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**Appendices to the Teaching and Examination
Regulations (TER) of the Bachelor's degree
programme in Industrial Engineering and
Management (2016-2017)**



Appendix I: Learning outcomes in the Bachelor's degree programme (art. 1.3.a)

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.



Appendix II: Majors and Minors of the degree programme Article 2.1.4

The degree programme comprises a Major with two tracks:

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



Appendix III Course units in the propaedeutic phase

- **List of course units; Article 3.1.1**
- **Course units with one or more practicals; Article 3.2**
- **Compulsory order of examinations; Article 8.2**

<i>Course unit name</i>	<i>ECTS</i>	<i>Practical</i>	<i>Entry requirements</i>
Orientation IEM	5	Yes	
Global Supply Chain Management	5		
Calculus for IEM	5		
Linear Algebra & Multivariable Calculus for IEM	5		
Financial Accounting	5	Yes	
Fundamentals of Process and Product Technology	5	Yes	
Physical Systems for IEM	5	Yes	
Algorithmics	5	Yes	
IEM Methods and Design	5	Yes	
IEM Integrated Design Project	5	Yes	
Statistics and Stochastics	5		
Management Accounting	5	Yes	



Appendix IV Course units in the post-propaedeutic phase

- List of course units; Article 6.1.1
- Course units with one or more practicals; Article 6.2.1
- Compulsory order of examinations; Article 8.2

Course unit name	ECTS	Practical	Entry requirements
2nd year:	30		
joint programme			
Nederlands Bedrijfsrecht voor IEM Or International Business Law for IEM	5		
Operations Research 1	5	Yes	
Outlining & Implementing Innovation Strategy	5	Yes	
Marketing	5		
Physical Transport Phenomena 1	5		
Production Planning and Quality Control	5		
2nd year: PTL track	30		
Mechanics	5		
Materials Science and Engineering	5	Yes	
Production Techniques	5	Yes	
Modelling and Analysis of Complex Networks	5	Yes	
Applied Manufacturing Research	5	Yes	
Signals and Systems for IEM and BMT	5	Yes	
2nd year: PPT track	30		
Technical Thermodynamics	5		
Polymer Chemistry	5	Yes	
Single-Phase Reactors	5	Yes	
Separation Processes	5		
Biological Systems	5	Yes	
Structures and molecules	5	Yes	
3rd year: joint programme	25		
Business System Design	5		
Work Organization and Job Design	5	Yes	
Integration Project	15	Yes	140 ECTS of Bachelor's IEM programme (including propaedeutic phase) must have been completed.
3rd year: PTL track	35		
Control Engineering	5	Yes	
Numerical Methods	5	Yes	
Mechatronics	5	Yes	
Computer Aided Design & Manufacturing	5	Yes	
Digital and Hybrid Control Systems	5		
Design and Construction	5	Yes	



Elective	5	Var.	
3rd year: PPT track	35		
General Process Equipment	5	Yes	
Practical course (bio-) process technology	5	Yes	
Special Process Equipment	5	Yes	
Multiphase Reactors	5		
Product Technology	5	Yes	
Electives	10	Var.	

PTL electives list

Course code	Course name	Practical	ECTS
NAPMS-12	Principles of Measurement Systems		5
NAGO-11	Waves and Optics	Yes	5
NAGE-10	Geo-Energy		5
NAEUG-12	Energy from Gas		5
EBB117A05	Entrepreneurial marketing*		5
EBB119A05	Technology-based offerings*		5
EBB118A10	Project innovation and entrepreneurship*		10

PPT electives list

Course code	Course name	Practical	ECTS
CHEVM1-11	Physical properties of Materials 1		5
WBIE13003	Molecular Biotechnology	Yes	5
CHOC1-10	Organic Chemistry 1		5
CHQC-11	Quantum Chemistry	Yes	5
NAGE-10**	Geo-Energy		5
NAEUG-12**	Energy from Gas		5
CHBC-10	Biochemistry	Yes	5
EBB117A05	Entrepreneurial marketing*		5
EBB119A05	Technology-based offerings*		5
EBB118A10	Project innovation and entrepreneurship*		10

*Only as part of the (shortened) Minor Innovation & Entrepreneurship. The (shortened) Minor Innovation & Entrepreneurship is organized by the Faculty of Economics and Business (FEB) and the University of Groningen Centre of Entrepreneurship (UGCE) and is open for BSc IEM students who completed their first year. The minor has a limited number of places and students have to apply for these places.

The shortened Minor consists of Entrepreneurial marketing (5 ECTS), Technology-based offerings (5 ECTS) and Project innovation and entrepreneurship (10 ECTS). There is a limited number of ECTS available for electives dependent of the track. The other ECTS of this Minor will be extra-curricular.

** It is only allowed to choose one of the Energy-courses.



Appendix V Entry requirements (Article 10.2.1)

A. HBO (university of applied science) propaedeutic certificate

1. The following requirements apply to the entrance examination as defined in Article 7.28.3 of the Act:

Degree programme	Subjects at VWO (pre-university) level	Requirement: Dutch as a Second Language (programme II) for non-native speakers of Dutch
B Biology	wia or wib + na+sk+bio	Yes
B Pharmacy	wia or wib + na+sk	Yes
B Life Science and Technology	wib+na+sk	Yes
B Computing Science	wib	
B Artificial Intelligence	wia or wib	
B Physics	wib+na	
B Chemistry	wib+na+sk	
B Astronomy	wib+na	
B Mathematics	wib	
B Chemical Engineering	wib+na+sk	
B Industrial Engineering and Management Science	wib	
B Applied Physics	wib+na	
B Applied Mathematics	wib	

wia = Mathematics A; wib = Mathematics B; na = Physics; sk = Chemistry; bio = Biology

2. Non-native speakers of Dutch who wish to be admitted to the Bachelor's degree programmes in Biology, Life Science and Technology, or Pharmacy must also have passed the State Examination in Dutch as a Second Language, Programme II (NT2-II).
3. The Faculty Committee for Special Admissions will determine whether deficiencies have been compensated satisfactorily.

B. Foreign qualifications (EEA)

1. Any certificate that grants access to a university in a European country will also grant access to Dutch universities.
2. The same requirements that also apply to candidates with an HBO (university of applied science) propaedeutic certificate will apply to these candidates in the entrance examination as defined in Article 7.28.3 of the Act (see A).
3. Non-native speakers of Dutch who wish to be admitted to the Bachelor's degree programmes in Biology, Life Science and Technology, or Pharmacy must also have passed the State Examination in Dutch as a Second Language, Programme II (NT2-II).



4. In addition, candidates are required to be competent in English: an IELTS score of 6.5, a TOEFL score of 580 (paper-based), of 237 (computer-based) or of 92 (internet-based) or equivalent.
5. The Faculty Committee for Special Admissions will determine whether deficiencies have been compensated satisfactorily.

C. Foreign qualifications (German)

1. German candidates must have a Zeugnis der Allgemeinen Hochschulreife ('Abitur').
2. The following requirements apply to the entrance examination as defined in Article 7.28.3 of the Act:

Degree programme	
B Biology	wi (LK or GK) na (LK or GK) sk (LK or GK) bio (LK or GK) (at least one subject at Leistungskurs level)
B Pharmacy B Life Science and Technology B Chemistry B Chemical Engineering	wi (LK or GK) na (LK or GK) sk (LK or GK) (at least one subject at Leistungskurs level)
B Computing Science B Mathematics B Applied Mathematics B Artificial Intelligence	wi (LK)
B Physics B Astronomy B Applied Physics	wi (LK) na (LK or GK)
B Industrial Engineering and Management Science	wi (LK or GK) na (LK or GK) (at least one subject at Leistungskurs level)

wi= Mathematics; na = Physics; sk = Chemistry; bio = Biology
LK = Leistungskurs level; GK = Grundkurs level followed until end of Class 13 or Class 12 (if Gymnasium education lasts 12 years).

3. Non-native speakers of Dutch who wish to be admitted to the Bachelor's degree programmes in Biology, Life Science and Technology, or Pharmacy must also have passed the State Examination in Dutch as a Second Language, Programme II (NT2-II).
4. The Faculty Committee for Special Admissions will determine whether deficiencies have been compensated satisfactorily.



D. Foreign qualifications (International Baccalaureate)

1. The following requirements apply to the entrance examination as defined in Article 7.28.3 of the Act:

Degree programme	from 2010/2011
B Biology	Biology (SL or HL) Maths (SL or HL) Physics (SL or HL) Chemistry (SL or HL) two of these subjects at HL
B Pharmacy B Life Science and Technology B Chemistry B Chemical Engineering	Maths (SL or HL) Physics (SL or HL) Chemistry (SL or HL) two of these subjects at HL
B Computing Science B Mathematics B Applied Mathematics	Maths HL
B Artificial Intelligence	Maths SL or Maths HL
B Physics B Astronomy B Applied Physics B Industrial Engineering and Management Science	Maths HL Physics HL

SL = Standard Level, HL = Higher Level

2. Non-native speakers of Dutch who wish to be admitted to the Bachelor's degree programmes in Biology, Life Science and Technology, or Pharmacy must also have passed the State Examination in Dutch as a Second Language, Programme II (NT2-II).
3. The Faculty Committee for Special Admissions will determine whether deficiencies have been compensated satisfactorily.

E. Foreign qualifications (non-EEA)

1. A non-European certificate that according to NUFFIC and/or NARIC standards is equivalent to a Dutch VWO certificate will grant access to university in the Netherlands.
2. The same requirements that also apply to candidates with an HBO (university of applied science) propaedeutic certificate will apply to these candidates in the entrance examination as defined in Article 7.28.3 of the Act (see A).
3. Non-native speakers of Dutch who wish to be admitted to the Bachelor's degree programmes in Biology, Life Science and Technology, or Pharmacy must also have passed the State Examination in Dutch as a Second Language, Programme II (NT2-II).
4. In addition, candidates are required to be competent in English: an IELTS score of 6.5, a TOEFL score of 580 (paper-based), of 237 (computer-based) or of 92 (internet-based) or equivalent.



5. The Faculty Committee for Special Admissions will determine whether deficiencies have been compensated satisfactorily.

F. Entrance examination

1. The following requirements apply to the entrance examination as defined in Article 7.29 of the Act:

Degree programme	Nature and Health VWO level	or	Nature and Technology VWO level
B Biology	en, wia or b, sk, bio, na		en, wib, na, sk, bio
B Pharmacy	en, wia or b, sk, bio, na		en, wib, na, sk
B Life Science and Technology	en, wib, sk, bio, na		en, wib, na, sk
B Computing Science	en, wib, sk, bio		en, wib, na, sk
B Artificial Intelligence	en, wia of b, sk, bio		en, wib, na, sk
B Physics	en, wib, sk, bio, na		en, wib, na, sk
B Chemistry	en, wib, sk, bio, na		en, wib, na, sk
B Astronomy	en, wib, sk, bio, na		en, wib, na, sk
B Mathematics	en, wib, sk, bio		en, wib, na, sk
B Chemical Engineering	en, wib, sk, bio, na		en, wib, na, sk
B Industrial Engineering and Management Science	en, wib, sk, bio		en, wib, na, sk
B Applied Physics	en, wib, sk, bio, na		en, wib, na, sk
B Applied Mathematics	en, wib, sk, bio		en, wib, na, sk

en = English; wia = Mathematics A; wib = Mathematics B; na = Physics; sk = Chemistry; bio = Biology

2. Non-native speakers of Dutch who wish to be admitted to the Bachelor's degree programmes in Biology, Life Science and Technology, or Pharmacy must also have passed the State Examination in Dutch as a Second Language, Programme II (NT2-II).
3. The Faculty Committee for Special Admissions will determine whether deficiencies have been compensated satisfactorily.



Appendix VI Clustering of Bachelor's degree programmes Article 4.3.4, Article 4.6.1

Degree programme CROHO code	Name of degree programme	Clustered with CROHO code	Name of degree programme
56286	B Life Science and Technology	56860 56157	B Biology B Pharmacy
56860	B Biology	56286 56157	B Life Science and Technology B Pharmacy
56157	B Pharmacy	56860 56286	B Biology B Life Science and Technology
56980	B Mathematics	56965	B Applied Mathematics
56965	B Applied Mathematics	56980	B Mathematics
50206	B Physics	56962 50205	B Applied Physics B Astronomy
56962	B Applied Physics	50206 50205	B Physics B Astronomy
50205	B Astronomy	56962 50206	B Applied Physics B Physics
56857	B Chemistry	56960	B Chemical Engineering
56960	B Chemical Engineering	56857	B Chemistry



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Appendix VII Admission to the post-propaedeutic phase Article 5.1.1

The following candidates will be admitted to the post-propaedeutic phase:
Holders of a propaedeutic certificate of
the Bachelor's degree programme in Industrial Engineering and Management



Appendix VIII Contact hours propaedeutic phase Article 2.4

Degree programme year 1	
Structure contact hours	Contact hours per year
Lectures	310
Tutorial	180
Tutoring	12
Supervision during an internship	
Examinations	210
Practicals	50



Appendix IX University Minors of the faculty of Mathematics and Natural Sciences Article 7.5.1

1. Neurosciences Minor:

- Neuroscience (15 ECTS)
- Behavioural Neuroscience (15 ECTS)

People, Planet, Profit Minor:

- Overview and Coherence People Planet Profit (10 ECTS)
- Paper People Planet Profit (5 ECTS)
- Project People, Planet, Profit (15 ECTS)

Astronomy through Space and Time Minor:

- The Evolving Universe (5 ECTS)
- Cosmic Origins (5 ECTS)
- Astrobiology (5 ECTS)

2. The Programme Committee for the Bachelor's degree programmes in Biology and Life Science & Technology also has authority in the field of the Neurosciences Minor and/or its course units.

The Programme Committee for the Master's degree programme in Energy & Environmental Sciences also has authority in the field of the People, Planet, Profit Minor and/or its course units.

The Programme Committee for the Bachelor's degree programme in Astronomy also has authority in the field of the Astronomy through Space and Time Minor and/or its course units.

3. The Board of Examiners for the Bachelor's degree programmes in Biology and Life Science & Technology and the Master's degree programmes in Biology, Ecology & Evolution, Marine Biology and Molecular Biology & Biotechnology also has authority in the field of the Neurosciences Minor and/or its course units.

The Board of Examiners for the Master's degree programme in Energy & Environmental Sciences also has authority in the field of the People, Planet, Profit Minor and/or its course units.

The Board of Examiners for the Bachelor's degree programme in Astronomy also has authority in the field of the Astronomy through Space and Time Minor and/or its course units.

4. These Teaching and Examination Regulations also apply in their entirety to the Minors in Neurosciences, People, Planet, Profit and Astronomy through Space and Time and/or their course units.