Rules and Regulations for the Examinations of the Masters-Course in Molecular Biosciences of the University of Heidelberg

15. December 2006

The German document was approved by the vice-chancellor on the 15th of December 2006. This English translation has no legal standing. In cases of dispute only the German version is valid.

I. General Regulations

§1. Aims of the course and of the examination

(1) The research-oriented Masters course in molecular biosciences teaches a deeper understanding of both the subject and of research methods used in the molecular biosciences. This is taught in specialised subject areas known as majors. The course builds upon, and is a continuation of, the Heidelberg Bachelor course in biosciences.

(2) The Masters examination aims to assess students' overall comprehension of the subject as well as their ability to use research methods and new knowledge. The examination also assesses whether or not students have acquired a thorough enough base of subject knowledge for future research or professional work and entry into doctoral programmes.

(3) Admission to the Masters course and to the majors is regulated by a dedicated set of admission regulations.

§2. Masters degree

If the Masters examination is passed, the candidate will be awarded the academic degree of "Master of Science" ("M.Sc.") by the University of Heidelberg, through the Faculty of Biosciences.

§3. Regulation length of the course, overall organisation of the course, major subjects, areas and extent of teaching

(1) The regulation length of the course, including the Masters examination, is four semesters.

(2) Teaching is offered over three semesters; the Masters Thesis is to be completed in the fourth semester. The courses available are those listed in Appendix 1. The total required attendance of taught courses (obligatory and optional subject areas), including the Masters Thesis / oral defence module, is equivalent to 120 ECTS-points (European Credit Transfer System).

(3) Majors offered as part of the Masters-course in molecular biosciences are:

1. Cancer Biology
2. Developmental Biology
3. Evolution and Ecology

4. Infectious Diseases
5. Molecular and Cellular Biology
6. Molecular, Cellular and Developmental Biology of Plants
7. Neuroscience
8. Systems Biology

The inclusion of additional majors is possible by application to the examinations committee, following a recommendation by the Biosciences teaching committee.

(4) The modules of the second and third semester and the Masters Thesis are in the Major subject areas. The modules "Focus Bioscience 1", "Focus Bioscience 2" and "Biolab" of the student's chosen major must be completed.

(5) The module "Working in Bioscience" can be freely chosen.

(6) Coursework and examination achievements are assessed with aid of credit points (LP/CP) following the ECTS guidelines. One credit point corresponds to approximately 30 hours' work. Credit points are only awarded for completed modules. For the successful completion of a module, it is necessary to have achieved at least the grade "sufficient" (4.0)

(7) The teaching language is usually English. Examinations are in general conducted in the teaching language.

(8) At the end of each semester, a Transcript of Records is made, in which passed module examinations are recorded along with the corresponding credit points and grades awarded.

§4. Examinations committee

(1) An Examinations Committee is created for the purpose of organisation of the examinations, and for those tasks assigned to it in these rules and regulations. This committee comprises five members of faculty scientific staff, including four members of the teaching staff and a representative of the research staff. The committee also includes a student representative, who is limited to an advisory role.

(2) The chairperson, deputy chairperson, members, and deputy (replacement) members of the examinations committee are appointed by the faculty council (Fakultätsrat). The chair and deputy chair must be members of the teaching staff. The student member is appointed by the faculty council on the advice of the committee of student representatives.

(3) The term of office of the members is two years, that of the student member is one year. The term of office begins on the 1st of January. Re-appointment is possible.

(4) The examinations committee enforces the regulations set down in the Rules and Regulations for Examination. It regularly reports back to the faculty on the

development of examination- and study times and marking, and on the distribution of marks. The reports must be made accessible as appropriate.

(5) The chair keeps records of the examinations committee proceedings, prepares the meetings, runs the meetings and gives a casting vote in the event of a tie. The examinations committee can also temporarily give the head of committee further tasks.

(6) Members of the examinations committee have the right to be present at the examinations.

(7) The members and deputy members of the examinations committee are obliged to respect professional confidentiality. If they are not in civil service employment, they must be committed to confidentiality by the head of committee.

§5. Examiners, witnesses

(1) The head of committee, in agreement with the committee, appoints the examiners for the Masters examinations. Examiners must be teachers of the molecular biosciences Masters course.

(2) Examiners within the individual majors are appointed by the examinations committee on the recommendation of the Biosciences teaching committee. The teachers in each major have the right to propose examiners.

(3) The individuals responsible for individual teaching modules should in general also examine those modules.

(4) *Witnesses must have passed the Masters-examination or an equivalent final examination. Witnesses are appointed by the examinations committee; the examinations committee can transfer the task of appointing witnesses to the appropriate examiner. (*This is a translation of "Beisitzer" - a person who witnesses an examination but does not actually examine. This person is there to ensure that the examination is carried out properly. The Witness is mainly needed during one-to-one oral examinations).

(5) In general, people may be appointed as examiners for the master thesis and defense only if they are *members of the Biosciences faculty. Examiners may either hold a formal teaching position, or be members of the research staff on whom the faculty council has conferred the right to examine on the basis of long teaching experience. . People with similar qualifications who are not members of the biosciences faculty may be appointed as secondary examiners or thesis witnesses if the primary examiner or marker is a Biosciences faculty member. (*The term "members" includes everyone who is formally included in the Faculty list, whether or not they are actually paid by the University.)

(6) §4 paragraph 7 (confidentiality) applies to examiners and witnesses.

§6. Recognition of study hours, course achievements and examination results

(1) Study hours, course achievements and examination results achieved at a German University or comparable Higher Education Institution are recognised, provided they are judged to be equal to those required in the Heidelberg University Masters course in molecular biosciences. An evaluation of 'equal' may be given when study hours, course achievements and examinations correspond in content, scope and requirements to those offered in the Heidelberg University Masters course in molecular biosciences. The comparison is to be made on an overall basis, not by looking for strict one-to-one equivalence.

(2) In the case of study hours, course achievements and examination results achieved outside of Germany, officially approved equivalence agreements should be consulted. These originate either from Higher Education partnership agreements or rules approved by the conferences of ministers of education and of vice-chancellors of higher education institutions. If there is a doubt regarding the status of the qualification, the central office for foreign education systems may be consulted.

(3) Paragraph (1) also applies to study hours, course achievements and examination results achieved in state-recognised distance-learning and other teaching institutions, particularly in state-run or state-recognised universities of cooperative education (Berufsakademie).

(4) If study hours, course achievements and examination results are recognised and grading systems are equivalent to those used in this MSc programme, those grades and the hours are to be adopted and included in the final mark. If the grading system is not equivalent then an ungraded "pass" is awarded. Grades and credits adopted from other establishments may be indicated as such in the final certificate. If more than half of the credits are ungraded, the examination committee decides how to proceed.

(5) Relevant work experience can be recognised.

(6) Recognition of grades and credits from other Universities and Higher Education institutions can be refused, if the total credits would be more than half of those required to obtain the degree or if the Masters thesis was prepared and examined elsewhere.

(7) The decisions in paragraphs (1)-(6) are made by the examinations committee.

§7. Absence, withdrawal, cheating, breaking of rules and regulations

(1) An examination is marked as "insufficient" (5.0) if the candidate is absent from the examination without sufficient reason, or if he/she withdraws from the examination after its beginning without adequate reason. The same applies to a failure to submit a written examination within the allocated time, except the candidate is not responsible for the failure.

(2) Reasons for absence or withdrawal must immediately be submitted to the examinations committee in writing, accompanied by sufficient written evidence. In the case of illness of the candidate or of a child under his/her principal care, the submission of a doctor's certificate, and, in case of doubt, a doctor's

certificate from a doctor chosen by the University, can be demanded. If the reasons and evidence are accepted by the committee, a new examination date will be set for the candidate. In judging such cases, previous examination results obtained by the candidate will be taken into account.

(3) In the case of decisions regarding failures by a candidate to meet an examination or inscription deadline, the examinations committee must observe laws concerning both the protection of mothers and parental leave. The examinations commission must likewise enable the recourse to these laws by the candidate.

(4) Should the candidate attempt to influence his/her examination result through the use of cheating, or of aids that are forbidden in that examination, the examination will be evaluated as "insufficient" (5.0). If a candidate disturbs the orderly conduct of an examination, he/she may be excluded from the rest of the examination by the examiners or invigilators. In this case, the examination result will be given as "insufficient" (5.0). In extreme cases, the examinations committee may exclude candidates from all further examinations.

(5) Within 14 days of the examination, the candidate may demand a re-evaluation by the examinations committee of decisions made under paragraphs (1) and (2). Decisions against the candidate must immediately be communicated to him/her in writing, with reasons and accompanied by information on the right to appeal against the decision.

§8. Types of examination

(1) Examination achievements are

1. Oral examinations
2. Written examinations
3. The Masters Thesis including the oral defence.

(2) If the candidate provides a doctor's certificate as evidence that he/she is unable, by reason of a long-term or permanent physical handicap, to sit the examinations in the usual form, the examinations committee may permit her/him to sit equivalent examinations in a different format. The same applies to coursework.

§9. Oral examinations

(1) In oral examinations, the candidate is expected to show an overall understanding of the subject of examination and that he/she can place details of specific aspects within the overall context.

(2) Oral examinations are generally taken by an examiner in the presence of a witness who is expert in the field of examination.

(3) The length of the individual oral examinations is between 15 and 45 minutes.

(4) The content of the oral examination is summarised in an examination record, which also record the result. The candidate is to be told the result directly after the examination.

(5) Students who intend to take the same examination at a later date may be admitted as observers, if space is available. They may not be present at the subsequent advice session or for the communication of the examination result. The public may be excluded at the candidate's request or for other important reasons.

§10. Written examinations

(1) In written examinations, the candidate is expected to show an ability to recognise problems and find solutions in a limited time, with recourse to the usual methods used in the subject for examination. Tools that can be used in each examination are limited by the examiner.

(2) The length of written examinations is between 45 and 120 minutes. Multiple-choice questions are permitted.

(3) Multiple choice questions will be posed by examiners approved by the examination committee. The questions must be relevant to the course being examined and give reliable results. The fulfilment of this criteria has to be controlled by a committee. If it turns out that a question does not fulfill these criteria, then answers for that question must be ignored in calculating the final exam result. For the remaining questions, the number of marks per question has to be increased proportionately so that the total number of possible marks is the same as it was originally.

If multiple choice questions are included in an exam, the pass mark is determined as follows:
a) the candidate passes if at least 50% of the questions are answered correctly.
or
b) The average percentage of correct answers is calculated for all candidates. If the result of the candidate less than 50% but is higher than this percentage average minus 22%, the examination is passed.

If the candidate has exceeded the pass mark, and the pass mark is 50% then the grade is as shown below. If the pass mark is below 50%, the whole scale is shifted linearly by the difference between 50% and the average mark minus 22%.

Percentage	grade
≥ 50 – 55	4,0
> 55 – 60	3,7
> 60 – 65	3,3

> 65 – 70	3,0
> 70 – 75	2,7
> 75 – 80	2,3
> 80 – 85	2,0
> 85 – 90	1,7
> 90 – 95	1,3
> 95 – 100	1,0

(4) If a written examination is submitted in the form of homework, this must nevertheless be completed under examination conditions. For this to apply, the candidate must guarantee that the homework was done by him/herself without assistance, and using only the permitted tools.

§11. Examination evaluation and grading

(1) The marks for individual examinations are set by the respective examiners. The following marks are to be used for examination evaluations:

1 = very good	=	An excellent achievement
2 = good	=	An achievement that is considerably above average
3 = satisfactory	=	An achievement that corresponds to the average requirements
4 = sufficient	=	An achievement that, despite considerable deficits, complies with minimal requirements
5 = insufficient	=	An achievement that is so deficient that it does not comply with the minimum required.

For a differentiated evaluation of examination results, intermediate values may be created through an augmentation or decrease of the marks by 0.3; but the marks 0.7, 4.3, 4.7 and 5.3 are not allowed.

(2) The marking process for examinations should in general be completed within two weeks after the completion of the respective module.

(3) The pass mark for individual examinations is “sufficient” (4.0). A complete module is passed if all of the examinations within it are passed.

(4) The module mark is calculated by the arithmetic mean of the results of the module section examinations.

(5) In the calculation of the module and overall marks, only the first decimal place is counted. All other decimal places are deleted without rounding.

(6) In addition, marks are distributed according to the European Credit Transfer System, see appendix 2.

§12. Re-take of Examinations

(1) Failed examinations or examinations that have been counted as failed may be re-taken once.

(2) If a candidate has already failed Biosciences I or Biosciences II twice, the candidate can apply to the examination committee for permission to take the failed exam for a third (and final) time. If permission to re-take is granted, the exam will be an oral exam, with one of the approved examiners. If the candidate passes, the only possible grade is 4,0

(3) Failed examinations must be re-taken at the next possible examination date. If this deadline passes, the candidate loses the right to re-examination, unless the candidate provides an acceptable reason for this.

IV. Masters Examination

§13. Examination extent and type, organisation of the examination

(1) The Masters examination consists of

1. The examinations of course units with the Modules as outlined in Appendix 1
2. The Masters-Thesis/oral defence module

(2) The examinations, following section 1 paragraph 1, are taken in the context of the relevant course unit and are written or oral. The type and length of examinations, are decided by the course unit organiser and announced at the latest at the beginning of the module or course unit.

(3) Module examinations may consist of several course-unit examinations.

§14. Admission to the examination procedure

(1) People will only be admitted to the individual examinations if they:

1. are inscribed in the Masters course in Molecular Biosciences at the University of Heidelberg;

2. have not lost their right to be examined for the Masters course in Molecular Biotechnology or for the Masters course in Molecular Biosciences in the Faculty for Biological Sciences of the University of Heidelberg.

For admission of the Masters Thesis examination, written confirmation of the following is also required:

3. Successfully completed teaching modules as defined in appendix 1 and §3 paragraphs (3) and (4).

(2) The application for admission to the overall examination must be submitted to the head of the examinations committee in writing before the first module or course-unit examination. The following must be included:

1. Proof of compliance with the conditions of admission as stated in paragraph (1) no. 1;

2. A statement that the candidate has not lost his/her right to be examined for the Masters course in Molecular Biotechnology or the Masters course in Molecular Biosciences in the Faculty for Biological Sciences.

(3) Should the candidate be unable to provide the documentation required by paragraph (2) no.1 in the required form, the examinations committee may permit proof of compliance with the conditions of admission to be submitted in another way.

(4) Admissions to examination are made by the head of the examinations committee.

(5) Admission may only be refused if

1. The requirements named in paragraph (1) are not fulfilled;

2. The documentation is incomplete;

3. The candidate has by another means lost his/her right to be examined.

(6) The statement named in paragraph (2) no. 2 must be submitted to the examiner at each module or course unit examination.

§15. Masters Thesis

(1) The Masters Thesis is an examined coursework which completes a scientific education. It should demonstrate the candidate's ability to address a problem from his/her Major in the area of Molecular Biosciences independently, within a given time-frame, using scientific methods. The Masters Thesis work should be done within the relevant Major .

(2) The Masters Thesis may be supervised, and the topic may be set, by any qualified examiner of the respective Major, in accordance with §5 paragraphs (1) and (5).

(3) The candidate must register his/her Masters Thesis within six weeks after the successful completion of the final examinations, or apply to the head of the examinations committee for the allocation of a Masters Thesis topic. Beginning

with the thesis work is only possible after registration. Late beginning is only possible after application to the head of the examination committee.

(4) If the thesis work is not started within this time, the thesis will be graded "insufficient" (5,0), unless the candidate can provide an acceptable reason for the delay.

(5) The topic of the Masters Thesis is set by the supervisor with the agreement of the candidate. If the applicant applies to the examination committee for a topic, the head of the examinations committee ensures that the candidate receives a Masters Thesis topic on time. The candidate must be allowed to make suggestions for his/her topic, but the candidate does not have a right to be allocated to his/her chosen topic. The topic is allocated by the head of the examinations committee; the time and date of allocation must be recorded.

(6) The time period between the allocation of the Masters Thesis topic and the deadline for submission of the Masters Thesis is 6 months. In exceptional cases, this deadline can be extended by the examinations committee by one month. The Masters Thesis is evaluated as "insufficient" (5.0) if the named deadline is not met, unless the candidate can present an acceptable reason for the delay.

(7) The topic, aims, and range of the Masters Thesis should be limited such that its completion is possible within the allocated time.

(8) The Masters Thesis may be written in English or in German.

(9) The Thesis must include a summary in English.

§16. Submission and evaluation of the Masters Thesis

(1) 3 copies of the Masters Thesis must be submitted to the examinations committee within the deadline; the date and time of submission must be recorded.

(2) On the submission of his/her Masters Thesis, the candidate must confirm in writing that he/she has completed the Thesis him/herself using none other than the cited sources and aids.

(3) The Masters Thesis is marked by two examiners, in accordance with §5 paragraphs (1) and (5). The supervisor of the Masters Thesis should be the first examiner. The candidate has the right to suggest an examiner, but this does not constitute a right to be examined by the candidate's examiner of choice. The marking must be completed within four weeks.

(4) The final mark for the Masters Thesis is calculated as the arithmetic mean of the evaluations given by the two examiners. Should the examiners' evaluations differ by more than one full mark, the examinations committee decides the final mark based on discussions with both examiners. In this case, the examinations committee may appoint a third examiner.

(5) If the Masters Thesis is marked as "insufficient" (5.0), it can be repeated with a new topic; it may not be repeated with the original topic.

(6) The Masters Thesis may be shown to third parties for inspection, if the candidate has agreed to this in writing.

§17. Oral defence

(1) In the oral defence, the candidate must present the results of the Masters Thesis and discuss it with the examiners. This must be completed within four weeks of the submission of the Masters Thesis.

(2) The oral defence is conducted by two examiners in accordance with §5 paragraphs (1) and (5). The supervisor of the Masters Thesis should be one of the examiners; in general, the second examiner of the Masters Thesis should also examine the oral defence. The examiners are appointed by the examinations committee; the candidate has a right to suggest examiners.

(3) The oral defence takes about 45 minutes. The presentation of the important results of the Masters Thesis should take 20 minutes at most.

(4) The mark for the oral defence is calculated by the arithmetic mean of the individual marks.

(5) If the oral defence is marked as "insufficient" (5.0), it may be repeated once.

§18. Overall mark for the Masters Thesis and oral defence

The overall mark for the module Masters Thesis/oral defence is calculated using the marks of the oral defence and Masters Thesis. The Masters Thesis is worth 2/3, the oral defence 1/3 of the overall mark. Both the Masters Thesis and the oral defence must be passed, with a mark of at least "sufficient" (4.0); it is not possible to compensate for a failure of one section using the grade from the other.

§19. Passing the examination, overall mark

(1) The Masters examination is passed if all Module examinations, the Masters Thesis and the oral defence achieve an evaluation of at least "sufficient" (4.0).

(2) §11 applies to the overall mark of the Masters examination.

(3) For the overall Masters examination mark, the marks for the individual modules in appendix 1 and the Masters Thesis/oral defence are weighted according to their respective numbers of credit points.

§20. Course Certificate

(1) Within four weeks of passing the Masters examination, a certificate containing the name of the major subject, the individual modules and their corresponding marks, the achieved credit points and the overall mark will be issued. This certificate carries the date of the final examination and is signed by the head of the examinations committee.

(2) A “diploma supplement” containing additional information on the content and format of the course in accordance with the “European Diploma Supplement Model” is attached to the certificate in both German and English.

§21. Masters Degree Certificate

(1) At the same time as the certificate, the candidate also receives a Masters degree certificate which carries the same date as the course certificate. This confirms and certifies conferment of the academic degree.

(2) The Masters degree certificate is signed by the dean and by the head of the examinations committee and stamped with the Faculty seal.

(3) If the candidate has not passed the Masters examination, he may on application and following submission of the appropriate evidence be awarded with a certificate documenting passed examinations and their marks, as well as those examinations that have not yet been passed, with the note that the Masters examination has not been passed. This certificate is signed by the head of the examinations committee. The same applies to a Masters candidate who has definitively failed the examination.

V. Final Regulations

§22. Invalid examinations

(1) If the candidate has cheated during an examination, and the examinations committee only becomes aware of this after the degree certificate has been issued, then the examinations committee can retrospectively alter the marks for those examinations in which the candidate has cheated, and declare the overall examination or parts of the overall examination as “failed”.

(2) If the requirements for admission to the examination were not complete, but the candidate did not deliberately cheat in his/her application, then this failure is compensated for by passing the examination. If the candidate deliberately cheated during the admissions process, the examinations committee decides.

(3) The candidate must be allowed to present his/her case before a decision is reached.

(4) An incorrect examination certificate will be withdrawn and, if applicable, a new certificate awarded. The Masters Degree will also be withdrawn if the examination has been declared “failed” due to cheating. Decisions in accordance with paragraph (1) and paragraph (2) sentence 2 may not be taken after five years have passed from the date on the examination certificate.

§23. Access to examination papers

The candidate is permitted to see his/her written examination papers, the comments of the examiners and the examination guidelines within a year of the completion of the examination. The head of the examinations committee decides when and where the candidate is permitted to see these documents.

§24. Validity of this document

The definitive German version of these rules and regulations come into force on the 1st of October 2006. This English version has no legal standing.

Appendix 1:

Obligatory modules with certificate of successful participation and marking

Module	Teaching format	Credit Points
Frontiers in Bioscience 1	L, P, T, S	15
Frontiers in Bioscience 2	L, P, T, S	15
Focus Bioscience 1 *	L, P, T, S	15
Focus Bioscience 2 *	L, P, T, S	15
Biolab *	P	15
Working in Bioscience	P	15
Masters Thesis/oral defence*	Masters Thesis/oral defence	30

* The modules “Focus Bioscience 1”, “Focus Bioscience 2”, “Biolab” and the Masters Thesis must be completed in the major subject.

Appendix 2: Marking by the ECTS scheme

The students who have completed the corresponding examinations successfully receive both a final mark by the German system and a relative mark on the following scale:

A	The top 10%
B	The next 25%
C	The next 30%
D	The next 25%
E	The next 10%

Depending on the size of the graduating class, at least two previous classes must be added to the cohort in order to calculate the relative marks. The ECTS mark is an obligatory part of the final grade. It may, if needed be certified by the faculty for individual modules if this is possible.

Appendix 3: Information on the teaching content of the individual courses (majors)

1. Cancer Biology

This Major builds on solid foundations of knowledge in molecular and cell biology to specialise in the different avenues of cancer biology using a broad, interdisciplinary approach. The modules examine virological, immunological and toxicological aspects of cancer research as well as relevant themes in translational oncology. Laboratory practicals in current areas of cancer biology research complete the intensive education in this major.

2. Developmental Biology

The major "Developmental Biology" is aimed at students who wish to specialise in modern developmental biology. You will deepen your knowledge of the bases of molecular and cell biology and learn the principles of developmental biology. The course moves from the molecular level of developmental processes via signal transduction cascades to the systemic level and the creation of models.

3. Evolution and Ecology

The major "Evolution and Ecology" represents the bridge from the cellular level through organisms and societies up to ecosystems. Initially in this major, basic knowledge and principles of evolution and ecology are taught. The genetic and molecular bases of the most varied adaptations are currently being intensively studied, and this major attempts to convey an evolutionary viewpoint on, and evaluation of, the loss and gain of specific characteristics. The teaching on organisms will be deepened by practical fieldwork.

4. Infectious Diseases

The major "Infectious Diseases" is aimed at students with a good basic knowledge of molecular and cell biology who wish to specialise in a subject that is particularly relevant to medicine, and who wish to follow an interdisciplinary approach. In this major they will deepen their knowledge of molecular and cell biology and learn about specific aspects of the replication of infectious pathogens and their interaction with their hosts by the medium of lectures, seminars and practicals.

5. Molecular and Cell Biology

The aim of this major is a broad, interdisciplinary and research-oriented education in molecular and cell biology, in which both basic knowledge and medical aspects are considered and taught. Current topics are taught through theoretical courses, method courses and higher-level laboratory practicals. The major covers a broad range of topics from the molecular and cellular level up to the organism level and the use of biochemical, biophysical, molecular, genetic and cellular biological methods.

6. Molecular, Cellular and Developmental Biology of Plants

The analysis of the biological system "plant" lies at the core of the major "Molecular, Cellular and Developmental Biology of Plants". The course includes the molecular and cellular biological description of endogenously driven processes, as well as the adaptation of the organism to its environment and the molecular evolution of these processes in the plant kingdom. Host-pathogen relationships and symbioses with other organisms form another central topic. A basic knowledge of the molecular biotechnology of agricultural crops is also taught. On an experimental level, the course covers the entire spectrum of molecular and cellular biological techniques.

7. Neuroscience

In the major "Neuroscience", students learn about current topics in Neurobiology through a combination of theoretical courses and an intensive practical education. The spectrum of topics includes molecular and cell neurobiology, developmental neurobiology, signal transmission in neural networks and neurophysiological research. A structured practical course program covering a wide repertoire of neurobiological methods is one of the focal points of the course.

8. Systems Biology

In the major "Systems Biology", students are introduced to systems biology through a combination of intensive biological, molecular biological and bioinformatics practicals and theoretical instruction in bioinformatics and biology. The biological topics concern the processes involved in the creation of regulatory networks in the cell and in the developing and adult organism. High-throughput techniques for the gathering and analysis of complex and extensive systemic parameters and processes in organisms form a focus of the methodological teaching. A second focus is the modelling of systemic processes.

Appendix 4: Module descriptions

Module: Frontiers in Bioscience 1 (obligatory)

a) *Content and Aims of the module*
Advanced theoretical knowledge and practical abilities in the area of molecular biology and biochemistry are achieved.
The teaching language for this course is English.

b) *Teaching format*
Lecture, Tutorial, Practical, Seminar

c) *Conditions for participation*
none

d) *Uses of the module*
Molecular biosciences (Masters)

e) *Conditions for the awarding of credit points*
The courses for the module must be attended and the examinations passed.

f) *Credit points and marks*
15 credit points are awarded.
The module mark is calculated from the arithmetic mean of the examination results. The lectures and tutorials are subject to a written examination. The examination modus for the practical and associated seminar is determined by the course unit organiser and announced at the beginning of the module.

g) *Dates of availability of the module*
Every winter semester

h) *Hours of work*
The workload is 450 hours

i) *Length*
nine weeks

Module: Frontiers in Bioscience 2 (obligatory)

a) *Content and Aims of the module*
Advanced theoretical knowledge and practical abilities in the area of molecular biology and biochemistry are achieved.
The teaching language for this course is English.

b) *Teaching format*
Lecture, Tutorial, Practical, Seminar

c) *Conditions for participation*
none

d) *Uses of the module*
Molecular biosciences (Masters)

e) *Conditions for the awarding of credit points*
The courses for the module must be attended and the examinations passed.

f) *Credit points and marks*
15 credit points are awarded.
The module mark is calculated from the arithmetic mean of the examination results. The lectures and tutorials are subject to written examination. The examination modus for the practical and associated seminar is determined by the course unit organiser and announced at the beginning of the module.

g) *Dates of availability of the module*
Every winter semester

h) *Hours of work*
The workload is 450 hours

i) *Length*
nine weeks

Module: Focus Bioscience 1 (obligatory)

a) *Content and Aims of the module*
The acquisition of basic, advanced, and specialised biological knowledge is coupled with the acquisition of practical skills using concrete problems in molecular biosciences in the area of the chosen Major.
The practicals allow the student to acquire key skills such as qualitative and operative time management and independent, goal-orientated working. Various presentation techniques are learned in the seminars, and a grounding in presentation media is acquired. Clarity and communication are improved through students' own presentations and subsequent discussions. The language of teaching may be English.

b) *Teaching format*
Lecture, Tutorial, Practical, Seminar

c) *Conditions for participation*
Admission to the major of choice. The modules "Frontiers in Biosciences 1" and "Frontiers in Biosciences 2" must be successfully completed.

d) *Uses of the module*
Molecular biosciences (Masters)

e) *Conditions for the awarding of credit points*
The courses for the module must be attended and the examinations passed.

f) *Credit points and marks*
15 credit points are awarded.
The module mark is calculated from the arithmetic mean of the examination results. The lectures and tutorials are subject to written examination. The examination modus for the practical and associated seminar is determined by the course unit organisers and announced at the beginning of the module.

g) *Dates of availability of the module*
Every summer semester

h) *Hours of work*
The workload is of 450 hours

i) *Length*
nine weeks

Module: Focus Bioscience 2 (obligatory)

a) *Content and Aims of the module*
The acquisition of basic, advanced, and specialised biological knowledge is coupled with the acquisition of practical skills using concrete problems in molecular biosciences in the area of the chosen major.
The practicals allow the student to acquire key skills such as qualitative and operative time management and independent, goal-orientated working. Various presentation techniques are learned in the seminars, and a grounding in presentation media is acquired. Clarity and communication are improved through students' own presentations and subsequent discussions. The language of teaching may be English.

b) *Teaching format*
Lecture, Tutorial, Practical, Seminar

c) *Conditions for participation*
Admission to the major of choice. The modules "Frontiers in Biosciences 1" and "Frontiers in Biosciences 2" must be successfully completed.

d) *Uses of the module*
Molecular biosciences (Masters)

e) *Conditions for the awarding of credit points*
The courses for the module must be attended and the examinations passed.

f) *Credit points and marks*
15 credit points are awarded.
The module mark is calculated from the arithmetic mean of the examination results. The lectures and tutorials are subject to written examination. The examination modus for the practical and associated seminar is determined by the course unit organisers and announced at the beginning of the module.

g) *Dates of availability of the module*
Every summer semester

h) *Hours of work*
The workload is of 450 hours

i) *Length*
nine weeks

Module: Biolab (obligatory)

a) *Content and Aims of the module*
The aim is the acquisition of practical skills using concrete problems in molecular biosciences in the subject area of the chosen Major. The research practical allows the student to acquire key skills such as qualitative and operative time management and independent, goal-orientated working. Problem-solving strategies and systemic thinking are taught in preparation for independent scientific work.
The language of teaching may be English.

b) *Teaching format*
Research practical

c) *Conditions for participation*
Admission to the major of choice. The modules "Frontiers in Biosciences 1" and "Frontiers in Biosciences 2" must be successfully completed.

d) *Uses of the module*
Molecular biosciences (Masters)

e) *Conditions for the awarding of credit points*
The courses for the module must be attended and the examinations passed.

f) *Credit points and marks*
15 credit points are awarded.
The module mark is calculated from the arithmetic mean of the examination results.
The course organiser defines the mode of examination.

g) *Dates of availability of the module*
Every winter semester

h) *Hours of work*
The workload is 450 hours

i) *Length*
nine weeks

Module: Working in Bioscience (obligatory)

a) *Content and Aims of the module*
The aim is the acquisition of practical qualifications using concrete problems in molecular biosciences in the area of the chosen major or any other available major. The research practical allows the student to acquire key skills such as qualitative and operative time management and independent, goal-orientated working. Problem-solving strategies and systemic thinking are taught in preparation for independent scientific work.
The language of teaching may be English.

b) *Teaching format*
Research practical

c) *Conditions for participation*
The modules "Frontiers in Biosciences 1" and "Frontiers in Biosciences 2" must be successfully completed.

d) *Uses of the module*
Molecular biosciences (Masters)

e) *Conditions for the awarding of credit points*
The courses for the module must be attended and the examinations passed.

f) *Credit points and marks*
15 credit points are awarded.
The module mark is calculated from the arithmetic mean of the examination results.
The course organiser defines the mode of examination.
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g) *Dates of availability of the module*
Every winter semester

h) *Hours of work*
The workload is of 450 hours

i) *Length*

nine weeks

Module: Masters Thesis / oral defence

a) *Content and Aims of the module*
A topic from the area of the candidate's chosen major subject must be independently researched using scientific methods. The results are communicated in written form in the Masters Thesis, which contains a summary in both English. The results are presented and defended orally in the oral defence. The oral defence is also intended to show that the candidate understands the broader context of his/her research.

b) *Teaching format*
Instructions for research methods

c) *Conditions for participation*
Admission to the major of choice. All teaching modules must be successfully completed. The oral defence is scheduled at the latest a week after the submission of the written Masters Thesis.

d) *Uses of the module*
Molecular biosciences (Masters)

e) *Conditions for the awarding of credit points*
The evaluation is undertaken by two examiners. The candidate's Masters Thesis supervisor should be the first examiner. The module mark is calculated from the mark of the written Thesis and the oral defence.
The module must be begun at the latest six weeks after the last module examination or module section examination.
The Masters Thesis may be repeated once.

f) *Credit points and marks*
30 credit points are awarded.

g) *Dates of availability of the module*
Every semester

h) *Hours of work*
The workload is of 900 hours

i) *Length*

6 months, one month extension on application in exceptional cases