



university of  
 groningen

**Appendices to the Teaching and Examination  
 Regulations of the Master's degree programme in**

**Industrial Engineering and Management**

**(2016-2017)**



## **Appendix I Learning outcomes of the degree programme (art. 1.3)**

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 Specializations of the degree programme (art. 2.2)**

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

- Production Technology and Logistics (PTL)
- Product and Process Technology (PPT)



### Appendix III Content of the degree programme (art. 2.3)

Course unit	ECTS	Practical	Entry requirements
<b>Core programme</b>	<b>75</b>		
Technology Based Entrepreneurship	5	Yes	
Sustainability for Engineers	5	Yes	
Systems Engineering	5	Yes	
Master's Design Project IEM	25	Yes	- Research Methodology; - 45 ECTS of Master's IEM programme must have been completed.
Master's Research Project IEM including Scientific Integrity module	30	Yes	- Research Methodology; - 45 ECTS of Master's IEM programme must have been completed.
Research Methodology	5		
<b>PTL-Track</b>	<b>45</b>		
Foundations of Logistics Systems Engineering	5	Yes	
Simulation of Logistic Systems	5	Yes	
Robotics	5	Yes	
Surface Engineering & Coating Technology	5	Yes	
Analysis and control of smart systems	5		
Optional Modules	20	Var	
<b>PPT-track</b>	<b>45</b>		
Interfacial Engineering	5		
Bio-based products	5		
Polymer Products	5	Yes	
Advanced product engineering	5	Yes	
Physical transport phenomena 2	5		
Optional Modules	20	Var	



## Appendix IV & V: Electives (art. 2.4) & Entry requirements and compulsory order of examinations (art. 3.4)

Within the PTL and PPT tracks of the IEM degree programme, there are 3 and 2 specializations, respectively. The IE track does not have any further specialization.

The specializations of PTL are:

- Production Logistics Engineering (PLE)
- Advanced Production Engineering (APE)
- Smart Systems in Control and Automation (SSCA)

The specializations of PPT are:

- Chemical Engineering (CE)
- Biotechnology (BT)

Each of these specializations are characterized by their own specific optional technical modules, shown in the tables below. Each specialization consists of packages of optional technical modules for which a logical connection exists. All IEM students should choose at least 15 ECTS technical module(s) of their specialization.

The remaining choice (5 ECTS) can be made from optional technical modules of other specializations within the track or from the list of optional management modules.

For type of examination, prerequisites, course format and other details, see <http://www.rug.nl/ocasys>.

<b>Optional technical modules Production Logistics Engineering (PTL)</b>			
<b>Course unit</b>	<b>ECTS</b>	<b>Practical</b>	<b>Entry requirements</b>
Planning and Scheduling Methods	5		
Data-driven Business Innovation	5	Yes	
Asset Management	5	Yes	

<b>Optional technical modules Advanced Production Engineering (PTL)</b>			
<b>Course unit</b>	<b>ECTS</b>	<b>Practical</b>	<b>Entry requirements</b>
Multi-scale Contact Mechanics & Tribology	5	Yes	
Product design by the finite element method	5	Yes	
Characterization of Materials	5	Yes	
Structure at Macro, Meso and Nano Scale	5		
Device Physics	5		
Mechanical properties	5		
Numerical mathematics I	5	Yes	



<b>Optional technical modules Smart Systems in Control and Automation PTL</b>			
<b>Course unit</b>	<b>ECTS</b>	<b>Practical</b>	<b>Entry requirements</b>
Fitting dynamical models to data	5	Yes	
Modeling and Control of Complex Nonlinear Engineering Systems	5		
Advanced Digital and Hybrid Control Systems	5	Yes	
Mathematical Modelling	5		
Calculus of Variations and Optimal Control	5		

<b>Optional technical modules Chemical Engineering (PPT)</b>			
<b>Course unit</b>	<b>ECTS</b>	<b>Practical</b>	<b>Entry requirements</b>
Process design	10	Yes	
Particulate Products	5	Yes	
Catalysis for Engineers	5		
Design of industrial catalysts	5	Yes	
Advanced polymer processing	5		
Food Pharma products	5		
Product focused process design	5	Yes	

<b>Optional technical modules Biotechnology (PPT)</b>			
<b>Course unit</b>	<b>ECTS</b>	<b>Practical</b>	<b>Entry requirements</b>
Bioprocess Technology	5	Yes	
Food Pharma products	5		
Applied Biocatalysis and Bioconversion	5		

<b>Optional management modules (EB-courses)</b>	<b>ECTS</b>	<b>Practical (Ocasys)</b>	<b>Entry requirements (Ocasys)</b>
Business Ethics <input type="checkbox"/>	5		
Healthcare Operations <input type="checkbox"/>	5		
Managerial Decision Making and Control <input type="checkbox"/>	5		
Operations Management in Process Industry <input type="checkbox"/>	5		
Responsible Finance and Investing <input type="checkbox"/>	5		
Simulation of Logistic Systems <input type="checkbox"/>	5		
Strategic Management & Technology <input type="checkbox"/>	5		
Inventory Management <input type="checkbox"/>	5		
Process Improvement and Change <input type="checkbox"/>	5		
Behavioural Finance & Personal Investing <input type="checkbox"/>	5		
Behavioural Operations Management <input type="checkbox"/>	5		
Finance and Development <input type="checkbox"/>	5		
Innovation & Entrepreneurship <input type="checkbox"/>	5		



## **Appendix VI Admission to the degree programme and different specializations (art. 5.1.1 + art. 5.2)**

- Holders of a Bachelor's degree in Industrial Engineering and Management from the University of Groningen. Admission is profile specific.
- 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**

### **Application deadlines for admission (art. 5.6.1)**

<b>Deadline of Application</b>	<b>Non-EU students</b>	<b>EU students</b>
Nanoscience	February 1st 2017	May 1 st 2017
Behavioural and Cognitive Neurosciences	May 1st 2017	May 1st 2017
Biomolecular Sciences (topprogramme)	May 1st 2017	May 1st 2017
Evolutionary Biology (topprogramme)	May 1st 2017	May 1st 2017
Remaining FMNS Masters	May 1st 2017	May 1st 2017

### **Decision deadlines**

#### **(art. 5.6.3)**

<b>Deadline of Decision</b>	<b>Non-EU students</b>	<b>EU students</b>
Nanoscience	June 1st 2017	June 1st 2017
Behavioural and Cognitive Neurosciences	June 1st 2017	June 1st 2017
Biomolecular Sciences (topprogramme)	June 1st 2017	June 1st 2017
Evolutionary Biology (topprogramme)	June 1st 2017	June 1st 2017
Remaining FMNS Masters	November 1st 2017	November 1st 2017