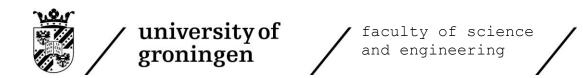
Appendices to the Teaching and Examination Regulations of the Master's degree programme in Industrial Engineering and Management (2017-2018)

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
Core programme	75		
Technology Based	5	Yes	
Entrepreneurship			
Sustainability for Engineers	5	Yes	
Systems Engineering	5	Yes	
Master's Design Project IEM	25	Yes	- Research Methodology; - 45 ECTS of 1 st year Master's IEM programme must have been completed.
Master's Research Project IEM including Scientific Integrity module	30	Yes	- Research Methodology; - 45 ECTS of 1 st year Master's IEM programme must have been completed.
Research Methodology	5		
PTL-Track	45		
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	
PPT-track	45		
Interfacial Engineering	5		
Bio-based Products	5		
Polymer Products	5	Yes	
Advanced Product Engineering	5	Yes	
Optional Modules	20	Var	
Product Focused Process Design	5	Yes	

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.

Optional technical modules Production Logistics Engineering (PLE) (PTL)							
Course unit	ECTS	Practical	Entry requirements				
Planning and Scheduling Methods	5						
Technology-enabled Innovation	5	Yes					
Asset Management	5	Yes					

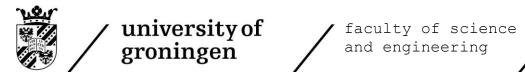
Optional technical modules Advanced Production Engineering (APE) (PTL)							
Course unit	ECTS	Practical	Entry requirements				
Multi-scale Contact Mechanics	5	Yes					
& Tribology							
Product design by the finite	5	Yes					
element method							
Characterization of Materials	5	Yes					
Structure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

Optional technical modules Smart Systems in Control and Automation (SSCA) (PTL)							
Course unit	ECTS	Practical	Entry requirements				
Fitting dynamical models to data	5	Yes					
Modeling and Control of Complex	5						
Nonlinear Engineering Systems							
Advanced Digital and Hybrid	5	Yes					
Control Systems							
Mathematical Modelling	5						
Calculus of Variations and Optimal	5						
Control							
Convex optimization (2018/2019	5						
Numerical mathematics I	5	Yes					

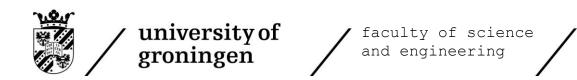
Optional technical modules Chemical Engineering (CE) (PPT)						
Course unit	ECTS	Practical	Entry requirements			
Process design	10	Yes				
Particulate Products	5	Yes				
Catalysis for Engineers	5					
Design of industrial catalysts	5	Yes				
Advanced polymer processing	5					
Food Pharma products	5					
Advanced process and energy	5					
technologies						

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

Optional management	ECTS	Practical	Entry requirements
modules (EB-courses)		(Ocasys)	(Ocasys)
Business Ethics	5		
Healthcare Operations	5		
Managerial Decision Making and	5		
Control			
Operations Management in	5		
Process Industry			
Responsible Finance and	5		
Investing			
Simulation of Logistic Systems	5		
Strategic Management &	5		
Technology			
Inventory Management	5		
Process Improvement and	5		
Change			
Behavioural Finance & Personal	5	-	



Investing		
Behavioural Operations	5	
Management		
Finance and Development	5	
Innovation & Entrepreneurship	5	
Advanced industrial organization	5	



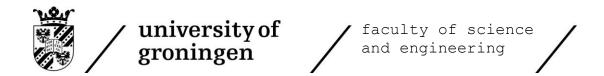
Appendix VI Admission to the degree programme and different tracks/specializations (art. 5.1.1 + art. 5.2)

- Holders of a Bachelor's degree in Industrial Engineering and Management from the University of Groningen. Admission is track 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 Transitional provisions (art 7.1)

Disconti	inued course	uni	ts	Substit	ute course u	nits		
Course unit code	Course unit name	EC TS	Final exam period	Course unit code	Course unit name	EC TS	Explanation	Equivalent Yes/No*
CHTFT V205E	Physical Transport Phenomena 2	5	IIA	CHPF PD-10	Product Focused Process Design	5	Physical Transport Phenomena 2 is moved to Bachelor IEM	No
EBM76 oCo5	Data- driven business innovation	5	IB	EBM7 60D05	Technology -enabled Innovation	5	New name of the course, better explanation content	Yes

^{*} It is also possible to substitute equivalent course units in the other direction. This can apply to students with a large backlog who want to fall under the new OER.



Appendix VIII Application deadlines for admission (art. 5.6.1)

Deadline of Application	Non-EU students	EU students
Industrial Engineering and Management	November 1st 2017	November 1st 2017
Industrial Engineering and Management	May 1st 2018	May 1st 2018

Decision deadlines (art. 5.6.3)

Deadline of Decision	Non-EU students	EU students
Industrial Engineering and Management	December 1st 2017	December 1st 2017
Industrial Engineering and Management	June 1st 2018	June 1st 2018