



Appendices to the Teaching and Examination Regulations for the Master's degree programme(s) in Industrial Engineering and Management (2024-2025)

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Appendix I Learning outcomes of the degree programme (Article 3.1)

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

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 stake-holders).
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.
8. Professional skills for managerial, societal and ethical behaviour when applying technology.

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

The master's programme Industrial Engineering and Management contains two tracks:

1. Production Technology and Logistics (PTL)
2. Sustainable Process Engineering (SPE)



Appendix III Content of the degree programme (Article 3.8)

Production Technology and Logistics Track

| Course unit name | Course code | ECTS | Entry requirements |
|--|-------------|------|--|
| Foundations of Logistics Systems Engineering | WMIE002-05 | 5 | |
| Robotics for IEM | WMIE005-05 | 5 | |
| Technology Based Entrepreneurship | WMIE006-05 | 5 | |
| Simulation of Logistic Systems | WMIE012-05 | 5 | |
| Analysis and Control of Smart Systems | WMIE015-05 | 5 | |
| Sustainable Industrial Practice | WMIE027-05 | 5 | |
| Systems Engineering | WMIE021-05 | 5 | |
| Elective courses | | 25 | |
| Research Methodology | WMIE025-05 | 5 | |
| Master's Design Project | WMIE901-25 | 25 | - Research Methodology; - 45 ECTS of 1st year Master IEM programme. |
| Master's Research Project | WMIE905-30 | 30 | - Research Methodology; - 45 ECTS of 1st year Master IEM programme. |

Sustainable Process Engineering Track

| Course unit name | Course code | ECTS | Entry requirements |
|-----------------------------------|-------------|------|--|
| Bioprocesses for Engineers | WMIE028-05 | 5 | |
| Technology Based Entrepreneurship | WMIE006-05 | 5 | |
| Polymer Products | WMCE005-05 | 5 | |
| Advanced Polymer Processing | WMCE006-05 | 5 | |
| Advanced LCA for Sustainability | WMIE034-05 | 5 | |
| Advanced Product Engineering | WMCE007-05 | 5 | |
| Sustainable Industrial Practice | WMIE027-05 | 5 | |
| Systems Engineering | WMIE021-05 | 5 | |
| Elective courses | | 20 | |
| Research Methodology | WMIE025-05 | 5 | |
| Master's Design Project | WMIE901-25 | 25 | - Research Methodology; - 45 ECTS of 1st year Master IEM programme. |
| Master's Research Project | WMIE905-30 | 30 | - Research Methodology; - 45 ECTS of 1st year Master IEM programme. |

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



Joint project options for obtaining a master's degree in a closely related programme

| Course unit name | Course code | EC TS | Entry requirements |
|---------------------------------------|-------------|----------|--|
| Master Research Project IEM-ME* | WMIE903-55 | 55 | - Passed 45 ECTS of courses of both the IEM and ME master programmes - Passed Research Methodology |
| Master Research Project IEM-CE** | WMIE904-55 | 55 | - Passed 45 ECTS of courses of both the IEM and CE master programmes - Passed Research Methodology |
| Master's Research Project IEM-EES*** | WMEE907-40 | 40 | - Passed 45 ECTS of courses of the IEM master programme - Passed Research Methodology |
| Master's Research Project IEM-S&C**** | WMIE907-55 | 55 | - Passed 45 ECTS of courses of the IEM and 35 ECTS of the S&C master programmes - Passed Research Methodology |
| Master's Design Project IEM-S&C***** | WMIE906-30 | 30 | - Passed 45 ECTS of courses of the IEM and 35 ECTS of the S&C master programmes - Passed Research Methodology |

* The joint Master Research Project IEM-ME is available only to students enrolled in both the Industrial Engineering and Management and Mechanical Engineering master programmes. This joint project replaces, and cannot be combined with, the regular Research Projects in both programmes.

** The joint Master Research Project IEM-CE is available only to students enrolled in both the Industrial Engineering and Management and Chemical Engineering master programmes. This joint project replaces, and cannot be combined with, the regular Research Projects in both programmes.

*** For the entry requirements of MSc Energy and Environmental Sciences (EES), check the EES TER appendices. The joint Master Research Project IEM-EES is available only to students enrolled in both the IEM and EES master programmes. This joint project replaces, and cannot be combined with, the regular IEM Research Project.

**** For the entry requirements of MSc Systems & Control (S&C), check the S&C TER appendices. The joint Master Research Project IEM-S&C is available only to students enrolled in both the IEM and S&C master programmes. This joint project replaces, and cannot be combined with, the regular IEM Research Project.

***** For the entry requirements of MSc Systems & Control (S&C), check the S&C TER appendices. The joint Master Design Project IEM-S&C is available only to students enrolled in both the IEM and S&C master programmes. This joint project replaces, and cannot be combined with, the regular IEM Design Project.



Appendix IV Electives (Article 3.9.1)

The specializations of the Production Technology and Logistics track:

1. Production Logistics Engineering (PLE)
2. Advanced Production Engineering (APE)
3. Smart Systems in Control and Automation (SSCA)

The specializations of the Sustainable Process Engineering track:

1. Chemical Engineering (CE)
2. Biotechnology (BT)

SPE students choose at least 15 ECTS in electives of their chosen specialization. PTL students choose at least 20 ECTS in electives in their chosen specialization.

Production Technology and Logistics track – Electives Production Logistics Engineering

| Course unit name | Course code | ECTS |
|---|-------------|------|
| Advanced LCA for Sustainability | WMIE034-05 | 5 |
| Game Theory with Engineering Applications | WMIE009-05 | 5 |
| Surface Engineering & Coating Technology | WMIE013-05 | 5 |
| Engineering Design Integration | WMIE029-05 | 5 |
| Optimization in Engineering Systems | WMIE026-05 | 5 |
| Data-driven Optimization | WMME011-05 | 5 |
| Introduction to Stochastic Programming | WMIE019-05 | 5 |

Production Technology and Logistics track – Electives Advanced Production Engineering

| Course unit name | Course code | ECTS |
|---|-------------|------|
| Advanced LCA for Sustainability | WMIE034-05 | 5 |
| MEMS, NEMS and Nanofabrication | WMIE010-05 | 5 |
| Multiscale Contact Mechanics & Tribology | WMIE011-05 | 5 |
| Surface Engineering & Coating Technology | WMIE013-05 | 5 |
| Compressible Flows | WMCE008-05 | 5 |
| Engineering Design Integration | WMIE029-05 | 5 |
| Device Physics | WBPH037-05 | 5 |
| Mechanical Properties | WMPH023-05 | 5 |
| Product Design by the Finite Element Method | WMIE003-05 | 5 |
| CFD for Engineers | WMCE013-05 | 5 |
| Composites and Metamaterials | WMME031-05 | 5 |



Production Technology and Logistics track – Electives Smart Systems in Control and Automation

| Course unit name | Course code | ECTS |
|--|-------------|------|
| Advanced LCA for Sustainability | WMIE034-05 | 5 |
| Multibody and Non-Linear Dynamics | WMME009-05 | 5 |
| Fitting Dynamical Models to Data | WMIE007-05 | 5 |
| Iterative Algorithms | WMMA057-05 | 5 |
| MEMS, NEMS and Nanofabrication | WMIE010-05 | 5 |
| Multiscale Contact Mechanics & Tribology | WMIE011-05 | 5 |
| Surface Engineering & Coating Technology | WMIE013-05 | 5 |
| Compressible Flows | WMCE008-05 | 5 |
| Engineering Design Integration | WMIE029-05 | 5 |
| Nonlinear Control Systems | WMSC003-05 | 5 |
| Optimization in Engineering Systems | WMIE026-05 | 5 |
| CFD for Engineers | WMCE013-05 | 5 |
| Data-driven Optimization | WMME011-05 | 5 |
| Mathematical Modelling | WBMA007-05 | 5 |

Sustainable Process Engineering track – Electives Chemical Engineering

| Course unit name | Course code | ECTS |
|---|-------------|------|
| Processes and Products for a Sustainable Carbon Cycle | WMCE021-05 | 5 |
| Catalysis for Engineers | WMCE002-05 | 5 |
| Interfacial Engineering | WMCE003-05 | 5 |
| Food Pharma Products | WMIE008-05 | 5 |
| Microfluidics | WMME020-05 | 5 |
| Circular Polymers | WMCE017-05 | 5 |
| Compressible Flows | WMCE008-05 | 5 |
| Design of Industrial Catalysts | WMCE009-05 | 5 |
| Engineering Design Integration | WMIE029-05 | 5 |
| Product Focused Process Design | WMCE011-05 | 5 |
| Advanced Process and Energy Technologies | WMCE012-05 | 5 |
| CFD for Engineers | WMCE013-05 | 5 |

Sustainable Process Engineering track – Electives Biotechnology

| Course unit name | Course code | ECTS |
|---|-------------|------|
| Processes and Products for a Sustainable Carbon Cycle | WMCE021-05 | 5 |
| Food Pharma Products | WMIE008-05 | 5 |
| Microfluidics | WMME020-05 | 5 |
| Bioprocess Technology | WMIE018-05 | 5 |
| Circular Polymers | WMCE017-05 | 5 |
| Engineering Design Integration | WMIE029-05 | 5 |

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



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

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

Appendix VI Admission to the degree programme (Article 2.1A.1 + 2.1B.1)

1. Holders of a Bachelor's degree in Industrial Engineering and Management from the University of Groningen.

Holders of other degrees with equivalent learning outcomes may be eligible for admission as well, but will need to file a request for admission.

Appendix VII Transitional provisions (Article 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 |
| WMIE031-05 | Introduction to Optimization | 5 | 2023-2024 | WBMA054-05 | Introduction to Optimization | 5 | Administrative change in course code | Yes |
| WMIE033-05 | Mathematical Modelling | 5 | 2023-2024 | WBMA007-05 | Mathematical Modelling | 5 | Administrative change in course code | Yes |
| WMPH037-05 | Device Physics (MSc) | 5 | 2023-2024 | WBPH037-05 | Device Physics | 5 | Administrative change in course code | Yes |
| WMCE001-05 | Bio-based Products | 5 | 2023-2024 | Will follow | Processes and Products for a Sustainable Carbon Cycle | 5 | Name change of the course and change in focus | No |
| WMMA020-05 | Modeling and Control of Complex Nonlinear Engineering Systems | 5 | 2023-2024 | WMSC003-05 | Nonlinear Control Systems | 5 | Name change of the course | Yes |



Appendix VIII Additional requirements open degree programmes (Article 3.10)

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.