

**Master  
Physics and  
Astronomy**

This EER consists of various parts:

PART I: General provisions

Part II: Provisions applicable to all Master's programmes

Part III: Programme specific provisions

Appendices (2x)

Part I and II have a combined table of contents

Part III has a separate table of contents

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## **PART I General provisions**

### **Section 1 – General provisions**

#### ***Article 1.1 – Applicability of these regulations***

1. These Education and Examination Regulations (EER) apply to the Master's degree programmes of the Faculty of Science and outline the applicable procedures, rights and obligations concerning teaching, interim examinations and course examinations. Part II of these EER lists the provisions applicable to all Master's degree programmes of the Faculty of Science; Part III specifies the provisions applicable to each individual degree programme.
2. The present regulations apply to all students enrolled in a Faculty of Science degree programme for the first time in the academic year 2016-2017.
3. The faculty offers the following 120-EC Master's programmes:
  - a. Biology;
  - b. Computing Science;
  - c. Medical Biology;
  - d. Molecular Life Sciences;
  - e. Physics and Astronomy;
  - f. Science;
  - g. Chemistry;
  - h. Mathematics.

The faculty offers the following 60-EC Master's programmes:

- i. Information Sciences.
4. All degree programmes are offered exclusively as full-time programmes.

#### ***Article 1.2 – Definitions***

1. The terms used in these EER, which are also used in the Higher Education and Research Act (Wet op het hoger onderwijs en wetenschappelijk onderzoek, hereinafter, "the Act") will have the same meaning as in the Act.
2. Apart from the terms referred to in paragraph 1, the following terms will be understood to have the following meaning:
  - a. Fraud: any deliberate act or omission by a student that makes forming an accurate opinion of his or her knowledge, understanding and skills partially or entirely impossible.
  - b. Degree programme: the Master's degree programmes referred to in Article 7.3a, paragraph 1 of the Act;
  - c. Study component: an educational unit as referred to in Article 7.3, paragraph 3 of the Act;
  - d. Student: anyone enrolled at Radboud University for participation in a degree programme and/or in the courses or final examinations of a programme;
  - e. Practical exercise: a practical exercise as referred to in Art. 7.13 paragraph 2 under d of the Act, in one of the following forms:
    - i. Writing a thesis
    - ii. Writing a paper or experimental design
    - iii. Carrying out a design or research assignment

- iv. Completing a literature review
- v. Writing a computer program
- vi. Completing an internship
- vii. Participating in fieldwork or going on an excursion
- viii. Conducting tests or experiments
- ix. Participating in an additional educational activity to acquire certain skills;
- f. Interim examination: an examination testing the knowledge, understanding and skills of the student in relation to a certain unit of study, as well as the assessment of this examination, which is administered by at least one examiner designated by the Examination Board;
- g. Final examination: an examination of the student's academic achievements, in which the Examination Board determines whether or not all examinations that are part of the Master's programme have been successfully completed. The Examination Board may determine that this review requires a test of the candidate's knowledge, understanding and skills by the Examination Board itself and an assessment of the results of that test (in accordance with Article 7.10 of the Act);
- h. Examination Board: the examination committee of a degree programme, established in accordance with Article 7.12 of the Act. Also see the Radboud University Structural Regulations;
- i. Examiner: the person designated by the Examination Board to administer the interim examination, in accordance with Article 7.12 of the Act;
- j. EC: European Credits, i.e. the study load unit in accordance with the European Credit Transfer System. One EC is equal to 28 hours of study;
- k. Specialisation: a coherent programme within the Master's programme that has been approved as such by the faculty board;
- l. Work day: Monday till Friday, with the exception of official holidays and any other days marked by Radboud University as collective holidays;
- m. Awarding of the degree certificate: the formal confirmation that all the examination requirements have been met;
- n. Study guide: the guide for a particular degree programme of the Faculty of Science, containing specific information for the Master's degree programme;
- o. The University: Radboud University;
- p. The faculty: The Faculty of Science
- q. Free elective: a freely-selected, academic, testable component.

## **Part II Provisions applicable to all Master's programmes**

### **Section 2 Access to the degree programme and education**

#### ***Article 2.1 Admission and admission requirements***

1. Decisions regarding admission are made by the Examination Board.

2. The programme-specific part of this EER lists the admission requirements the student must meet to be admitted to the degree programme.

### **Section 3 Structure and design**

#### ***Article 3.1 Final examination, degree and distinctions***

1. The programme is concluded by the Master's examination.
2. A student who has passed the examination of the Master's degree programme will be awarded the Master of Science (MSc) degree.
3. The degree referred to in the second paragraph, is exclusively awarded if the student has earned at least half of his/her EC at this university.
4. The examination board can award a distinction to a student who has successfully passed the degree programme examination. The rules for awarding a distinction are to be found in Article 4.7 of this EER.

#### ***Article 3.2 General learning outcomes***

1. The degree programme has the following learning outcomes for students:
  - a. Acquire knowledge, skills and insights in the relevant field of study;
  - b. Develop academic competences;
  - c. Prepare for their future career;
  - d. Strengthen qualifications in the area of independent academic research;
  - e. With regard to the specialisation Science, Management and Innovation, acquire knowledge, insight and skills in relevant areas of business administration, policy sciences and social beta themes;
  - f. With regard to the specialisation Science in Society, acquire knowledge, insight and skill in relevant areas of media, knowledge transfer and social interaction;
  - g. With regard to the specialisation Science and Education, acquire additional teaching competences.

#### ***Article 3.3 Curriculum***

1. The programme comprises the total of the components as described in the programme-specific part of these regulations and is aimed at the realisation of well-defined objectives in the areas of the knowledge, understanding and skills that students are deemed to possess upon successful completion.
2. The programme has a number of research specialisations. These specialisations are described in Articles 7.1 and 7.5 of the programme specific provisions.
3. In addition, the faculty has 3 specialisations with a social component:
  - a. Science, Management and Innovation
  - b. Science in Society
  - c. Science and EducationThese specialisations are described in paragraphs 7, 8 and 9.
4. Within the Master's programme Computing Science, it is not possible to follow the specialisation referred to in paragraph 3 under c. (Science and Education).

5. Within the Master's programme Information Science, it is not possible to follow any of the specialisations referred to in paragraph 3.
6. The faculty specialisations mentioned in paragraph 3 consist of programme-specific components equivalent to 60 EC (see the programme-specific provisions in this EER) and account for 60 EC of the programme as described below in paragraphs 7, 8 and 9.

Each degree programme includes a component that is philosophical in nature with a minimum study load of 3 EC, free elective space of 6 EC and a portfolio component with a study load of 0 or 1 EC. For the specialisations Science, Management and Innovation and Science in Society, 3 EC of free electives space is included in the specialisation programme. The other 3 EC is included in the programme specific curriculum. For the specialisations Science, 6 EC of free electives space is included in the specialisation programme. The portfolio component is intended to enable students to reflect on study performance, planning and career orientation.

7. The specialisation Science, Management and Innovation includes the following components with the accompanying study load:
  - a. Courses selected by the student from the following themes: 1) climate and energy and 2) health. After permission from the Examination Board, a different social beta theme course may be selected as well. Depending on the theme, the student will follow compulsory courses from Science, Management and Innovation with a total study load of 12 EC, consisting of:
    - i. Core theme courses (6 EC);

Course code	Course name	EC
<i>Climate and Energy theme</i>		
NWI-FMT022	Climate and Energy	6
<i>Health theme</i>		
NWI-FMT023	The Future of Health: from the laboratory to the clinic and from utopia to applications	6

- ii. Courses on other themes (6 EC in total)
  - For the Climate and Energy theme, selection of

Course code	Course name	EC
NWI-FMT020	The Bio Economy	3
NWI-FMT026	Energy Modelling	3
NWI-MM020	Sustainable Consumption and Production	3

- For the Health theme, selection of:

Course code	Course name	EC
NWI-FMT021	Neuroscience	3
NWI-FMT025	Synthetic Bio-chemistry, Nanomedicine and Tissue Engineering: from research lab to clinic	3

For specific social beta themes a curriculum of specific themes has been set (12 EC)

- b. Compulsory Science, Management and Innovation components with a total study load of 15 EC:

Course code	Course name	EC
NWI-FMT003E	Innovation Management	6
NWI-FMT0234	Policy & Economics	3
NWI-FMT006A	Entrepreneurship Making a business plan	3
NWI-FMT019	Methods in Societal Research	3

- c. Free electives (3 EC) (part of the 6 EC free electives space of the Master's)  
 d. Science, Management and Innovation final research project of 30 EC
8. The specialisation Science, Management and Innovation includes the following components with the accompanying study load:
- a. Compulsory components with a total study load of 21 EC:

Course code	Course name	EC
NWI-FC002B	Science and Societal Interaction	3
NWI-FC003B	Risk Communication	3
NWI-FC0010C	Framing Knowledge	3
NWI-FC0011C	Knowledge Society	3
NWI-FC0013C	Science and Media	3
NWI-FC0043B	Science and Public Policy	3
NWI-FC0044B	Methods of Societal Research	3

- b. Electives within the specialisation with a total study load of at least 6 EC  
 c. Free electives (3 EC) (part of the 6 EC free electives space of the Master's)  
 d. Science in Society internship and report totalling 30 EC.
9. The specialisation Science and Education includes the following components with the accompanying study load:
- a. Series of lectures (5 EC)  
 b. Self-evaluation 1 (10 EC)  
 c. Supervised internship (15 EC)  
 d. Design and Research (10 EC)  
 e. Self-evaluation 2 (5 EC)  
 f. Independent internship (15 EC)

These components are provided by the Radboud Graduate School of Education. If, due to the successful completion of the education minor during the Bachelor's programme or for other reasons, a portion of the above-mentioned components need not be followed, the corresponding number of EC must be filled with programme specific components.

10. The composition of the Master's programme compiled by the student must be presented for



approval to the Examination Board no later than six months before the expected examination date. The Examination Board will decide whether to grant approval within a month of receiving the submitted programme.

***Article 3.4 Sequence of education and interim examinations***

1. The graduation project of the specialisation Science, Management and Innovation cannot be taken before a passing grade has been earned or an exemption granted for the core theme courses and the Methods in Societal Research courses, as referred to in Article 3.3 paragraph 7 under a and b.
2. The graduation project of the specialisation Science in Society cannot be taken before a passing grade has been earned or an exemption granted for a total of 12 EC of compulsory components, including the component Methods in Societal Research, as referred to in Article 3.3 paragraph 8 under a.
3. The components of the specialisation Science and Education cannot be taken before a passing grade has been earned or an exemption granted for the programme-specific components with a study load of at least 30 EC, including the practical activities of the research internship/research thesis of the degree programme.
4. If applicable, the programme-specific section lists additional requirements regarding the sequence of the programme-specific components of the specialisations with a social component and for the research specialisations.

***Article 3.5 – Type of interim examination***

1. Each component of the degree programme will be concluded by an interim examination. Interim examinations may comprise more than one modular interim examination and are administered in the following forms:
  - a. Written (paper and/or digitally);
  - b. Oral;
  - c. Presentation;
  - d. Practical and related report.
2. At the request of the student, the Examination Board may allow an interim examination to be administered in a form other than stated above.
3. Students with disabilities are given the opportunity to take interim examinations in a manner appropriately suited to their disability. The Examination Board, if necessary, shall seek expert advice and counsel prior to reaching its decision. If the students in question require certain facilities for their interim examinations, they must request these from the faculty's Education and Examination Administration no later than two weeks before the interim examination.
4. For oral examinations, no more than one person is tested at the same time, unless decided otherwise by the Examination Board.
5. An oral interim examination is not public, unless the Examination Board has deemed otherwise for exceptional cases.
6. Oral interim examinations are administered in the presence of at least one second examiner or an observer appointed by the Examination Board. In special cases, the Examination Board may require that the oral interim examination be recorded.

7. For each component, the examiner with the approval of the Examination Board will announce the form in which the interim examinations will be administered prior to the commencement of the academic year. In special cases, the examiner may change the format of examination later on in the academic year. This may only be done before the start of the component in question and must be approved by the Examination Board.

### ***Article 3.6 Exemptions***

1. The Examination Board at the request of a student and having heard the examiner involved, may exempt the student, either partially or fully, from sitting an interim examination if the student:
  - a. has passed a course examination in a relevant subject at a university or institute of higher vocational education (HBO);
  - b. demonstrates that he/she has adequate knowledge and skills regarding the component in question as a result of relevant work experience or professional experience.
2. At the request of the student who has completed a Bachelor's at the faculty, granting access to the Master's, the Examination Board may grant the student exemption for a maximum of two Master's courses or for multiple Master's courses with a total study load of no more than 10 EC, provided these were earned as extracurricular Bachelor's components and correspond to the Master's components.
3. Exemptions as referred to in paragraphs 1 and 2 cannot be granted for final examination papers.

### ***Article 3.7 Term of validity of successfully completed interim examinations***

1. The term of validity of successfully completed interim examinations is unlimited.
2. Contrary to the provisions in the first paragraph, the Examination Board may set supplementary or replacement requirements for a component, if it judges that the requirements pertaining to that interim examination deviate considerably from those that were in effect at the time the interim examination was taken.

## **Section 4 Examinations**

### ***Article 4.1 Frequency of interim examinations***

1. Students are given at least two opportunities per year to take interim examinations, with the exception of practical courses or the practical portion of components, which can be taken at least once per academic year. Interim examinations are administered immediately upon completion of the component, during a period to be determined.
2. Contrary to the stipulation in the first paragraph, there will be at least one opportunity in the following year to take an interim examination for a course that was taught for the final time in a particular academic year.
3. If a certain component is not given in a particular year, the opportunity to take the corresponding examination will be given once in that year, as long as the interim examination is administered in written or oral form.

#### ***Article 4.2 Registration for interim examinations***

1. Students who register through OSIRIS for courses in the programme are also automatically registered for the first interim examination opportunity in the relevant academic year. If a student does not wish to participate in the interim examination, he/she must de-register for the examination via Osiris up to 1 day before the examination date. After the abovementioned time period, the student can only personally deregister directly with the lecturer up until the starting time of the interim examination.

If the student does not sit the examination without having deregistered in time, he/she will lose an examination opportunity for the interim examination, unless the Examination Board decides otherwise in exceptional cases.

2. The student must register for an interim examination in accordance with the applicable guidelines and instructions, no later than seven days before the interim examination date.
3. If a resit for an interim examination has been taken two or more times, additional requirements are set for subsequent resits.
4. The "Regulations for examination participation" in these EER are applicable in these cases.

#### ***Article 4.3 Confirmation of interim examination results***

1. The result of an interim examination is determined by an examiner in the form of a grade on a scale of 1 (lowest possible grade) to 10 (highest possible grade), consisting exclusively of whole number or half numbers. The grade 5.5, however, is never given. When rounding off between 5 and 6 the rule applies that a grade lower than a 5.5 is rounded down to a five (5) which is an insufficient grade, meaning the educational component has not been successfully completed; while a 5.5 and higher is rounded up to a six (6), meaning that this educational component has been successfully completed. In addition to results in the form of a grade, the assessments "satisfactory" and "not satisfactory" may also be awarded.
2. If a student re-sits an interim examination, the most recent mark will determine the final result.

#### ***Article 4.4 Publication of results***

1. The examiner shall, on the date that an oral interim examination is administered, determine the result and give the student a written statement of this.
2. The examiner shall determine the result of a written interim examination within 15 working days of the date it was administered. Here the precondition applies that there are at least 10 work days between the date of the publication of the result in Osiris and the date of the resit. The examiner will provide the faculty administration office with the necessary details for them to award of the document of proof regarding the student's result. This result must be made available to the student within two work days after the result has been determined.
3. In special cases, the Examination Board may extend the term in which the result must be determined, as referred to in paragraph 2, by a maximum of 10 work days.
4. In instances in which an interim examination is administered in a form other than oral or written, the Examination Board shall determine prior to the administration of the examination how and when the student shall be issued a statement of the result. This term shall not be longer than 30 days after the interim examination was administered.

5. On this statement of the result of an interim examination, the student is informed of his/her right of inspection, referred to in Article 4.5 as well as the right to appeal to the Examination Appeals Board.
6. A student may submit an appeal of a decision by the Examination Board to the Examination Appeals Board within six weeks.

#### ***Article 4.5 Right of inspection and right of cognizance***

1. Within at least 30 days following publication of a written interim examination result, the student may request access to review and inspect all graded work. In relation to the results of interim examinations with "open" questions, at the student's request he/she will be granted at cost price a copy of their graded work.
2. During the period, referred to in paragraph 1 of this Article, any student who has taken an interim examination may review the questions and assignments of the interim examination in question, as well as the standards on which the result was based.
3. The Examination Board may determine that the inspection or review shall take place at a particular location and provide at least two different time periods. If the student demonstrates that he/she is unable to attend the inspection or review as a result of force majeure, then another option shall be offered, if possible within the period stated in paragraph 1 of this Article.
4. In all cases, provided this has been requested by the student in a timely fashion, the inspection must take place a minimum of five working days before the resit of an interim examination.
5. The examiner shall retain all written interim examinations and related papers (assignments or otherwise) that count towards the final result for a period of two years following the date the examination was administered. Master's programme reports and theses must remain available for visitations, accreditations and inspections and shall be kept for seven years.

#### ***Article 4.6 Confirmation of the result of the final examination***

1. The student is given the opportunity to take the final examination after he/she has provided sufficient proof that he/she has passed the components leading up to the final examination.
2. The Examination Board will determine the result of the final examination, as well as the rules in relation to the manner in which the result of the examination is determined.
3. Prior to determining the result of the final examination, the Examination Board may evaluate and assess the student's knowledge with respect to one or more components or aspects of the programme, if and to the degree to which the results of the related interim examinations justify this.

#### ***Article 4.7 Awarding distinctions***

1. With due observance of the provisions set out in this Article, the Examination Board is responsible for the decision of whether a distinction shall be awarded and if so, which distinction.
2. The distinctions
  - a. "cum laude" shall be awarded if the weighted average result of the final assessment of the components referred to in paragraph 3 is equal to or higher than 8.0.

- b. "summa cum laude" shall be awarded if the weighted average result of the final assessment of the components referred to in paragraph 3 is equal to or higher than 9.0.
3. The distinction shall be calculated on the basis of all components of the examination programme for which a mark has been awarded on a scale of 1 to 10, with the exception of extra-curricular components.
  4. The number of EC of the component referred to in paragraph 3 shall serve as the weighting factor for the calculation of the weighted average result, unless provided otherwise in the programme-specific part of these regulations.
  5. The distinction shall not be awarded if more than 10 per cent of the total study load of the examinations for the degree programme (being one or more components) has been re-sat or if interim examinations have been re-sat more than once, unless the Examination Board decides otherwise, stating the reasons for this decision.
  6. The distinction shall not be awarded if fraud was discovered in one of the examinations of the degree programme.
  7. Supplementary to paragraph 2, the degree programme uses the weighing factors below when determining distinctions.

The following criteria are used for awarding the cum laude distinction:

- The EC weighted average of the assessments of all the examination components with a scope of fewer than 20 EC must at least equal 8.0 without any rounding.
- The EC weighted average of the assessments of all the examination components with a scope greater than or equal to 20 EC must at least equal 8.0 without rounding.

The following criteria are used for awarding the summa cum laude distinction:

- The EC weighted average of the assessments of all the examination components with a scope of fewer than 20 EC must at least equal 9.0 without rounding.
- The EC weighted average of the assessments of all the examination components with a scope greater than or equal to 20 EC must at least equal 9.0 without rounding.

#### ***Article 4.8 – Fraud and plagiarism***

1. If an examiner or supervisor suspects or finds proof of fraud, plagiarism or other irregularities during the interim examination or while assessing the interim examination or written assignment, the examiner or supervisor shall inform, in writing, both the relevant programme Examination Board and the student concerned. The student will be permitted to complete the interim examination.
2. The Examination Board will then decide as quickly as possible but at least within 20 work days whether fraud or plagiarism has indeed been committed and what possible actions will be taken. The Examination Board shall not make a decision in this regard until after hearing the student in question, or at least providing the student with the opportunity to be heard. A written report of this hearing shall be made.
3. In the event of fraud or plagiarism, a note of this will be made in the student's file.
4. In case of fraud during an interim examination, the student shall be excluded from further participation in the interim examination and no grade shall be awarded. This means the student will have used up one of his/her interim examination opportunities.

5. In accordance with Article 7.12b paragraph 2 of the Act, the Examination Board may, in case of fraud or plagiarism, bar the student from sitting for one or more interim examinations and/or final examinations at the institute for a maximum period of 12 months.
6. In the event of serious fraud, the institutional board may recommend that the student's enrolment for the degree programme be terminated.
7. In cases of plagiarism, the relevant Examination Board may, in addition to the measures listed under paragraph 5 of this Article, require the student to complete a new assignment on a subject to be determined by the lecturer responsible for that course examination.

## **Section 5 Study performance, support and advice**

### ***Article 5.1 – Study performance and support***

1. The faculty dean is responsible for recording student results in such a way that, upon request, the Examination Board can provide the student with an overview of the progress of the study within a reasonable time of this request.
2. The dean is responsible for providing adequate student counselling.

## **PART III Programme-specific provisions for the MASTER'S PROGRAMME IN PHYSICS AND ASTRONOMY**

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## **Section 6 Access to the degree programme and education**

### ***Article 6.1.1 Admission requirements***

Admission requirements for the programme:

- a. Students must have successfully completed the final examination of the Radboud University Bachelor's programme in Physics and Astronomy; or
- b. Students must have successfully completed the final examination of the Bachelor's programme in (Technical) Physics and/or Astronomy at another Dutch university; or
- c. Students must be in possession of a proof of admission provided by the Executive Board for the academic year in question (Article 6.1.2).

### ***Article 6.1.2 Proof of Admission***

To be eligible for a proof of admission:

- a. Students must be in possession of a degree certificate that is at least equal to the degrees referred to in paragraph 6.1.1 under a and b; or
- b. Students must have demonstrated suitability for participation in the degree programme, in the opinion of the Examination Board.
- c. And students must provide proof of sufficient proficiency in English, as described in Article 6.3.

### ***Article 6.1.3 Enrolment periods***

Students can enrol in the programme on 1 September. Enrolment during the course of the programme is only possible if the Examination Board grants explicit permission and declares that enrolment in the programme is still possible.

### ***Article 6.2 Pre-Master's***

Not applicable.

### ***Article 6.3 Language requirements***

1. In addition to the admission requirements described above, sufficient proficiency in English is also required. This language requirement is satisfied if a student:
  - a. Is in possession of a diploma of a university of applied sciences (HBO); or
  - b. Is in possession of a Bachelor's diploma earned at a Dutch university; or
  - c. Has passed one of the following tests:
    - i. The TOEFL with a score of 550 or higher for the paper version;
    - ii. The TOEFL with a score of 213 or higher for the computer version;
    - iii. The TOEFL with a score of 79 or higher for the online version;
    - iv. The IELTS with a score of 6.0 or higher;
    - v. The Cambridge CAE or CPE with a score of C or higher.

The Examination Board may in certain cases assess whether a student has sufficient proficiency in English.



2. A sufficient command of the Dutch language is required to participate in components taught in Dutch (as described in Article 7.4). Non-Dutch students have met the language requirement for sufficient proficiency in Dutch if they have passed the state examination of Dutch as a second language, level 2.

The Examination Board may in certain cases assess whether a student has sufficient proficiency in Dutch.

## **Section 7 Structure and design**

### ***Article 7.1.1 Programme-specific learning outcomes***

In addition to the general learning outcomes described in Part II of these regulations, the Master's programme in Physics and Astronomy has the following learning outcomes:

#### **General cognitive skills**

1. Graduates will have acquired a way of thinking that will enable them to penetrate and solve problems, while maintaining a critical stance towards established scientific insights.
2. Graduates will be able to formulate and analyse scientific problems at an abstract level by dividing them into testable sub-problems, differentiating between major and minor aspects.
3. Graduates will be able to synthesize solutions to sub-problems within a scientific framework and thus contribute to the formulation of general theories.
4. Graduates will possess mathematical knowledge to the extent that this is relevant in physics and astronomy at the Master's level.
5. Graduates will possess sufficient skills in the fields of computing and computer science, which will enable them to design and implement computer programs and use current application programs.

#### **Skills based on knowledge and insights pertaining to the fields of physics and astronomy**

6. Graduates will have gained adequate knowledge and insights pertaining to the basic sub-areas of physics and astronomy. The scope of this basic knowledge will be sufficient to allow them to do practical training in one of the research groups.
7. Graduates will possess sufficient skills in at least one sub-specialisation of physics and astronomy to conduct scientific research under supervision.
8. Graduates will be able to understand scientific articles on the chosen specialisation. Furthermore, they will be able to follow the developments in the chosen specialisation (level: Physical Review).
9. Graduates will be able to assimilate newly acquired knowledge of physics and astronomy and to integrate this knowledge with the knowledge they already possess. In addition, they will be able to orient themselves at specialist level in a sub-specialisation of physics and astronomy that lies outside the chosen specialisation.

### **Research methods in physics and astronomy**

10. Graduates will be able to find relevant scientific sources relating to physical or astronomical problems that need to be solved.
11. Graduates will be able to formulate new questions and hypotheses in the fields of physics and astronomy, and to select the appropriate pathways and research methods for solving these questions, taking into account the services and means available.
12. Graduates will be able to set up and perform experimental or theoretical scientific research, to systematically process and critically interpret the research results, and to formulate conclusions

### **General communication skills**

13. Graduates will be able to communicate with colleagues in the same discipline about scientific knowledge, both at basic and specialist levels. They will be able to report orally and in writing, and to discuss a scientific topic, in Dutch as well as in English.
14. Graduates will be able to hold an oral presentation and to write a lucid article on the research conducted and modern concepts in physics and astronomy for a general, non-specialist public.

### **Reflection on society, societal problems and professional career**

15. Graduates will have gained sufficient knowledge of and insights into the role of physics and astronomy in society in order to function adequately in their future professions and reflect on societal problems.
16. Graduates will have gained knowledge and acquired skills to compete for professional opportunities after graduation.

Specific skills to be acquired in the specialisations Particle and Astrophysics, Physics of Molecules and Materials, and Neuroscience:

17. Graduates will have a broad and in depth overview of the topic of the Master's specialisation and profound knowledge of capita selecta in connection to the subject of the Master's thesis.

### **Specific skills to be acquired in the specialisation Science in Society (SIS)**

18. Graduates will have sufficient knowledge of various theories of communication that will enable them to reflect critically on the literature in the field of communication.
19. Graduates will have gained insight into theories of communication and will be able to put a number of them into practice.
20. Graduates will be able to reflect on the ways in which they put their communication skills into practice, efficiently applying communicative concepts.
21. Graduates will have gained insight into factors that have a positive or negative effect on communication, and will have acquired the skills to identify and influence these factors in concrete communicative situations.
22. Graduates will possess skills in the fields of scientific journalism and technical communication, and knowledge of recent developments in these fields.

**Specific skills to be acquired in the specialisation Science for Education**

23. Graduates will have sufficient knowledge of various theories of communication that will enable them to reflect critically on the literature in the field of communication.
24. Graduates will have gained insight into theories of communication and will be able to put a number of them into practice.
25. Graduates will be able to reflect on the ways in which they put their teaching skills into practice, efficiently applying educational concepts.
26. Graduates will be able to indicate how scientific analyses and solutions to questions should be applied in concrete curricular and extra-curricular settings.
27. Graduates will be able to guide non-colleagues in mastering and practising the teaching profession.

**Specific skills to be acquired in the specialisation Science, Management and Innovation**

28. Graduates will have gained an overview of and insight into the various theories in the fields of management science and business administration.
29. Graduates will have sufficient knowledge of these theories to reflect critically on the literature on counselling in these fields.
30. Graduates will have gained insight into the various tools and strategies relating to the diagnosis and analysis of various types of complex management questions in science-related, knowledge-intensive organisations.
31. Graduates will be able to use these tools and strategies in practice and to report on them orally and in writing, effectively applying theoretical concepts from management science and business administration.

***Article 7.1.2 External assessment of programme-specific learning outcomes***

The specific learning outcomes are included in the critical self-study of the degree programme to enable independent assessment via the national degree programme assessment for Physics and Astronomy 2013/14 carried out by an external committee of experts under the auspices of QANU (organisation for the quality assessment of Dutch universities). On the basis of this assessment, the degree programme was accredited by the NVAO (Accreditation Organisation of the Netherlands and Flanders) until 30-12-2020.

***Article 7.2 Programme study load***

The Master's programme in Physics and Astronomy has a study load of 120 EC.

***Article 7.3 Programme type***

The programme is only offered full-time.

***Article 7.4 Programme language***

The degree programme is taught in English.

Contrary to this provision, the specialisation Science and Education, as stated in Article 3.3 paragraph 9, is taught in Dutch.

**Article 7.5 Composition of the programme**

1. Subject to the provisions in Part II of these regulations, the student chooses one of the following specialisations of the degree programme:
  - a) Particle and Astrophysics
  - b) Physics of Molecules and Materials
  - c) Neuroscience
  - d) Science, Management and Innovation
  - e) Science in Society
  - f) Science and Education
2. Students must select their specialisation through Osiris within two months of the start of the Master's programme.

**Article 7.5.1 Master's specialisation programme**

**Article 7.5.1.1 Master's specialisation programme a, b, c**

The specialisations Particle and Astrophysics, Physics of Molecules and Materials and Neuroscience comprise the following programme-specific components and corresponding study load:

1. NWI-NM086C - Master's Thesis (60 EC) corresponding to the chosen specialisation.  
The degree programme publishes a list of approved internship departments every year. In order to complete an internship at a department that is not on this list, permission must be requested from the Examination Board prior to the start of the internship.
2. The compulsory selection (40 EC) from the Physics and Astronomy Master's courses including specialisation-specific courses (15 EC) described in Article 7.5.1.1a.  
NWI-NM001B - Electrodynamics (3 EC) is compulsory if it is not already included in the specialisation-specific courses.
3. NWI-FFIL211B - Transformative Role of Physics (3 EC).
4. NWI-NM019B - Professional Preparation (1 EC)
5. The course selection in the free elective space (10 EC) must be presented for approval to the Examination Board.
6. Free electives (6 EC).

**Article 7.5.1.1a Master's specialisation in Particle and Astrophysics  
Compulsory courses (15 EC)**

Course code	Course name	EC
NWI-NM001B	Electrodynamics	3
NWI-NM062D	Cosmology	9
NWI-NM072C	Student Seminar Particle and Astrophysics	3

**Article 7.5.1.1b Master's specialisation in Physics of Molecules and Materials**

**1. Compulsory courses (15 EC)**

Course code	Course name	EC
NWI-NM001B	Electrodynamics	3
NWI-NM009B	Solid State Physics	6
NWI-NM089B	Molecular Physics	6

**Article 7.5.1.1c Master's specialisation in Neuroscience**

**1. Compulsory courses (15 EC)**

Course code	Course name	EC
NWI-BM044B	Systems Neuroscience	3
NWI-BM053B	Behavioural Neuroscience	3
NWI-BM059B	Systematic Reviews in Neuroscience	6
NWI-BM103B	Methods in Neuroscience	3

**Article 7.5.1.2 Master's specialisation in Science, Management and Innovation, Science in Society and Science and Education**

The faculty specialisations comprise the following components of 60 EC in total:

1. Science, Management and Innovation:
  - a. NWI-NM078D - Master's Thesis (30 EC)  
The degree programme publishes a list of approved internship departments every year. In order to complete an internship at a department that is not on this list, permission must be requested from the Examination Board prior to the start of the internship.
  - b. The selection of compulsory courses (23 EC) from the Physics and Astronomy Master's courses, which must be approved in advance by the Examination Board.
  - c. NWI-NM019B - Professional Preparation (1 EC)
  - d. NWI-FFIL211B - Transformative Role of Physics (3 EC).
  - e. Free electives (3 EC).

The faculty portion of these specialisations are described in Article 3.3 paragraph 7.

2. Science in Society:
  - a. NWI-NM078D - Master's Thesis (30 EC)  
The degree programme publishes a list of approved internship departments every year. In order to complete an internship at a department that is not on this list, permission must be requested from the Examination Board prior to the start of the internship.
  - b. The selection of compulsory courses (23 EC) from the Physics and Astronomy Master's courses, which must be approved in advance by the Examination Board.
  - c. NWI-NM019B - Professional Preparation (1 EC)
  - d. NWI-FFIL211B - Transformative Role of Physics (3 EC).
  - e. Free electives (3 EC).

The faculty portion of these specialisations are described in Article 3.3 paragraph 8.

3. Science and Education:

a. NWI-NM078D - Master's Thesis (30 EC)

The degree programme publishes a list of approved internship departments every year. In order to complete an internship at a department that is not on this list, permission must be requested from the Examination Board prior to the start of the internship.

b. The selection of compulsory courses (20 EC) from the Physics and Astronomy Master's courses, which must be approved in advance by the Examination Board.

c. NWI-NM019B - Professional Preparation (1 EC)

d. NWI-FFIL211B - Transformative Role of Physics (3 EC).

e. Free electives (6 EC).

The portion of these specialisations that are provided by the Radboud Graduate School of Education are described in Article 3.3 paragraph 9.

***Article 7.5.2 Deviating programme***

If a student does not choose a specialisation, he/she must submit a motivated request for permission to the Examination Board for an alternative course selection for the Master's programme. The submitted course selection must include at least 60 EC, including at least 15 EC of Master's courses and a programme-specific internship. The components of the deviating programme must in general meet the requirements of the programme-specific curriculum (120 EC) described in Article 7.5.1.1.

## Part IV – Transitional and final provisions

### Section 9 Transitional provisions

Not applicable in 2016-2017.

### Section 10 Final provisions

#### *Article 10.1 Safety net scheme and hardship clause*

1. In any situations which are not fully or clearly covered by these regulations, the decision lies with the dean.
2. Any situations which these regulations may result in unreasonable hardship for individual students, the Examination Board or the dean is authorised to make an exception to the provisions in the Education and Examination Regulations.

#### *Article 10.2 Confirmation and amendments*

1. Notwithstanding the provisions in Article 7 of the Structure Regulations, these regulations are drawn up or amended by the dean after receiving advice from the programme committees and after having obtained approval from the faculties' general assembly.
2. An amendment to these regulations cannot enter into force in the current academic year, unless the situation has the potential to make it extremely difficult for the student to participate in the programme.
3. **Article 10.3 Entry into force**

These regulations shall enter into force on 1 September 2016.

#### *Article 10.4 Publication*

1. The dean is responsible for publishing these regulations and any amendments thereto.
2. Interested parties may consult these regulations on the website: [www.radboudnet.nl](http://www.radboudnet.nl) or [www.student.ru.nl](http://www.student.ru.nl)

As established by the dean on August 29, 2016

## Regulations for examination participation

These regulations are applicable to all students at the Faculty of Science and are in regards to the central registration and deregistration for examinations and the application procedure for additional examination opportunities.

1. A student has two examination opportunities for each component.
2. By registering for a course in Osiris, you will be automatically registered for the first examination opportunity.
3. Contrary to point 2, students are required to register for all other examinations through Osiris. This is possible up to 7 days before the examination.
4. Students can deregister for the examination in Osiris up to 1 day before the examination date.
5. After the time period mentioned in point 4, students can only personally deregister directly with the lecturer up until the starting time of the examination.
6. If a student does not sit the examination without having deregistered through one of options stipulated above, they lose an examination opportunity (1 of 2). This is logged in the examination administration as “ND” (“niet deelgenomen” - did not participate).
7. If the student can demonstrate that they were unable to take the examination or deregister in a timely fashion due to mitigating circumstances, the Examination Board may decide to disregard the original registration for the examination.
8. If the examination has not been passed after the second attempt, the student must get permission from the lecturer to take part in the examination each additional time he/she wishes to take it. This permission is requested via an online form: <http://www.radboudnet.nl> or [www.student.ru.nl](http://www.student.ru.nl). The student must hand in the form signed by the lecturer to the Student Service Desk. The Student Service Desk handles the examination registrations. The student can check their registration in Osiris.
9. These regulations are in effect from 1 September 2016.



## **Code of Conduct for foreign language use, as referred to in Article 7.2 (c) of the Higher Education and Research Act (the Act)**

(Agreed upon by the Executive Board)

At Radboud University the following code of conduct applies:

### **Article 1**

At Radboud University Nijmegen, allowance for administering examinations and interim examinations in a language other than Dutch will be considered if the specific nature, design or quality of the education or nationality of the students necessitate this.

### **Article 2**

A decision to use a foreign language will be made by the dean of the faculty in question, after having received advice from the programme committee. The dean will observe the following principles:

- the need to use a different language other than Dutch must be clear;
- examinations and interim examinations for English-speaking degree programmes are administered in English; interim examinations of courses taught in English are administered in English, unless the examination committee of the degree programme in question decides otherwise;
- education in a foreign language must meet the same quality standards as education in Dutch.

### **Article 3**

The decision by the dean is included in the education and examination regulations of the degree programme.

### **Article 4**

The dean of the faculty will report his/her decision to the Executive Board.