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**Appendices Teaching and Examination  
 Regulations  
 2014-2015**

**Master's degree programme Nanoscience**



## **Appendix I Teaching outcomes of the degree programme (art. 1.3)**

The graduate of the Top Master Programme in Nanoscience:

1. has recent and profound knowledge of those parts of the disciplines of physics, chemistry, molecular biology, and mathematics that are relevant to nanoscience
2. is able to apply this knowledge to solving realistic scientific problems in nanoscience, even on the basis of a rudimentary problem specification
3. is capable of acquiring within a limited time span sufficient knowledge to work successfully in a different speciality within nanoscience
4. is capable of critically using the scientific literature in his/her chosen speciality
5. is capable of performing scientific experiments and of interpreting their results
6. can effectively convey results of scientific research, orally and in written form, to specialists as well as non-specialists
7. is capable of working independently
8. can co-operate successfully in a research team
9. can formulate and defend a realistic and well-argued research plan on the basis of a rudimentary problem specification
10. is aware of the social and ethical ramifications of scientific research and its applications
11. is able to adapt to the rapid changes occurring in the field of nanoscience
12. has the motivation, knowledge and skills to successfully enter a PhD programme in any of the world's leading research institutes in nanoscience.



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## **Appendix II Specializations of the degree programme (art. 2.2)**

The degree programme is not divided into specializations.



## Appendix III Content of the degree programme (art. 2.3)

The compulsory part of the Top Master Programme in Nanoscience consists of:

- a. **Guided self-study** (6 ECTS) intended to enable students to follow the Core Curriculum. Topics from the following list will be assigned on an individual basis by the Chair of the Board of Examiners:

- Solid-state physics
- Quantum theory
- Organic chemistry
- Inorganic chemistry
- Mathematics

For each assigned topic, the tutor associated with the topic will determine in an oral exam whether the student has passed the requirements.

- b. **Core Curriculum** (30 ECTS)

The Core Curriculum defines to a large extent the character of the Programme.

It consist of the following three modules:

Preparation of nanomaterials and devices (8 ECTS)

Characterization of nanomaterials (9 ECTS)

Fundamental and functional properties of nanomaterials (13 ECTS)

These modules will be examined in written form in two or three parts each. The mark obtained for each part has to be at least 6.

- c. **Scientific paper** (6 ECTS)

The student will write a scientific paper on a topic of his or her choice. This choice needs the approval of the mentor and of the coordinator of this component of the programme, who will also jointly determine the mark obtained.

- d. **Small research project** (13 ECTS)

The student will carry out a small research project around an already defined problem. All students of a given cohort will jointly organize a symposium in which they will present their individual small research projects. The supervisor of the project and the coordinator of this component of the curriculum will jointly determine the mark obtained.

- e. **MSc thesis project** (45 ECTS)

The student will carry out a substantial research project.

- f. **PhD proposal** (6 ECTS)

The student will write a proposal for a PhD project, in the form required by Dutch funding agencies like FOM. It is not necessary that the student actually intends to carry out this project himself or herself. The supervisor of the project and the coordinator of this component of the curriculum will jointly determine the mark obtained.

The small research project (sub d) and the MSc thesis project (sub e) cannot be carried out in the same research group.

The small research project (sub d), the MSc thesis project (sub e), and the scientific paper (sub c) cannot be on the same topic nor supervised by the same person.



<b>Course unit name</b>	<b>ECTS</b>	<b>Practical</b>		<b>Mode of assessment</b>
NS000 Guided self-study	6	No		ST (or MT)
NS001 Core module preparation	8	Yes		ST (or MT), PR
NS002 Core module Characterization	9	Yes		ST (or MT), PR
NS003a Core module properties	13	Yes		ST (or MT), PR
NS190 Scientific paper	6	No		Opdr
NS194 Small research project	13	Research		Opdr
NS200 thesis project	45	Research		Opdr
NS202 PhD proposal	6	No		Opdr
Electives	14			



## Appendix IV Electives (art. 2.4)

### Electives from other master programmes

The student will spend at least 14 ECTS on electives, on topics related to nanoscience but not sufficiently covered by the Core Curriculum. The choice of electives requires consultation with the mentor and approval by the Board of Examiners. These electives are taken from the regular physics and chemistry curricula; the examination method is determined by the Board of Examiners of these curricula. The study load in ECTS is determined by the Board of Examiners of the Top Master Programme in Nanoscience, and is normally about 20% lower than that in the regular physics and chemistry curricula.

A selection of recommended electives (with ECTS) in the list below are recommended. Up-to-date information on the electives is presented on the website of the Programme.

Course name	Code	Credits(ECTS)
Structure determination using spectroscopic methods	NS104	4
Computational physics	NS106	4
Non-linear optics	NS108	4
Many-particle systems and quantum theory of solids	NS110	4
Theoretical condensed-matter physics	NS112	4
Mesoscopic physics	NS114	4
Micromechanics	NS116	4
Computational methods of quantum chemistry	NS120	4
Stereochemistry	NS124	4
Coordination chemistry	NS128	4
Polymer surfaces and interfaces	NS132	4
Polymer physics	NS134	4
Advanced polymer chemistry	NS136	4
Physics of lasers	NS138	4
Solid-state phase transitions	NS140	4
Device physics	NS142	2
Modern laser microscopy	NS146	4
Surface analysis techniques (Part of: Surfaces and Interfaces)	NS196	3

The Board of Examiners may permit the student to select one or more course units from another master's degree programme (from the University of Groningen or from another university). In such case, the Board of Examiners will determine the study load on ECTS of the course units.



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## **Appendix V Entry requirements and compulsory order of examinations (art. 3.2)**

The Guided Self-study has to be completed prior to the start of the Core Curriculum. The three Core Modules have to be completed prior to starting the small research project, the MSc project, and the PhD proposal, unless the Board of Examiners has ruled otherwise on a motivated written request of the student.



## **Appendix VI Admission to the degree programme (art. 4.1.1 + art. 4.2)**

1. Students in possession of an admission permit can be admitted to the programme.
2. Students who meet the requirements are provided with an admission permit by the Admission Board.
3. An admission permit is only valid for the academic year following the academic year in which the permit is granted.
4. There may be other conditions attached to the admission permit. The requirements must be met before the programme has started.
5. The admission requirements comprise:
  - a bachelor's degree in chemistry, physics, materials science, or other field deemed relevant by the Admissions Board;
  - sufficient knowledge of the English language;
  - sufficient knowledge of the relevant sciences;
  - a suitable attitude, motivation and talent to follow the programme.
6. The Board of Examiners establishes an Admissions Board that judges the student's fulfilment of the requirements. This Board consists of three members of the Board of Examiners, completed by a university employee. One of the members is appointed as chairperson.
7. The decisions of the Admissions Board can be appealed to at the Board of Appeal for Examinations.
8. Students apply to the admission procedure by sending in the following documents:
  - a completed application form;
  - a complete curriculum vitae;
  - a survey of the study results attained in academic courses so far;
  - a letter in which the student states why s/he wants to follow this programme in particular, what his/her expectations and ambitions are;
  - (if desired) results of former research projects, like reports or articles;
  - the names of three scientists willing to provide personal information on the applicant;
  - (if desired) other documents that the student thinks useful in furthering his/her application.

These documents are to be sent to the Faculty of Mathematics and Natural Sciences by 1 February preceding the start of the programme.

9. Sufficient knowledge of the English language can be proved by
  - Cambridge Certificate of Proficiency in English (A, B or C);
  - Cambridge Certificate in Advanced English (A, B or C);
  - an overall score of 6.5 or higher in the International English Language Testing System (Academic version);





- a score of at least 580 on the paper-based form of the Test of English as a Foreign Language;
- a score of at least 237 on the computer-based form of the Test of English as a Foreign Language;
- a score of at least 92 on the internet-based form of the Test of English as a Foreign Language.

An original certificate of the test, not older than two years, needs to be sent in. The Admissions Board may accept other proofs of knowledge of the English language that guarantee a comparable level of knowledge of English.

Students who have completed their secondary education in The Netherlands, are exempt from the English proficiency requirement.

### **Applications procedure**

1. The application deadline for admission to the degree programme is 1 February for non-EEA-students and 1 May for EEA-students. The application must be submitted to the Admissions Board.
2. Only in exceptional cases will the Admissions Board consider an application submitted after the dates stated in Article 4.5.1.
3. The Admissions Board will make a decision before 1 May for non-EEA-students and before 1 July for EEA-students. The written admissions declaration will include information for the student about the possibility of an appeal to the Committee of Appeal for the Final Assessments.



## Appendix VII

### Application deadlines for admission (art. 4.6.1)

<b>Deadline of Application</b>	<b>Non-EU students</b>	<b>EU students</b>
Nanoscience	February 1st 2015	February 1st 2015
Behavioural and Cognitive Neurosciences	April 1st 2015	May 1st 2015
Biomolecular Sciences (topprogramme)	April 1st 2015	April 1st 2015
Evolutionary Biology (topprogramme/EM)	January 15th 2015	January 15th 2015
Remaining FMNS Masters	May 1st 2015	May 1st 2015

### Decision deadlines (art. 4.6.3)

<b>Deadline of Decision</b>	<b>Non-EU students</b>	<b>EU students</b>
Nanoscience	June 1st 2015	June 1st 2015
Behavioural and Cognitive Neurosciences	June 1st 2015	June 1st 2015
Biomolecular Sciences (topprogramme)	June 1st 2015	June 1st 2015
Evolutionary Biology (topprogramme/EM)	June 1st 2015	June 1st 2015
Remaining FMNS Masters	November 1st 2015	November 1st 2015