

Education and Examination Regulations

2025-2026

Master Mathematics

Radboud Universiteit



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PART I GENERAL PROVISIONS MASTER

SECTION 1. GENERAL PROVISIONS

ARTICLE 1.1 APPLICABILITY OF THE REGULATIONS

1. These Education and Examination Regulations (hereinafter: EER) apply to the Master's programmes (the study programme in which the student is enrolled, is hereinafter referred to as: the study programme), including all associated educational units, of the Faculty of Science. These regulations outline the applicable procedures, rights and obligations for teaching, interim examinations and final examinations.
2. The present regulations apply to all students enrolled in the study programme in the 2025-2026 academic year. Students who enrolled in the study programme before 1 September 2016 and have been continuously enrolled in this study programme may appeal to the regulations that were active at the time of their initial enrolment in the study programme.
3. Educational units that are included in the programme-specific part of these regulations as part of the study programme are subject to the rules outlined in these regulations. Educational units offered by the Faculty of Science are always subject to the regulations included in at least one of the EERs of the Faculty of Science.
4. The Faculty offers the following 120 EC Master's programmes:
 - a. Biology
 - b. Computing Science
 - c. Science Education
 - d. Mathematics
 - e. Medical Biology
 - f. Molecular Sciences
 - g. Physics and Astronomy
 - h. Science for Sustainability
5. The Faculty offers the following 60 EC Master's programmes:
 - a. Information Sciences
6. The study programmes are offered exclusively as full-time programmes.

ARTICLE 1.2 EXECUTIVE BOARD GUIDELINES

1. In view of the organisation and coordination of the provisions in these regulations, the Executive Board has established the following guideline and regulations. The guideline and regulations can be found in the appendix:
 - a. Appendix 1: Guideline for Awarding Distinctions
 - b. Appendix 2: Fraud Regulations

ARTICLE 1.3 DEFINITIONS

1. The terms used in these regulations that also appear in the Higher Education and Research Act (Wet op het Hoger onderwijs en Wetenschappelijk onderzoek, hereinafter: 'the Act') have the same meaning as that assigned to them by the Act.
2. Apart from the terms referred to in paragraph 1, the terms below are understood to have the following meanings:
 - a. **Study programme:** the Master's programme, as referred to in Article 7.3a, paragraph 1 of the Act.
 - b. **Educational unit:** a study programme is a coherent set of educational units; see Article 7.3, paragraphs 2 and 3 of the Act. In practice, an educational unit is also referred to as a 'course'.
 - c. **Student:** a person enrolled at Radboud University to take educational units and/or to take interim examinations and the final examination of a study programme.
 - d. **Academic year:** the period from 1 September in a given year until 31 August of the following year.
 - e. **Practical:** a practical exercise as referred to in Article 7.13, paragraph 2 under (d) of the Act.
 - f. **Course objective:** a general description of the knowledge, understanding and/or skills the student must possess after completing an educational unit.
 - g. **Interim examination:** an examination testing the knowledge, understanding or skills of the student in relation to a certain educational unit, as well as the assessment of the results of this examination, which is administered by at least one examiner designated by the Examination Board as referred to in Article 7.10, paragraph 1 of the Act.
 - h. **Partial examination:** an examination testing the knowledge, understanding or skills of the student in relation to a certain educational unit, which in conjunction with one or more other partial examinations constitute the interim examination. In these regulations, when the term 'interim examination' is used, this can also be read as 'partial examination', unless explicitly indicated otherwise.
 - i. **Resit:** an opportunity to retake an interim examination as referred to in Article 7.10, paragraph 1 of the Act. In these regulations, when the term 'interim examination' is used, this can also be read as 'resit', unless explicitly indicated otherwise.
 - j. **Final examination:** an assessment, on the basis of which the Examination Board determines whether the Master's examination, as defined in the programme-specific part of these regulations, has been completed successfully.
 - k. **Final project:** the final project is an academic proof of competence in the specific field of study of the study programme.
 - l. **Fraud:** any behaviour or negligence on the part of the student that, by its nature, is directed toward making it partly or entirely impossible to properly assess the knowledge, understanding and skills of the student or of another student.
 - m. **Examination Board:** the examination board of a study programme, established in accordance with Article 7.12 of the Act. See also the Radboud University Structure Regulations.
 - n. **Examiner:** the person designated by the Examination Board to administer the interim examinations, in accordance with Article 7.12c of the Act.
 - o. **Distinction:** a distinction awarded by the Examination Board that indicates that a student has completed the study programme with exceptional success. There are two distinctions: cum laude and summa cum laude.

- p. **EC:** European Credits, i.e. the study load unit in accordance with the European Credit Transfer System.
- q. **Specialisation:** a coherent programme within the Master's programme that has been approved as such by the Faculty Board.
- r. **Working day:** Mondays to Fridays, with the exception of official holidays and any other days designated by Radboud University as collective holidays.
- s. **Course catalogue:** catalogue listing the educational units and minors associated with the study programmes. The catalogue provides programme-specific information about all Radboud University study programmes.
- t. **University:** Radboud University.
- u. **Faculty:** the Faculty of Science of Radboud University.
- v. **Education Institute:** the organisational unit responsible for the study programme.
- w. **Programme Director:** person responsible for managing the study programme. In these regulations, where the term 'programme director' is used, this can also be read as 'programme coordinator'.
- x. **Free elective:** a freely-selected, academic, assessable educational unit chosen from the options offered within the study programme.
- y. **Rules and Regulations:** regulations in which the Examination Board sets out how it works in accordance with these regulations.

PART II GENERAL PART

SECTION 2. ADMISSION TO THE STUDY PROGRAMME AND EDUCATION

ARTICLE 2.1 ADMISSION AND ADMISSION REQUIREMENTS

1. The Admissions Office decides on admission on behalf of the Dean.
2. The general admission requirements are included in the [Registration Regulations for the 2025-2026 academic year](#). The programme-specific part of these regulations lists the programme-specific admission requirements.

ARTICLE 2.2 LANGUAGE REQUIREMENTS

1. The Faculty offers study programmes in Dutch or in English. A Dutch-taught study programme may include English-taught educational units. An English-taught study programme may include Dutch-taught educational units. The language of instruction of the study programme is specified in the programme-specific part of these regulations.
2. To participate in a Dutch-taught study programme, the student must be able to provide proof of sufficient Dutch language proficiency. Qualifications and certificates that meet the Dutch language requirements can be found on the [website of Radboud University](#).
3. To participate in an English-taught study programme, the student must be able to provide proof of sufficient English language proficiency. Qualifications and certificates that meet the English language requirements can be found on the [website of Radboud University](#).
 - a. For the following certificates, the test results listed below are required:
 - TOEFL IBT, score ≥ 90 + sub-score ≥ 22 + writing sub-score ≥ 25
 - IELTS Academic, score ≥ 6.5 + sub-score ≥ 6.0 + writing sub-score ≥ 6.5
 - Cambridge Certificate C1 Advanced: general minimum score 176, minimum component score 169, minimum writing component score 176
 - Cambridge Certificate C2 Proficiency, general minimum score 180, minimum component score 169, minimum writing component score 176
4. A student who does not meet the requirements described above but can otherwise demonstrate sufficient language proficiency may submit a request for exemption from the language requirement to the Admissions Office, which will decide on the matter on behalf of the Dean.

SECTION 3. STRUCTURE AND DESIGN

ARTICLE 3.1 FINAL EXAMINATION, DEGREE AND DISTINCTIONS

1. A Master's programme is concluded with a Master's examination.
2. Students who pass the study programme's Master's examination will be awarded a Master of Science degree. The Master's examination is considered to have been successfully completed if a valid and satisfactory interim examination result has been obtained for all compulsory educational units, supplemented by elective educational units, as specified in the programme-specific part of these regulations. The Examination Board may conduct an additional investigation into the knowledge, understanding and skills of the candidate (see Article 7.10, paragraphs 1 and 2 of the Act).

3. The degree referred to in paragraph 2 is awarded exclusively if the student has earned at least half of the EC required for their study programme at this University.
4. The Examination Board can award distinctions to students who have successfully passed the final examination of the study programme. The rules for awarding distinctions can be found in the Guideline for Awarding Distinctions in the appendix.

ARTICLE 3.2 GENERAL LEARNING OUTCOMES

The study programme has the following learning outcomes for students:

1. Acquire knowledge, understanding and skills in the relevant field of study
2. Develop academic competences
3. Prepare for a future career
4. Deepen qualifications in the area of independent academic research

ARTICLE 3.3 CURRICULUM

1. The programme-specific part of these regulations lists and describes all of the educational units that jointly comprise the study programme.
2. For each educational unit, the Programme Director is responsible for ensuring that the following information is included in the course catalogue for the academic year corresponding to these regulations prior to the adoption of these regulations:
 - a. a description of the educational unit
 - b. the course objectives
 - c. any admission requirements
 - d. the manner in which interim examinations are administered
 - e. how the results of an interim examination are determined, taking into account the weighting of any partial examinations
 - f. scheduling of partial or interim examinations
 - g. if relevant, the limited validity of partial examinations
 - h. any capacity restrictions
3. Contrary to the provisions of Article 3.3, paragraph 2, the information from Article 3.3, paragraph 2 under (a), (c), (e), and (f) of the educational units that are completed in the third and fourth periods may still be amended by the Programme Director up until the start of the second period.
4. Students can register for an educational unit up until 11:59 p.m. on the day prior to a period of four weeks before the start of the period in which the educational unit starts. For educational units in the first period, students can register until the end of the first week of teaching.
5. For educational units with a capacity restriction as referred to in Article 3.3, paragraph 2 under (h), if the number of enrolments exceeds capacity, the following procedure will be followed: participants will be admitted in order of enrolment. Students who cannot be admitted due to capacity restrictions will also be placed on a waiting list in order of enrolment. Notwithstanding the above provisions, the Programme Director can decide otherwise; the procedure that applies in that case must be included in the course catalogue for the academic year corresponding to these regulations prior to the adoption of these regulations. A capacity restriction may not apply to students for whom the educational unit is compulsory.
6. If students are granted admission to an educational unit, they are admitted to all components of the unit in question, including the interim examination.

7. Some modes of instruction have attendance/participation requirements. Attendance or participation can only be made compulsory if attendance is required to meet one or more of the course objectives. The attendance/participation requirement must be listed in the course catalogue under the relevant educational unit.
8. All Faculty of Science Master's programmes, with the exception of Information Sciences and Science for Sustainability, offer research specialisations and societal specialisations. The specialisations are described in the programme-specific part of these regulations.
9. The educational units of the nominal space of the study programme may not have any substantial substantive overlap.
10. The study programme includes a free elective space with a study load of 6 EC.
11. The study programme includes an educational unit of a philosophical nature with a minimum study load of 3 EC.
12. The study programme includes a component for the purpose of reflecting on study progress and planning, and professional orientation with a study load of 1, 2, or 3 EC. This component can be a stand-alone educational unit or integrated into subject-specific educational units. In the latter case, assessment must take the form of one or more partial examinations.
13. The study programme includes an individual final project. The programme-specific part of these regulations lists the partial or interim examinations that together represent the final project, and their scope in EC.
14. The student must present their compiled Master's programme to the Examination Board for approval no later than three months before the expected examination date. The Examination Board will reach a decision within 20 working days of receiving the submitted programme.
15. Extracurricular educational units are allowed if, in the opinion of the Examination Board, the course is testable at an academic level.
16. If a student chooses educational units within the programme that result in a total study load exceeding 120 EC or 60 EC respectively, the excess educational units will be classified as extracurricular. This does not apply if the study load of such an educational unit would have to be split up. Extracurricular educational units do not count towards the determination of the distinction.
17. If a student can choose different educational units within the curriculum, and the student has passed more than one of these educational units, the student can decide which educational units will count toward their distinction if one or more of the educational units are extracurricular.

ARTICLE 3.4 SEQUENCE OF EDUCATION AND INTERIM EXAMINATIONS

1. The programme-specific part of these regulations may contain further requirements for the order in which educational units and the accompanying interim examinations may be taken.

ARTICLE 3.5 TYPES OF INTERIM EXAMINATIONS

1. Educational units are concluded by an interim examination. Interim examinations may comprise several partial examinations. Only partial examinations and interim examinations can be used to determine a final grade.
2. Partial examinations and interim examinations may consist of the following assessment forms:
 - a. Written test and/or
 - b. Oral test and/or
 - c. Presentation and/or
 - d. Skills test and/or

- e. The creation of a discipline-specific product and/or text.
3. Contrary to the provisions of Article 3.3, paragraph 2 under (d) and at the request of the student or the examiner, the Examination Board may allow an interim examination to be taken in an alternative form, if this is not to the detriment of the student.
 4. The course materials offered provide the student with insight into the manner in which, as well as the form in which the learning objectives will be assessed.
 5. For partial and interim examinations as referred to in paragraph 2 under (a), information concerning the format of the partial or interim examination will be provided no later than 10 working days before the day on which the partial or interim examination concerned is administered. In this context, the following must be specified:
 - a. The type of questions: open and/or closed questions
 - b. Permitted aids and resources
 - c. Application of methods whereby points are deducted, such as 'guess correction'
 6. For partial and interim examinations as referred to in paragraph 2, under (c), (d), and (e), the assessment criteria must be made available with the assignment, or otherwise communicated to the student.
 7. Students with functional impairments have the opportunity to take interim examinations in a manner appropriately suited to their impairment. The Examination Board shall, if necessary, seek expert advice prior to reaching a decision on the matter. If a student requires certain facilities for their interim examinations, they must request these from the Education and Examination Administration of the Faculty no later than two weeks before the interim examination.
 8. During oral examinations, no more than one person is tested at a time, unless the Examination Board decides otherwise.
 9. Oral examinations are not public, unless the Examination Board has deemed otherwise in exceptional cases. Oral examinations are recorded, or a second examiner or designated observer is present.

ARTICLE 3.6 EXEMPTIONS

1. At the request of the student and having heard the examiner involved, the Examination Board may exempt the student, either partially or fully, from sitting for an interim examination if the student:
 - a. Has completed an educational unit at a research university or university of applied sciences (HBO) that is equivalent in content and level, or
 - b. Demonstrates that they have adequate knowledge and skills regarding the educational unit in question as a result of relevant work or professional experience.
2. Any generic exemptions in the study programme are included in the programme-specific part of these regulations.
3. A course can only be registered with a grade on the diploma for one study programme. If a course is also part of another examination programme, this course will be listed as an exemption on one of the two diplomas.
4. For students who first enrolled on or after 1 September 2017, the number of exemptions as referred to in paragraph 1 may not exceed one quarter of the total study load of the study programme expressed in EC.
5. All results achieved before the date of initial enrolment for a study programme are listed as exemptions on the diploma for that study programme. These exemptions do not count towards the EC as stated in paragraph 4 if the courses are only included in one examination programme.
6. Nor is it possible to obtain an exemption for the free elective space based on a Bachelor's educational unit that was not completed during the Master's programme.

7. Exemptions as referred to in paragraphs 1 and 2 cannot be granted for final projects.
8. If, after completing two Master's programmes, a student wishes to distribute the exemptions in accordance with paragraphs 2 and 3 across the two diplomas, they must submit an examination application for both study programmes at the same time.

ARTICLE 3.7 TERM OF VALIDITY FOR SUCCESSFULLY COMPLETED INTERIM EXAMINATIONS

1. Successfully completed interim examinations are valid indefinitely.
2. Successfully completed partial examinations are valid indefinitely, unless specified otherwise in the course catalogue (see Article 3.3, paragraph 2, under (g)), but at least until the end of the academic year in which they were completed.
3. A successfully passed interim examination may be taken again. If a student resits an interim examination, in derogation from paragraph 1, the last result obtained always applies.

ARTICLE 3.8 ELECTIVE PROGRAMMES

The Examination Board of the study programme decides about requests for authorisation to follow an elective programme as referred to in Article 7.3j of the Act. The Examination Board verifies whether the elective programme fits within the domain of the study programme, whether it is sufficiently cohesive, and whether the level is adequate in the context of the study programme's learning outcomes. Further requirements to this end may be set out in the programme-specific part of these regulations.

SECTION 4. ASSESSMENT

ARTICLE 4.1 FREQUENCY OF INTERIM EXAMINATIONS

1. For each educational unit, there are at least two interim examination opportunities per academic year.
2. Notwithstanding paragraph 1, there may in some cases only be one opportunity to take an interim examination or partial examination. The Programme Director is responsible for ensuring that this is included in the course catalogue for the academic year corresponding to these regulations prior to the adoption of these regulations.
3. Notwithstanding paragraph 1, if an educational unit is offered for the last time in a particular academic year, there will be at least one other opportunity to take an interim examination for this educational unit in the following academic year.
4. If an educational unit is not offered in a particular academic year, the opportunity to take the corresponding interim examination will be offered once in that academic year, as long as the interim examination is administered in written or oral form.

ARTICLE 4.2 REGISTRATION FOR INTERIM EXAMINATIONS

1. Students can register for an interim examination up until 11:59 p.m. on the day prior to a period of five working days before the date of the interim examination. Registration is not possible after this, unless the head of the Education Centre decides otherwise in exceptional cases and on behalf of the Dean.

ARTICLE 4.3 DETERMINATION OF INTERIM EXAMINATION RESULTS

1. The examiner determines the result of an interim examination on one of the following result scales:
 - a. A grade on a scale from 1 (lowest possible grade) to 10 (the highest possible grade), whereby only the following final grades can be awarded: 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, 5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5, 10. A final grade of 6 or higher means that the educational unit has been successfully completed (pass). Grades that are not one of the permitted final grades must be rounded to the nearest permitted final grade. A grade that falls exactly between two permitted final grades must be rounded up.
 - b. A non-numerical result from the following list: 'pass' (voldaan, VD), 'fail' (niet voldaan, NVD), 'satisfactory' (voldoende, VLD), 'unsatisfactory' (onvoldoende, ONV), 'good' (goed, G), 'participated' (deelgenomen, D) and 'did not participate' (niet deelgenomen, ND), whereby a result of 'VD', 'VLD', 'G' or 'D' means that the educational unit has been successfully completed.
2. Notwithstanding the provisions of paragraph 1 under (a), partial examinations may also be graded to one decimal point on a scale of 1 to 10.

ARTICLE 4.4. PUBLICATION OF INTERIM EXAMINATION RESULTS

1. The examiner determines the result of an interim examination within 15 working days of the date the interim examination was administered. Here, the precondition applies that there must be at least 10 working days between the date of the publication of the result in OSIRIS and the date of the resit.
2. Notwithstanding paragraph 1, for interim examinations in the fourth period, the examiner shall determine the results of the examination no later than nine days before the date of the resit. The period between the interim examination and the resit is always at least 14 working days. This gives the examiner five working days to establish the result.
3. Contrary to the provisions of paragraph 1, the examiner shall determine the result of an oral examination within a maximum of five working days of the date it was administered, such that the student is given the opportunity to graduate in the current academic year.
4. In exceptional cases, the Examination Board may extend the term in which the result must be determined as referred to in paragraphs 1 and 2 by a maximum of 10 working days. This is not possible for the interim examinations in the fourth period. The lecturer will inform students of this extension.
5. The examiner determines the result of the final project within 15 working days after all products and assessments have been completed and submitted according to the method specified in the course catalogue.
6. In the statement concerning the result of an interim examination, the student is also informed of their right to inspection, as referred to in Article 4.5, as well as the right to appeal to the Examination Appeals Board.
7. Students may appeal an interim examination result to the Examination Appeals Board within six weeks after the date of publication of the examination result in question.

ARTICLE 4.5 RIGHT OF INSPECTION AND REVIEW

1. Students are given the opportunity to view their graded work within 30 working days of the publication of the results of a written interim examination. The student can submit a request to this end to the examiner. The student may upon request also be provided with a copy of their graded work where 'open' questions are concerned. The inspection must take place at least five working days before the resit. For interim examinations in the fourth period, this is possible until one working day before the resit.

2. During the period referred to in paragraph 1, 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 assessment was based.
3. If the student demonstrates that they are or were unable to attend an inspection due to circumstances outside their control, they may ask the Examination Board to allow them another opportunity to inspect the examination, if possible within the period referred to in paragraph 1.
4. The retention period for partial and interim examinations is:
 - Written partial and interim examinations on paper: two years (retained by the examiner)
 - Digital written partial and interim examinations: two years (retained in the assessment software)
 - Final project: seven years (retained in OSIRIS)

ARTICLE 4.6 DETERMINATION OF FINAL EXAMINATION RESULTS

1. Students are given the opportunity to take the final examination once they have successfully completed all educational units, as described in Article 3.3, paragraph 14.
2. There is at least one final examination date every month.
3. The Examination Board will determine the result of the final examination, as well as the rules for the manner in which the result of the examination is determined. The result is determined within five weeks following the application. If the final examination takes place in July, the results will be determined no later than 31 August. Where needed due to entry requirements for a subsequent study programme or the acceptance of a job, a statement can be released within five working days indicating that the student has met the requirements of the final examination. This is only possible if the student has met the requirement specified in paragraph 1.
4. Before the Examination Board determines the result of the final examination, they may evaluate and assess the student's knowledge on one or more educational units or aspects of the study programme, if and to the degree to which this is justified by the results of the relevant interim examinations.

SECTION 5. STUDY PROGRESS, ACADEMIC COUNSELLING, STUDY ADVICE AND EVALUATION OF EDUCATION

ARTICLE 5.1 STUDY PROGRESS AND ACADEMIC COUNSELLING

1. The Dean is responsible for recording study results in such a way that the Education and Examination Administration can, upon request, and within a reasonable time period, provide every student with an overview of their study results up to that moment.
2. The Dean is responsible for providing adequate academic counselling.

ARTICLE 5.2 METHOD OF EVALUATING EDUCATION

In compliance with the quality assurance system of the University as described in the Radboud University Quality Assurance Manual, the Dean shall ensure that the education of the study programmes is evaluated systematically.

PART III PROGRAMME-SPECIFIC PART

SECTION 6. ADMISSION TO THE STUDY PROGRAMME AND EDUCATION

ARTICLE 6.1 ADMISSION REQUIREMENTS

The following students are admissible to the study programme:

1. Students who have successfully completed the final examination of the Bachelor's programme in Mathematics at Radboud University;
2. Students who have successfully completed the final examination of the Bachelor's programme in Mathematics or Technical Mathematics at another Dutch university.
3. Students who have successfully completed the final examination of the Bachelor's programme in Physics and Astronomy at Radboud University with the following Mathematics courses: NWI-WP029 Introduction to Mathematics, NWI-WP030 Group Theory, NWI-NP028 Linear Algebra B, NWI-WP001B Real Analysis, NWI-WB001B Multivariable Analysis, supplemented with three second- or third-year Mathematics courses, each worth 6 EC.
4. Students who are in possession of a qualification that is at least equivalent to the qualification referred to in paragraphs 1, 2, or 3.
5. Students who have in the opinion of the Examination Board otherwise demonstrated their suitability for participation in the study programme, including the successful completion of a pre-Master's programme set for them.
6. Students must provide proof of sufficient proficiency in English, as described in Article 2.2.

SECTION 7. STRUCTURE AND DESIGN

ARTICLE 7.1 PROGRAMME-SPECIFIC LEARNING OUTCOMES

In addition to the general learning outcomes described in the general part of these regulations, the study programme aims to achieve the following learning outcomes:

1. Graduates have acquired knowledge, skills and insights in the field of mathematics that enable them to independently carry out their profession and qualify for advanced programmes as researchers and designers.
2. Graduates have acquired specialist knowledge and insight in at least one sub-specialisation of mathematics.
3. Additionally, graduates have acquired specialist knowledge of another sub-specialisation of mathematics, or of a mathematics-related topic outside the field of mathematics.
4. Graduates are able to acquire independent insight into new developments in their field.
5. Graduates have learned to independently solve complicated problems and formulate solutions, while simultaneously critically assessing established academic insights.
6. Graduates possess adequate computer and computing skills.
7. Graduates can acquire new knowledge in the field of mathematics and integrate this into their existing knowledge. In addition, they possess the learning skill to orientate themselves at the level of a specialist in a sub-specialisation of mathematics outside their chosen specialisation.

8. Graduates are able to communicate with their peers on academic knowledge, at both a basic and a specialised level. Graduates are also able to hold oral presentations and write clear articles on research that they have conducted, also for a general non-specialist audience. Graduates can prepare both oral and written reports and can debate scientific topics.
9. Graduates possess sufficient knowledge and insight into the role of mathematics in society to enable them to perform satisfactorily in their future positions and to reflect on societal and ethical problems.
10. Graduates have demonstrated, by completing a final project, their ability to independently develop or apply mathematics at a sufficient standard or to apply it in context.

Specific qualifications that are gained through the different specialisations:

Research specialisation in Mathematics (as described in Article 7.2.1)

Graduates

1. Have a broad and in-depth overview of the main theme of the Master's specialisation, and fundamental knowledge of capita selecta in connection to the subject of their Master's thesis.
2. Are able to keep up to date independently on developments in mathematics by means of a literature review.
3. Are able to formulate new research questions and hypotheses in the field of mathematics, and to select suitable techniques and research methods to answer these questions.

Specialisation in Science, Management and Innovation (as described in Article 7.2.2)

Students who opt for the specialisation in Science, Management and Innovation also achieve the following learning outcomes:

- a. Graduates are able to bridge the gap between their own scientific discipline and other disciplines, based on a profound understanding of their chosen core theme and its relation to political, business/economic, societal, technological, environmental and legal issues or objectives in today's world.
- b. Graduates are able to take an analytical approach to a system that can draw on methods or models from both inside and outside their core scientific discipline.
- c. Graduates have developed a proficiency in utilising research methods and frameworks from the social sciences.
- d. Graduates have developed a proficiency in speaking the language of both the natural and social sciences to effectively communicate in written and spoken form the problems and approaches for solutions that are found at the intersection of scientific research and applications in society.
- e. Graduates have developed the ability to balance perspectives and interests in specific contexts within a company, government and non-government organisation or an industry in the general sense in order to formulate appropriate strategies and recommendations that can be utilised towards the realisation of the Sustainable Development Goals (SDGs).
- f. Graduates have developed the ability to work in multidisciplinary and multicultural high-performance teams based on a sound division of tasks, knowledge, competencies, and responsibilities, whilst respecting diverging views and opinions.

Specialisation in Science in Society (as described in Article 7.2.3)

Graduates are

1. Capable of analysing the role of scientific expertise in societally relevant issues.
2. Capable of designing and conducting independent, methodologically sound research about the interface of science and society, and contributing to academic research.
3. Capable of understanding and implementing public and stakeholder engagement in research and innovation.
4. Capable of analysing, improving and evaluating interdisciplinary collaborations with multiple stakeholders, integrating different perceptions, interests and types of knowledge (experiential, professional and scientific).
5. Capable of substantiating and communicating the relevance of their scientific discipline in society.

Specialisation in Science and Education (as described in Article 7.2.4)

| | Knowledge and insight | Skills | | Attitude | |
|--|--|---|---|--|---|
| | 1. Knowledge and insight | 2. Applying knowledge and insight | 3. Communication | 4. Making judgements | 5. Learning skills |
| A. (Development of) Scientific Competences 2.4, 2.7-2.9, 2.11, 2.13* | Graduates have knowledge and understanding of national and international developments in science and its relation to their school subject. This refers to: - [the scientific discipline]** - [(discipline) didactics] Graduates are familiar with relevant educational and learning theories. | Graduates are able to carry out scientific research that, in a relevant way, combines elements from the field of - [scientific discipline] - [(discipline) didactics] | Graduates are able to report on research in an academically responsible manner. This concerns in any case research that, in a relevant way, combines elements from the field of - [scientific discipline] - [(discipline) didactics] | Graduates are able to make judgements about the quality of research in these areas from the perspective of [scientific discipline] and [(discipline) didactic knowledge] and insights. | Graduates are able to reflect on their own learning from academic education and learning theories and can independently keep pace with national and international developments in academia. |
| B. (Development of) Didactics Competences 2.4* | Graduates have basic academic knowledge of discipline-specific and general didactic insights about teaching and [the school subject]. | Graduates are able to create, implement and systematically evaluate an educational design (which includes designing tests). In the process, they are able to establish a relationship between (discipline) didactic and disciplinary content concepts, pupils' disciplinary thinking at different levels and problems from teaching practice in the school subject. | Graduates are able to communicate clearly with individual pupils and groups of pupils, colleagues and relevant third parties (e.g. parents), with a focus on cooperation, responsibility, and differentiated action and improving the social climate. | Graduates are able to make judgements about specific problems in [the school subject] and infer appropriate action. Graduates are able to prioritise developmental and behavioural problems independently, and act appropriately after consulting relevant third parties. | Graduates are able to devote attention to the discipline-specific learning of individual students, with a focus on developing inspiring education. |
| B. (Development of) Pedagogic Competences 2.14, 2.16, 2.18* | Graduates have basic academic knowledge about the development of, and communication with, students in the classroom, the conditions for a powerful learning | | | | |

| | Knowledge and insight | Skills | | Attitude | |
|---|---|--|---|---|---|
| | 1. Knowledge and insight | 2. Applying knowledge and insight | 3. Communication | 4. Making judgements | 5. Learning skills |
| | environment, and how to use them to create an effective working environment. | | | | |
| C. (Development of) Academic Professional Competencies | <p>Graduates have basic knowledge of standards and requirements related to relevant professional sectors, including at least [discipline-related professional sectors] and the professional educational sector.</p> | <p>Graduates are able to responsibly translate and apply academic knowledge and insights for the benefit of professional practice, including [discipline-related professional sectors] and educational professional practice.</p> <p>More specifically, they are able to apply academic knowledge and insights for the benefit of school and policy development, scientific discipline development and teacher development (both personal development and that of colleagues).</p> <p>Graduates are able to think and act creatively to solve problems, using digital competences.</p> | <p>Graduates are able to contribute in a constructive and clear manner to relevant collaborations, including:</p> <ul style="list-style-type: none"> - the academic, public and societal debate - professional groups in [discipline-related professional sectors] and the educational sector - teams at school. | <p>Graduates are able to take an academically argued position in relevant collaborations, including:</p> <ul style="list-style-type: none"> - the academic, public and societal debate - professional groups in [discipline-related professional sectors] and the educational sector - teams at school. <p>Graduates are able to critically consider and adjust their own actions, using basic knowledge of standards and requirements related to relevant professional sectors.</p> | <p>Graduates have developed a distinct identity in the context of the academic profession.</p> <p>Graduates are able to interpret their own knowledge and actions and the actions and feedback of colleagues, and use them to guide their own professional development.</p> |

* Italicised numbers refer to the relevant paragraph in the *Besluit Bekwaamheidseisen Onderwijspersoneel* (Decree on Proficiency Requirements for Teaching Staff) (16 March 2017).

** Text in square brackets refers to educational units that are completed in a discipline-specific manner, depending on the chosen specialisation.

ARTICLE 7.2 COMPOSITION OF THE STUDY PROGRAMME

The student chooses one of the following specialisations within the study programme:

1. Mathematics
2. Science, Management and Innovation
3. Science in Society
4. Science and Education (enrolment is no longer possible in 2024-2025)

7.2.1 THE MASTER'S SPECIALISATION IN MATHEMATICS CONSISTS OF THE FOLLOWING EDUCATIONAL UNITS:

7.2.1.1 MANDATORY COURSES (5 EC)

| Course code | Course name | EC |
|-------------|-----------------------------------|----|
| NWI-WM301 | Professional Preparation for Math | 2 |
| NWI-WM115B | Master Seminar | 3 |

7.2.1.2 PHILOSOPHY COURSE (3 EC)

| Course code | Course name | EC |
|----------------|---|----|
| NWI-FFIL223 | Philosophy of Mathematics | 3 |
| NWI-EDU-WI001A | Geschiedenis van de wiskunde | 3 |
| NWI-IMI003 | Philosophy&Ethics for Comp&Inf.Science | 3 |
| NWI-FFIL212 | Philosophy of Water Management | 3 |
| NWI-FFIL215 | Upgrading the Human? | 3 |
| NWI-FFIL216 | Imagining the Anthropocene | 3 |
| NWI-FFIL217 | Science and Arts | 3 |
| NWI-FFIL218 | Science and Values | 3 |
| NWI-FFIL220 | Philosophy of Evidence and Expertise | 3 |
| NWI-FFIL202A | Evolution and the Mind | 3 |
| NWI-FFIL203B | Bio-Ethics for Life Scientists | 3 |
| NWI-FFIL209B | Environmental Ethics | 3 |
| NWI-FFIL211B | Physics and Philosophy | 3 |
| NWI-WM256 | History&Philosophy of Math (MasterMath) | 8 |
| NWI-FFIL221 | An Introduction to Interdisciplinarity | 3 |
| NWI-FFIL222 | Philosophy of Ecological Restoration | 3 |
| NWI-FFIL302 | Philosophy and Ethics in Microbiology | 3 |

7.2.1.3 TRACK-SPECIFIC EDUCATIONAL UNITS (66 EC)

Students choose one of the following tracks. The courses provided by the MasterMath partnership can be found on the MasterMath website (<https://elo.mastermath.nl/>).

A. TRACK: PURE MATHEMATICS (66 EC)

Students must select at least 40 EC from the mandatory track courses listed under A.1 Mandatory Electives. These are supplemented with Master's courses in Mathematics totalling at least 54 EC. The programme is then supplemented with Master's courses of the student's choice up to 66 EC.

A.1 MANDATORY ELECTIVES (40 EC)

Students select at least 40 EC from the mandatory track courses.

| Course code | Course name | EC |
|-------------|---|----|
| NWI-WM150B | Category Theory and Homological Algebra | 8 |
| NWI-WM304B | Sheaves and Geometry | 8 |
| NWI-WM270 | Calculus of Variations (MasterMath) <i>or</i> | 8 |
| NWI-WM144B | Calculus of Variations | 8 |
| NWI-WM200 | Differential Geometry (MasterMath) | 8 |
| NWI-WM214 | Algebraic Geometry 1 (MasterMath) | 8 |
| NWI-WM201 | Lie Groups (MasterMath) | 8 |
| NWI-WM202 | Lie Algebras (MasterMath) | 8 |
| NWI-WM094D | Algebraic Topology 1, <i>or</i> | 8 |
| NWI-WM203 | Algebraic Topology 1 (MasterMath) | 8 |
| NWI-WM072D | Complexity Theory <i>or</i> | 8 |
| NWI-WM072C | Complexity Theory (MasterMath) | 8 |
| NWI-WM123B | Riemann Surfaces (MasterMath) | 8 |
| NWI-WM240 | Elliptic Curves (MasterMath) | 8 |
| NWI-WM205 | Operator Algebras (MasterMath) | 8 |
| NWI-WM120D | Computability Theory <i>or</i> | 8 |
| NWI-WM223 | Computability Theory (Mastermath) | 8 |
| NWI-WM218 | Functional Analysis (MasterMath) | 8 |
| NWI-WM206 | Algebraic Number Theory (MasterMath) | 8 |
| NWI-WM139B | Analytic Methods in Number Theory | 8 |
| NWI-WM204 | PDEs (MasterMath) | 8 |

A.2 MATHEMATICS ELECTIVES

The mandatory track courses are supplemented with Master's courses in Mathematics totalling at least 54 EC.

A.3 ELECTIVES

The programme under A1 and A2 is supplemented with Master's courses of the student's choice up to 66 EC.

B. TRACK: SYNERGY TRACK MATHEMATICS OF COMPUTER SCIENCE (66 EC)

Students select in any case the mandatory synergy track course listed under 1. Mandatory Courses, and supplement it with at least 12 EC work of synergy track courses listed under 2. Electives. Students then choose at least 16 EC worth of Pure Mathematics courses (3. Mandatory Electives). These are supplemented with Master's courses in Mathematics totalling at least 54 EC. The programme is then supplemented with Master's courses of the student's choice up to 66 EC.

B.1 MANDATORY COURSES (8 EC)

| Course code | Course name | EC |
|-------------|------------------|----|
| NWI-WM069D | Computer Algebra | 8 |

B.2 MANDATORY SYNERGY TRACK ELECTIVES (12 EC)

| Course code | Course name | EC |
|-------------|--|----|
| NWI-IMC010 | Type Theory and Coq | 6 |
| NWI-IMC011 | Semantics and Domain Theory | 6 |
| NWI-IMC036 | Category Theory and Coalgebra | 6 |
| NWI-IMC009 | Automated Reasoning | 6 |
| NWI-IMC057 | Seminar Math.Foundations of Comp.Science | 6 |

B.3 MANDATORY PURE MATHEMATICS ELECTIVES (16 EC)

| Course code | Course name | EC |
|-------------|---|----|
| NWI-WM150B | Category Theory and Homological Algebra | 8 |
| NWI-WM304B | Sheaves and Geometry | 8 |
| NWI-WM270 | Calculus of Variations (MasterMath) <i>or</i> | 8 |
| NWI-WM144B | Calculus of Variations | 8 |
| NWI-WM200 | Differential Geometry (MasterMath) | 8 |
| NWI-WM214 | Algebraic Geometry 1 (MasterMath) | 8 |
| NWI-WM201 | Lie Groups (MasterMath) | 8 |
| NWI-WM202 | Lie Algebras (MasterMath) | 8 |
| NWI-WM094D | Algebraic Topology 1, <i>or</i> | 8 |
| NWI-WM203 | Algebraic Topology 1 (MasterMath) | 8 |
| NWI-WM072D | Complexity Theory <i>or</i> | 8 |
| NWI-WM072C | Complexity Theory (MasterMath) | 8 |
| NWI-WM123B | Riemann Surfaces (MasterMath) | 8 |
| NWI-WM240 | Elliptic Curves (MasterMath) | 8 |
| NWI-WM205 | Operator Algebras (MasterMath) | 8 |
| NWI-WM120D | Computability Theory <i>or</i> | 8 |
| NWI-WM223 | Computability Theory (Mastermath) | 8 |
| NWI-WM218 | Functional Analysis (MasterMath) | 8 |
| NWI-WM206 | Algebraic Number Theory (MasterMath) | 8 |
| NWI-WM139B | Analytic Methods in Number Theory | 8 |
| NWI-WM204 | PDEs (MasterMath) | 8 |

B.4 MATHEMATICS ELECTIVES

The programme under B1 through B3 is supplemented with Master's courses in Mathematics totalling at least 54 EC.

B.5 ELECTIVES

The programme under B1 through B4 is supplemented with Master's courses of the student's choice up to 66 EC.

C. TRACK: APPLIED MATHEMATICS

Students select at least 40 EC from the mandatory track courses listed under C.1 Mandatory Electives. These are supplemented with Master's courses in Mathematics totalling at least 54 EC. The programme is then supplemented with Master's courses of the student's choice up to 66 EC.

C.1 MANDATORY ELECTIVES (40 EC)

Students select at least 40 EC from the mandatory track courses.

| Course code | Course name | EC |
|-------------|--|----|
| NWI-WM144B | Calculus of Variations <i>or</i> | 8 |
| NWI-WM270 | Calculus of Variations (MasterMath) | 8 |
| NWI-WM213 | Measure Theoretic Probability (MM) | 8 |
| NWI-WM265 | Numerical Linear Algebra (MasterMath) | 8 |
| NWI-WM246C | Optimal Transport (MasterMath) | 8 |
| NWI-WM258 | Mathematical Neuroscience (MasterMath) | 8 |
| NWI-WM209 | Dynamical Systems (MasterMath) | 8 |
| NWI-WM098C | Regression Analysis | 8 |
| NWI-WM224 | Mathematical Biology (MasterMath) | 8 |
| NWI-WM247 | Asymptotic Statistics (MasterMath) | 8 |
| NWI-WM303B | Finite Element Methods | 8 |
| NWI-WM216 | Forensic Probability and Statistics (MM) | 8 |
| NWI-WM161B | Monte Carlo Methods | 8 |
| NWI-WM152B | Entropy and Large Deviations | 8 |
| NWI-WM153B | Nonlinear Wave Equations | 8 |
| NWI-WM151B | Stochastic Simulation | 8 |
| NWI-WM204 | PDEs (MasterMath) | 8 |

C.2 MATHEMATICS ELECTIVES

The mandatory track courses are supplemented with Master's courses in Mathematics totalling at least 54 EC.

C.3 ELECTIVES

The programme under C1 and C2 is supplemented with Master's courses of the student's choice up to 66 EC.

D. TRACK: MATHEMATICS OF DATA SCIENCE SYNERGY TRACK

Students select in any case the mandatory synergy track course listed under D.1 and supplement it with at least 12 EC worth of synergy track courses listed under D.2. Students then choose at least 16 EC worth of Applied Mathematics courses (D.3). These are supplemented with Master's courses in Mathematics totalling at least 54 EC. The programme is then supplemented with Master's courses of the student's choice up to 66 EC.

D.1 MANDATORY COURSES (8 EC)

| Course code | Course name | EC |
|-------------|---------------------|----|
| NWI-WM098C | Regression Analysis | 8 |

D.2 MANDATORY SYNERGY TRACK ELECTIVES (12 EC)

| Course code | Course name | EC |
|-------------|--------------------------------------|----|
| NWI-WM222 | Machine Learning Theory (MasterMath) | 8 |
| NWI-IMC030 | Machine Learning in Practice | 6 |
| NWI-NM048D | CDS: Machine Learning | 3 |
| NWI-NM047D | Computational Neuroscience | 3 |
| NWI-NM127 | Modelling of Complex Systems | 6 |

D.3 MANDATORY APPLIED MATHEMATICS ELECTIVES (16 EC)

| Course code | Course name | EC |
|-------------|--|----|
| NWI-WM144B | Calculus of Variations <i>or</i> | 8 |
| NWI-WM270 | Calculus of Variations (MasterMath) | 8 |
| NWI-WM213 | Measure Theoretic Probability (MM) | 8 |
| NWI-WM265 | Numerical Linear Algebra (MasterMath) | 8 |
| NWI-WM246C | Optimal Transport (MasterMath) | 8 |
| NWI-WM258 | Mathematical Neuroscience (MasterMath) | 8 |
| NWI-WM209 | Dynamical Systems (MasterMath) | 8 |
| NWI-WM098C | Regression Analysis | 8 |
| NWI-WM224 | Mathematical Biology (MasterMath) | 8 |
| NWI-WM247 | Asymptotic Statistics (MasterMath) | 8 |
| NWI-WM303B | Finite Element Methods | 8 |
| NWI-WM216 | Forensic Probability and Statistics (MM) | 8 |
| NWI-WM161B | Monte Carlo Methods | 8 |
| NWI-WM152B | Entropy and Large Deviations | 8 |
| NWI-WM153B | Nonlinear Wave Equations | 8 |
| NWI-WM151B | Stochastic Simulation | 8 |
| NWI-WM204 | PDEs (MasterMath) | 8 |

D.4 MATHEMATICS ELECTIVES

The programme under D1 through D3 is supplemented with Master's courses in Mathematics totalling at least 54 EC.

D.5 ELECTIVES

The programme under D1 through D4 is supplemented with Master's courses of the student's choice up to 66 EC.

E. TRACK: MATHEMATICAL PHYSICS

Students select at least 40 EC from the mandatory track courses listed under E.1 Mandatory Electives. These are supplemented with Master's courses in Mathematics totalling at least 54 EC. The programme is then supplemented with Master's courses of the student's choice up to 66 EC.

E.1 MANDATORY ELECTIVES (40 EC)

Students select at least 40 EC from the mandatory track courses.

| Course code | Course name | EC |
|-------------|---|----|
| NWI-WM200 | Differential Geometry (MasterMath) | 8 |
| NWI-WM263 | Symplectic Geometry (MasterMath) | 8 |
| NWI-WM310 | Riemannian Geometry | 8 |
| NWI-WM068D | Noncommutative Geometry | 8 |
| NWI-WM152B | Entropy and Large Deviations | 8 |
| NWI-WM201 | Lie Groups (MasterMath) | 8 |
| NWI-WM202 | Lie Algebras (MasterMath) | 8 |
| NWI-WM270 | Calculus of Variations (MasterMath) <i>or</i> | 8 |
| NWI-WM144B | Calculus of Variations | 8 |
| NWI-WM204 | PDEs (MasterMath) | 8 |
| NWI-WM153B | Nonlinear Wave Equations | 8 |
| NWI-WM159B | Singularities and Black Holes | 8 |
| NWI-WM218 | Functional Analysis (MasterMath) | 8 |
| NWI-WM205 | Operator Algebras (MasterMath) | 8 |
| NWI-WM233 | Quantum Computing (MasterMath) | 8 |
| NWI-WM235 | Quantum Information Theory (MasterMath) | 8 |

E.2 MATHEMATICS ELECTIVES

The mandatory track courses are supplemented with Master's courses in Mathematics totalling at least 54 EC.

E.3 ELECTIVES

The programme under E1 and E2 is supplemented with Master's courses of the student's choice up to 66 EC.

F. TRACK: SYNERGY TRACK GRAVITY+

Students select at least 12 EC worth of synergy track courses listed under D.1. They then choose at least 24 EC worth of Mathematical Physics courses. These are supplemented with Master's courses in Mathematics totalling at least 54 EC. The programme is then supplemented with Master's courses of the student's choice up to 66 EC.

F.1 MANDATORY SYNERGY TRACK ELECTIVES (12 EC)

| Course code | Course name | EC |
|-------------|--|----|
| NWI-NM107B | General Relativity | 9 |
| NWI-NM024C | Foundations & Frontiers of GW Astrophysics | 6 |
| NWI-NM114 | Quantum Gravity | 6 |
| NWI-WM159B | Singularities and Black Holes | 8 |
| NWI-WM153B | Nonlinear Wave Equations | 8 |
| NWI-NM124 | Gravity+ Club | 3 |

F.2 MANDATORY MATHEMATICAL PHYSICS ELECTIVES (24 EC)

| Course code | Course name | EC |
|-------------|---|----|
| NWI-WM200 | Differential Geometry (MasterMath) | 8 |
| NWI-WM263 | Symplectic Geometry (MasterMath) | 8 |
| NWI-WM310 | Riemannian Geometry | 8 |
| NWI-WM068D | Noncommutative Geometry | 8 |
| NWI-WM152B | Entropy and Large Deviations | 8 |
| NWI-WM201 | Lie Groups (MasterMath) | 8 |
| NWI-WM202 | Lie Algebras (MasterMath) | 8 |
| NWI-WM270 | Calculus of Variations (MasterMath) <i>or</i> | 8 |
| NWI-WM144B | Calculus of Variations | 8 |
| NWI-WM204 | PDEs (MasterMath) | 8 |
| NWI-WM153B | Nonlinear Wave Equations | 8 |
| NWI-WM159B | Singularities and Black Holes | 8 |
| NWI-WM218 | Functional Analysis (MasterMath) | 8 |
| NWI-WM205 | Operator Algebras (MasterMath) | 8 |
| NWI-WM233 | Quantum Computing (MasterMath) | 8 |
| NWI-WM235 | Quantum Information Theory (MasterMath) | 8 |

F.3 MATHEMATICS ELECTIVES

The programme under F1 through F3 is supplemented with Master's courses in Mathematics totalling at least 54 EC.

F.4 ELECTIVES

The programme under F1 through F4 is supplemented with Master's courses of the student's choice up to 66 EC.

7.2.1.4 FREE ELECTIVES (6 EC)

See the general part of the EER, Article 3.3, paragraph 10.

7.2.1.5 FINAL PROJECT (40 EC)

The final project comprises the Master Thesis Project Mathematics (NWI-WM052B).

ARTICLE 7.2.2 SCIENCE, MANAGEMENT AND INNOVATION

The Master's programme Mathematics with the specialisation in Science, Management and Innovation consists of the following educational units:

1. TRACK (24 EC)

Students must choose from one of the tracks Pure Mathematics, Applied Mathematics and Mathematical Physics as referred to in Article 7.2.1. A minimum of 24 EC must be obtained from the mandatory track courses listed.

2. MATHEMATICAL ELECTIVES (22 EC)

Students must take 22 EC of Mathematics courses at Master's level. This course package must be presented to the Examination Board for approval.

3. MANDATORY EDUCATIONAL UNITS (5 EC)

Students must take 5 EC of mandatory educational units as referred to in Article 7.2.1 Mandatory Courses.

4. EDUCATIONAL UNIT OF A PHILOSOPHICAL NATURE (3 EC)

The student must take at least 3 EC worth of courses of a philosophical nature at Master's level, as referred to in Article 7.2.1 Philosophy.

5. FREE ELECTIVES (9 EC)

To be filled with assessable courses at academic level. Students can use the free elective space to expand the Science, Management and Innovation final research project by 3 EC.

6. SPECIALISATION SPACE (57 EC)

6A. MANDATORY EDUCATIONAL UNITS (15 EC)

| Course code | Course name | EC |
|-------------|--|----|
| NWI-FMT003F | Sustainable Innovation Management | 3 |
| NWI-FMT030 | Reaching Sustainable Development Goals | 6 |
| NWI-FMT019A | Methods in Societal Research: Science, Management & Innovation | 6 |

6B. THEMATIC EDUCATIONAL UNITS (15 EC)

Students can choose from one of the following themes:

Climate and Energy

| Course code | Course name | EC |
|-------------|-------------------------------------|----|
| NWI-FMT022 | Energy and Climate | 6 |
| NWI-FMT026 | Energy Systems Analysis | 3 |
| NWI-FMT032 | Environmental Life Cycle Assessment | 6 |

Health

| Course code | Course name | EC |
|-------------|-------------------------|----|
| NWI-FMT023 | The Future of Health | 6 |
| NWI-FMT029 | How Health Systems Work | 6 |
| | Free electives | 3 |

Biodiversity

| Course code | Course name | EC |
|-------------|---------------------------------------|----|
| NWI-BM038A | Ecological and Environmental Concepts | 3 |
| NWI-BM075 | Biodiversity Assessment | 3 |
| NWI-BM033F | Nature in a Crowded Country | 3 |
| NWI-FMT032 | Environmental Life Cycle Assessment | 6 |

6C. SCIENCE, MANAGEMENT AND INNOVATION FINAL RESEARCH PROJECT (27 EC) (NWI-FMT033)

The SMI research project may, in consultation with the SMI coordinator or a lecturer from the SMI specialisation, be completed both internally (within RU/Radboudumc) or externally (government, businesses, consulting firms, NGOs, etc.), at home or abroad. In the first month, the student writes a research plan that must be approved by the first examiner, the day-to-day supervisor from the organisation, and the second examiner. Students may only take part in the Science, Management and Innovation Final Research Project once they have successfully completed the theme-based educational units NWI-FMT019A Methods in Societal Research: Science, Management & Innovation and NWI-FMT003F Sustainable Innovation Management. The assessment of the thesis is based on the criteria described in the *Doing your Research Project in the Science, Management and Innovation Master Specialisation: Student Guide* manual. It is possible to extend the SMI Research Project up to a maximum of 30 EC.

ARTICLE 7.2.3 SCIENCE IN SOCIETY

The Master's programme in Mathematics with the specialisation Science in Society consists of the following educational units:

1. TRACK (24 EC)

Students must choose from one of the tracks Pure Mathematics, Applied Mathematics, or Mathematical Physics as referred to in Article 7.2.1. A minimum of 24 EC must be obtained from the mandatory track courses listed.

2. MATHEMATICAL ELECTIVES (22 EC)

Students must take 22 EC of Mathematics courses at Master's level. This course package must be presented to the Examination Board for approval.

3. MANDATORY EDUCATIONAL UNITS (5 EC)

Students must take 5 EC of mandatory educational units as referred to in Article 7.2.1 Mandatory Courses.

4. EDUCATIONAL UNIT OF A PHILOSOPHICAL NATURE (3 EC)

The student must take at least 3 EC worth of courses of a philosophical nature at Master's level, as referred to in Article 7.2.1 Philosophy.

5. FREE ELECTIVES (9 EC)

To be filled with assessable courses at academic level.

6. MANDATORY EDUCATIONAL UNITS (27 EC)

| Course code | Course name | EC |
|-------------|--|----|
| NWI-FC0046 | Introduction to Philosophy and Social Studies of Science | 3 |
| NWI-FFIL218 | Science and Values | 3 |
| NWI-FC0045 | Science and Public Participation | 6 |
| NWI-FC0010D | Framing Knowledge | 6 |

| | | |
|--------------------------------------|---|--------|
| NWI-FFIL220 <i>OR</i> NWI-FC0043B | Philosophy of Evidence and Expertise <i>OR</i> Science and Public Policy | 3 3 |
| NWI-FC0049 | Social Scientific and Philosophical Methods for Science in Society | 3 |
| SiS elective course* | Elective course (see below) | 3 |

*The student chooses one of the following educational units:

| Course code | Course name | EC |
|--------------|---|----|
| NWI-FC0013C | Science and Media | 3 |
| MED-BMS07 | Science, Communication and Society | 3 |
| NWI-FFIL209B | Environmental Ethics | 3 |
| NWI-FFIL217 | Science and Arts | 3 |
| NWI-FFIL302 | Philosophy and Ethics in Microbiology | 3 |
| NWI-IMI003 | Philosophy and Ethics for Computing and Information Science | 3 |
| NWI-FFIL221 | Beyond Boundaries: An Introduction to Interdisciplinarity | 3 |

7. SCIENCE IN SOCIETY RESEARCH PROJECT (30 EC) (NWI-SISSTAGE)

In consultation with a SiS lecturer, the SiS graduation project can be completed both internally (at the ISIS department) and externally (government, consulting firms, NGOs, etc.). In the first month, the student will write a research plan which must be approved by both the first and the second examiner. The assessment of the thesis is based on the criteria described in the Graduation Project Guidelines SiS. Students may only take part in the Science, Management and Innovation Final Research Project once they have successfully completed 12 EC from the SiS curriculum, including at the very least the Social Scientific and Philosophical Methods for Science in Society course.

ARTICLE 7.2.4 SCIENCE AND EDUCATION

Note: This specialisation is closed for new students from 2024-2025.

PROGRAMME

In derogation from Article 3.3 paragraph 4 of the general part of the Master's EER, this variant has no free elective space.

1. MANDATORY EDUCATIONAL UNITS (84 EC)

| Course code | Course name | EC |
|---------------|---|----|
| NWI-EDU-WI001 | Geschiedenis en filosofie van de wiskunde | 6 |
| NWI-EDU-WI002 | Wiskundig denken | 6 |

| | | |
|---------------|---|----|
| NWI-EDU-WI003 | Statistiek en samenleving | 6 |
| RDA-VDA-WI | Vakdidactiek A wiskunde | 5 |
| RDA-VDB-WI | Vakdidactiek B wiskunde | 5 |
| RDA-PED | Pedagogisch handelen | 4 |
| RDA-MA2-WP | Wetenschap in de educatieve praktijk | 4 |
| RDA-MA2-BS | Begeleide Stage en Integraal Oordeel | 15 |
| RDA-MA2-ZS | Zelfstandige Stage en Integraal Oordeel | 15 |
| NWI-EDU02 | Methoden van Vakdidactisch Onderzoek | 6 |
| LET-EDU-MA17 | Academische en Professionele Ontwikkeling 1 | 3 |
| LET-EDU-MA18 | Academische en Professionele Ontwikkeling 2 | 3 |
| LET-EDU-MA19 | Academische en Professionele Ontwikkeling 3 | 3 |
| LET-EDU-MA20 | Academische en Professionele Ontwikkeling 4 | 3 |

2. ELECTIVES (16 EC)

2a. Mathematics electives (12 EC)

To choose from courses in the Master's programme in Mathematics. Suggestions are included in the course catalogue.

2b. Pedagogical-didactic electives (4 EC)

To choose from RDA specialisation courses, 2 EC each, course codes RDA-SP-01 up to and including RDA-SP-08

3. MASTER'S THESIS (20 EC)

A graduation thesis (NWI-EDU03, 20 EC), to be decided in consultation with one of ISE staff members.

ARTICLE 7.3 DEVIATING PROGRAMME

If a student does not choose a specialisation, they must request permission from the Examination Board, by means of a motivated request and within three months of commencing the Master's programme, to modify the Master's programme.

The alternative programme should include at least the following educational units from Article 7.2.1:

- 1. MANDATORY COURSES (8 EC)
- 4. THESIS (40 EC)

ARTICLE 7.4 ADDITIONAL REQUIREMENTS

The Master's programme selected by the student may, pending prior permission from the Examination Board, include a maximum of 12 EC worth of courses from the Bachelor's programme in Mathematics. This concerns exclusively third-year Bachelor's courses that were not included in the student's Bachelor's programme.

ARTICLE 7.5 DEFINITION OF FINAL PROJECT

The following educational units count as a final project:

- Master Thesis Project Mathematics NWI-WM052B (40 EC)
- Science, Management and Innovation Research Project NWI-FMT033 (27 EC)
- Science in Society Research Project NWI-SISSTAGE (30 EC)
- Integrated Master's Research NWI-EDU03 (20 EC)

SECTION 8. TRANSITIONAL PROVISIONS

| From academic year | New course(s) | | Old course(s) | |
|--------------------|---------------|---|---------------|--|
| 2025-2026 | NWI-NM107B | General Relativity (9 EC) | NWI-NM107 | General Relativity (6 EC) |
| 2024-2025 | NWI-EDU-WI002 | Wiskundig denken (6 EC) | NWI-WM300 | Wiskundig denken (6 EC) |
| 2024-2025 | NWI-EDU-WI003 | Statistiek en samenleving (6 EC) | NWI-WM157 | Statistiek en samenleving (6 EC) |
| 2024-2025 | NWI-WM152B | Entropy and Large Deviations (8 EC) | NWI-WM152B | Martingales and Large Deviations (8 EC) |
| 2023-2024 | NWI-WM068D | Noncommutative Geometry (8 EC) | NWI-WM068C | Noncommutative Geometry (6 EC) |
| 2023-2024 | NWI-WM069D | Computer Algebra (8 EC) | NWI-WM069B | Computer Algebra (6 EC) |
| 2023-2024 | NWI-WM072D | Complexity Theory (8 EC) | NWI-WM072B | Complexity Theory (6 EC) |
| 2023-2024 | NWI-WM094D | Algebraic Topology 1 (8 EC) | NWI-WM094B | Algebraic Topology 1 (6 EC) |
| 2023-2024 | NWI-WM098C | Regression Analysis (8 EC) | NWI-WM098B | Regression Analysis (6 EC) |
| 2023-2024 | NWI-WM120D | Computability Theory (8 EC) | NWI-WM120C | Computability Theory (6 EC) |
| 2023-2024 | NWI-WM126B | Data Science with Applications in Medicine and Biology (8 EC) | NWI-WM126 | Biostatistics (6 EC) |
| 2023-2024 | NWI-WM139B | Analytic Methods in Number Theory (8 EC) | NWI-WM139 | Analytic Methods in Number Theory (6 EC) |
| 2023-2024 | NWI-WM144B | Calculus of Variations (8 EC) | NWI-WM144 | Calculus of Variations (6 EC) |
| 2023-2024 | NWI-WM150B | Category Theory and Homological Algebra (8 EC) | NWI-WM150 | Category Theory and Homological Algebra (6 EC) |
| 2023-2024 | NWI-WM151B | Stochastic Simulation (8 EC) | NWI-WM151 | Stochastic Simulation (6 EC) |
| 2023-2024 | NWI-WM152B | Martingales and Large Deviations (8 EC) | NWI-WM152 | Martingales and Large Deviations (6 EC) |
| 2023-2024 | NWI-WM153B | Nonlinear Wave Equations (8 EC) | NWI-WM153 | Nonlinear Wave Equations (6 EC) |
| 2023-2024 | NWI-WM158B | Experimental Mathematics (8 EC) | NWI-WM158 | Experimental Mathematics (6 EC) |
| 2023-2024 | NWI-WM159B | Singularities and Black Holes (8 EC) | NWI-WM159 | Singularities and Black Holes (6 EC) |
| 2023-2024 | NWI-WM161B | Monte Carlo Methods (8 EC) | NWI-WM161 | Monte Carlo Methods (6 EC) |
| 2023-2024 | NWI-WM246B | Optimal Transport (8 EC) | NWI-WM246 | Optimal Transport (6 EC) |
| 2023-2024 | NWI-WM303B | Finite Element Methods (8 EC) | NWI-WM303 | Finite Element Methods (6 EC) |
| 2023-2024 | NWI-WM304B | Sheaves and Geometry (8 EC) | NWI-WM304 | Sheaves and Geometry (6 EC) |
| 2023-2024 | NWI-WM115B | Master Seminar (6 EC) | NWI-WM115C | Master Seminar (3 EC) and elective (3 EC) |
| 2023-2024 | NWI-EDU-WI001 | History and Philosophy of Mathematics (6 EC) | NWI-WM302 | History and Philosophy of Mathematics (6 EC) |

ARTICLE 8.1 MATHEMATICS FOR STUDENTS ENROLLED IN 2024-2025 OR EARLIER

The courses NWI-WM126B Data Science with Applications in Medicine and Biology (8 EC), NWI-WM305 Num Bifurcation An. Large-scale Sys (MM) (8 EC) and NWI-WM246 Optimal Transport (6 EC) may also be included in the Applied Mathematics track and the Mathematical and Data Science synergy track.

The NWI-WM158 Experimental Mathematics course may also be included in the Mathematical or Computer Science synergy track.

The NWI-WM210 Poisson Geometry (MasterMath) course (8 EC) may also be included in the Mathematical Physics track and the Gravity+ synergy track.

ARTICLE 8.2 MATHEMATICS FOR STUDENTS ENROLLED IN 2022-2023 OR EARLIER

In addition to the courses mentioned in the various tracks (Article 8.2, points 1 a, b and c), students may also choose courses from the tracks of the same name mentioned in Article 7.2.1.

The Master's programme in Mathematics with the research specialisation in Mathematics consists of the following educational units:

1. TRACK (30 EC)

A choice needs to be made from one of the following tracks with at least 30 EC. Educational units with the course code MasterMath are provided by the MasterMath partnership. They can be found on the MasterMath website (<https://elo.mastermath.nl/>).

1A. TRACK: PURE MATHEMATICS

Mandatory elective (30 EC) from the following courses and optional interdisciplinary synergy track (not all courses are offered every year):

| | Course code | Course name | EC |
|---|-----------------------|---|-----|
| 1 | NWI-WM150 | Category Theory and Homological Algebra, or | 6 |
| | MasterMath | Calculus of Variations or | 8 |
| | NWI-WM144 | Calculus of Variations | 6 |
| 2 | MasterMath | Differential Geometry, or | 8 |
| | MasterMath | Algebraic Geometry 1 | 8 |
| 3 | MasterMath | Lie Groups, or | 8 |
| | MasterMath | Lie Algebras | 8 |
| 4 | NWI-WM094B/MasterMath | Algebraic Topology 1 | 6/8 |
| | NWI-WM072B/MasterMath | or Complexity Theory | 6/8 |
| 5 | MasterMath | Riemann Surfaces, or | 8 |
| | NWI-WM255 | Elliptic Curves, or | 8 |
| | | Probabilistic Combinatorics | 6 |
| 6 | MasterMath | Operator Algebras, or | 8 |
| | NWI-WM120C/MasterMath | Computability Theory | 6/8 |
| 7 | MasterMath | Algebraic Number Theory, or | 8 |
| | NWI-WM139 | Analytic Methods in Number Theory | 6 |

| | | | |
|------------------------------------|---|--|---|
| 8 | Synergy Track Mathematics of Computer Science | | |
| | Mandatory course (6 EC): | NWI-WM069B Computer Algebra | 6 |
| | Mandatory electives (12 EC): | NWI-IMC010 Type Theory and Coq | 6 |
| | | NWI-IMC011 Semantics and Domain Theory | 6 |
| | | NWI-IMC036 Category Theory and Coalgebra | 6 |
| NWI-WM158 Experimental Mathematics | | 6 | |
| | NWI-IMC009 Automated Reasoning | 6 | |

1B. TRACK: APPLIED MATHEMATICS

Mandatory electives (30 EC) from the following courses and optional interdisciplinary synergy track:

| | Course code | Course name | EC |
|--|--|---|----|
| 1 | NWI-WM144 | Calculus of Variations, or | 6 |
| | MasterMath | Calculus of Variations, or | 8 |
| | MasterMath | Measure Theoretic Probability, or | 8 |
| | MasterMath | Numerical Linear Algebra | 8 |
| 2 | NWI-WM246 | Optimal Transport, or | 6 |
| | NWI-WM160 | Gamma-Convergence | 6 |
| 3 | NWI-WM126 | Biostatistics, or | 6 |
| | NWI-WM098B | Regression Analysis and Non-Parametric Statistics | 6 |
| 4 | MasterMath | Mathematical Biology, or | 8 |
| | MasterMath | Asymptotic Statistics, or | 8 |
| | NWI-WM156 | Finite Elements | 6 |
| 5 | NWI-WM255 | Probabilistic Combinatorics, or | 6 |
| | NWI-WM161 | Monte Carlo Methods | 6 |
| 6 | NWI-WM152 | Martingales and Large Deviations, or | 6 |
| | MasterMath | Numerical Bifurcation Analysis of Large-scale Systems | 8 |
| 7 | NWI-WM153 | Nonlinear Wave Equations, or | 6 |
| | NWI-WM151 | Stochastic Simulation, or | 6 |
| | MasterMath | Partial Differential Equations | 8 |
| 8 | Synergy Track Mathematics and Data Science | | |
| | Mandatory course (6 EC): | NWI-WM098B Regression Analysis and Non-Parametric Statistics | 6 |
| | Mandatory electives (12 EC): | MasterMath Machine Learning Theory | 8 |
| | | NWI-IMC030 Machine Learning in Practice | 6 |
| | | NWI-NM048D CDS: Machine Learning + NWI-NM047D Computational Neuroscience* | 6 |
| NWI-NM127 Modeling of Complex Real-world Systems | | 6 | |

*These 6 EC can be replaced by: NWI-NM048B Advanced Machine Learning (6 EC)

1C. TRACK: MATHEMATICAL PHYSICS

Mandatory electives (30 EC) from the following courses and optional interdisciplinary synergy track:

| | Course code | Course name | EC |
|---|-----------------------------|--|----|
| 1 | MasterMath | Differential Geometry, or | 8 |
| | NWI-WM069B | Symplectic Geometry | 6 |
| 2 | NWI-WM068C | Noncommutative Geometry, or | 6 |
| | MasterMath | Poisson Geometry | 8 |
| 3 | MasterMath | Lie Groups, or | 8 |
| | MasterMath | Lie Algebras | 8 |
| 4 | MasterMath | Calculus of Variations, or | 8 |
| | NWI-WM144 | Calculus of Variations, or | 6 |
| | MasterMath | Partial Differential Equations | 8 |
| 5 | NWI-WM153 | Nonlinear Wave Equations, or | 6 |
| | NWI-WM159 | Singularities and Black Holes | 6 |
| 6 | MasterMath | Functional Analysis, or | 8 |
| | MasterMath | Operator Algebras | 8 |
| 7 | MasterMath | Quantum Computing, or | 8 |
| | MasterMath | Quantum Information Theory | 8 |
| 8 | Synergy Track Gravity+: | | |
| | Mandatory electives (12 EC) | NWI-NM107 General Relativity | 6 |
| | | NWI-NM024C Foundations and Frontiers of Gravitational Wave Astrophysics or NWI-NM114 Quantum Gravity | 6 |
| | | NWI-WM159 Singularities and Black Holes | 6 |
| | | NWI-WM153 Nonlinear Wave Equations | 6 |

2. MANDATORY EDUCATIONAL UNITS (8 EC)

| Course code | Course name | EC |
|-------------|-----------------------------------|----|
| NWI-WM115C | Master Seminar* | 6 |
| NWI-WM301 | Professional Preparation for Math | 2 |

Students who choose the synergy track Mathematics of Computer Science may replace NWI-WM115C Master Seminar (6 EC) by NWI-IMC057 MFoCS Seminar (6 EC). Students who choose the synergy track Gravity+ may replace NWI-WM115C Master Seminar (6 EC) by NWI-WM115B Master Seminar (3 EC) + NWI-NM124 Gravity+ Club (3 EC).

3. MATHEMATICAL ELECTIVES (18 EC)

Students must take 18 EC worth of Mathematics courses at Master's level. This package must be presented to the Examination Board for approval.

4. MASTER ELECTIVES (15 EC)

Students must take 15 EC worth of courses at Master's level, within or outside Mathematics. This package must be presented to the Examination Board for approval.

5. EDUCATIONAL UNITS OF A PHILOSOPHICAL NATURE (3 EC)

Students must take at least 3 EC worth of courses of a philosophical nature at Master's level. Courses from the table below have been pre-approved.

NOTE: Not all courses are offered annually, and some are subject to enrolment restrictions.

| Course code | Course name | EC |
|--------------|--|-----------|
| NWI-FFIL212 | Philosophy of Water Management | 3 |
| NWI-FFIL215 | Upgrading the Human? | 3 |
| NWI-FFIL216 | Imagining the Anthropocene | 3 |
| NWI-FFIL217 | Science and Arts | 3 |
| NWI-FFIL218 | Science and Values | 3 |
| NWI-FFIL219 | Philosophy of Neuroscience | 3 |
| NWI-FFIL220 | Philosophy of Evidence and Expertise | 3 |
| NWI-FFIL302 | Philosophy and Ethics in Microbiology | 3 |
| NWI-FFIL202A | Evolution and the Mind | 3 |
| NWI-FFIL203B | Bio-Ethics for Life Scientists | 3 |
| NWI-FFIL209B | Environmental Ethics | 3 |
| NWI-FFIL211B | Physics and Philosophy | 3 |
| NWI-WM302 | History and Philosophy of Mathematics | 3 or 6 |
| MasterMath | History and Philosophy of Mathematics | 8 |
| NWI-FFIL220 | Philosophy of Evidence and Expertise | 3 |
| NWI-FFIL221 | Compete or Collaborate? An Introduction to Disciplines and Interdisciplinarity | 3 |

6. FREE ELECTIVES (6 EC)

To be filled with assessable courses at academic level.

7. MASTER THESIS PROJECT MATHEMATICS NWI-WM052C (40 EC)

In line with the major, and consisting of conducting a literature study, writing a thesis, and making a final presentation. The thesis may consist of an internship report. Research or internships may be completed outside of the Mathematics department, but the first assessor needs to be from the department. A plan needs to be drafted in consultation with the first assessor prior to commencement of the research or internship.

ARTICLE 8.3 FOR STUDENTS OF THE SPECIALISATION IN SCIENCE, MANAGEMENT AND INNOVATION IN SOCIETY, THE FOLLOWING APPLIES:

- Only students who were already enrolled in the Green Industries and IT theme prior to the 2025-2026 academic year may complete this theme.
- Students who started the Science, Management and Innovation specialisation in the 2025-2026 academic year but have not completed both NWI-FMT003E and NWI-FMT019 must enrol for NWI-FMT003F and NWI-FMT019A.
- Students who have completed NWI-FMT003E are not permitted to participate in NWI-FMT003F, and students who have completed NWI-FMT019 are not permitted to participate in NWI-FMT019A.
- Students who have already completed NWI-FMT003E but not NWI-FMT019 must register for NWI-FMT019A. As a result, the free elective space for these students is reduced by 3 EC.
- Students who have already completed NWI-FMT019 but not NWI-FMT003E must register for NWI-FMT003F and may do a research project (NWI-FMT033) worth 30 EC instead of 27 EC.

ARTICLE 8.4 FOR STUDENTS OF THE SPECIALISATION IN SCIENCE AND SOCIETY, THE FOLLOWING APPLIES:

| Old course | | | | Replacement course | | | |
|-------------|--|----|------------|--------------------------|---|--------|--|
| Course code | Name | EC | Final year | Course code | Name | EC | Remarks |
| NWI-FC0048 | Philosophical Methods for Science in Society | 3 | 2024 | NWi-FC0049 | Social Scientific and Philosophical Methods for Science in Society | 3 | NWI-FC0047 and NWI-FC0048 have been merged into NWI-FC0049. Successfully completing NWI-FC0047 or NWI-FC0048 is equivalent to completing NWI-FC0049. |
| NWI-FC0044C | Methods of Societal Research | 6 | 2023 | NWI-FC0046 NWI-FC0049 | Introduction to Philosophy and Social Studies of Science + Social Scientific and Philosophical Methods for Science in Society | 3 3 | |
| NWI-FC003B | Research, Responsibility | 3 | 2022 | NWI-FC0045 | Science & Public Participation | 6 | NWI-FC0045 is a combination of |

| | | | | | | | |
|------------------|--|---|------|------------|---|---|--|
| | and Uncertainty | | | | | | NWI-FC003B and NWI-FC002B. NWI- FC0045 can therefore not be included in a single programme with NWI-FC003B or NWI-FC002B. |
| NWI-FC002B | Science and Societal Interaction | 3 | 2022 | NWI-FC0045 | Science & Public Participation | 6 | NWI-FC0045 is a combination of NWI-FC003B and NWI-FC002B. NWI- FC0045 can therefore not be included in a single programme with NWI-FC003B or NWI-FC002B. |
| NWI- FFIL300C | Philosophy of Mathematical Practice | 3 | 2021 | none | | | Students may use the course as a philosophy elective course |
| NWI-FFIL219 | Philosophy of Neuroscience | 3 | 2023 | none | | | Students may use the course as a philosophy elective course |
| NWI-FC0047 | Social Scientific Methods for Science in Society | 3 | 2024 | NWi-FC0049 | Social Scientific and Philosophical Methods for Science in Society | 3 | NWI-FC0047 and NWI-FC0048 have been merged into NWI-FC0049. Successfully completing NWI- FC0047 or NWI- FC0048 is equivalent to completing NWI- FC0049. |

Until 2024, students were required to choose one of the following profiles: *Science and Societal Interaction* or *Philosophies and Worldviews*. This requirement was abolished in 2025. With the course package and the elective courses that meet the requirements of the profiles, the current structure also meets the requirements of the Science in Society specialisation.

ARTICLE 8.5 FOR STUDENTS OF THE SPECIALISATION IN SCIENCE AND SOCIETY WHO ENROLLED BEFORE THE 2023-2024 ACADEMIC YEAR, THE FOLLOWING APPLIES:

| Educational unit | To be replaced by |
|---|--|
| RDA-MA2-02 Leren en Instructie 1 (2 EC) | RDA-VDA-WI-A Vakdidactiek A wiskunde (variant, 2 EC) |

| | |
|--|--|
| RDA-MA2-04 Leren en Instructie 2 (2 EC) | RDA-SP-01 Specialisatiecursus Formatief handelen |
| RDA-MA2-21 Leren en Instructie 3 (3 EC) | RDA-VDA-WI-B Vakdidactiek A wiskunde (variant, 3 EC) |
| RDA-MA2-06 Oriëntatie op Pedagogische Professionaliteit (3 EC) | RDA-PED-A Pedagogisch handelen (variant, 3 EC) |
| RDA-MA2-08 Handelen vanuit pedagogische professionaliteit (2 EC) | RDA-PED-B Pedagogisch handelen (variant, 2 EC) |
| RDA-MA2-20 and RDA-MA2-15 Intensification themes (2 x 1 EC) | RDA-SP-01 up to and including RDA-SP-08 Specialisation Course (2 EC) |
| LET-EDU-MA11 Academische en Professionele Ontwikkeling 1 (2 EC) | LET-EDU-MA17-A Academische en Professionele Ontwikkeling 1 (variant, 2 EC) |
| LET-EDU-MA12 Academische en Professionele Ontwikkeling 2 (2 EC) | LET-EDU-MA18-A Academische en Professionele Ontwikkeling 2 (variant, 2 EC) |

PART IV FINAL PROVISIONS

SECTION 9. FINAL PROVISIONS

ARTICLE 9.1 SAFETY NET SCHEME AND HARDSHIP CLAUSE

1. In all cases not covered fully or clearly by these regulations, the final decision lies with the Dean. If this concerns an educational unit in which the Dean is involved, the Vice Dean responsible for education will decide.
2. In all cases in which these regulations may result in an unreasonable or unfair situation for individual students, the Examination Board or the Dean is authorised to make an exception to the provisions in these regulations. Unless this concerns an educational unit in which the Dean is involved, in which case the Vice Dean responsible for education is authorised to do so instead of the Dean.

ARTICLE 9.2 ESTABLISHMENT AND AMENDMENTS

1. Without prejudice to the provisions in Article 7 of the Structure Regulations, these regulations are established or amended by the Dean following advice from the programme committees and approval by the Joint Assembly of the Faculty.
2. An amendment to these regulations applies in the current academic year, unless this would disproportionately damage the interests of the student.
3. Notwithstanding the provisions of paragraph 1, the Dean is authorised to drop elective educational units from the curriculum should the circumstances be deemed impossible for offering these educational units.

ARTICLE 9.3 ENTRY INTO FORCE

These regulations enter into force on 1 September 2025.

ARTICLE 9.4 PUBLICATION

The Dean is responsible for ensuring that these regulations and any amendments thereto are published in an appropriate manner via the [Radboud University website](#).

As established by the Dean on 15 July 2025.

APPENDIX 1: GUIDELINE FOR AWARDING DISTINCTIONS¹

- a. With due observance of the provisions set out in this Article, the Examination Board is responsible for deciding whether a distinction should be awarded and if so, which distinction.
- b. The distinction is calculated on the basis of all units of the examination programme for which a grade has been awarded on a scale from 1 to 10, with the exception of extracurricular units.
- c. The number of EC of the unit referred to in paragraph b shall serve as the weighting factor for the calculation of the weighted average result, unless stipulated otherwise in the programme-specific part of the EER.
- d. The distinction 'cum laude' shall be awarded if the weighted average result of the final assessment of the units referred to in paragraph b is equal to or higher than 8.0.

Both the EC-weighted average of the assessments of all the educational units of the examination with a study load of **less than 20 EC** and the EC-weighted averages of the assessments of the educational units of the examination with a study load **equal to or more than 20 EC** must be at least equal to 8.0 before any rounding off.

- e. The distinction 'summa cum laude' shall be awarded if the weighted average result of the final assessment of the units referred to in paragraph b is equal to or more than 9.0.

Both the EC-weighted average of the assessments of all the educational units of the examination with a study load of **less than 20 EC** and the EC-weighted averages of the assessments of the educational units of the examination with a study load **equal to or more than 20 EC** must be at least equal to 9.0 before any rounding off.

- f. The distinction shall not be awarded if more than 10% of the total study load of the examination programme (consisting of one or more educational units) has been resat, unless the Examination Board decides otherwise, stating their reasons for this decision.
- g. The distinction shall not be awarded if interim examinations have been resat more than once, unless the Examination Board decides otherwise, stating their reasons for this decision.
- h. The distinction shall not be awarded if the scope of the granted exemptions constitutes more than 50% of the programme, taking into account any further restrictions to the permitted number of exemptions as established in the EER.
- i. The distinction shall not be awarded if fraud was discovered in one of the educational units of the examination programme.

¹ In this guideline, 'unit' refers to an educational unit as referred to in Article 7.3, paragraphs 2 and 3 of the Act.

APPENDIX 2: FRAUD REGULATIONS

SECTION 1. INTRODUCTORY PROVISIONS

ARTICLE 1. OBJECTIVE AND SCOPE OF THE REGULATIONS

The Dean of the Radboud University Faculty of Science has drawn up the following regulations with a view to preventing fraud during interim and final examinations as referred to in Article 7.12b of the Higher Education and Research Act (Wet op het Hoger onderwijs en Wetenschappelijk onderzoek, hereinafter: 'the Act') and that are part of the teaching and examinations of the study programmes offered by the Radboud University Faculty of Science.

ARTICLE 2. DEFINITIONS

The terms used in these regulations – in so far as these terms also appear in the Act or the Education and Examination Regulations of the study programme (hereinafter: the EER) – have the same meaning as that given to them in the Act and the EER.

SECTION 2. DEFINITION OF FRAUD, PROCEDURE AND SANCTIONS

ARTICLE 3. DEFINITION OF FRAUD

1. At Radboud University, fraud is understood to mean any act or omission by a student which, by its nature, is intended to render the proper assessment of the knowledge, understanding and skills of that student or another student fully or partially impossible.
2. Fraud is understood to mean in any case:
 - a. Fraud when taking written interim and final examinations, including:
 - i. Having access to unauthorised aids as referred to in the House Rules for Radboud University Examination Rooms
 - ii. Looking at the work of others or exchanging information
 - iii. Impersonating someone else or allowing someone else to impersonate oneself during an interim or final examination
 - b. Committing fraud when writing theses or other papers, or completing assignments, including:
 - i. Plagiarism in the sense of using or copying someone else's texts, data or ideas without complete and correct references to sources, plagiarism in the sense of copying the work of another student and presenting this as one's own work, and other specifically academic forms of plagiarism
 - ii. The fabrication and/or falsification of research data
 - iii. The submission of a thesis or other paper that has been written by someone else
 - c. Other fraud during assessment and examination, including:
 - i. Taking possession of assignments, answer keys and the like, prior to the time the interim or final examination takes place
 - ii. Changing answers to questions on an interim or final examination after it has been submitted for assessment
 - iii. Providing incorrect information when requesting an exemption, an extension of the validity period, and other similar requests regarding an interim or final examination
3. Any attempt at fraud will also be considered fraud in the sense of these regulations.

ARTICLE 4. PROCEDURE FOR DETERMINING FRAUD

1. In the event that fraud is suspected, the Examination Board or the examiner will immediately inform the student. If fraud is suspected while an interim or final examination is being administered, the Examination Board or the examiner will provide the student with the opportunity to complete the interim or final examination.
2. The Examination Board or the examiner may order the student to hand over the materials involved in the suspicion of fraud.
3. For the application of the provisions in paragraphs 1 and 2, 'examiner' is also understood to mean the invigilator or another Radboud University staff member.
4. The Examination Board or the examiner will draw up a report of the suspected fraud. If the examiner draws up the report, the examiner will send it to the Examination Board immediately.
5. The Examination Board will immediately make the report referred to in paragraph 4 available to the student and will launch an investigation into the matter. The Examination Board will provide the student with the opportunity to respond to the report in writing. The Examination Board will hear both the examiner and the student.
6. Within four weeks of making the report available to the student, the Examination Board will determine whether there is evidence of fraud. The Examination Board will inform both the student and the examiner of its decision in writing. The period of four weeks may be extended by two weeks.

ARTICLE 5. REMEDIAL MEASURES

If the Examination Board determines that fraud has been committed:

- a. The Examination Board will declare that the relevant interim or final examination taken by the student (or students) in question is considered invalid, and
- b. It will document the identification of fraud and, if applicable, the sanctions imposed in the student's file.

ARTICLE 6. SANCTIONS

1. If the Examination Board determines that fraud has been committed, it may:
 - a. Decide that the student is no longer allowed to sit one or more interim or final examinations during a period to be defined by the Examination Board, being no longer than one year.
 - b. Make a recommendation to the Manager and Faculty Programme Director of the Honours Academy that the student should not be admitted to the honours programme of the University or the Faculty, or recommend that the student's participation in the honours programme of the University or the Faculty be terminated.
2. If the Examination Board establishes that serious fraud has been committed:
 - a. The Examination Board may recommend to the Executive Board that the student's enrolment in a study programme be definitively terminated
 - b. The Executive Board may definitively terminate the student's enrolment in a study programme at the recommendation of the Examination Board.
3. As described in the Guideline for Awarding Distinctions, a distinction will not be awarded if fraud has been detected in one or more of the educational units of the examination programme as a whole.
4. The sanctions as specified in this provision will be imposed as from the day following the date on which the student has been informed of the decision to impose the sanctions.

SECTION 3. FINAL PROVISIONS

ARTICLE 7. DECISIONS AND LEGAL PROTECTION

1. Decisions on the basis of these regulations may be sent to the student via OSIRIS and/or by email.
 2. For decisions based on these regulations, the student is permitted to appeal the relevant decision with the Examination Appeals Board (EAB) within six weeks of the decision date.
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ARTICLE 8. ADOPTION AND AMENDMENTS

1. These regulations are adopted and amended by the Dean.
 2. Where the content of these regulations relates to duties and powers of the Examination Board of the study programme, that content must also be ratified by that Examination Board.
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ARTICLE 9. ENTRY INTO FORCE

These regulations enter into force on 1 September 2025. On that date, these regulations will replace any previous regulations.

ARTICLE 10. PUBLICATION

1. The Dean is responsible for publishing these regulations and for appropriately disclosing any amendments thereto.
2. For the purpose of proper and clear provision of information to students and prospective students, the Dean will include these regulations as an appendix to the EER.

As established by the Dean on 15 July 2025 and ratified by the Examination Board on 15 July 2025.