- und Verordnungsblatt, Law and Ordinance Gazette] p. 254), the Joint Committee of the Charité University Medicine Berlin, the Department of Biology-Chemistry-Pharmacy of the Free University of Berlin, the Mathematical-Natural Science Faculty I of the Humboldt University of Berlin and the Faculty IV – Electrical Engineering and Computer Science of the Technical University of Berlin has issued the following Study Regulations.

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§ 1 – Scope of application

These Study Regulations govern the objective, contents and structure of the international Master's program in Computational Neuroscience at the Free University of Berlin, the Humboldt University of Berlin and the Technical University of Berlin.

§ 2 – Study objectives

The objective of the interdisciplinary Master's program in Computational Neuroscience is to bundle, deepen and systematically supplement the knowledge, abilities and skills regarding studies on the characteristics and function of neural systems, which were acquired during the first degree course. The education shall enable the students to work scientifically at a high level, and to bring the acquired knowledge into the areas of application of Computational Neuroscience in Health sciences and the IT area.

The study program is research-oriented and closely tied to current research. The students shall be enabled to:

- develop new theoretical concepts on the function of neural systems,
- set up, evaluate and examine mathematic models of neural systems in close coordination with experimental and clinical research,
- develop new experimental paradigms from theoretical concepts and mathematic models,
- enhance experimental and clinical methods by developing new procedures for data acquisition and analysis,
- perform a transfer of ideas between the study of neural systems and IT-applications – above all in the area of machine intelligence,
- use the acquired technologies also in the clinical field,
- deal with the ethical and social consequences of this direction of research.

These study objectives require that:

- the transfer of specialized knowledge will include theoretical, methodical and experimental bases,
- the ability for interdisciplinary scientific work and for a successful theoretical-experimental cooperation in scientific projects (“lab rotations”) will be trained,
- students will be made familiar with potential areas of application in the IT area and in Health Sciences and can deepen their knowledge in this area.
- social competence will be developed for the interdisciplinary work in joint projects.

Therefore, one special focus is the extensive practical work within the framework of “lab rotations” (s. § 4, sub-sec. 5) and of the Master thesis, during which the students – together with their supervising working group – shall work on current research issues. The students shall be explicitly instructed to carry out combined experimental-theoretical projects; the bases for this are provided in the courses of the first year, during which theoretical, experimental und application-oriented subjects are combined. The increased demands on the quality of the education due to the interdisciplinary character of the program will be satisfied by a teaching staff that includes lecturers from the theoretical field, from the area of Experimental Neuro-Sciences and from the clinical field.

Furthermore, the students should learn to see their area of expertise in the social context and to realize their responsibility in such conditions. Creative cooperation in interdisciplinary groups as well as gender competence should be supported by means of project and team work.

§ 3 – Modules and module catalog

(1) The program is subdivided into modules; their workload will be expressed in Credit Points (LP, *Leistungspunkte*). A credit point represents an average workload of 30 working hours over one semester for participation in the courses, for independently dealing with the subject matter, for drawing up exercise papers, for preparing the examination and for the examinations themselves.

(2) A module may consist of one or several courses and comprise various types of courses.

(3) The module offer is divided into

1. Compulsory modules, the participation in which is obligatorily required from the students.

2. Compulsory optional modules: Modules that are chosen from a provided catalog.
3. Optional modules: Modules that can be freely chosen from the range of scientific courses offered by the universities in Berlin and Brandenburg.

(4) For all compulsory and compulsory optional modules, a module description is provided, including the following specifications:

Title of the module and credit points

Person responsible for the module and contact information

Qualification objectives

Contents

Module components

Description of teaching and learning types

Requirements for participation

Usability

Workload and credit points

Examination and grading of the module

Duration of the module

Number of participants

Registration formalities

References, scripts

The entirety of these module descriptions forms the program's module catalog. The module descriptions will be annually updated and published by the Joint Commission with decision-making power for the Master's program in Computational Neuroscience. Changes of the module description will only be permissible if the scope remains the same and if they conform to the qualification objectives and to the contents to be transferred of the respective module.

§ 4 – Structure of the program

(1) The program comprises four semesters. The courses will be offered in such a way that the program can be commenced in the winter semester and concluded in the fourth semester, by completion of a Master thesis. The courses are offered in English.

(2) The structure of the program in Computational Neuroscience and the time schedule for the program (study course schedule) results from the following table:

Table 1

Models of Neural Systems 12 LP	Acquisition and Analysis of Neural Data 12 LP	Machine Intelligence 12 LP	Programming Course and Project 6 LP	Individual Studies 6 LP	1 st Year
Models of Higher Brain Functions 12 LP					
Lab Rotations (three projects) 3 x 9 LP				Ethical Issues 3 LP	2 nd Year
Courses on Advanced Topics 10 LP	Master Thesis 20 LP				

(3) During the program, the following modules are to be completed obligatorily:

Models of Neural Systems:	12	LP
Models of Higher Brain Functions:	12	LP
Acquisition and Analysis of Neural Data:	12	LP
Machine Intelligence:	12	LP
Programming Course and Project:	6	LP
Ethical Issues:	3	LP

(4) 10 LP from freely chosen modules (pursuant to § 3 sub-sec. 3) must be contributed to the optional field of “Courses on Advanced Topics”. The student determines the modules upon consultation by her/his mentor (see § 8 sub-sec. 1).

(5) During the program, three projects („lab rotation“), each comprising 9 LP, must be completed. At least one project must have an experimental focus, at least one further project a theoretical focus. Each project shall be completed in a different working group of the center; jointly supervised interdisciplinary topics are expressly desired, however. In agreement with her/his mentor (§ 8 sub-sec. 1) and the future supervisor of the project, the student will determine the topic and work schedule. Topic and work schedule must be approved by the Examination Board, whereby – as a general rule – the student’s proposal should be complied with.

(6) At the end of the program, a Master thesis comprising 20 LP must be written. It is expressly desired that the Master thesis will be written in the subject field of one of the “lab rotations” completed by the student.

(7) Altogether, 6 LP are available for “individual studies” in order to close gaps in the student’s technical background resulting from her/his first degree course. In agreement with her/his mentor, the student will determine the content of the “individual studies”.

(8) The program will be concluded with the Master's examination.

§ 5 – Recognition of study achievements

Study or examination achievements obtained abroad or at other German universities may, at request, be recognized. Details are governed by § 8 of the Examination Regulations for the Master's program in Computational Neuroscience (*PO CNS*) and by the Examination Board (cf. § 6 of the Regulations of the Technical University of Berlin on the students' rights and duties (*OTU*)).

§ 6 – Course types

Study objectives can be reached through the following course types:

Lecture (VL, *Vorlesung*):

In lectures, the teaching topic is presented by the lecturer in the form of regularly given lectures.

Exercise (UE, *Übung*):

Exercises serve to review and deepen the subject matter transferred during the lectures and to enhance the ability to work independently, in a scientific and practice-oriented way.

Practical courses (PR, *Praktika*):

Primarily, practical courses serve to acquire methodical abilities through practical work of the students and to implement the subject matter dealt with in other courses.

Project (PJ, *Projekt*):

Projects also serve to acquire methodical abilities and to implement the subject matter transferred in the courses in an exemplary way. They differ from the practical courses in the scope of the task to be performed, in their focusing on scientific issues and in the training of social competence, which is required for successful scientific work.

Integrated course (IV, *Integrierte Lehrveranstaltung*):

In integrated courses, the various course types alternate without a fixed time limit.

Seminar (SE, *Seminar*):

Seminars serve for the independent, scientific development and deepening of subject fields and issues.

§ 7 – Study counseling and special examination counseling

(1) For general and psychological counseling, the Department for General Study Counseling of the Free University of Berlin, the Humboldt University of Berlin and the Technical University of Berlin will be at your disposal.

(2) Counseling concerning the subject of study will be performed by the Examination Board. It will hereby be supported by the university lecturers involved in the teaching program of the Master's program.

§ 8 – Mentor program

(1) From the first semester onwards, each student will be assigned a university lecturer as mentor. The mentor may be changed provided that the new mentor agrees.

(2) The mentor's activity centers on individual counseling and the provision of help when problems arise.

§ 9 – Entry into force

These Study Regulations will enter into force on the day following that of their publication in the official newsletters of the Free University of Berlin, the Humboldt University of Berlin and the Technical University of Berlin.