

Examination Regulations
for the
Life Science Informatics
Master's Degree Programme
of the
Rheinische Friedrich–Wilhelms–Universität Bonn
(University of Bonn)
and the
Rheinisch-Westfälische Technische Hochschule Aachen
(RWTH Aachen University)

from September 29, 2003

By virtue of Section 2, Para. 4 and Section 94, Para. 1 of the *Gesetz über die Hochschulen des Landes Nordrhein-Westfalen* (Act on the Universities of the State of North Rhine-Westphalia, also known as the *Hochschulgesetz*) from March 14, 2000 (*Gesetz- und Verordnungsblatt* of the State of North Rhine-Westphalia, p. 190) as last amended by Section 5 of the *Studienkonten- und –finanzierungsgesetz* (Act on Student Study Accounts and the Financing of Tertiary-level Studies) from January 28, 2003 (*Gesetz- und Verordnungsblatt* of the State of North Rhine-Westphalia, p. 36 ff.), the Rheinische Friedrich–Wilhelms–Universität Bonn (University of Bonn) and the Rheinisch-Westfälische Technische Hochschule Aachen (RWTH Aachen University) issue the following Regulations:

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I. General

Section 1

Aim of the Master's Programme and purpose of the master's assessment process

(1) Giving due regard to changes and requirements in the working world, the aim of the Master's Programme in Life Science Informatics is to impart to students holding a relevant bachelor's degree (Section 3, Para. 1, No. 1) the particular knowledge, skills and methods required in the Life Science Informatics field in a way that enables them to conduct scientific work, to critically assess and integrate scientific findings and knowledge, and to act responsibly. In order to achieve these objectives, the Master's Programme in Life Science Informatics strives to link research and instruction very closely with one another, *inter alia* through intensive lab courses conducted in collaboration with the Fraunhofer-Institut für Angewandte Informationstechnik FIT (Fraunhofer Institute for Applied Information Technology) and the Fraunhofer-Institut für Algorithmen und Wissenschaftliches Rechnen SCAI (Fraunhofer Institute for Algorithms and Scientific Computing).

(2) The master's assessment process shall lead to conferral of a master's degree in Life Science Informatics which qualifies the holder to practise a profession. The purpose of the master's assessment process is to determine whether the candidate has acquired the specialised knowledge necessary for practising a particular profession, has a fundamental grasp of his field of study and has the ability to apply scientific methods and findings.

(3) The programme shall be conducted in English.

Section 2

Master's degree

Candidates who successfully complete the master's assessment process shall be awarded a Master of Science (abbreviated as M.Sc.) degree in Life Science Informatics by the Faculty of Mathematics and Natural Sciences of the University of Bonn.

Section 3

Admission requirements

(1) The requirements for admission to the Master's Programme are:

1. A recognised first academic degree which establishes the candidate's academic qualification for the Master's Programme. Academic qualification shall be deemed to exist when the degree evidences a subject spectrum and knowledge as specified by Para. 2. Academic degrees which have been approved by the appropriate government agency of the country in which the university is located or have been accredited in a state-approved process shall be recognised. The

decision of the relevant government agency shall prevail in the case of degrees earned in Germany; the equivalency agreements approved by the Ständige Konferenz der Kultusminister (Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* in the Federal Republic of Germany) and the Hochschulrektorenkonferenz (Association of Universities and Other Higher Education Institutions in Germany) and agreements under university partnerships shall be observed for academic degrees that have been earned in other countries. In case of doubt, an advisory opinion shall be obtained from the Zentralstelle für ausländisches Bildungswesen (Central Office for Foreign Education of the Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* in the Federal Republic of Germany).

2. Sufficient English-language proficiency is a prerequisite for admission to the programme. The TOEFL 550, Computer TOEFL 213 (Test of English as a Foreign Language), IELTS 6.0 (International English Language Testing System) or equivalent tests shall be used to determine the applicant's level of proficiency.
3. A further prerequisite for admission to the degree programme is the submission of proof that the candidate has been accepted for a lab course at either the Fraunhofer-Institut für Angewandte Informationstechnik FIT (Fraunhofer Institute for Applied Information Technology) or the Fraunhofer-Institut für Algorithmen und Wissenschaftliches Rechnen SCAI (Fraunhofer Institute for Algorithms and Scientific Computing) in Sankt Augustin, Germany. Placement in these lab courses shall be decided by a committee that is to be set up by the Examination Committee and comprised of instructors from the University of Bonn, RWTH Aachen University and the aforementioned Fraunhofer Institutes.

(2) For the purposes of Para. 1, candidates should have, as a special educational background, knowledge in the following fields: Linear Algebra, Calculus, Fundamentals of Statistics, Fundamentals of Organic Chemistry and Biochemistry, and Theoretical Biology. A knowledge of informatics totalling 12 credit hours shall also be expected in the areas Programming, Data Structures and Algorithms, Computer Architecture and Fundamentals of Theoretical Computer Science.

(3) The question of whether the individual candidate fulfils the admission requirements set forth in Para. 1 and has the required academic qualifications shall be decided by the Examination Committee for Life Science Informatics on the basis of a separate set of regulations prior to his or her matriculation.

Section 4

Standard period of study, scope of studies, credit points

(1) The standard period of study including the master's assessment process is four semesters.

(2) A total of 60 credit hours shall be required to complete study. Lecture courses, tutorials and lab courses with related subject matter lead to intermediate qualification; such lecture courses, tutorials and lab courses shall be grouped together in modules. Modules shall, as a rule, be comprised of two or more different lecture courses, tutorials or lab courses. Candidates shall have completed a module when they have earned the number of credits points stipulated in Section 10, Paras. 2 – 4 in the lecture courses, tutorials and lab courses that have been grouped together in the respective module shown in Annex 1.

A total of at least 120 credit points (based on the European Credit Transfer System – ECTS), with the master's thesis accounting for 30 of these credit points, shall be required to complete this Master's Programme.

Section 5

Assessment process and assessment deadlines

(1) The master's assessment process shall encompass grade-based and pass / fail examinations and a master's thesis. Examinations shall be conducted in English.

(2) Course-specific examinations and the master's thesis shall flank the course of study and should be completed within the standard period of study set forth in Section 4, Para.

1. Two dates prior to the start of the next lecture period shall be offered for course-specific examinations. The first date should be scheduled shortly after the end of the respective lecture period, as a rule no later than three weeks after it has ended.

(3) Candidates shall apply for admission to the master's assessment process at the same time that they register for the first examination in the process (see Section 11).

Application and registration shall be made in writing to the Examination Committee. The Examination Committee shall announce the registration deadline; this deadline should precede the examination date by at least six weeks.

(4) Should a candidate prove on the basis of a medical certificate that he or she is unable to complete the assessment process in part or in its entirety in the designated form due to prolonged or chronic physical illness or impairment, the chairman of the Examination Committee shall allow the candidate to undergo a different but equivalent form of assessment. The same shall apply to *Scheine* (course credits).

(5) On application by the particular student, corresponding allowances shall be made for the maternity protection leave time frames stipulated in the version of the *Mutterschutzgesetz* (Maternity Protection Act) that is currently in force. Necessary documents shall be attached to the application. All time frames stipulated by these Examination Regulations shall be suspended by maternity protection leave; assessment time frames shall not include periods of maternity protection leave. Allowances shall likewise be made on application for periods of parental leave under the version of the *Gesetz zum Erziehungsgeld und zur Elternzeit* (Federal Child-raising Allowance and Parental Leave Act) that is currently in force. Students shall notify the Examination Committee in writing of the period or periods during which they wish to take parental leave, enclosing necessary substantiating documents, at least four weeks prior to the date on which they wish to start parental leave. The Examination Committee shall determine whether the statutory requirements have been met which would lead to an employee being entitled to parental leave under the Federal Child-raising Allowance and Parental Leave Act and shall inform the student immediately of its findings and, if applicable, any new assessment deadlines. The time frame in which a student's master's thesis must be completed may not be interrupted by a period of parental leave. Should a candidate take

maternity protection leave or parental leave, the proposed topic for the thesis shall be deemed as not having been assigned. The student shall receive a new topic after the maternity protection leave or parental leave has come to an end.

Section 6

Master's Programme Committee

(1) A joint Master's Programme Committee shall be set up for this degree programme.

(2) The joint Master's Programme Committee shall coordinate organisational collaboration between the contracting parties (i.e., the University of Bonn and RWTH Aachen University) in the implementation and conduct of the joint Master's Programme. This Committee shall also act as the Examination Committee. In this capacity, it shall report to the rectors of the University of Bonn and RWTH Aachen University on a regular, at least annual, basis on the development of the master's assessment process and periods of study.

The Committee's tasks shall include in particular:

- Developing and refining the degree programme, including the Study Regulations and Examination Regulations
- Organising the courses on offer
- Discharging responsibilities in its capacity as the body in charge of examinations under Section 94 of the Act on the Universities of the State of North Rhine-Westphalia.

(3) The Master's Programme Committee shall be comprised of:

- Three professors each from the University of Bonn and RWTH Aachen University (a total of six, one of whom must be a member of the Fraunhofer Gesellschaft),

- One member from each university's group of *wissenschaftliche Mitarbeiter* (scientific staff excluding professors and lecturers (*Hochschuldozenten* and *Privatdozenten*)) working in the Life Sciences Informatics Master's Programme,
- One member taken from the group of students enrolled in the Master's Programme.

(4) Members of the Master's Programme Committee who are eligible to vote and to stand for election are those professors from the respective university who have a regular teaching load in Life Sciences Informatics and those professors from the respective university who offer at least two credit hours of instruction in the course of an academic year. In the group of *wissenschaftliche Mitarbeiter*, those individuals who work in the Life Science Informatics Master's Programme shall be entitled to vote and eligible to stand for election on behalf of the respective university. Among the students in the respective student body, those students who are enrolled in the Life Science Informatics Master's Programme shall be entitled to vote and eligible to stand for election. The Senate of the University of Bonn and the Rectorate of RWTH Aachen University shall confirm the composition of the Master's Programme Committee.

(5) The professors who are entitled to vote and eligible to stand for election pursuant to Para. 4 shall elect the chairman and deputy chairman of the Master's Programme Committee from the group of professors specified in Para. 3. The chairman must be a member of the faculty of the University of Bonn, the deputy chairman must be a member of the faculty of RWTH Aachen University.

(6) A deputy shall be elected for each of the members of the Master's Programme Committee. The term of office for student members shall be one year, the term of office for all other members shall be two years. Members may be re-elected.

(7) The Master's Programme Committee is an administrative body as defined by Germany's administrative procedure law and law governing procedure in contentious administrative matters.

(8) The Master's Programme Committee shall ensure compliance with the provisions of the Examination Regulations and make certain that the assessment process is conducted in accordance with regulations. The Master's Programme Committee shall be responsible in particular for deciding appeals lodged in connection with decisions taken in the course of the assessment process. In addition, the Master's Programme Committee shall report to the respective faculties regularly, at least once a year, on the development of the assessment process and periods of study. The Master's Programme Committee shall make suggestions for changes to the Examination Regulations, the Study Regulations and curricula and shall disclose the distribution of grades for individual courses and overall performance. The Master's Programme Committee may delegate routine tasks to the chairman or deputy chairman; this shall not apply to decisions on appeals or to its report to the faculties.

(9) The Master's Programme Committee shall have a quorum when, in addition to the chairman or his deputy and two further professors, at least two more members who are entitled to vote are present. Resolutions shall be passed by simple majority. In the event of a tie vote, the chairman's vote shall be the deciding vote. Those members of the Master's Programme Committee who are students shall not be involved in the assignment of grades for course work or examinations or in the recognition of course work or examinations.

(10) Members of the Master's Programme Committee shall have the right to be present during examinations.

(11) Meetings of the Master's Programme Committee shall be closed to the public. Members of the joint Master's Programme Committee, their deputies, the examiners and assistant examiners shall observe confidentiality. Those members who are not civil servants shall be bound to confidentiality by the chairman of the Master's Programme Committee.

(12) The Master's Programme Committee shall, in conjunction with the Faculty of Mathematics and Natural Sciences of the University of Bonn and the Faculty for

Mathematics, Informatics and Natural Sciences of RWTH Aachen University, designate a *wissenschaftlicher Mitarbeiter* to be Programme Coordinator.

Section 7

Examiners and assistant examiners

(1) In the event of Para. 2, sentence 2, the Examination Committee shall appoint the examiners, assistant examiners and preliminary evaluators for the individual examinations. The committee may delegate this task to the chairman. As a rule, only professors or lecturers (*Hochschuldozenten* and *Privatdozenten*) shall be appointed as examiners. Further, only those persons who hold a corresponding Master's degree or a *Diplom* in a field of mathematics, natural science or engineering from a German university and, providing there are no compelling reasons for a departure from this requirement, have taught classes on their own authority in the examination subject in the segment of the Master's Programme that precedes the examination may be appointed as an examiner. Only those persons who hold a corresponding Master's degree or *Diplom* in a field of mathematics, natural science or engineering or a comparable degree may be appointed as an assistant examiner or preliminary evaluator.

(2) As a rule, course examinations shall be conducted by the lecturer in charge of the course. Should this person not be able to conduct these examinations within the stipulated time frame due to illness or other compelling reasons, the chairman of the Examination Committee shall ensure that another examiner is appointed to conduct the examination. Such examiners should have already taught courses in the particular module on their own authority.

(3) Examiners shall be independent in their conduct of examinations.

(4) The chairman of the Examination Committee shall ensure that the students are notified of the names of the examiners at least two weeks prior to the date of the particular examination.

(5) The examiners, assistant examiners and preliminary evaluators shall be bound to confidentiality. Those members who are not civil servants shall be bound to confidentiality by the chairman of the Master's Programme Committee.

Section 8

Recognition of grades and credits for course work, assignment to a more senior specialised-study semester

(1) Credit shall be granted, without a determination of equivalency, for grades that a student has earned in the same course of study at another university in Germany.

(2)

Credit shall be granted for grades earned in other courses of study or at a non-university educational institution in Germany provided that equivalency has been determined. Credit for grades earned at universities outside of Germany shall be granted on application, when equivalency has been established. The equivalency of grades shall be deemed to exist when the content, scope and requirements of the particular examination, taking the *Scheine* (credits) earned in the examination into account where applicable, substantially correspond to the content, scope and requirements set forth in this Master's Programme. Moreover, equivalency shall not be established on the basis of a skeletal comparison but rather on the basis of an overall review and evaluation. Equivalency agreements approved by the Standing Conference of the Ministers of Education and Cultural Affairs of the *Länder* in the Federal Republic of Germany and agreements under university partnerships shall be observed when determining the equivalency of periods of study, course work and grades which were completed or earned outside the ambit of the *Hochschulrahmengesetz* (Framework Act for Higher Education). Otherwise, the Central Office for Foreign Education may be consulted when doubts regarding equivalency exist.

(3) The Examination Committee shall be responsible for granting credit pursuant to Paras. 1 and 2. Appropriate representatives of the respective subjects shall be consulted before a decision on equivalency is taken.

(4) Should credit be granted for examinations, the grades earned – in so far as the grading systems are comparable – shall be recognised and used to calculate the final grade. Should the grading systems not be comparable, the entry "recognised" shall be made in the student's transcript. Such credits shall be identified accordingly in the student's *Zeugnis* (official certificate documenting academic performance).

(5)

(5) When the requirements set forth in Paras. 1 and 2 have been satisfied, examinations which were taken within the ambit of Germany's Framework Act for Higher Education shall be recognised *ex officio*. The student shall submit the documentation necessary for granting credit.

Section 9

Cancellation, failure to appear, withdrawal, cheating, disruption of examinations

(1) Candidates may cancel their registration for a course-based examination without indicating the reason for the cancellation up to one week before the examination date at the latest.

(2) Candidates who fail to appear on the day of an examination without good cause or who withdraw from an examination without good cause once it has begun shall receive the grade "Insufficient" (5.0); this shall not affect Para. 1. The same shall apply when a candidate does not complete a written test within the allotted time.

(3) Candidates shall immediately notify the Examination Committee in writing of the reasons for their failure to appear and credibly substantiate them. In the event of illness, the candidate may be required to submit a medical certificate. The chairman of the Examination Committee may, in individual cases, require the submission of a certificate from a medical examiner designated by the Committee. The Examination Committee shall notify the candidate in writing when it refuses to recognise the reasons submitted. Any grades that have already been earned shall be recognised.

(4) Candidates who try to influence the outcome of an assessment (examination or thesis) through deception or the use of inadmissible materials or aids shall receive the

grade "Insufficient" (5.0). The respective examiner or proctor may bar any candidate from continuing an examination who, despite a warning, disrupts the orderly conduct of the examination; in such cases, the candidate shall receive the grade "Insufficient" (5.0). A record shall be made of the reasons for barring the candidate from the examination. In serious cases, the Examination Committee may bar the candidate from taking further examinations.

(5) Candidates may, within a period of 14 days, request that decisions taken pursuant to Para. 2 and Para. 4, sentences 1 and 2 be reviewed by the Examination Committee which shall give the particular candidate an opportunity to state his case. The Committee shall inform the respective candidate of any negative decisions, substantiate its decision, and advise him of the legal remedies available to him, immediately and in writing.

II. Master's assessment process

Section 10

Scope and type of assessment

(1) The master's assessment process consists of

1. The final examinations for courses with ancillary tutorials and for seminars and lab courses organised in the modules Fundamentals of Life Science Informatics, Methods of Bioinformatics, and the candidate's field of biological specialisation;
2. A master's thesis.

Candidates shall be awarded credit points (credits on the basis of the European Credit Transfer System – ECTS) for successful examinations, following the schedule at Annex I. In the case of a block of courses, the credit points will be apportioned between the individual courses on the basis of the number of hours they accounted for.

(2) To meet programme requirements for the subject Fundamentals of Life Science Informatics, candidates must earn:

1. Fourteen credit points (in accordance with Para. 6) in the Introduction to Life Science Informatics module
2. Nine credit points (in accordance with Para. 6) in the Information Systems for Life Science Informatics module
3. Eighteen credit points (in accordance with Para. 6) in the Applied LSI module.

(3) To meet programme requirements for the subject Algorithmic Bioinformatics, candidates must earn:

1. Twelve credit points (in accordance with Para. 6) in the Algorithmic Bioinformatics module
2. Fifteen credit points (in accordance with Para. 6) in the Foundations of Statistics module
3. Eleven credit points (in accordance with Para. 6) in the Computational Visualistics module.

(4) To meet programme requirements for the respective field of biological specialisation, candidates must earn eleven credit points (in accordance with Para. 6) in the LSI specialisation module.

(5) Candidates must earn a combined total of at least 90 credit points through course work in the modules to meet programme requirements.

(6) The assessments for individual lecture courses shall, as a rule, be conducted in the form of oral examinations in accordance with Section 14. Prior to the start of the lecture period, the Examination Committee may, on application from the instructor in charge of the examination, choose a written test as the form of assessment in accordance with Section 13. Students shall be informed of the form of assessment by the start of the course at the latest. Should the lecture courses listed in Annex I be organised in blocks, the examination grades earned in the individual courses shall be used to calculate the final grade in accordance with the provisions of Section 18, Para. 3. Grades shall be issued

for the examinations in the individual lecture courses. The Examination Committee shall, on application by the instructor in charge, specify the type of assessment (oral or written examination) to be conducted for seminars and lab courses. The Examination Committee shall give notice of the type of assessment when the course is announced. The Study Regulations may specify further particulars. Assessments in seminars and lab courses shall be conducted on a pass / fail basis.

Section 11

Admission to the master's assessment process

(1) Only those persons who

1. Fulfil the admission requirements specified in Section 3, Para. 1 and
2. Are enrolled in the Master's Programme in Life Science Informatics at the University of Bonn

may be admitted to the master's assessment process.

(2) Candidates shall submit their application for admission to the master's assessment process to the Examination Committee in writing together their application for the first examination in the process. The following shall be included with the application, unless already submitted:

1. Documents proving that the candidate satisfies the admission requirements specified in Para. 1,
2. A statement from the candidate on whether he has already failed a master's assessment process once in this or a related course of study or has definitively failed the process in this or a related course of study after having exhausted all options for repeating it or has already failed a *Diplom* assessment process in Informatics once or has definitively failed the *Diplom* assessment process in Informatics after having exhausted all options for repeating it, and whether he is presently undergoing an assessment process elsewhere.

(3) All further applications shall also be submitted to the Examination Committee. When applying, the candidate shall specify which modules and courses are to be covered by the examination.

(4) Should the candidate not be able to include the documents stipulated in Paras. 1 and 2 in the required form, the Examination Committee may allow him to provide the requisite proof in another form.

Section 12

Admission procedure

(1) The Examination Committee or, in accordance with Section 6, Para. 8, the chairman of the Examination Committee shall decide on applications for admission to the master's assessment process.

(2) An application shall be rejected when

- a) The requirements specified in Section 11, Para. 1 have not been satisfied, or
- b) The candidate's documentation is incomplete, or
- c) The candidate has definitively failed the master's assessment process in the same Master's Programme after having exhausted all options for repeating it or has definitively failed the *Diplom* assessment process in Informatics after having exhausted all options for repeating it, or
- d) The candidate is already enrolled in the same master's programme at another university, or

the candidate is currently undergoing a master's assessment process in an Informatics degree programme.

Section 13

Written tests

- (1) In the course of a written test, candidates are supposed to prove that they are capable of understanding a problem and finding ways to solve it using methods commonly used in their discipline, within a specific period of time and with the help of limited aids.
- (2) The examiners shall announce on a timely basis which aids may be used during a written test. Written tests shall last a maximum of 150 minutes per module.
- (3) Each written test shall be graded by an examiner in accordance with Section 18. Should the candidate be repeating the written test for the second time pursuant to Section 19, Para. 3, it shall be graded by two examiners. Preliminary correction by *wissenschaftliche Mitarbeiter* shall be permissible.
- (2) On application, candidates shall be allowed to examine their graded tests.

Section 14

Oral examinations

- (1) In oral examinations, candidates are supposed to prove that they understand the relationships and correlations in the field they are being tested on and are able to analyse and process specific questions or tasks within this overall context. Oral examinations should also determine whether the individual candidate has a broad basic knowledge of his field.
- (2) Oral examinations shall be conducted by either a panel of several examiners (*Kollegialprüfung*) or a single examiner in the presence of a competent assistant examiner (Section 7, Para. 1, sentence 5), with the candidate being examined either individually or in a group.
- (3) Oral examinations should last an average of 30 minutes (a minimum of 15 minutes and a maximum of 45 minutes) per candidate undergoing a regular assessment in the

course of the semester.

(4) A record shall be kept of the essential topics and results of the examination in the individual courses. Candidates shall be informed of their grade immediately following the oral examination.

Section 15

Master's thesis

(1) The master's thesis is a written dissertation on an independent research project and concludes the candidate's academic training. A master's thesis should demonstrate that the candidate is capable of conducting independent work on a problem taken from the Life Science Informatics field and of producing findings within a specified period of time under application of scientific methods.

(2) Any professor or person with qualification to lecture (*Habilitation*) from the participating faculties who regularly offers courses for the Life Science Informatics Master's Programme in accordance with Section 10, Para. 1, sentences 1 – 4, may assign the subject for a master's thesis; as a rule, the person who assigns the subject shall also act as supervisor for the thesis. Permission from the chairman of the Examination Committee shall be required when a professor who conducts research and teaches at an educational institution or facility outside the participating faculties provides the topic for the master's thesis and subsequently serves as the candidate's supervisor or when the candidate is to do his thesis at a facility outside the university.

(3) Candidates may apply to the chairman of the Examination Committee to have a topic assigned them. In such cases, the chairman shall ensure that the candidate receives a topic for his master's thesis on a timely basis. The candidate shall be given an opportunity to submit proposals for the topic of his master's thesis.

(4) The chairman of the Examination Committee shall notify candidates of the topic of their master's thesis. A record shall be kept of the date of notification.

(5) Candidates shall have six months from the date on which they were notified of the topic their thesis to the date on which they have to submit their thesis. The topic and the nature of the assigned task must be such that the master's thesis can be completed within the specified period. Candidates may decline a topic only once and only within the first month of notification. As an exception, the Examination Committee may extend the submission deadline by up to six weeks upon receipt of an application in which the candidate cites reasons that would justify an extension.

(6) Candidates shall declare in writing when they submit their thesis that the particular thesis is their own work, that they used only those sources and resources cited in the thesis and that they have identified citations as such.

(7) The master's thesis should comprise 30 to 80 DIN A4-size pages. It should be written in English.

(8) Thirty credit points shall be awarded for the master's thesis.

Section 16

Submission and evaluation of a master's thesis

(1) Candidates shall submit their master's thesis in quadruplicate to the Examination Committee by the specified deadline. A record shall be made of the time and date on which the particular master's thesis was submitted. Should a master's thesis not be handed in on time, it shall be deemed to have received the grade "Insufficient" (5.0).

(2) Master's theses shall be evaluated and graded by two examiners. One of the examiners shall be the person who assigned the subject for the particular master's thesis, the other shall be designated by the chairman of the Examination Committee from the group of persons specified in Section 15, Para. 2, sentence 1. The candidate shall be entitled to propose the second examiner.

(3) The examiners shall each grade the master's thesis separately and provide the reasons for the grade they assigned in writing in accordance with Section 18, Para. 1. When the difference between the two grades is less than 2.0, they shall be averaged together for the final grade for the particular master's thesis. Should the difference be 2.0 or greater, the Examination Committee shall appoint a third examiner to evaluate the thesis. In such cases, all three grades will be averaged together for the final grade. A master's thesis may however be awarded the grade "Sufficient" or higher only when at least two of the individual grades were "Sufficient" or higher. Grades shall be averaged in accordance with Section 18, Para. 6.

(4) The candidate shall be notified of his grade within eight weeks at the latest following the submission deadline.

Section 17

Supplementary courses

(1) In addition to their examinations in compulsory courses, candidates may opt to be examined in other subjects (supplementary courses). On application, the Examination Committee shall specify the course and the type and scope of the examination.

On application by the candidate, the results of any examination in these courses shall be included in his *Zeugnis* (official certificate documenting academic performance); these grades however shall not be used when calculating his overall grade.

Section 18

Assessment, grading system and pass requirements for the master's assessment process

(1) The grade for each examination shall be determined by the respective examiner.

The following grading system shall be used:

1	Very good	Excellent achievement
2	Good	Achievement well above average requirements
3	Satisfactory	Achievement corresponding to average requirements
4	Sufficient	Achievement that still meets necessary requirements despite deficiencies
5	Insufficient	Achievement that does not satisfy requirements due to substantial deficiencies

These grades may be raised or lowered by values of 0.3 to produce a graduated grading scale and provide a more nuanced assessment; grades of 0.7, 4.3, 4.7 and 5.3 shall not be allowed.

(2) Candidates shall be informed of the grades earned in individual examinations within six weeks of the particular examination, and the grade awarded for their master's thesis within eight weeks at the latest following the submission deadline. The Examination Committee shall decide the method of notification, giving due consideration to data protection requirements.

(3) The grade earned for a major or minor shall be calculated using the average grade from all examinations the candidate has passed which fall under the subject that constitutes the particular major or minor, with the individual grades being weighted on the basis of the corresponding credit points. The grading scale here is:

Very good	1.5 or less
Good	1.6 to 2.5
Satisfactory	2.6 to 3.5
Sufficient	3.6 to 4.0
Insufficient	More than 4.0

(4) Candidates shall have satisfied the requirements for the master's assessment process when they pass all examinations in the subjects which constitute a major or minor and receive a passing grade on their master's thesis.

(5) The final grade shall be calculated using the average of the grades earned in the three required subjects (i.e., major and minor fields of study), weighted on the basis of the corresponding credit points, in accordance with Section 10, Para. 1, and the grade earned for the master's thesis (weighted with 30 credit points). The grading scale for the final grade for the master's assessment process:

Average of 1.5 or less	Very good
Average of 1.6 to 2.5	Good
Average of 2.6 to 3.5	Satisfactory
Average of 3.6 to 4.0	Sufficient

(6) Only the first decimal place after the decimal shall be used when calculating the grades for individual subjects (i.e., major or minor fields of study) or for overall performance; all further decimal places shall be dropped without rounding off.

(7) When a candidate receives a 1.0 for his master's thesis and the grade average for the three required subjects (i.e. major or minor fields of study) does not exceed 1.1, the candidate shall be awarded a master's degree "with distinction" rather than the final grade of "Very good" as stated in Para. 5.

Section 19

Repeating the master's assessment process

(1) Should a candidate's master's thesis be given the grade "Insufficient", the candidate may write another thesis. The candidate may decline the proposed topic for his master's thesis within the period specified in Section 15, Para. 5, sentence 3 only when he did not make use of this option with his first thesis.

(2) Should a candidate's master's thesis be given the grade "Insufficient" or should his thesis be deemed "Insufficient", the candidate shall, upon submitting an application for permission to write a second master's thesis, be assigned a new topic. Sections 15 and 16 shall apply accordingly. Should the second thesis also be assessed as "Insufficient", the candidate shall have definitively failed the master's assessment process and have no further opportunities to repeat it.

(2) (3) Students may repeat twice any course-specific examinations they have failed. Students who have already repeated an examination once for an elective class in a module may take the examination only once when they select another class in the same module. Should a student who has enrolled in classes for the specialised-study semester designated in Annex I fail to pass the corresponding examination on both examination dates and subsequently enrol in the another lecture class offered in the module in order to meet module requirements, he shall have the option to repeat the examination for the latter class twice if necessary. Students may not repeat any examinations for which they have earned credit points.

(4) A student shall have definitively failed the master's assessment process when he fails to earn any credit points in the last permissible repeat of an examination in a module, making it impossible to earn the number of credit points required for the particular module as outlined in Section 10.

Section 20

Zeugnis

(1) Upon completing the master's assessment process and satisfying the requirements for a master's degree, candidates shall receive a *Zeugnis* (official certificate documenting the individual's academic performance) listing his grades within three months at the latest following the last assessment (i.e., examination or the master's thesis). The *Zeugnis* shall be issued by the University of Bonn and shall list the grades and credit points earned in the individual examinations, the subject of the individual's master's thesis, the grade

received for the thesis, and the overall grade. The overall grade shall be entered in words and as a number with one decimal place in accordance with Section 18, Para. 5.

Supplementary courses shall be listed in accordance with Section 17, Para. 2. The *Zeugnis* shall be signed by the chairman of the Examination Committee.

(2) The *Zeugnis* shall show the date on which the individual completed his last assessment (i.e., examination or the master's thesis).

(3) The *Zeugnis* shall be issued in English and German. It shall be augmented by a Diploma Supplement. Diploma Supplements are issued in a standardised format in English and German and contain supplementary information regarding subject matter, the course of the holder's studies, the academic or occupational qualification acquired with the degree, and the university awarding the degree. Diploma Supplements are intended to improve the level of recognition and assessment of German degrees in other countries. In Germany, Diploma Supplements are additionally intended to help make content and academic qualifications transparent.

(4) In the event that a candidate definitively fails the master's assessment process after having exhausted all options available for repeating it, the chairman of the Examination Committee shall issue the candidate a written notification thereof which shall include information regarding possible legal remedies.

(5) Students who leave the University of Bonn without completing their course of study shall be issued, upon request, a *Zeugnis* after their name has been removed from the university's register of students (exmatriculation). This *Zeugnis* shall be limited to those parts of the student's course of study which he successfully completed. In addition, a certificate may be issued upon request that indicates which examinations or other assessments (examinations or master's thesis) the student did not pass or which the student still needs in order to complete the requirements for a master's degree.

(1) At the same time that he receives the *Zeugnis*, the candidate shall be issued a diploma in English and German with the same date as the *Zeugnis*. This diploma shall document that the holder was awarded a master's degree in accordance with Section 2.

Diplomas shall be signed by the dean of the Faculty of Mathematics and Natural Sciences of the University of Bonn and by the chairman of the Examination Committee for Life Science Informatics and stamped with the seal of the Faculty of Mathematics and Natural Sciences.

IV. Final provisions

Section 22

Invalidity of the master's assessment process and revocation of the master's degree

(1) Should it become known after the *Zeugnis* has been issued that the candidate cheated on an examination or his master's thesis, the Examination Committee may correspondingly correct the grades for those examinations or the thesis on which the candidate cheated and declare the entire master's assessment process or parts thereof as failed.

(2) Should it become known after the *Zeugnis* has been issued that the particular candidate had not fulfilled the requirements for admission to the master's assessment process, and should this have happened without any fraudulent intent on the part of the candidate, this defect shall be remedied by the candidate's successful completion of the assessment process. Should the candidate have wrongfully secured admission with intent, the Examination Committee shall decide on the legal consequences in accordance with the administrative procedure law for the State of North Rhine-Westphalia.

(3) Prior to taking a decision, the Examination Committee shall give the particular student an opportunity to state his case.

(4) The incorrect *Zeugnis* shall be withdrawn and, where applicable, a new *Zeugnis* shall be issued. Decisions pursuant to Para. 1 and Para. 2, sentence 2, may be taken only for a period of five years after the issue of the *Zeugnis*.

(5) Should the candidate's entire master's assessment process be declared a "Fail", the faculty shall revoke the master's degree and withdraw his diploma.

Section 23

Access to master's assessment process records

(1) Upon completion of the master's assessment process, candidates shall be granted access to their written examinations, their thesis, the examiners' written evaluations and the assessment process reports.

Candidates may apply to the chairman of the Examination Committee within one month of issue of the *Zeugnis* for access to their files. The chairman of the Examination Committee shall determine the place and time of such access.

Section 24

Entry into force und publication

(1) These Examination Regulations shall enter into force on the day after their publication.

(2) These Examination Regulations shall be published in the *Amtliche Bekanntmachungen* (Official Announcements) of the University of Bonn and RWTH Aachen University.

M. Winiger
Dean of the
Mathematics and
Natural Science Faculty of the

University of Bonn
Dr. Matthias Winiger, University Professor

Executed pursuant to the resolution adopted by the Faculty Council of the Faculty of Mathematics and Natural Sciences on July 16, 2003 and the resolution passed by the Rectorate on July 22, 2003.

Bonn, September 29, 2003

Aachen, September 23, 2003

Klaus Borchard
Rector
of the
University of Bonn
Dr. Klaus Borchard
University Professor

B. Rauhut
Rector
of
RWTH Aachen University
Dr. Burkhard Rauhut
University Professor

Annex**Modules for LSI MDP**

Course title / Subject	Pts.
Introduction to LSI	14
LSI information systems	9
Algorithmic bioinformatics	12
Foundations in statistics	15
Computational visualistics	11
Applied LSI	18
LSI specialisation	11
Total	90