



university of  
 groningen

**Appendices for the Master's degree programme(s) in  
 Industrial Engineering and Management (2022-2023)**

## **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 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.
8. 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 programme Industrial Engineering and Management contains two tracks:

1. Production Technology and Logistics (PTL)
2. Sustainable Process Engineering (SPE, previously Product and Process Technology; PPT)

## Appendix III Content of the degree programme (art. 3.8)

### 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	
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	WMIE901-30	30	- Research Methodology; - 45 ECTS of 1st year Master IEM programme.

### Sustainable Process Engineering Track

Course unit name	Course code	EC TS	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 Product Engineering	WMCE007-05	5	
Circular Polymers	WMCE017-05	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	WMIE901-30	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 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*	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 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 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.

## Appendix IV Electives (art. 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
Introduction to Stochastic Programming	WMIE019-05	5
Data-driven Optimization	WMME011-05	5

### Production Technology and Logistics Track – Electives Advanced Production Engineering

Course unit name	Course code	ECTS
Engineering Design Integration	WMIE029-05	5
MEMS, NEMS and Nanofabrication*	WMIE010-05	5
Multi-scale Contact Mechanics & Tribology	WMIE011-05	5
Characterization of Materials	WMPH021-05	5
Compressible Flows	WMCE008-05	5
Device Physics (MSc)	Will Follow	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 (for IEM)	Will follow	5

\*Course was mistakenly left out of previous TER appendices, but has been an APE elective since 2018-2019

### Production Technology and Logistics Track – Electives Smart Systems in Control and Automation

Course unit name	Course code	ECTS
Mathematical Modelling (for IEM)	Will Follow	5
Introduction to optimization (for IEM)	Will Follow	5
Fitting Dynamical Models to Data	WMIE007-05	5
Engineering Design Integration	WMIE029-05	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	WMIE026-05	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 (for IEM)	Will Follow	5

\*Course was mistakenly left out of previous TER appendices, but has been an SSCA elective since 2018-2019

### Sustainable Process Engineering Track – Electives Chemical Engineering

Course unit name	Course code	ECTS
Bio-based Products	WMCE001-05	5
Interfacial Engineering*	WMCE003-05	5
Catalysis for Engineers*	WMCE002-05	5
Microfluidics	WMME020-05	5
Food Pharma Products	WMIE008-05	5
Particulate Products	WMCE004-05	5
Engineering Design Integration	WMIE029-05	5
Product Focused Process Design	WMCE011-05	5
Advanced Polymer Processing	WMCE006-05	5
Compressible Flows	WMCE008-05	5
Design of Industrial Catalysts	WMCE009-05	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**

<b>Course unit name</b>	<b>Course code</b>	<b>ECTS</b>
Bio-based Products	WMCE001-05	5
Advanced Instrumentation and Analytics in Biotechnology	WMIE023-05	5
Microfluidics	WMME020-05	5
Engineering Design Integration	WMIE029-05	5
Food Pharma Products	WMIE008-05	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 (and Scientific Integrity) have been passed.

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

1. Holders of a Bachelor's degree in Industrial Engineering and Management from the University of Groningen.
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 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
WMIE020-05	Sustainability for Engineers	5	2022-2023	WMIE027-05	Sustainable Industrial Practice	5		No
WMCE005-05	Polymer products	5	-	-	-	-	*	-
WMIE016-05	Applied Biocatalysis and Bioconversion	5	2022-2023	WMIE028-05	Bioprocesses for Engineers	5	Replaced by new course better attuned to SPE	No
WBMA016-05	Calculus of Variations and Optimal Control	5	**	Will follow	Introduction to optimization (for IEM)	5	**	**
WBMA045-05	Numerical Mathematics 1	5	-	Will follow	Numerical Mathematics 1 (for IEM)	5	Equivalent course on Master level for IEM students	Yes
WBMA007-05	Mathematical Modelling	5	-	Will follow	Mathematical Modelling (for IEM)	5	Equivalent course on Master level for IEM students	Yes
WBPH037-05	Device Physics	5	-	Will follow	Device Physics (MSc)	5	Equivalent course on Master level for IEM students	Yes

\*Course is removed from the curriculum to make room for (elective) courses better attuned to IEM. Students from Cohort <2022-2023 can still participate in the course, since it is still part of another degree programme. As an alternative, students can choose a different elective.

\*\*Please check the TER appendices of the degree programme that hosts the course for the specifics on the transitional provisions.

**Appendix VIII Additional Requirements Open degree  
Programmes (Art. 5.6)**



## Appendix IX

### Application and decision deadlines for admission (art. 2.6.1 and 2.6.3)

#### Programmes starting on 1 September 2022

Programme	Deadline of Application	Deadline of decision
Behavioural and Cognitive Neurosciences	1 May 2022	1 June 2022
Biology	1 May 2022	1 June 2022
Biomedical Engineering	1 May 2022	1 June 2022
Biomedical Sciences	1 May 2022	1 June 2022
Biomolecular Sciences	1 May 2022	1 June 2022
Ecology and Evolution	1 May 2022	1 June 2022
Energy and Environmental Sciences	1 May 2022	1 June 2022
Human-Machine Communication	1 May 2022	1 June 2022
Industrial Engineering and Management	1 May 2022	1 June 2022
Marine Biology	1 May 2022	1 June 2022
Mechanical Engineering	1 May 2022	1 June 2022
Medical Pharmaceutical Sciences	1 May 2022	1 June 2022
Nanoscience: for non-EU/EEA students	1 February 2022	1 June 2022
Nanoscience: for EU/EEA students	1 May 2022	1 June 2022
Science Education and Communication	1 May 2022	1 June 2022

#### Programmes starting on 1 September 2022 and 1 February 2023

Programme	Deadline of Application for 1 September	Deadline of decision for 1 September	Deadline of Application for 1 February	Deadline of decision for 1 February
Applied Mathematics	1 May 2022	1 June 2022	15 October 2022	15 November 2022
Applied Physics	1 May 2022	1 June 2022	15 October 2022	15 November 2022
Artificial Intelligence	1 May 2022	1 June 2022	15 October 2022	15 November 2022
Astronomy	1 May 2022	1 June 2022	15 October 2022	15 November 2022
Chemical Engineering	1 May 2022	1 June 2022	15 October 2022	15 November 2022
Chemistry	1 May 2022	1 June 2022	15 October 2022	15 November 2022
Computing Science	1 May 2022	1 June 2022	15 October 2022	15 November 2022
Farmacie	1 May 2022	1 June 2022	15 October 2022	15 November 2022
Mathematics	1 May 2022	1 June 2022	15 October 2022	15 November 2022
Physics	1 May 2022	1 June 2022	15 October 2022	15 November 2022