



Appendices to the Teaching and Examination Regulations for the Master's degree programme(s) in Industrial Engineering and Management (2023-2024)

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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	
Surface Engineering & Coating Technology	WMIE013-05	5	
Analysis and Control of Smart Systems	WMIE015-05	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.

Sustainable Process Engineering Track

Course unit name	Course code	ECTS	Entry requirements
Bioprocesses for Engineers	WMIE028-05	5	
Interfacial Engineering (option A)*	WMCE003-05	5	
Catalysis for Engineers (option B)*	WMCE002-05	5	
Technology Based Entrepreneurship	WMIE006-05	5	
Advanced LCA for Sustainability	WMIE034-05	5	
Advanced Product Engineering	WMCE007-05	5	
Sustainable Industrial Practice	WMIE027-05	5	
Advanced Process and Energy Technologies	WMCE012-05	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.

*Either option A or option B is chosen as a mandatory course. The other option can be used as an elective in the CE specialization, see appendix IV.

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)

Students choose at least 15 ECTS in electives of their chosen specialization.

Production Technology and Logistics track – Electives Production Logistics Engineering

Course unit name	Course code	ECTS
Game Theory with Engineering Applications	WMIE009-05	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
MEMS, NEMS and Nanofabrication	WMIE010-05	5
Multi-scale Contact Mechanics & Tribology	WMIE011-05	5
Characterisation of Materials	WMPH021-05	5
Compressible Flows	WMCE008-05	5
Device Physics (MSc)	WMPH050-05	5
Engineering Design Integration	WMIE029-05	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
Numerical Mathematics 1	WMIE032-05	5



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

Course unit name	Course code	ECTS
Introduction to Optimization	WMIE031-05	5
Multibody and Non-Linear Dynamics	WMME009-05	5
Fitting Dynamical Models to Data	WMIE007-05	5
MEMS, NEMS and Nanofabrication	WMIE010-05	5
Compressible Flows	WMCE008-05	5
Engineering Design Integration	WMIE029-05	5
Modeling and Control of Complex Nonlinear Engineering Systems	WMMA020-05	5
Optimization in Engineering Systems	WMIE026-05	5
CFD for Engineers	WMCE013-05	5
Data-driven Optimization	WMME011-05	5
Mathematical Modelling	WMIE033-05	5
Numerical Mathematics 1	WMIE032-05	5

Sustainable Process Engineering track – Electives Chemical Engineering

Course unit name	Course code	ECTS
Bio-based Products	WMCE001-05	5
Catalysis for Engineers*	WMCE002-05	5
Interfacial Engineering*	WMCE003-05	5
Food Pharma Products	WMIE008-05	5
Microfluidics	WMME020-05	5
Advanced Polymer Processing	WMCE006-05	5
Characterisation of Materials	WMPH021-05	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
CFD for Engineers	WMCE013-05	5

*Either Interfacial Engineering or Catalysis for engineers is chosen as a mandatory course. The other course can be used as an elective in the CE specialization.

Sustainable Process Engineering track – Electives Biotechnology

Course unit name	Course code	ECTS
Bio-based Products	WMCE001-05	5
Advanced Instrumentation and Analytics in Biotechnology	WMIE023-05	5
Engineering Design Integration	WMIE029-05	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
WMIE901-30	Master's Research Project	30	2022-2023	WMIE905-30	Master's Research Project	30	Course code change due to administrative reasons.	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.