

Assessment plan of the Master's degree programmes 2023-2024: Ecology and Evolution

Introduction

This assessment plan is a description of the testing and assessment modes for all study components in the curriculum of the Master's degree programme Ecology and Evolution. The plan is based on the assessment policy of the Faculty of Science and Engineering, as set out in the [FSE Quality Assurance Manual](#) (Chapter 6: Assessment appendix B) and the protocol setting out the duties and powers of the Faculty's Board of Examiners (Chapter 6: Assessment appendix G).

The assessment plan for the curriculum consists of the following parts:

1. the objective(s) of the degree programme
2. the learning outcomes of the degree programme
3. descriptions of the study components, as set out in the appendices to the Teaching and Examination Regulations 2023-2024 of the degree programme
4. descriptions of the content of each study component in Ocasys, the online course catalogue. The following elements are relevant in this context:
 - objectives
 - description of content
 - lecturers
 - assessment mode(s) and calculation of final mark
 - mode(s) of instruction.
5. an overview of the mentors and examiners (Appendix 1 and 2) and the assessment mode for each study component (Table 1 and Appendix 3). This overview is based on the curriculum approved by the Programme Committee, as set out in the appendices to the Teaching and Examination Regulations 2023-2024 for the degree programme.
6. A matrix showing the relationship between the study components and the learning outcomes for each competence area.

Parts 3 and 4 are not included in this document. For the descriptions of the study components, see the Appendix to the Teaching and Examination Regulations for the degree programme Ecology & Evolution. Descriptions of the content of each study component can be found in Ocasys, the online course catalogue (<http://www.rug.nl/ocasys/>).

1. Objectives of the degree programme

The selective master's programme is research oriented. It focuses on teaching specialist theoretical topics at an advanced level of knowledge and research skills, to prepare for a career in academia or other research institutes. The study programme therefore mainly consists of research projects, which focus on learning about conducting research by actually doing it. Students will not only independently perform experiments in the laboratory or the field, they will also go through the whole process of conducting science developing skills such as searching for and studying scientific literature, formulating hypotheses, designing and performing experiments, and presenting results.

Within the Research-profile students have to choose a specialization track in *Ecology and Conservation* or *Evolutionary Biology*.

For the second track students can be admitted to the Erasmus Mundus mobility programme (MEME), an intensified European programme which prepares for conducting top quality research in this field of evolutionary biology.

In consultation with a study mentor (Appendix 1) students design their own study programme tailored to their interests. The board of examiners must approve of each individual programme.

2. Learning outcomes of the degree programme

The taxonomy of Bloom has been adopted as an adequate means to describe the teaching objectives and their level, the teaching and student activities to reach these objectives and the unambiguous assessment of the extent to which the objectives have been reached.

After completion of the master's degree programme, the graduate:

1. a) has acquired in depth knowledge on one or more scientific disciplines within the field of Ecology and Evolution, and can use this knowledge to explain in detail the relevant concepts, using the appropriate terminology;
b) has acquired cross disciplinary knowledge of issues across scientific disciplines within the field of Ecology and Evolution and can use this knowledge to explain current societal and scientific challenges;
2. can design, and conduct scientific research, and systematically organize his/her work in scientific research;
3. can independently investigate, and critically evaluate scientific literature;
4. can identify new developments in the related disciplines, and can become familiar with these developments;
5. can formulate realistic, and original solutions to complex problems;
6. can participate in, and contribute to a multidisciplinary team;
7. can effectively communicate acquired knowledge, insights and skills to others, both in writing, and in oral presentation;
8. can identify societal and ethical implications of scientific research, and is able to critically reflect on his/her actions in this context;
9. can independently acquire new knowledge, and skills that are relevant for his/her professional career, in science, in policy & management or society.

Track-specific learning outcomes

After completion of the track Ecology and Conservation, the graduate:

1. can contribute to the development of new knowledge and to solving current ecological problems and future challenges
2. can apply relevant eco-evolutionary theories and methods to current pertinent issues in nature conservation
3. can analyze the functioning and stability of natural communities in the wild by integrating theory and ecological research
4. can communicate research and philosophies of ecology and conservation at a professional level to a scientific audience.

Track-specific learning outcomes

After completion of the track Evolutionary Biology, the graduate:

1. can contribute to the development of new knowledge and to elucidating evolutionary processes
2. can apply central concepts of evolutionary theory in various research contexts, including empirical research and theoretical modelling
3. can analyze population or individual-based genetic and genomic data to address research questions in conservation genetics, evolutionary ecology, development and behavior
4. can communicate eco-evolutionary principles, theory and research at a professional level to a scientific audience.

Curriculum

The major part of the master's degree programme consists of 80 ECTS of compulsory individual elements (research projects, colloquium, essay, see table 1) within the domain of Ecology & Evolution. These are graded by examiners appointed by the Board of Examiners (table 3).

In addition to the 80 ECTS individual elements, at most 40 ECTS of the student's programme is composed of course units. Of these, 27/20 ECTS are obligatory for the chosen track. In these courses, the student increases their track-specific knowledge and skills.

Electives

At most 20 ECTS of the student's programme is composed of electives. The student increases their domain-specific knowledge and skills in these courses.

The coordinators of the courses organized by the masters programmes in Ecology & Evolution, have been asked to update or provide information in the form of a so called Course Unit Assessment Overview (CUAO) and to provide information on the contribution to the teaching outcomes of the programme. (See table 3 and 4).

Students may also choose electives organized by other programmes of the FSE or elsewhere. These are not included in this assessment plan but are chosen in consultation with the mentor to make sure the individual programme of the student adheres to all learning outcomes of the programme (Appendix 1 mentors).

With the individual elements the student acquire most of the qualifications/ learning outcomes (table 4) In the courses, the student increases their domain-specific knowledge and skills and acquires the qualifications/learning outcomes as indicated in table 2.

Table 1. An overview of the master's degree programme

Evolutionary Biology:

COURSE UNIT	ECTS	TEACHING FORM	ASSESSMENT
Essay	5	Individual literature study	Written report
Research project	≥ 30	Research	Technical and/or laboratory skills, written report, oral presentation
Research project	≥ 40	Research	Technical and/or laboratory skills, written report, oral presentation
Colloquium	5	Individual literature study	Oral presentation
<i>Obligatory courses:</i>	27	Various	See table 2
Behaviour, Ecology and Evolution	9		
Evolutionary Theory	8		
Genomics in Ecology and Evolution	5		
Principles of Population Genetics in Natural Populations	5		
Electives	≤13	Various	Various

Ecology and Conservation

COURSE UNIT	ECTS	TEACHING FORM	ASSESSMENT
Essay	5	Individual literature study	Written report
Research project	≥ 30	Research	Technical and/or laboratory skills, written report, oral presentation
Research project	≥ 40	Research	Technical and/or laboratory skills, written report, oral presentation

Colloquium	5	Individual literature study	Oral presentation
<i>Obligatory courses:</i>	20	Various	See table 2
Conservation Ecology Practices	5		
Ecological Research Skills	10		
Advanced Population and Community Ecology	5		
Electives	≤20	Various	Various

3. Overview of examiners and testing and assessment modes for study components

Table 2 shows the study components for each year of the programme, and the intended examiner(s) and assessment modes. Not all elective course units are part of this table but can be found in the Teaching and Examination Regulations (TERs) and/or Ocasys. This satisfies requirement 3 in the Protocol of Duties and Powers of the Board of Examiners of the Faculty of Science and Engineering.

Course name	Course code	EC	Coordinator/ examinator	Second examiner	Mode of assessment
Advanced Population and Community Ecology	WMEV008-05	5	Prof. Dr. ir. C. Both	Prof. Dr. H. Olf	P/PR/AST
Behaviour, Ecology and Evolution	WMEV003-09	9	Prof. Dr. ir. J. Komdeur	Prof. Dr. L.W. Beukeboom	R/P/AST
Conservation Ecology Practices	WMEV004-05	5	Dr. Ir. C. Smit	Prof. Dr. T. van der Heide	R/P/PR
Ecological research skills	WMEV005-10	10	Prof. Dr. H. Olf	Prof. Dr. ir. C. Both	R/P
Ecology of Sustainable Farming	WMEV009-05	5	Prof. Dr. P.A. Tittone	Prof. Dr. H. Olf	R/P/AST
Evolutionary Theory	WMEV006-08	8	Dr. G.S. van Doorn	Prof. Dr. I.R. Pen	AST
Flyway ecology (biennial, runs in 2024/2025)	WMEV010-05	5	Prof. Dr. J.A. van Gils	Prof. Dr.T. Piersma	R/P/PR
Genomics in Ecology and Evolution	WMEV011-05	5	prof. dr. B. Wertheim	Prof. Dr. J. Falcão Salles	P/AST
Island Biology	WMEV016-05	5	L.M. Lima Valente PhD (coordinator) Prof. Dr. R. Etienne	tba	P/PR/AST
Mathematical Models in Ecology and Evolution	WMEV013-06	6	Prof. Dr. I.R. Pen	Prof. Dr. C.J.M. Egas	WE
Molecular Methods in Ecology and Evolution	WMEV007-10	5/ 10	Prof. Dr. B. Wertheim	Prof. Dr. J. Falcão Salles	P/PR/AST
Principles of Population Genetics in Natural Populations	WMMB005-05	5	Prof. Dr. P.J. Palsboll	Dr. M. Bérubé	P/PR/AST
Research proposal Ecology and Evolution	WMEV012-05	5	Prof. Dr. B.I. Tieleman	Dr M.Nicolaus	R/P

Assessment abbreviations:

- (WE) Written Exam
- (MC) Multiple choice
- (IT) Interim Test
- (OE) Oral Exam
- (R) Report
- (P) Presentation
- (PR) Practical Work
- (AST) Assignment

4. Relationship between course units and details of the learning outcomes

Table 3 (individual elements) and table 4 (Master and elective courses) show the relationship between the learning outcomes and the course units of the curriculum.

Table 3. Relation between learning outcomes and compulsory individual elements of the master's degree programme:

	Essay	Research projects	Colloquium
1 knowledge	+++	+++	+++
2 research design		+++	
3 scientific literature	+++	+++	+++
4 new developments	+++	+++	+++
5 solving complex problems	++	+++	++
6 team contribution		+++	
7 communication	+++	+++	+++
8 reflection	++	+	++
9 learning abilities	+++	++	+++

*The number of + indicates to what extent the module contributes to the learning outcomes.

Students are allowed to do a research assignment of 5-20 ECTS as an elective. Since these research assignments are individual assignments, their contribution to the degree programme's end terms vary as well.

Table 4: Contribution to the learning outcomes of the course units:

Vaknaam	E1	E2	E3	E4	E5	E6	E7	E8	E9
Advanced Population and Community Ecology	X	X	x	x	x	0	x	0	X
Behaviour, Ecology and Evolution	X	X	X	X	x	x	x	0	x
Conservation Ecology Practices	X	X	x	x	X	x	x	x	X
Ecological research skills	X	X	X	x	X	x	X	0	X
Ecology of Sustainable Farming	x	X	X	x	x	0	x	X	x
Evolutionary Theory	X	X	X	x	X	X	X	0	X
Flyway ecology (biennial, runs in 2022/2023)	X	x	X	X	0	X	X	x	X
Genomics in Ecology and Evolution	x	x	X	X	0	X	X	x	x
Island Biology	X	x	x	x	x	0	x	x	x
Mathematical Models in Ecology and Evolution	X	X	X	X	X	x	x	0	X
Molecular Methods in Ecology and Evolution	x	X	X	x	X	X	X	0	X
Principles of Population Genetics in Natural Population	X	x	X	X	X	X	x	x	X
Research proposal Ecology and Evolution	X	X	X	x	x	0	X	x	x

Appendix 1. Mentors Ecology and Evolution

Prof. Dr. J. Komdeur	Behavioural & Physiological Ecology
Prof. Dr. B.I. Tieleman	Behavioural & Physiological Ecology
Prof. Dr. S. Verhulst	Behavioural & Physiological Ecology
Prof. ir. C. Both	Conservation Ecology
Dr. L.L. Govers	Conservation Ecology
Dr M.Nicolaus	Conservation Ecology
Prof. Dr. H. Olff	Conservation Ecology
Prof. Dr. T. Piersma	Conservation Ecology
Prof.dr.ir. C. Smit	Conservation Ecology
Prof. Dr. L.W. Beukeboom	Evolutionary Genetics, Development & Behaviour
Prof. Dr. B. Wertheim	Evolutionary Genetics, Development & Behaviour
Prof. Dr. J. Falcao Salles	Genomics Research in Ecology & Evolution in Nature
dr. S.J.J. Lequime	Genomics Research in Ecology & Evolution in Nature
dr. G.S. van Doorn	Theoretical Research in Evolutionary Life Sciences
Prof H.L. Dugdale	Theoretical Research in Evolutionary Life Sciences
Prof. Dr. R. Etienne	Theoretical Research in Evolutionary Life Sciences
Prof. Dr. I.R. Pen	Theoretical Research in Evolutionary Life Sciences

Appendix 2: Examiners

List of appointed examiners

The list presented in this chapter provides names of staff members that are formally appointed as Examiner by the Board of Examiners of Biology. Examiners can be contacted for research projects, essays, colloquia and research assignments.

New Examiners can be appointed during the year by the Board of Examiners. Their names and (other) revisions of the list of Examiners will be published on the Student Portal.

Contact details are also available on Student Portal.

To be approved:

Prof. Dr. P.A. Tittone (request pending for exemption via PIE/ESI based on earlier experience)

Name	Field of expertise/ Research group
Dr. M. Bérubé	Genomics Research in Ecology & Evolution in Nature
Prof. Dr. Matty P. Berg	Conservation Ecology
Prof. Dr. L.W. Beukeboom	Evolutionary Genetics, Development & Behaviour
Prof. Dr. J.C. Billeter	Evolutionary Genetics, Development & Behaviour
Dr. P. Boelen	Ocean Ecosystems
Prof. ir. C. Both	Conservation Ecology
Prof.dr. T.J. Bouma	Conservation Ecology
Dr. M.W. Dietz	Behavioural & Physiological Ecology
Prof. Dr. G. van Dijk	Neurobiology
dr. G.S. van Doorn	Theoretical Research in Evolutionary Life Sciences
Prof H.L. Dugdale	Evolutionary Medicine, Quantitative Genetics
Prof. Dr. C.J.M. Egas	Evolutionary Biology
Prof. Dr. U.L.M. Eisel	Neurobiology
Dr. M.G.Elliot	Evolutionary Biology
Prof. Dr. B.D.H.K. Eriksson	Genomics Research in Ecology & Evolution in Nature
Prof. Dr. R. Etienne	Theoretical Research in Evolutionary Life Sciences
Dr. E. Geuverink	Evolutionary Genetics, Development & Behaviour (EGDB)
Prof. Dr. J. Falcao Salles	Genomics Research in Ecology & Evolution in Nature
Prof. Dr. J.A. van Gils	Conservation Ecology Group
Dr. L.L. Govers	Conservation Ecology
Dr. R. Havekes	Molecular Neurobiology
Prof. Dr. T. van der Heide	Conservation Ecology
Prof. Dr. R.A. Hut	Neurobiology
Prof. dr. M.J.H. Kas	Neurobiology
Prof. Dr. J. Komdeur	Behavioural & Physiological Ecology
Prof. Dr. J. van de Koppel	Community & Conservation ecology
dr. S.J.J. Lequime	Genomics Research in Ecology & Evolution in Nature
Dr. M.J.J.E. Loonen	Arctic Centre
Dr. P. Meerlo	Neurobiology
S.E.T. van der Meij, PhD	Genomics Research in Ecology & Evolution in Nature
Dr M.Nicolaus	Conservation Ecology
Dr. Ing. J.D.A. Olivier	Neurobiology
Prof. Dr. H. Olff	Conservation Ecology
Prof. Dr. P.J. Palsboll	Genomics Research in Ecology & Evolution in Nature

Prof. Dr. I.R. Pen	Theoretical Research in Evolutionary Life Sciences
Prof. Dr. T. Piersma	Conservation Ecology
Prof. dr.ir. C. Smit	Conservation Ecology
Dr. J. Stefels	Genomics Research in Ecology & Evolution in Nature
Dr. K.J. Tiedge	Plant Functional Genetics and Genomics
Prof. Dr. B.I. Tieleman	Behavioural & Physiological Ecology
H. van Veen, MSc	Evolutionary Plant Ecophysiology
Prof. Dr. S. Verhulst	Behavioural & Physiological Ecology
Prof. Dr. M.E. Visser	Chronobiology
dr. ir. M.G.J. de Vos	Genomics Research in Ecology & Evolution in Nature
Prof. Dr. B. Wertheim	Evolutionary Genetics, Development & Behaviour
Prof. Dr. E.A. van der Zee	Neurobiology