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**Appendices to the Teaching and Examination
Regulations of the Master's degree programme in
Industrial Engineering and Management (2015-
2016)**



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 three tracks:

- Production Technology and Logistics (PTL)
- Information Engineering (IE) (last admission 2014-2015)
- 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 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	30	Yes	- Research Methodology; - 45 ECTS of 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	
IE-Track	45		
Distributed Systems	5	Yes	
Software Architecture	5	Yes	
Business Intelligence	5	Yes	
Sustainable and Integrated Information Systems	5	Yes	
Optional Modules	25	Var	
PPT-track	45		
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. 3.3)

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 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 (PTL)			
Course unit	ECTS	Practical	Entry requirements
Planning and Scheduling Methods	5		
Data-driven Business Innovation	5		
Asset Management	5		

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



Mechanical properties	5		
Numerical mathematics I	5		

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

Optional technical modules Chemical Engineering (PPT)			
Course unit	ECTS	Practical	Entry requirements
Process design	10		
Particulate Products	5		
Catalysis for Engineers	5		
Design of industrial catalysts	5		

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

Optional management modules	ECTS	Practical	Entry requirements
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		
International Business & Supply Chain Marketing <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	5		



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Management <input type="checkbox"/>			
Finance and Development <input type="checkbox"/>	5		
Innovation & Entrepreneurship <input type="checkbox"/>	5		
Organisatie, technologie en verandering	5		



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Appendix VI Admission to the degree programme and different specializations (art. 4.1.1 + art. 4.2)

- 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. 4.6.1)

Deadline of Application	Non-EU students	EU students
Nanoscience	February 1st 2016	May 1 st 2016
Behavioural and Cognitive Neurosciences	May 1st 2016	May 1st 2016
Biomolecular Sciences (topprogramme)	May 1st 2016	May 1st 2016
Evolutionary Biology (topprogramme/EM)	January 15th 2016	January 15th 2016
Remaining FMNS Masters	May 1st 2016	May 1st 2016

Decision deadlines (art. 4.6.3)

Deadline of Decision	Non-EU students	EU students
Nanoscience	June 1st 2016	June 1st 2016
Behavioural and Cognitive Neurosciences	June 1st 2016	June 1st 2016
Biomolecular Sciences (topprogramme)	June 1st 2016	June 1st 2016
Evolutionary Biology (topprogramme/EM)	June 1st 2016	June 1st 2016
Remaining FMNS Masters	November 1st 2016	November 1st 2016