Universiteit Leiden

Faculty of Science, Leiden University

and

Faculty of Technology, Policy and Management,
Delft University of Technology

Implementation Regulations

1 September 2026 till 31 August 2027

Masters' Programme Industrial Ecology

Corresponding to the Course and Examination Regulations of the Master's Programme Industrial Ecology

Contents

Description of the Master's Programme (CER chapter 2)

For students who have started the Master's programme per September 2020, articles 1.1 – 1.8 apply:

Article 1.1 – Learning outcomes

Knowledge, understanding, integration and application

The student has:

1. thorough understanding of society's metabolism, its role in sustainability issues and its drivers and impacts;
2. thorough knowledge of the most important approaches, hereby defined as theories, methods and tools, used in Industrial Ecology research;
3. in-depth knowledge of at least one approach used for analysing physical processes and one approach for analysing social processes, used in Industrial Ecology research.

The student is able to:

4. apply systems thinking in analysing society's metabolism and in evaluating and designing solutions to sustainability problems;
5. systematically combine and integrate knowledge, methods and tools from various disciplines relevant to Industrial Ecology;
6. formulate relevant research questions and choose the appropriate methods to answer these questions;
7. apply and critically evaluate at least one approach for analysing physical processes and one approach for analysing social processes, used in Industrial Ecology research;
8. contribute to the further development and/or validation of theories, methods or tools in Industrial Ecology research.

Skills

The student is able to:

9. constructively work and actively collaborate in multidisciplinary and international teams;
10. gather, use and integrate data from multiple sources;
11. independently plan, conduct and evaluate in-depth research, within an interdisciplinary context,
12. convincingly communicate results to specialist and non-specialist audiences, both verbally and in writing, with due attention to uncertainties;
13. design and plan their own learning processes through continuous reflection on personal knowledge, skills, attitudes and performance;
14. reflect on the ethical aspects of their research and to incorporate these reflections in setting up research and developing recommendations and/or sustainability solutions.

Article 1.2 - Overview of the two-year curriculum

1. Core courses (30 EC)
2. Industrial Ecology Project 1 (10 EC)
3. Industrial Ecology Project 2 (10 EC)
4. Specialisation courses (35 EC, including a minimum of 9 EC restricted)
5. Thesis Preparation (5 EC)
6. Thesis Research (30 EC)

Component	Level	Study load
Core courses	500	30 EC
Industrial Ecology project 1: Integrated Project	500	10 EC
Industrial Ecology project 2: Sustainability Challenge	600	10 EC
Specialisation courses*	500/600/Master	35 EC
Thesis Preparation Course	600	5 EC

Thesis Research Project	600	30 EC

7. **optional components as referred to in Article 3.3 in the Course and Examination Regulations*

Article 1.3 – Core courses (30 EC)
The six core courses in the first semester of the first year form the central part of the programme and are compulsory for every student.

Article 1.4 – Industrial Ecology Projects (10 + 10 EC)
In the first and second year, students join interdisciplinary project groups and are trained to solve interdisciplinary Industrial Ecology problems, by integrating knowledge and insights acquired from the core courses. Students can only participate in the Sustainability Challenge if they have finished at least 25 EC of the core courses of the first semester of the first year and the Integrated Project: Industrial and Urban Systems (10 EC).

Article 1.5 – Specialisation courses (35 EC)
1. 30 EC of the 35 EC meant for specialisation courses, should be used to complete courses that are relevant for the field of Industrial Ecology, preferably also to the topic of the Thesis Research Project, and at master education level, i.e. for Leiden University with a level 500 or higher, for Delft University of Technology or other universities the course has to be from a master's programme or comparable to a MSc level at a Dutch research university. In addition, the content of the courses should not overlap with other courses on a student's Individual Study Programme (ISP).
2. A document with pre-approved specialisation courses, relevant for the field of Industrial Ecology, can be found on Brightspace. When choosing Industrial Ecology relevant specialisation courses from this list, only two courses from the cluster Entrepreneurship, one course from the cluster Organisation and Management and one course from the cluster Serious Games can be chosen.
3. As part of the 30 EC meant for specialisation courses relevant for the field of Industrial Ecology, students have to choose at least one course from a list of restricted electives on methods for analysing physical processes and one course from a list of restricted electives on methods for analysing social processes. These restricted electives are part of the document with pre-approved specialisation courses, mentioned in 1.5.2.
4. If a student wants to take a course that is not mentioned in the document with pre-approved courses mentioned in 2.5.2. and wants to use it for the 30 EC of specialisation courses relevant for the field of Industrial Ecology (as described in 1.5.1 or 1.5.3), approval by the Board of Examiners (BoE) is needed. A request for a specialisation course should be submitted by the student to the BoE via BoE-IE@cml.leidenuniv.nl. This request should be accompanied by a letter of motivation, course description and a student's Individual Study Programme (ISP).
5. For 5 EC of the 35 EC, the only requirement is that the course or courses are at least on master education level and are not language course(s) (even when a language course might be offered on master education level). In addition, the content of the course(s) should not overlap with other courses on a student's Individual Study Programme (ISP).

Article 1.6 – Thesis Preparation Course and Thesis Research Project (35 EC)
1. The graduation is composed of two courses, the Thesis Preparation Course and Thesis Research Project. Students have to select, depending on their interest and background, a research topic in deliberation with an examiner. Students have to work independently on a research project. As preparation to the research topic, the involved supervisors may ask the student to successfully finish specific Specialisation courses. This has to be discussed with the student before the Thesis Research Project starts.
2. Students can only start the Thesis Research Project if:
   - All the core courses (40 EC) of the first year are completed.
   - The Thesis Preparation Course is completed (semester 1 or semester 2 course).

- The Individual Study Programme (ISP) satisfies the final terms as described in the Course and Examination Regulations (CER) and Implementation Regulations (IR) and is handed in to the study advisors.
- The Thesis Kick-Off Form is completed and handed in to the graduation coordinator.

Article 1.7 – Capita Selecta

A Capita Selecta introduces a new topic that is not treated elsewhere within the MSc Industrial Ecology curriculum. It is an additional piece of work which is not covered by any other course or part of the programme and may allow students to broaden or deepen their knowledge and skills. A Capita Selecta can be proposed by a student, or by an examiner of the programme, and can be conducted individually (by one student), or by a group of students. Within Industrial Ecology a Capita Selecta can have the value of 2, 3, 4, 5 or 6 ECTS. If approved by the Board of Examiners, a Capita Selecta can be used as part of the 35 ECTS on specialisation courses. The Capita Selecta is bound to several criteria:

1. All Capita Selecta's need to be approved by the Board of Examiners and assessed by two supervisors, of which one is an Industrial Ecology examiner.
2. The Capita Selecta should contain specific and realistic learning objectives. Through the learning objectives it should be clear why the Capita Selecta is worth the requested amount of ECTS credits.
3. In addition, the teaching method(s), final product(s) and timeline should be specified in the Capita Selecta proposal form.
4. A specific and realistic assessment method and assessment criteria should be defined coupled to the learning objectives and allowing evaluation by the BoE.
5. Final products are checked for plagiarism in a plagiarism programme (for example Turnitin).
6. Similar to specialisation courses, a Capita Selecta should allow a student of Industrial Ecology to broaden or deepen the knowledge and skills taught in the curriculum. This will be evaluated through the formulation of learning objectives, contents (teaching method/final product) and assessment method and criteria.

Article 1.8 – Composition of the Individual Study Programme

1. Each student proposes an Individual Study Programme (ISP). An ISP must satisfy the final terms as described in the Course and Examination Regulations (CER) and Implementation Regulations (IR) and is subject to the approval by the BoE.
2. Adaptations to the ISP are likewise subject to approval by the BoE.

Article 1.9 – Transitional arrangements

1.9.1 Curriculum renewal as of 2020-2021

The following coursesare not offered from September 2020 onwards:

Course code	Course	Level	EC
4413GEIIEY	General Introduction to Industrial Ecology	500	6
4413FMDA6Y	Fundamentals of Modelling and Data Analysis	500	6
4413ANMT6Y	Analytical Methodologies and Tools	500	6
4413CLOSCY	Closed Loop Supply Chains	500	6
4413RENESY	Renewable Energy Systems	500	6
4413SYSEAY	System Earth	500	6
4413DoSTSY	Design of Sustainable Technological Systems	500	6
4413SUISCY	Sustainable Innovation and Social Change	500	6
4413UEINFY	Urban Environments and Infrastructures	500	6

The following coursesare not offered from September 2021 onwards:

Course code	Course	Level	EC
4413GRPMD	Thesis Preparation Module	600	6
4413INTPG	Interdisciplinary Project Groups	600	12
4413IEPR1	Industrial Ecology Project 1	500	10

If a student has not completed one or more of the above-mentioned courses, the following scheme applies:

Course code	Course		Course code	Alternative course
4413GEIIEY	General Introduction to Industrial Ecology	→	Not applicable	Alternative assignment(s)
4413FMDA6Y	Fundamentals of Modelling and Data Analysis	→	Not applicable	Alternative course and assignment, approved by the BoE
4413ANMT6Y	Analytical Methodologies and Tools	→	4413MAPPT	Methods: Analysing Physical Processes, plus extra assignment
4413CLOSCY	Closed Loop Supply Chains	→	4413TRIGL	Transitions, Innovation and Governance, plus extra assignment
4413RENESY	Renewable Energy Systems	→	Not applicable	Alternative course and assignment, approved by BoE
4413SYSEAY	System Earth	→	4413SOCMB	Society's Metabolism, plus extra assignment
4413DoSTSY	Design of Sustainable Technological Systems	→	4413SDIEL	System Design for Industrial Ecology, plus extra assignment
4413SUISCY	Sustainable Innovation and Social Change	→	4413TRIGL	Transitions, Innovation and Governance, plus extra assignment
4413UEINFY	Urban Environments and Infrastructures	→	4413INTPR	Integrated Project: Industrial or Urban Systems
4413GRPMD	Thesis Preparation Module	→	4413THPC1 or 4413THPC2	Thesis Preparation Course, plus extra assignment
4413INTPG	Interdisciplinary Project Groups	→	4413SUSCH	Sustainability Challenge
4413IEPR1	Industrial Ecology Project 1	→	4413INTPR	Integrated Project: Industrial and Urban Systems (change of course name)

If following one or more of the above-mentioned alternative courses leads to fewer EC than the original EC in core courses, students may be asked to fulfil an extra assignment or are allowed to complete an extra specialisation course.

If following one or more of the above-mentioned alternative courses leads to more EC than the original EC in core courses, students are allowed to complete less than 18 EC in specialisation courses.

1.9.2 Course set-up changes 2026-2027

As of September 2026, the set-up of the course GIS: Spatial Analysis of Urban Regions (4413GIS20) has changed. If a student has not completed this course, the following scheme applies:

Course code	Course		Course code	Alternative course
4413GIS20	GIS: Spatial Analysis in Urban Regions	→	4413GISIE	Spatial Analysis in Industrial Ecology

Students who have partially completed the course 4413GIS20 may in accordance with CER article 4.6.4 concerning the validity period of partial grades (*deelcijfers*) retain the partial grade obtained for 4413GIS20 for application to the course 4413GISIE. The topic of the group project and the format and content of the examination questions may however differ between the two courses.

Section 3 – Date of commencement

These regulations come into force on 1 September 2026. These regulations have been decreed by the Deans of the respective faculties together with the Course and Examination Regulations of the Master's Programme Industrial Ecology.