



Appendices to the Teaching and Examination Regulations for the Master's degree programme in Industrial Engineering and Management (2026-2027)

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Appendix I. Learning outcomes of the degree programme (Art. 3.1)

After the master's degree programme Industrial Engineering and Management students:

1. have the knowledge base required for applying engineering principles, mathematics, and scientific reasoning to identify, formulate, and solve complex engineering problems in a managerial and business context.
2. can systematically analyze engineering problems and innovations within industrial and business contexts, applying systems thinking to develop viable and sustainable solutions.
3. can diagnose the functionality and performance of selected high-tech processes and products using advanced analytical methods.
4. can apply critical elements of the design cycle, including intervention, implementation and validation, in the context of innovative high-tech processes and products while adapting to technological advancements and market changes.
5. apply a multidisciplinary approach to technology and management, effectively integrating diverse technologies and managerial insights from various stakeholder perspectives.
6. will have mastered academic-based research methods in engineering-related fields and can apply these methods to contribute new insights and solutions to the industrial engineering community.
7. can utilize empirical data from research and market to make informed engineering design choices and support sustainable innovation trajectories.
8. can cultivate lifelong learning and critical thinking skills, enabling them to function autonomously and advance academically and professionally.
9. can communicate effectively across diverse cultural and professional groups, ensuring clear and effective dissemination and discussion of complex engineering concepts.
10. can critically assess the ethical, global, economic, environmental, and societal impacts of engineering solutions, upholding high standards of professional responsibility.
11. demonstrate leadership in multicultural and interdisciplinary team settings, effectively collaborating to establish goals, plan tasks, and achieve objectives through inclusive and strategic actions.



Students that have started the programme prior to the academic 2026-2027 will have attained the following learning outcomes:

1. The knowledge to describe complex and advanced technological processes and products in a managerial/business context.
2. The understanding to diagnose the functionality and performance of such processes and products in a multi-disciplinary way (e.g. technological, managerial and from the viewpoint of various stakeholders).
3. The skills to (re)design, implement and then evaluate such processes and products.
4. The knowledge, understanding and skills for doing research, i.e. applying industrial engineering methodologies in research.
5. The knowledge, understanding and skills for life-long learning (including information retrieval and ICT-use) needed to function autonomously.
6. The skills to think critically and communicate scientifically about ideas and solutions with engineers and managers.
7. The knowledge and understanding of advanced technology, managerial/business sciences and mathematics to do research and to enter a PhD-program in Industrial Engineering or a related discipline. Professional skills for managerial, societal and ethical behaviour when applying technology.

Appendix II. Tracks/Specializations of the degree programme (Art. 3.6)

The Master's degree programme does not have separate tracks.

Appendix III. Content of the degree programme (Art. 3.7.1)

The IEM programme is undergoing a curriculum change starting in the academic year 26-27. Students who started prior to the academic year 26-27 will need to take the old-style curriculum. More information is available on Ocasys and the Student Portal.

Year 1

| Course unit name | Course code | ECTS | Entry requirements |
|--|-------------|------|--------------------|
| Research Strategy, Design and Analysis | WMIE040-05 | 5 | |
| Technology Based Entrepreneurship | WMIE006-05 | 5 | |
| Systems Engineering | WMIE021-05 | 5 | |
| Sustainable Industrial Practice | WMIE027-05 | 5 | |
| Elective courses | | 40 | |

Year 2

| Course unit name | Course code | ECTS | Entry requirements |
|---------------------------|-------------|------|---|
| Research Methodology | WMIE025-05 | 5 | |
| Master's Design Project | WMIE901-25 | 25 | - Research Methodology or Research Strategy, Design and Analysis - 45 ECTS of 1st year IEM Master's programme - Passed the Scientific Integrity module (WMME004-00) |
| Master's Research Project | WMIE905-30 | 30 | - 45 ECTS of 1st year IEM Master's programme - Passed the Scientific Integrity module (WMME004-00) |

The assessment methods of the courses can be found in the assessment plan of the degree programme and on ocasy.s.rug.nl. The teaching method of the courses can be found on ocasy.s.rug.nl.



Appendix IV. Electives (Art. 3.8.1)

At least 15 ECTS of the 40 ECTS in the elective space need to be chosen from the following courses:

| Course unit name | Course code | ECTS |
|---|-------------|------|
| Robotics and Automation | WMIE038-05 | 5 |
| Analysis and Control of Smart Systems | WMIE015-05 | 5 |
| Optimization for Smart Systems | WMIE039-05 | 5 |
| Foundations of Logistic Systems Engineering | WMIE005-05 | 5 |
| Fitting Dynamical Models to Data | WMIE007-05 | 5 |
| Advanced Life Cycle Assessment for Sustainability | WMIE034-05 | 5 |
| Bioprocesses for Engineers | WMIE028-05 | 5 |
| Simulation of Logistic Systems | WMIE012-05 | 5 |
| Circular Polymers | WMCE017-05 | 5 |

The remaining 25 ECTS can be chosen either from the list above or the following electives:

| Course unit name | Course code | ECTS |
|---|-------------|------|
| AI Applications in Engineering | WMME036-05 | 5 |
| Polymer Products | WMCE005-05 | 5 |
| Catalysis for Engineers | WMCE002-05 | 5 |
| Surface Engineering and Coating Technology | WMIE013-05 | 5 |
| MEMS, NEMS and Nanofabrication | WMME037-05 | 5 |
| Advanced Product Engineering | WMCE007-05 | 5 |
| Interfacial Engineering | WMCE003-05 | 5 |
| Processes and Products for a Sustainable Carbon Cycle | WMCE021-05 | 5 |
| Product-Focused Process Design | WMCE011-05 | 5 |
| Engineering Design Integration | WMEE029-05 | 5 |
| Product Design by the Finite Element Method | WMIE003-05 | 5 |
| Circular Polymers | WMCE017-05 | 5 |
| Advanced Polymer Processing | WMCE006-05 | 5 |
| CFD for Engineers | WMCE013-05 | 5 |
| Data-Driven Optimization | WMME011-05 | 5 |
| Optimization under Uncertainty | WMIE037-05 | 5 |
| Advanced Process and Energy Technologies | WMCE012-05 | 5 |
| Food Pharma Products | WMIE008-05 | 5 |
| Challenge-based Team Engineering Project | WMIE041-10 | 10 |

Appendix V. Entry requirements and compulsory order of examinations (Art. 4.4)

A student is allowed to start with either the Design project or Research project if at least 45 ECTS of first year courses, Research Methodology, and Scientific Integrity have been passed.



Appendix VI. Admission to the degree programme (Art. 2.1A.1, 2.1A.2 and 2.1B.1)

1. Holders of a Bachelor's degree in Industrial Engineering and Management (59664) from a research university in the Netherlands are directly admissible to the Master's programme.
2. Holders of a Bachelor's degree in Biomedical Engineering (56226) from the University of Groningen are directly admissible, if the following courses are also taken:
 - Outlining and Implementing Innovation Strategy (WBIE013-05)
 - Operations Research (WBIE007-05)
 - Production Planning and Quality Control (WBIE014-05)
 - Entrepreneurship for Engineers (WBIE047-05)
 - Mathematical Tools (for BME) (WBIE055-05) **or** Calculus 2 (for IEM) (WBIE0017-05)
 - A course package of either:
 1. Mechanics for IEM (WBIE024-05), Production Techniques (WBIE040-05) and Control Engineering (WBIE034-05 or WMBE024-05),
 - or
 2. Reactor Engineering (WBIE029-05), Process Design and Equipment (WBIE039-05) and Applied Transport Phenomena for Sustainable Processes (WBIE058-05)

Appendix VII. Pre-master programmes and Fast-Track programmes (Art. 2.3)

A. Pre-Master's programmes

1. FSE offers Pre-Master's programmes of *60 EC, 45 EC or 30 EC* and individually determined Pre-Master's programmes.
 2. The overview below shows:
 - which NVAO-accredited HBO diploma grants access to the MSc Industrial Engineering and Management upon completion of the Pre-Master's programme;
 - the content and student workload for these fixed programmes.
- a. Bachelor Mechanical Engineering/Werktuigbouwkunde (34280)

| Semester | Course unit name | Course code | ECTS |
|--------------|---|-------------|-----------|
| 1 | Design of Complex Systems | WBIE059-10 | 10 |
| 1a | Operations Research | WBIE007-05 | 5 |
| 1b | Linear Algebra (for IEM) | WBIE009-05 | 5 |
| 1b | Organizational Behaviour and Group Dynamics | WBIE012-05 | 5 |
| 2a | Calculus 2 (for IEM) | WBIE017-05 | 5 |
| 2a | Production Techniques | WBIE040-05 | 5 |
| 2a | Signals and Systems | WBIE030-05 | 5 |
| 2b | Control Engineering | WBIE034-05 | 5 |
| Total | | | 45 |

- Starting date 1 September



b. Bachelor Chemical Engineering/Chemische Technologie (34275)

| Semester | Course unit name | Course code | ECTS |
|--------------|---|-------------|------|
| 1 | Design of Complex Systems | WBIE059-10 | 10 |
| 1a | Operations Research | WBIE007-05 | 5 |
| 1b | Linear Algebra (for IEM) | WBIE009-05 | 5 |
| 1b | Organizational Behaviour and Group Dynamics | WBIE012-05 | 5 |
| 2a | Calculus 2 (for IEM) | WBIE017-05 | 5 |
| 2a | Technical Thermodynamics (IEM) | WWBIE031-05 | 5 |
| 2b | Applied Transport Phenomena for Sustainable Processes | WBIE058-05 | 5 |
| 2b | Process Design and Equipment | WBIE039-05 | 5 |
| Total | | | 45 |

- Starting date 1 September

3. For holders of a HBO diploma not listed above, or for holders of a Dutch or foreign degree not listed in Appendix VI, the Board of Admissions decides:

- a. The content and the student workload of a tailor-made Pre-Master's programme.
- or
- b. Admission is not granted.

The starting dates of the tailor-made programmes can be either 1 September or 1 February, depending on the selection of courses.

B. Fast-Track programmes

The MSc degree programme does not offer Fast-Track programmes.



Appendix VIII. Transitional provisions (Art. 7.1)

The transitional arrangement is an arrangement that students can use if they wish to replace a course that is part of their Teaching and Examination Regulations, but either no longer exists or has been changed to a different course in a later set of Teaching and Examination Regulations. In some cases, an arrangement can consist of multiple courses. If a transition is not in the list of transitional arrangements, students will need permission from the Board of Examiners first.

| Discontinued course units | | | | Substitute course units | | | | |
|---------------------------|--|------|-------------------|--------------------------------|--|------|---|-------------------|
| Course unit code | Course unit name | ECTS | Final exam period | Course unit code | Course unit name | ECTS | Explanation | Equivalent Yes/No |
| WMIE029-05 | Engineering Design Integration | 5 | 2024-2025 | WMEE029-05 | Engineering Design Integration | 5 | Course will fall under the responsibility of the EES programme from this academic year onwards. | Yes |
| WMIE026-05 | Optimization in Engineering Systems | 5 | 2024-2025 | WMIE035-05 or WMIE039-05 | Nonlinear and Dynamic Optimization Optimization for Smart Systems | 5 | The course material of the new course is adjusted so that it is suitable for all IEM students. | No |
| WMIE005-05 | Robotics for IEM | 5 | 2025-2026 | WMIE038-05 | Robotics and Automation | 5 | Course contents are slightly adjusted and the name is changed to reflect this. | No |
| WMIE010-05 | MEMS, NEMS and Nanofabrication | 5 | 2025-2026 | WMME037-05 | MEMS, NEMS and Nanofabrication | 5 | ME takes ownership of the course. The contents remain the same. | Yes |
| WMIE019-05 | Introduction to Stochastic Programming | 5 | 2025-2026 | WMIE037-05 | Optimization under Uncertainty | 5 | Name change of the course, reflecting the contents of the course more. | Yes |
| WMIE035-05 | Nonlinear and Dynamic Optimization | 5 | 2025-2026 | WMIE039-05 | Optimization for Smart Systems | 5 | Another update of the course name as the previous name was too specific. | No |

Appendix IX. Additional requirements Open Degree programmes (Art. 3.9.2)

Students wishing to pursue an open degree programme may file a request with the Board of Examiners Engineering. The Board of Examiners will evaluate whether the proposed curriculum meets the learning outcomes of the degree programme.