academion

M Environment and Resource Management

Vrije Universiteit Amsterdam

www.academion.nl
info@academion.nl

Project code P2304

Contents

Summary 4
Score table 5
Introduction 6
Procedure 6
Panel 7
Information on the programme 8
Description of the assessment 9
Organization 9
Previous accreditation's panel's recommendations 9
Standard 1. Intended learning outcomes 9
Standard 2. Teaching-learning environment 11
Standard 3. Student assessment 15
Standard 4. Achieved learning outcomes 17
General conclusion 17
Development points 17
Appendix 1. Intended learning outcomes 19
Appendix 2. Programme curriculum 21
Appendix 3. Programme of the site visit 22
Appendix 4. Materials 23

Summary

Standard 1. Intended learning outcomes

The ambitions of the MSc ERM are fitting for an academic master's programme in this field. The aims of the programme have been translated into a good, coherent and well-formulated set of intended learning outcomes (ILOs), that are aligned with the requirements of the academic and professional field. The panel stresses that the involvement of IVM is a great asset to ERM.

The panel encourages the programme to ensure continuous participation of the recently revived Professional Advisory Board as a means to keep the ILOs connected to the requirements of the professional field.

Standard 2. Teaching-learning environment

The curriculum of ERM enables student to achieve the intended learning outcomes of the programme. The choice of English as the language of instruction is logical and warranted. The curriculum is coherent and well-structured; the close proximity of IVM is a great asset, particularly with regards to access to great research(ers). The programme has grown considerably in student numbers and therefore faces some challenges related to scaling of activities, such as giving feedback to (individual) students and guiding students in decision-making.

The programme uses several activating and inspiring teaching methods that support its interdisciplinary approach. The panel recommends that teachers are aware of the backgrounds of their students, in order to optimize the learning experience. Students receive guidance and the programme is feasible.

The teaching staff is well-qualified; the panel appreciates the co-teaching method. Recently, the programme has faced a high turnover of (key) staff. In combination with the rise of student numbers, the panel concludes that the programme management faces some (organisational) challenges, for instance with regards to avoiding overlap in courses and deadlines, which will need continued attention.

The panel finds that the programme deploys ample initiatives to look after the quality and coherence of the programme. The programme is open to feedback and is willing to take measures to develop and improve.

Standard 3. Student assessment

The programme has a reliable, valid and transparent system of assessment in place. There are adequate procedures for design and quality assurance of exams, assignments and the theses. The panel suggests making the assessment of skills development more explicit.

The thesis assessment is transparent and contains feedback for students. The Examination Board fulfils its legal duties. The panel recommends the EB formulates a general, clear and transparent policy on the use of generative AI tools, as this is not yet available.

Standard 4. Achieved learning outcomes

The theses and the success of alumni on the job market show that students of the programme realize the intended learning outcomes.

Score table

The panel assesses the programme as follows:

Master's programme Environment and Resource Management

Standard 1: Intended learning outcomes	meets the standard
Standard 2: Teaching-learning environment	meets the standard
Standard 3: Student assessment	meets the standard
Standard 4: Achieved learning outcomes	meets the standard
General conclusion	positive

Em. prof. dr. J.T.A. (Hans) Bressers, panel chair
Drs. L. (Linda) te Marvelde, panel secretary
Date: 2 September 2024

Introduction

Procedure

Assessment

On 9 April 2024, the master's programme Environment and Resource Management of the Vrije Universiteit Amsterdam was assessed by an independent peer review panel as part of the cluster assessment Environmental Sciences. The assessment cluster consisted of 17 programmes, offered by the institutions Open University, University of Amsterdam, Wageningen University, Radboud University, Vrije Universiteit Amsterdam, University of Groningen, Maastricht University, Leiden University, Utrecht University and the Amsterdam Institute for Advanced Metropolitan Solutions (of Delft University of Technology and Wageningen University). The assessment followed the procedure and standards of the NVAO Assessment Framework for the Higher Education Accreditation System of the Netherlands (September 2018).

Quality assurance agency Academion coordinated the assessment upon request of the cluster Environmental Sciences. Peter Hildering and Jessica van Rossum acted as coordinator and panel secretaries. Annemarie Venemans, Esther Poort, Anne-Lise Kamphuis, Linda te Marvelde and Carlijn Braam also acted as secretaries in the cluster assessment. They have been certified and registered by the NVAO. Linda te Marvelde acted as panel secretary in the assessment of the programme of the Vrije Universiteit Amsterdam.

Preparation

Academion composed the peer review panel in cooperation with the institutions and taking into account the expertise and independence of the members as well as consistency within the cluster. On 15 December 2023, the NVAO approved the composition of the panel. The coordinator instructed the panel chair on his role in the site visit according to the Panel chair profile (NVAO 2016).

The programme composed a site visit schedule in consultation with the coordinator (see Appendix 3). The programme selected representative partners for the various interviews. It also determined that a development session would be made part of the site visit in the form of thematic sessions. A separate development report was made based on this dialogue.

The programme provided the coordinator with a list of graduates over the period October 2021 – August 2023. In consultation with the coordinator, the panel chair selected 15 theses of the master's programme Environment and Resource Management. They took the diversity of final grades and examiners into account, as well as the various specializations. The panel selected 2-4 theses for each of the five specializations. Prior to the site visit, the programme provided the panel with the theses and the accompanying assessment forms. It also provided the panel with an information file and additional materials (see appendix 4).

The panel members studied the information and sent their findings to the secretary. The secretary collected the panel's questions and remarks in a document and shared this with the panel members. In a preliminary online panel meeting on 25 March, the panel discussed the initial findings on the information file and the theses, as well as the division of tasks during the site visit. The panel was also informed on the assessment framework, the working method and the planning of the site visits and reports.

Site visit

During the site visit, the panel interviewed various programme representatives (see Appendix 3). The panel also offered students and staff members an opportunity for confidential discussion during a consultation

hour. No consultation was requested. The panel used the final part of the site visit to discuss its findings in an internal meeting. Afterwards, the panel chair publicly presented the preliminary findings.

Report

The secretary wrote a draft report based on the panel's findings and submitted it to the coordinator for peer assessment. Subsequently, the secretary sent the report to the panel for feedback. After processing this feedback, the secretary sent the draft report to the programme in order to have it checked for factual irregularities. The secretary discussed the ensuing comments with the panel chair and changes were implemented accordingly. The panel then finalized the report, and the coordinator sent it to the Faculty of Science and the Vrije Universiteit Amsterdam.

Panel

The following panel members were involved in the cluster assessment Environmental Sciences:

- Em. prof. dr. J.T.A. (Hans) Bressers, emeritus professor in Policy Studies and Environmental Policy at the University of Twente (chair);
- Prof. dr. A.C. (Arthur) Petersen, professor in Science, Technology and Public Policy at the University College London (United Kingdom);
- Dr. A.R. (Ana) Vasques, senior lecturer at the Erasmus University College of Erasmus University Rotterdam;
- Dr. S.E. (Sarah) Cornell, associate professor at the Stockholm Resilience Centre of Stockholm University (Sweden);
- Em. prof. dr. M.C. E. (Rietje) van Dam-Mieras, emeritus professor in Sustainable Development and Innovation of Education at Leiden University, and member of the Top Consortium for Knowledge and Innovation (TKI) Biobased Circular (focus Human Capacity Agenda);
- Dr. ir. T. (Thijs) Bosker, associate professor in Environmental Sciences at Leiden University;
- Prof. dr. ir. S.E. (Siegfried) Vlaeminck, professor in Microbial Cleantech and Environmental Systems Analyses at the Universiteit of Antwerpen (Belgium);
- Prof. dr. M.P.J. (Maarten) Loopmans, professor in Human Geography and Political Ecology at the KU Leuven (Belgium);
- Dr. ir. S.G. (Gerd) Weitkamp, associate professor in Health Geography, Mobility, and Geospatial Technologies at the University of Groningen;
- Prof. dr. P. (Paquita) Perez Salgado, professor in Natural Sciences at the Open University;
- Prof. dr. E. (Esther) Turnhout, professor in Science, Technology and Society at the University of Twente;
- Em. prof. dr. ir. J.T. (Hans) Mommaas, emeritus professor in Regional Sustainability Governance at Tilburg University, and chair of the Ecological Authority;
- Dr. P. (Patricia) de Cocq, director Living Environment and Nature at HAS Green Academy;
- Prof. dr. ir. Z. (Zofia) Lukszo, professor in Smart Energy Systems at the Delft University of Technology;
- M. M. (Marisa) Beunk MSc., alumna (March 2023) of the master's programme Environmental Sciences (Policy Track) of Wageningen University (student member);
- F.O. (Fenna) Oostrum, alumna (September 2023) of the master's programme Environment and Society Studies of Radboud University (student member).

The panel assessing the master's programme Environment and Resource Management at the Vrije Universiteit Amsterdam consisted of the following members:

- Em. prof. dr. J.T.A. (Hans) Bressers, emeritus professor in Policy Studies and Environmental Policy at the University of Twente (chair);

- Dr. A.R. (Ana) Vasques, senior lecturer at the Erasmus University College of Erasmus University Rotterdam;
- Dr. S.E. (Sarah) Cornell, associate professor at the Stockholm Resilience Centre of Stockholm University (Sweden);
- Prof. dr. M.P.J. (Maarten) Loopmans, professor in Human Geography and Political Ecology at the KU Leuven (Belgium);
- F.O. (Fenna) Oostrum, alumna (September 2023) of the master's programme Environment and Society Studies of Radboud University (student member).

Drs. Linda te Marvelde acted as secretary for the site visit.

Information on the programme

Name of the institution:	Vrije Universiteit Amsterdam
Status of the institution:	Publicly funded institution
Result institutional quality assurance assessment:	Positive
Programme name:	Environment and Resource Management
CROHO number:	60045
Level:	Master
Orientation:	Academic
Number of credits:	60 EC
Specialisations or tracks:	Ecosystem Services and Biodiversity Global Food Challenges Global Water Challenges Energy and Climate Global Sustainable Futures
Location:	Amsterdam
Mode of study:	Full time
Language of instruction:	English
Submission date NVAO:	1 November 2024

Description of the assessment

Organization

The master's programme Environment and Resource Management (ERM) is part of the Faculty of Science of the Vrije Universiteit Amsterdam (VU) and is hosted by the Institute for Environmental Studies (IVM). The head of the programme is the programme director, who is supported by a programme coordinator. The programme director is responsible for the overall strategy, vision, and operational management. The day-to-day operation of the programme, including most contact with students, teachers and the VU administration, is carried out by the programme coordinator. Administrative support is provided by the Faculty Education Office.

The programme has its own programme committee (in Dutch: Opleidingscommissie/OLC). The Examination Board is organized at the level of the Faculty of Science (see Standard 3).

Previous accreditation's panel's recommendations

The programme's documentation included an overview of how it followed up on the recommendations given by the previous accreditation panel (2018). The panel finds that the recommendations have been acted upon by the programme; the panel is satisfied with the improvement measures taken and sees that these have contributed to the improved quality of the programme.

Standard 1. Intended learning outcomes

The intended learning outcomes tie in with the level and orientation of the programme; they are geared to the expectations of the professional field, the discipline, and international requirements.

Findings

The one-year, English-taught master's programme Environment and Resource Management (ERM) envisages its graduates to drive change and foster sustainability across all sectors of society. Such change requires collaboration and contestation across societal sectors, academic disciplines and cultures. ERM is therefore interdisciplinary by design, welcoming students from the social, natural and technical sciences, and addressing sustainability from a systems-perspective rather than disciplinary perspective. ERM graduates are equipped with the academic knowledge, tools and critical attitude necessary for a career in public, private or non-profit organizations that work to pursue sustainability. All ERM graduates have a basic understanding of how socio-ecological systems function, how such systems are governed and to what effect. That entails learning about academic approaches and methods for analyzing socio-ecological systems and how to govern them.

The panel finds that the programme's aims and ambitions align well with the Dutch referential framework for academic programmes in Environment and Sustainability 2023 (which takes environment and sustainability as its core), as well as with the VU Amsterdam thematic profile Science for Sustainability. In addition, ERM is the flagship programme of the Institute for Environmental Studies (IVM), which is the Netherlands' oldest interdisciplinary institute dedicated to sustainability. IVM houses four specialized sections — Water and Climate Risk, Environmental Economics, Environmental Geography, and Environmental Policy Analysis — all of which are actively involved in ERM. The panel finds the closeness of ERM to IVM invaluable as it ensures an undisputed connection to good research and the latest developments in the (academic) field.

ERM graduates are generalists compared to those who have completed a disciplinary master's programme (e.g. Economics, Political Science, Law, Geology or Hydrology). The panel concurs with the programme's outlook that generalists are needed to tackle most contemporary sustainability challenges as they are able to understand and communicate with people from various academic backgrounds. ERM graduates are expected to function in interdisciplinary and disciplinary teams, being able to synthesize insights from different perspectives. The panel finds that interdisciplinarity is very well anchored in the programme's profile (and intended learning outcomes).

ERM is one of fourteen sustainability master's programmes in the Netherlands in the ICM cluster Environmental Sciences. ERM distinguishes itself as a one-year interdisciplinary sustainability master's programme in the Netherlands, as most other sustainability programmes typically span two years. Furthermore, ERM is specifically designed to equip students for roles as academic sustainability professionals. A significant part of the ERM students come from professional backgrounds, seeking specialization in sustainability without necessarily pursuing a PhD. In comparison to other programmes, ERM places a significant emphasis on environmental economics and sets itself apart by offering thematic specializations. The specializations provide students with the opportunity to build a profile in food (Global Food Challenges), biodiversity and ecosystems (Ecosystem Services and Biodiversity), water (Global Water Challenges), energy and climate (Energy and Climate), or a combination thereof (Global Sustainable Futures).

Intended learning outcomes
The ambitions of the programme have been translated into a very good, clear and balanced set of Intended Learning Outcomes (ILOs) (see Appendix A). The panel deems the ILOs to be in line with the aims of the programme, including its level and orientation, which is reflected in the structuring of the ILOs according to the Dublin descriptors. The panel finds that the ILOs unveil a deliberate choice for a 'gamma' oriented environmental sciences programme with sufficient elements of understanding of 'beta' aspects to support the graduates' ability to communicate across disciplines. The field (that is covered by IVM) and good research practices are visible in the ILOs.

Professional field
ERM's Professional Advisory Board (in Dutch: Werkveldadviesraad) plays a role in ensuring that the content and skills that the students learn in the programme are aligned with the needs of future employers. However, the last meeting of the Professional Advisory Board dates back to March 2018. Following a change in the ERM leadership (2023), the Professional Advisory Board is currently being revived with a review of the composition. Existing members haven been asked to confirm their intention to remain on the Board, new members have been recruited, and a kick-off meeting is planned in June 2024. The panel has been informed of the composition of the rejuvenated Board, which now consists of members from across public and private sectors, international and national organizations. The panel encourages ERM to make full use of the Board and to ensure that there will be continuity of its involvement in the future.

Considerations
The ambitions of the MSc ERM are fitting for an academic master's programme in this field. The aims of the programme have been translated into a good, coherent and well-formulated set of intended learning outcomes (ILOs), that are aligned with the requirements of the academic and professional field. The panel stresses that the involvement of IVM is a great asset to ERM.

The panel encourages the programme to ensure continuous participation of the recently revived Professional Advisory Board as a means to keep the ILOs connected to the requirements of the professional field.

Conclusion

The panel concludes that the programme meets standard 1.

Standard 2. Teaching-learning environment

The curriculum, the teaching-learning environment and the quality of the teaching staff enable the incoming students to achieve the intended learning outcomes.

Findings

Student intake

ERM attracts a mix of Dutch and international students with a great variety of (educational, cultural, professional) backgrounds. The programme is open to students from a broad range of disciplines, including natural and social sciences, as well as people who already have (some) work experience. The admission criteria reflect the openness of the programme, aiming to attract students with a good academic track-record and level of English, but also with an affinity to sustainability. Each year, approx. 30-35 students complete the pre-master programme which is offered to those who are not eligible for direct admission to the ERM programme. The panel is satisfied that, to remedy any deficiencies before entering the programme, three videos were produced as preparatory modules for environmental economics, statistics and environmental policy, as per the recommendation of the previous panel.

Student numbers have grown rapidly, especially in the last five years, during which the intake of students has almost doubled, increasing from 80 (2018) to 159 (2023). Overall, the programme management is satisfied with the current student enrolment and ERM is seeking to maintain a steady influx. Overall, the panel finds the increase in student numbers positive, but it did notice some growing pains with respect to the scalability of certain aspects of the programme, for instance with regards to individual feedback to students, coordination and work load for lecturers. This is further discussed below.

Curriculum

The panel finds that the English-taught master's programme ERM (60 EC) is well-structured and coherent. In the first half of the programme, all students follow three core courses that lay the theoretical foundation of ERM. Parallel to these core courses, ERM students are asked to choose between five specializations: Global Food Challenges, Energy and Climate, Global Water Challenges, Ecosystem Services and Biodiversity, and Global Sustainable Future. Each specialization comprises two courses, with one scheduled for Period 1 and the other for Period 3. The first four specializations include a predetermined combination set of courses, the fifth specialization, Global Sustainable Future, offers students the opportunity to create their own combination of specialization courses, which allows for more flexibility. An introductory session takes place during the first week of the programme, in which the teachers of each specialization present their courses. This provides students with an understanding of the courses offered and the possibilities within the programme.

In the second semester, students start preparing for their final thesis project. They follow two compulsory courses: Methods of Environment and Resource Management and the Research Design course, which provides them with the tools and knowledge to write a research proposal which may or may not be used for

their final thesis project. In parallel to the research design course, students follow an Academic Writing course organized by the VU's Academic Language Programme. Students conclude their studies with the ERM thesis research project, which is considered the capstone of their studies in which they apply and link both knowledge and skills acquired in previous courses. This final thesis report is a scientific write-up of the results found during the research project (see Standard 4). The panel concludes that the programme manages to offer students many opportunities to build their own profile within a one-year period. The panel finds that, due to the limited time available in a one-year programme, timely information sessions and structured guidance are key to the study success of (individual) students and in managing their expectations. In light of the growth in student numbers, the panel encourages the programme to ensure that (all) students are aware of the choices they have to make and to manage their expectations accordingly. This might require not only communicating options to students, but rather guiding them somewhat more in their decision-making processes, in addition to the existing activities and resources that are already available to students. The students informed the panel that in particular a reconsideration of the timeline surrounding the thesis process (i.e. clarity on the process) would be welcomed.

The didactic vision of ERM is based on five clear principles are operationalized throughout the programme's collaboration with the responsible teachers:

- From problem to solution: The programme starts with providing all students with a thorough and common understanding of the problems, i.e. the causes and consequences of environmental change. It gradually moves into sustainability governance and designing innovative solutions.
- From content to skills: The programme starts with emphasizing the knowledge development and learning about sustainability challenges from a system's perspective. The programme gradually shifts focus to skills development including research methods, research design, academic writing, presentation and employability.
- From multidisciplinary to interdisciplinary: The programme starts with a multidisciplinary perspective, in particular with the many types of backgrounds represented among students, aiming to foster interdisciplinarity.
- From group to individual: The programme starts with group assignments in most courses, training and familiarizing students with working in multidisciplinary teams. It gradually focuses on individual work, for instance by examination forms, which reach a crescendo with the final thesis to test the students' ability to carry out independent work.
- From exam to thesis: The programme starts with more exam-based forms of examinations, to test knowledge and understanding, applying newly learned concepts and skills. The forms of examination and teaching gradually focus more on higher order thinking, including synthesizing knowledge and evaluating by means of criteria and standards, as well as, creating new solutions.

The panel is impressed with ERM's clear didactic vision which provides cohesion to the programme. It aims to take the heterogenous background of students into account, looking to create a common knowledgebase regarding sustainability problems as well as building a community. The panel learned, however, that lecturers are not made aware of the educational and cultural backgrounds of their students in class. Considering the (didactic) vision and ambition of the programme, the panel considers this an undesirable and somewhat puzzling situation. The panel therefore recommends that teachers are aware of the backgrounds of their students in order to optimize the learning experience for all, for example by taking an inventory with students at the start of a course.

The panel is positive about the variety of teaching methods that are used in the programme. Throughout the programme, course coordinators guide students on learning objectives, planning, study materials, and assignments. Group assignments, which take primarily place in the first months, promote peer learning and

support. Some courses offer additional lecture hours for students seeking extra support to meet the programme's knowledge requirements. Junior lecturers or PhD candidates may assist course coordinators in addressing student queries. The panel is positive about the feasibility of the programme. However, students did report that there are some notable differences between lecturers in assigned workload in relation to the credits per course. The panel finds that the programme management would do well to (at least) limit such diversity in workload for students.

Student guidance
The panel noted that ERM offers ample guidance. The programme starts with a three-day introduction aimed at fostering connections among students, explaining programme features, assisting with decision-making, and informing students about available support services. Academic advisors are available for general study-related questions and personal tutoring. The programme coordinator plays a role regarding specific study programme inquiries or personal matters. International students also receive support from the international office for living and studying in the Netherlands. Additionally, students can seek assistance from the student psychological counsellor for short-term, solution-oriented services related to severe study or personal issues.

Course coordinators guide students on learning objectives, planning, study materials, and assignments. Group assignments, which take primarily place in the first months, promote peer learning and support. Some courses offer additional lecture hours for students seeking extra support to meet the programme's knowledge requirements. Junior lecturers or PhD candidates may assist course coordinators in addressing student queries. During thesis research projects, students receive regular supervision sessions and reflection moments. Students are also encouraged to participate in extracurricular courses such as the Soft Skills Workshop Series and activities, such as debates at 3D, the VU's debate centre, among others.

The panel compliments the programme with their efforts in addressing students' well-being. The panel understood that a particular challenge for ERM is that students may experience climate anxiety which is triggered by the contents of the programme. The panel finds that the programme is thoughtful and pro-active when it comes to this particular issue and encourages them to keep working with students to counter this problem.

Language of instruction
ERM is English-taught and uses and English language name, for which the programme lists several reasons. The job market for graduates is international and requires students to have an excellent command of academic English writing, understanding and presentation (employability). Also, the latest research on sustainability issues is by and large only available in English, requiring students to use English to engage with the literature in a meaningful way (access to resources). In addition, the staff of IVM – representing the some of the world's top researchers in various topics taught in ERM – have English as a working language (access to researchers). Moreover, English being lingua franca among sustainability professionals globally provides access and opportunities for collaboration and networking with a much larger pool people than would a Dutch-taught programme (collaboration and networking). Furthermore, since most sustainability issues treated in the programme are international (e.g. climate change) graduates should be able to communicate with people from other countries to solve them (preparing for global challenges). ERM adheres to the VU language policy; academic staff lecturing in English-taught degree programme or subjects possess C1 level English (at least). Considering the aforementioned, the panel concludes that the choice for English is logical and warranted.

Staff

The panel describes ERM's lecturing staff as knowledgeable and engaged. ERM has the capacity to access a wide pool of lecturers (largely connected to the IVM) for the specialization courses, as well as for individual lectures and to supervise the broad range of thesis topics. The panel finds that the adding of junior lecturers and the practice of co-teaching (multiple teachers involved in the same course) have made a positive effect on the team.

There have been staffing changes through the entire programme in 2022-2023 including a new PD, PC, and OLC and EB members. These changes have opened new possibilities but have also meant challenges in maintaining the institutional memory. The panel compliments the programme on all the work they do to tackle these challenges, so far. The rise in student numbers and the high workload of staff also pose a challenge in managing the programme. Despite the efforts of the management team to the contrary, students report (for instance) some overlap in courses and the existence of multiple deadlines and assessments at the same time. The panel understands the challenges for the programme management, but does suggest that adaptations might be necessary in order to deal effectively with the increase in programme size (i.e. further strengthen programme coordination).

A point of attention is that the students mention that the quality of the teacher-student relationship varies considerably between classes. It is not always clear what students can expect in each new class in terms of teacher feedback or time for questions in the classroom. The specialization classes have considerable teacher-student interactions, multiple questions leading to interesting discussions in class, and a good amount of feedback. All of this is in part due to much smaller class sizes, and a more focused curriculum. In comparison, outside the specialization courses class sizes go up to over 100 students. Due to the overall larger classes, there is less time for questions or discussions in class, and feedback and communication between the teacher, their aides, and the students. The panel was informed that some courses are electives for other programmes, leading to very large classes. The panel suggests that it might be worth considering if it would be possible to create separate courses for students from other programmes, to relieve the pressure of ERM to cater to this group in their own programme. The increased student numbers give rise to some pressure in teaching methodology and the wish to give students individual feedback. In the short term, the programme could look into splitting groups, in order to create more manageable group sizes. For the long term, the programme would do well to think out a strategy on how to deal with the increase in student numbers in relation to didactic choices and the quality of (individual) feedback in large courses, and to manage the students' expectation accordingly.

Considerations

The curriculum of ERM enables student to achieve the intended learning outcomes of the programme. The choice of English as the language of instruction is logical and warranted. The curriculum is coherent and well-structured; the close proximity of IVM is a great asset, particularly with regards to access to great research(ers). The programme has grown considerably in student numbers and therefore faces some challenges related to scaling of activities, such as giving feedback to (individual) students and guiding students in decision-making.

The programme uses several activating and inspiring teaching methods that support its interdisciplinary approach. The panel recommends that teachers are aware of the backgrounds of their students, in order to optimize the learning experience. Students receive guidance and the programme is feasible.

The teaching staff is well-qualified; the panel appreciates the co-teaching method. Recently, the programme has faced a high turnover of (key) staff. In combination with the rise of student numbers, the panel concludes

that the programme management faces some (organisational) challenges, for instance with regards to avoiding overlap in courses and deadlines, which will need continued attention.

The panel finds that the programme deploys ample initiatives to look after the quality and coherence of the programme. The programme is open to feedback and is willing to take measures to develop and improve.

Conclusion

The panel concludes that the programme meets standard 2.

Standard 3. Student assessment

The programme has an adequate system of student assessment in place.

Findings

The Faculty of Science has compiled an Assessment Policy, which includes thorough instructions on how to set up reliable examinations and assessments. These instructions were utilized as input by the Examination Board (EB) of the faculty in developing its EB Rules and Guidelines. A detailed explanation of the specific assessment policy for the bachelor's programme ERM is laid down in its Assessment Plan.

Course assessment

The panel finds that the programme has an appropriate system of assessment. ERM uses a broad range of methods, exposing students to different ways of demonstrating their knowledge and skills. The programme attracts students from different academic backgrounds and experience, and what is asked from them by future employers, and therefore mix more traditional ways of examination, e.g. essay writing and closed-book exams, with more novel forms of examination, e.g. video assignments and pitching contests. The course coordinators, in discussion with the programme director, are responsible for determining what types of formative and summative examinations that are appropriate for assessing whether the student has reached the intended learning goals of a course. When several forms of assessments are used in a course, it is established in advance which final attainment levels each form of testing contributes to, how heavy each form weighs in the final grade and whether or not compensation is possible. This information is also included in the study guide. General rules regarding testing, partial grades and compensation can be found in the Education and Examination Regulations (TER). Based on the discussions during the site visit, the panel suggests that the programme could benefit from assessing skills development in a more explicit manner (formative, guided peer review etc.).

Thesis assessment

The final attainment levels related to having an academic attitude (professional attitude, professional behaviour) are explicitly included in the assessment of the final work (thesis). The process of finding a research assignment, progression and assessment is laid down in a syllabus and is supervised by the thesis coordinator. The thesis is assessed by the VU supervisor who is an authorized examiner appointed by the Examination Board. In the event that students write their thesis with an external supervisor, the VU supervisor is responsible for the final assessment. Daily supervision may also be delegated to PhD students of the different departments at IVM, as long as there is always a VU supervisor responsible for the final assessment and for guiding the PhD student in their supervision. All supervisors are offered guidance on how to supervise a thesis and are invited to participate in an information session and grading discussion organized by the thesis coordinator.

The final thesis is preceded by the research design course. In this course, students write their research proposal with the aim to implement it during the thesis writing period. At the end of this course, the proposal is evaluated, and the go/no-go moment takes place. Here it is determined whether the research proposal is feasible, and the student can successfully complete the thesis within the set deadline. In case of a negative evaluation, the student will be given the opportunity to revise the proposal. Upon completion of the final work, the first evaluator (the VU supervisor) assesses the student's practical skills, academic attitude, and oral presentation. The written report is evaluated by both the first evaluator, and an independent second evaluator. The second evaluator is also an authorized examiner appointed by the examination committee and, moreover, not involved in the research. The final grade of the final paper is a weighted average of the two assessments. A uniform digital assessment form has been established for the final assessment so that every student is assessed in the same way. The panel is satisfied with the manner in which the theses are assessed. In addition, the panel concludes that the thesis assessment is very transparent; detailed feedback is given and directed to the student.

Examination Board

The panel spoke with an Examination Board (EB) that fulfils its legal duties. The Faculty of Sciences has two EB's: the EB for Natural Sciences and Mathematics (NSM-IS) and the EB for Life Sciences and Earth, Ecological and Environmental Sciences (HLS-EEE). Both have several subcommittees to ensure that each programme in the faculty is given ample attention. NSM-EEE includes the subcommittee ERM.

The EB has established an Assessment Committee to oversee the implementation of the examination guidelines. All the EB's subcommittees are represented in the Assessment Committee. Every year, a sample of courses are selected for review. Pass rates (courses with a pass rate of less than 50% are always reviewed), information from previous years, student course evaluations, requests from the Programme Director or Programme Committee, and other signals are used to choose the samples of courses. Each course is reviewed every three to four years. A representative sample of students' theses is selected for review as well, making sure that a variety of grades are part of the sample.

The outcomes of the EB's reviews are reported to the Programme Director who is responsible for acting in case of issues. The EB has not flagged any issues recently regarding the assessment and examination of the courses or the theses of the master's programme ERM.

Finally, the Examination Board regularly provides ad-hoc guidelines and advice for dealing with specific issues that may have an impact on the quality of assessment. One example is the rise of generative AI tools, such as ChatGPT. The EB informed the panel they have seen an increase in the prevalence of use of ChatGPT, which has led the EB to inform staff and students on the rules and regulations concerning fraud to make sure that all stakeholders are aware of the EB's stance and possible measures taken when fraud is detected. The EB discusses what the emergence of generative AI tools could mean for education in the future. The panel recommends the EB formulates a general, clear and transparent policy on these kinds of new developments, as this is not yet available.

Considerations

The programme has a reliable, valid and transparent system of assessment in place. There are adequate procedures for design and quality assurance of exams, assignments and the theses. The panel suggests making the assessment of skills development more explicit.

The thesis assessment is transparent and contains feedback for students. The Examination Board fulfils its legal duties. The panel recommends the EB formulates a general, clear and transparent policy on the use of generative AI tools, as this is not yet available.

Conclusion

The panel concludes that the programme meets standard 3.

Standard 4. Achieved learning outcomes

The programme demonstrates that the intended learning outcomes are achieved.

Findings

Prior to the site visit, the panel studied a selection of 15 MSc theses. It concludes that thesis quality is good and meets academic standards. The theses show a connection to practical outcomes that are based on a solid methodology.

Alumni

The national alumni survey shows that 71% of the students that finish ERM find a relevant job within four months after graduating. ERM graduates find jobs in private, public and not-for-profit organizations. Over the past six years, more graduates enter the private sector, including consultancies such as KPMG and Deloitte, banks, and manufacturing industry. The programme keeps in touch with its alumni (approx. 900) through a LinkedIn alumni page.

The panel finds that ERM provides students with ample opportunities to navigate the job market and to connect with potential employers. For instance, via external organizations (e.g., an (inter-)governmental organization, non-governmental organization, other university, or company) that submit research ideas to the thesis coordinator for ERM thesis research projects, job fairs, and/or employability lectures.

Considerations

The theses and the success of alumni on the job market show that students of the programme realize the intended learning outcomes.

Conclusion

The panel concludes that the programme meets standard 4.

General conclusion

The panel's assessment of the master's programme Environment and Resource Management is positive.

Development points

1. The panel encourages ERM to make full use of the Professional Advisory Board and to ensure that there will be continuity of its involvement in the future.
2. For the long term, the programme would do well to think out a strategy on how to deal with the increase in student numbers in relation to didactic choices and the quality of (individual) feedback in large courses, and to manage the students' expectation accordingly.
3. Ensure that teachers are aware of the various backgrounds of students in their classroom.

4. Students notice differences between lecturers in assigned workload. They also informed that panel of some overlap in course content and conflicting deadlines concerning assignments/assessments. The panel suggests the programme to take note of these findings and to ensure that these issues are solved or limited.
5. The panel recommends the EB formulates a general, clear and transparent policy on the use of generative AI tools, as this is not yet available.

Appendix 1. Intended learning outcomes

A graduate of the ERM will have:

1. Knowledge and understanding of the relevant key concepts, theories and methodologies in the field of environment and resource management;
2. In-depth knowledge of the theories and methodologies of at least one area in the field of environment and resource management by specializing in (a) ecosystem services and biodiversity (b) energy and climate; (c) global water challenges; (d) global food challenges; and (e) Global Sustainable Futures;
3. Understand the concept of sustainable development and the relationships between resource utilization, environmental pressure, production and consumption processes, societal processes and responses and is able to apply combinations of concepts and theories in a local, national or global context.

Applying Knowledge and Understanding: The ERM graduate an apply his/her knowledge, understanding and problem-solving abilities in new or unfamiliar environments within broader or multidisciplinary context of sustainability related to environment and resource management; has the ability to integrate knowledge of multiple disciplines with the purpose of handling complexity of environmental problems and designing effective solutions.

4. Can integrate knowledge from various disciplines and understands the interrelationships in sustainable development processes;
5. Is able to understand, and to apply various methods for investigating and assessing environmental problems, for example economic analysis, scenario analysis, stakeholder analysis and spatial analysis and is aware of the value and the scope of these tools;
6. Can independently develop and execute scientific research of societal relevance:
    a. Is able to formulate a problem based on empirical data or literature study and design a scientific approach for researching and investigating the problem;
    b. Has the skills to apply methodologies and techniques when conducting independent research;
    c. Is able to independently acquire and compile relevant information on environmental problems by doing literature study, modelling and/or empirical data collection;
    d. Is able to analyze and interpret research data and to understand, translate and evaluate these data in the context needed;
    e. Can formulate recommendations and/or policy advise based on the conclusions of the research.

Making Judgements: The ERM graduate can formulate judgments based on incomplete or limited information, that include reflection on social and ethical responsibilities linked to the application of the students' own knowledge and judgments.

7. Can recognize and acknowledge the different perspectives of relevant stakeholders on society and the environment, and is capable of taking these perspectives into account in a balanced manner;
8. Can reflect on core problems and solutions in the general domain of environment and resource management as well as the domain of the chosen specialization, and is able to form an opinion and to contribute to both scientific and practitioners' discussions;
9. Can reflect on the trade-offs between economic, social and environmental issues that play a role in environment and resource management.

Communication: The ERM graduate can communicate conclusions, the knowledge and the rationale that underpin these, to an audience of specialists and non-specialists in a clear and unambiguous manner.

10. Can operate in diverse (e.g. multidisciplinary, international and/or intercultural) teams at a level that is at the frontier of research in Environment and Resource Management by active and constructive participation in discussions, debates, and meetings;
11. Can clearly communicate in English, both orally and in writing, while making appropriate use of visual material, including digital aids:
    a. To the scientific community, the conclusions from their research, and the knowledge and rationale underpinning these. Communication may be in the form of a research report, poster presentation, or oral presentation;
    b. To a general audience, the purpose of their research, their findings and the significance of these. Communication may be in the form of pitches, stories and debates.

Learning Skills: Has the learning skills to continue to study in a manner that may be largely self- directed and autonomous.

12. Has the knowledge of and competences for working in a multidisciplinary team, in particular the ability to compare and integrate insights and approaches from various environmental scientific disciplines;
13. Is able to reflect critically, but constructively on one's own as well as peers' papers, presentations and general functioning in groups, and is able to accept, consider and put to advantage the feedback of others;
14. Understands his/her personal stronger and weaker points, affinities, development potential and preferences in relation to the discipline chosen and the related professional potential;
15. Can familiarize oneself with new topics related to the field of study within a short timeframe.

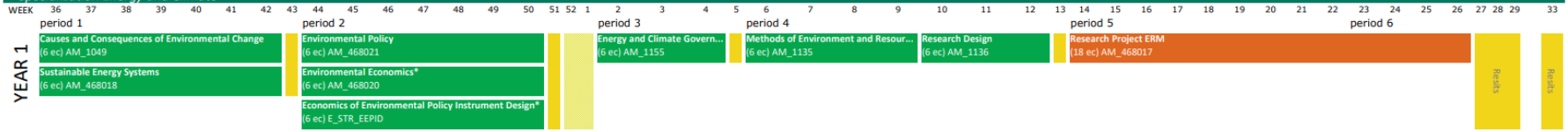
VU VRIJE UNIVERSITEIT AMSTERDAM — Faculteit der Bètawetenschappen

Compulsory Course | Elective | Examination week*
Constrained choice (6 EC) | Project | Education free**

Last modified: 6-6-2023

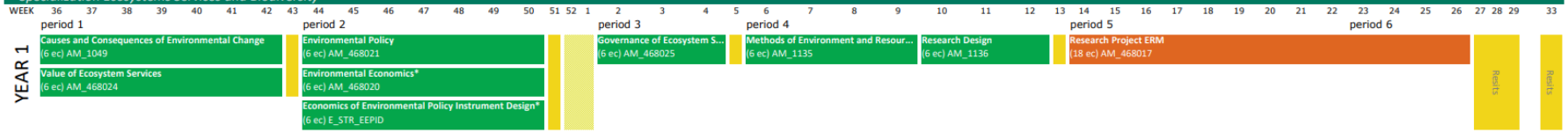
Year Schedule M Environment and Resource Management 2023-2024

Specialization Energy and Climate



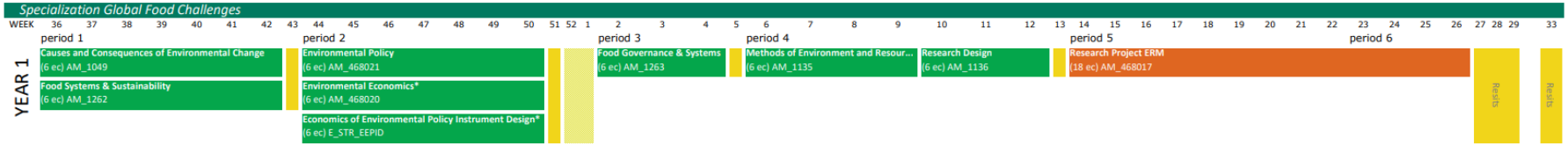
***Students with a Bachelor degree in economics can replace the course Environmental Economics with the course E_STR_EEPID: Economics of Environmental Policy Instrument Design.

Specialization Ecosystems Services and Biodiversity



***Students with a Bachelor degree in economics can replace the course Environmental Economics with the course E_STR_EEPID: Economics of Environmental Policy Instrument Design.

Specialization Global Food Challenges



***Students with a Bachelor degree in economics can replace the course Environmental Economics with the course E_STR_EEPID: Economics of Environmental Policy Instrument Design.

Appendix 3. Programme of the site visit

Monday 8 April 2024

09.00	09.15	Arrival and welcome
09.15	09.45	Panel preparation
09.45	10.15	Interview programme management BSc
10.30	11.15	Interview students BSc
11.15	11.45	Break/panel deliberation
11.45	12.30	Interview teaching staff BSc
12.30	13.15	Lunch break
13.15	14.45	Thematic sessions BSc
14.45	15.45	Panel deliberation
15.45	16.15	Final meeting management BSc
16.15	17.30	Panel deliberation

Tuesday 9 April 2024

08.30	09.00	Arrival, welcome and preparation
09.00	09.30	Interview programme management MSc
09.45	10.30	Interview students MSc
10.30	11.00	Break/panel deliberation
11.00	11.45	Interview teaching staff MSc
12.00	12.30	Interview Board of Examiners BSc + MSc
12.30	13.15	Lunch break
13.15	15.15	Thematic sessions MSc
15.15	16.00	Panel deliberation
16.00	16.30	Final meeting management MSc
16.30	17.30	Panel deliberation
17.30	18.00	Oral feedback

Appendix 4. Materials

Prior to the site visit, the panel studied 15 theses of the master's programme Environment and Resource Management (2-4 for each of the five specializations). Information on the theses is available from Academion upon request. The panel also studied other materials, which included:

- Report accreditation M ERM 2018
- M ERM Agenda Setting Memo incl. SWOT analysis
- Student Reflection Chapter ERM
- Exit qualifications M ERM
- Domain Specific Frame of Reference - Environmental Science 2023
- ERM Programme's annual report 2022-2023 (including annual report of the programme committee and annual report of the examination board)
- Professional Advisory Board ERM
- Overview Comparable Master Programmes in the Netherlands
- Year Schedule M ERM 2023-2024
- BETA TER Master ERM 2023-2024
- Overview Staff M ERM 2024
- Management Information - Factsheet 2023
- Management Information - Outflow and Pass Rates
- Overview ICM student enrolment (2018-2023)
- Course file: Causes and Consequences of Environmental Change
- Course file: Research Design
- Course file: Environmental Economics
- Assessment Policy Faculty of Science 2022
- Examination Board's Rules and Guidelines 2023-2024
- Assessment Plan ERM 2023-2024
- Assessment Programme ERM 2022
- Overview ERM theses 2021-2023 including selected final projects
- Manual ERM Research Project 2022-2023
- ERM Thesis procedure Plan
- Study Guide Pre-master ERM