

Appendices to the Teaching and Examination Regulations of the Bachelor's degree programme in Industrial Engineering and Management (2013-2014)

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- II. Follow-on Master's degree programmes: in addition to the Faculty-wide follow-on Master's degree programmes in Education and Communication in Mathematics and Natural Sciences and Energy and Environmental Sciences, the specific follow-on Master's degree programmes for each degree programme should also be listed here. These are the Master's degree programmes to which the Bachelor's programmes will grant unconditional admission
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I. Learning outcomes of the Bachelor's degree programme in Industrial Engineering and Management

Holders of a Bachelor's degree in Industrial Engineering and Management have:

1. The required knowledge to describe elementary technological products and processes within a business context.
2. The required understanding to determine and assess the functionality and performance of these products and processes in a multidisciplinary way (e.g. from technological and business perspectives as well as those of a variety of stakeholders).
3. The required skills to design, redesign, implement and subsequently validate these products and processes.
4. The required knowledge, understanding and skills for 'Life-Long Learning' (including finding information and using IT applications) to function largely autonomously.
5. The required knowledge and understanding of technology, business studies, mathematics and natural sciences to successfully complete a follow-on Master's degree programme in Industrial Engineering.
6. An academic attitude, i.e. the required knowledge, understanding and skills to conduct elementary academic research.
7. The required skills to communicate effectively about ideas and solutions with both engineers and managers.
8. Basic knowledge in the field of leadership, socially and ethically responsible behaviour in order to apply technology.

II. Follow-on Master's degree programmes

The Bachelor's degree programme will grant unconditional admission to the following Master's degree programmes at the University of Groningen:

- Industrial Engineering and Management
- Education and Communication in Mathematics and Natural Sciences (only the communication component of the degree programme)
- Energy and Environmental Sciences

III. Majors and Minors in the degree programme

The degree programme comprises a Major with two tracks or specializations:

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

IV. Course units in the propaedeutic phase

<i>Course unit name</i>	<i>ECTS</i>	<i>Practical</i>	<i>Type of examination*</i>
Orientation IEM	5	Yes	WE
Global Supply Chain Management	5		WE
Calculus for IEM (Incl. Fundamentals of Mathematics)	5		WE
Linear Algebra	5		WE
Financial Accounting	5		WE
Structure and Molecules	5	Yes	WE
Physical Systems	5	Yes	WE
Algorithmics	5	Yes	Ass.
IEM Integrated Design Project/First year symposium**	5	Yes	Ass.
Statistics and Stochastics	5		WE
IEM Methods and Design	5	Yes	WE
Management Accounting	5		WE

*WE: written examination; Ass.: assignment** Provisional name; course unit under development

V. Course units in the post-propaedeutic phase

Course unit name	ECTS	Practical	Type of examination*	Compulsory order**
2nd year: joint programme	35			
Bedrijfsrecht [Business Law]	5		WE	
Operations Research 1	5	Yes	WE	
Signals and Systems	5	Yes	WE	
Outlining & Implementing Innovations Strategy	5	Yes	Ass.	
Marketing	5		WE	
Transport Phenomena 1	5		WE	
Production Planning and Quality Control	5	Yes	WE	
2nd year: PTL track	25			
Mechanics	5	Yes	WE	
Materials Science and Design	5	Yes	WE	
Production Techniques	5	Yes	WE	
Modelling and Analysis of Complex Networks	5		WE	
Applied Manufacturing Research	5	Yes	Ass.	
2nd year: PPT track	25			
Technische Thermodynamica [Technical Thermodynamics]	5		WE	
Polymer Chemistry	5	Yes	WE	
Een-fase reactoren [Single-Phase Reactors]	5	Yes	WE	
Scheidingsprocessen [Separation Processes]	5		WE	
Introduction to Biological Systems	5	Yes	WE	
3rd year: joint programme	25			
Business System Design (OBS)	5		WE, ass.	
Work Organization and Job Design	5	Yes	WE	

Integration Project	15	Yes	Ass.	OBS must have been followed; 140 ECTS from the Bachelor's programme
3rd year: PTL track	35			
Control Engineering	5	Yes	WE	Signals and Systems
Production Planning and Control	5	Yes	WE	
Digital and Hybrid Control Systems	5		WE	
Mechatronics	5	Yes	WE	
CAD, CAM and CIM in Discrete Production	5	Yes	Ass.	
Applied Manufacturing Management	5	Yes	Ass.	
Design and Construction	5	Yes	Ass.	
3rd year: PPT track	35			
General Process Equipment	5	Yes	WE	
Process Technology: practical	5	Yes	Ass.	
Special Process Equipment	5	Yes	Ass.	
Meer-fase reactoren [Multi-Phase Reactors]	5		WE	
Product Technology	5	Yes	WE	
Electives	10	Var.	Var.	

*WE: written examination, OE: oral examination, Ass.: assignment accompanied by a report and/or presentation, Var.: variable, depending on the chosen course unit; **Compulsory order: the course units listed in this column must have been completed before the relevant examination may be sat.

Choice of electives in the first semester of the third year

PTL track

Within this track, students may take an *Information Engineering* Minor, comprising the following three course units with a total student workload of 15 ECTS:

- Object-Oriented Programming
- Computer Architecture and Networks
- Specialization Course in Business & IT

Students who choose to take the Information Engineering Minor will follow the three course units in this Minor instead of the Applied Manufacturing Management course unit and choose at least one of the following three course units:

- Production Planning and Control
- Digital and Hybrid Control Systems
- Mechatronics

PPT track

Within this track, students can choose one of the following three options as a 10 ECTS elective:

- An individual research project worth 10 ECTS
- At least two course units from the PPT electives list below
- At least two course units from outside the PPT electives list. This option is only possible upon approval by the Board of Examiners of a motivated request.

PPT electives list

Course code	Course name	Scheduled in period:
CHEVM1-11	<u>Eigenschappen van materialen 1 [Properties of Materials 1]</u>	1
CHBC2-11	<u>Bioenergetica en metabolisme [Bioenergetics and Metabolism]</u>	2

CHOC1-10	<u>Organische chemie 1 [Organic Chemistry 1]</u>	2
CHQC-11	<u>Quantumchemie [Quantum Chemistry]</u>	2
NAGE-10	<u>Geo-Energy</u>	2
CHBC-10	<u>Biochemistry</u>	3
CHTP-o8	<u>Procesdynamics</u>	3
CHBCP-10	<u>Biochemistry Practical</u>	3