



university of  
groningen

**Appendices to the Teaching and Examination  
Regulations of the Master's degree programme in  
Industrial Engineering and Management (2021-  
2022)**

## **Appendix I Learning outcomes of the degree programme (art 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 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 (art 3.5)**

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

1. Production Technology and Logistics (PTL)
2. Product and Process Technology (PPT)

## Appendix III Content of the degree programme (art 3.7)

### Production Technology and Logistics Track

Course unit name	Course code	EC TS	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	
Sustainability for Engineers	WMIE020-05	5	
Systems Engineering	WMIE021-05	5	
Elective courses		20	
Research Methodology	WMIE025-05	5	
Master's Design Project	WMIE901-25	20	- Research Methodology - 45 ECTS of 1st year Master IEM programme.
Master's Research Project	WMIE901-30	40	- Research Methodology - 45 ECTS of 1st year Master IEM programme.

### Product and Process Technology Track

Course unit name	Course code	EC TS	Entry requirements
Bio-based Products	WMCE001-05	5	
Interfacial Engineering	WMCE003-05	5	
Technology Based Entrepreneurship	WMIE006-05	5	
Microfluidics	WMME020-05	5	
Advanced Product Engineering	WMCE007-05	5	
Product Focused Process Design	WMCE011-05	5	
Sustainability for Engineers	WMIE020-05	5	
Systems Engineering	WMIE021-05	5	
Elective courses		20	
Research Methodology	WMIE025-05	5	
Master's Design Project	WMIE901-25	20	- Research Methodology - 45 ECTS of 1st year Master IEM programme.
Master's Research Project	WMIE901-30	40	- Research Methodology - 45 ECTS of 1st year Master IEM programme.

The assessment method of the courses can be found in the assessment plan of the degree programme and on [www.rug.nl/ocasys](http://www.rug.nl/ocasys).

The teaching method of the courses can be found on [www.rug.nl/ocasys](http://www.rug.nl/ocasys).

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

Course unit name	Course code	ECTS	Entry requirements
Master Research Project IEM-ME*	will follow	55	Passed 45 ECTS of courses of both the IEM and ME master programmes Passed Research Methodology
Master Research Project IEM-CE**	will follow	55	Passed 45 ECTS of courses of both the IEM and ME 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

\*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 EES, check the EES TER appendices. The joint Master Research Project IEM-ME 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.

## Appendix IV Electives (art 3.8)

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 Product and Process Technology Track:

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

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

### Production Technology and Logistics Track - Production Logistics Engineering

Course unit name	Course code	ECTS
Game Theory with Engineering Applications	WMIE009-05	5
Optimization in Engineering Systems	will follow	5
Introduction to Stochastic Programming	WMIE019-05	5
Data-driven Optimization	WMME011-05	5

**Production Technology and Logistics Track - Advanced Production Engineering**

<b>Course unit name</b>	<b>Course code</b>	<b>ECTS</b>
Multi-scale Contact Mechanics & Tribology	WMIE011-05	5
MEMS, NEMS and Nanofabrication	WMIE010-05	5
Characterization of Materials	WMPH021-05	5
Compressible Flows	WMCE008-05	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
Numerical Mathematics I	WBMA045-05	5

**Production Technology and Logistics Track - Smart Systems in Control and Automation**

<b>Course unit name</b>	<b>Course code</b>	<b>ECTS</b>
Mathematical Modelling	WBMA007-05	5
Calculus of Variations and Optimal Control	WBMA016-05	5
Fitting Dynamical Models to Data	WMIE007-05	5
MEMS, NEMS and Nanofabrication	WMIE010-05	5
Advanced Digital and Hybrid Control Systems	WMIE014-05	5
Compressible Flows	WMCE008-05	5
Optimization in Engineering Systems	will follow	5
Modeling and Control of Complex Nonlinear Engineering Systems	WMMA020-05	5
CFD for Engineers	WMCE013-05	5
Data-driven Optimization	WMME011-05	5
Numerical Mathematics I	WBMA045-05	5

**Product and Process Technology Track - Chemical Engineering**

<b>Course unit name</b>	<b>Course code</b>	<b>ECTS</b>
Catalysis for Engineers	WMCE002-05	5
Food Pharma Products	WMIE008-05	5
Particulate Products	WMCE004-05	5
Polymer products	WMCE005-05	5
Advanced Polymer Processing	WMCE006-05	5
Compressible Flows	WMCE008-05	5
Design of Industrial Catalysts	WMCE009-05	5
Advanced Process and Energy technologies	WMCE012-05	5
CFD for Engineers	WMCE013-05	5

## Product and Process Technology Track – Biotechnology

Course unit name	Course code	ECTS
Advanced Instrumentation and Analytics in Biotechnology	WMIE023-05	5
Applied Biocatalysis and Bioconversion	WMIE016-05	5
Bioprocess Technology	WMIE018-05	5

The assessment method of the courses can be found in the assessment plan of the degree programme and on [www.rug.nl/ocasys](http://www.rug.nl/ocasys).

The teaching methods and entry requirements of the courses can be found on [www.rug.nl/ocasys](http://www.rug.nl/ocasys).

## Appendix V Entry requirements and compulsory order of examinations (art 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 have been passed.

## Appendix VI Admission to the degree programme and different tracks/specializations (art 2.1)

1. Holders of a Bachelor's degree in Industrial Engineering and Management from the University of Groningen. Admission is track specific.
2. Holders of a Dutch or foreign Bachelor's or Master's degree with equivalent learning outcomes as the Bachelor's degree programme Industrial Engineering and Management of the University of Groningen.

## Appendix VII 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 of the Board of Examiners first.

Discontinued course units				Substitute course units				
Course unit code	Course unit name	EC TS	Final exam period	Course unit code	Course unit name	EC TS	Explanation	Equivalent Yes/No
WMIE022-05	Research Methodology (and Scientific Integrity)	5	-	WMIE025-05	Research Methodology	5	Mandatory Scientific Integrity lecture removed	Yes*
WMIE017-05	Distributed Optimization in Engineering Systems	5	-	will follow	Optimization in Engineering Systems	5	Name of course changes to better suit the content	Yes

\*The Scientific Integrity module will be offered as part of the Research Project, and has to be completed before receiving approval from the board of examiners and starting the project in Nestor.

## Appendix VIII Application and decision deadlines for admission (art 2.6) and Open Degree Programme (art 5.6)

### Programmes starting on 1 September 2021

Degree programme	Application deadline	Decision deadline
Artificial Intelligence	01 May 2021	15 June 2021
Behavioural and Cognitive Neurosciences - Research (selective)	01 May 2021	15 June 2021
Biology	01 May 2021	15 June 2021
Biomedical Engineering	01 May 2021	15 June 2021
Biomedical Sciences	01 May 2021	15 June 2021
Biomolecular Sciences (selective)	01 May 2021	15 June 2021
Chemistry (selective)	01 May 2021	15 June 2021
Ecology and Evolution (selective)	01 May 2021	15 June 2021
Energy and Environmental Sciences	01 May 2021	15 June 2021
Computational Cognitive Science (formerly Human-Machine Communication)	01 May 2021	15 June 2021
Marine Biology (selective)	01 May 2021	15 June 2021
Mechanical Engineering	01 May 2021	15 June 2021
Industrial Engineering and Management	01 May 2021	15 June 2021
Medical Pharmaceutical Sciences	01 May 2021	15 June 2021
Nanoscience Dutch/EU/EEA (selective)	01 May 2021	15 June 2021
Nanoscience non-EU/EEA (selective)	01 February 2021	15 June 2021
Science Education and Communication	01 May 2021	15 June 2021

### Programmes starting on 1 September 2021 and 1 February 2022

Degree programme	Application deadline 1 September	Decision deadline 1 September	Application deadline 1 February	Decision deadline 1 February
Applied Mathematics	01 May 2021	15 June 2021	15 October 2021	15 November 2021
Applied Physics	01 May 2021	15 June 2021	15 October 2021	15 November 2021
Astronomy	01 May 2021	15 June 2021	15 October 2021	15 November 2021
Chemical Engineering	01 May 2021	15 June 2021	15 October 2021	15 November 2021
Computing Science	01 May 2021	15 June 2021	15 October 2021	15 November 2021
Teacher Education (post-master)	01 May 2021	15 June 2021	15 October 2021	15 November 2021
Mathematics	01 May 2021	15 June 2021	15 October 2021	15 November 2021
Pharmacy	01 May 2021	15 June 2021	15 October 2021	15 November 2021
Physics	01 May 2021	15 June 2021	15 October 2021	15 November 2021
Water Technology (joint degree)	01 May 2021	15 June 2021	15 October 2021	15 November 2021

### Open degree programme

In exceptional circumstances students wishing to pursue an open degree programme may file a request with the Board of Examiners. The Board of Examiners will evaluate whether the proposed curriculum meets the learning outcomes of the degree programme and can determine further conditions in their Rules and Regulations.