Appendices to the Teaching and Examination Regulations for the Bachelor's degree programme(s) in Industrial Engineering and Management (2023-2024)

Appendix I Learning outcomes of the Bachelor's degree programme (Article 3.1.1)

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 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 3.7.4)

The degree programme has the following Majors, referred to as tracks:
1. PTL - Production Technology and Logistics
2. SPE - Sustainable Process Engineering

The degree programme has the following Minor(s):
The degree programme has no official Minors, but offers a selection of Specialisation Packages explained in Appendix IV.

Appendix III Course units in the propaedeutic phase and compulsory order of examinations (Article 4.1.1 and 9.3)

Course unit name	Course code	ECTS
Calculus 1 (for IEM)	WBIE003-05	5
Global Supply Chain	WBIE005-05	5
Programming, Modelling and Simulation	WBIE008-05	5
Linear Algebra (for IEM)	WBIE009-05	5
Organizational Behaviour and Group Dynamics	WBIE012-05	5
System Dynamics	WBIE016-05	5
Calculus 2 (for IEM)	WBIE017-05	5
Management Accounting	WBIE022-05	5
Materials and Molecules	WBIE023-05	5
Fluid Dynamics	WBIE004-05	5
Industrial Marketing	WBIE050-05	5
Statistics and Stochastics	WBIE041-05	5

- The assessment method of the courses can be found in the assessment plan of the degree programme and on ocasys.rug.nl.
- The teaching method of the courses can be found on ocasys.rug.nl.

Appendix IV Course units in the post-propaedeutic phase and compulsory order of examinations (Article 7.1.1 and 9.3)

Production Technology and Logistics Track

Course unit name	Course code	ECTS
Operations Research	WBIE007-05	5
Outlining & Implementing Innovation Strategy	WBIE013-05	5
Research and Design Methodology	WBIE015-05	5
Dynamics of Engineering Systems	WBIE035-05	5
Production Planning and Quality Control	WBIE014-05	5
Sustainable Engineering Design	WBIE052-05	5
Mechanics (for IEM)	WBIE024-05	5
Modelling and Analysis of Complex Networks	WBIE025-05	5
Signals and Systems (for IEM)	WBIE030-05	5
Computer Aided Design and Manufacturing	WBIE033-05	5
Control Engineering	WBIE034-05	5
Production Techniques	WBIE040-05	5
Design Science	WBIE019-05	5
Bachelor Integration Project	WBIE902-15	15
Design and Construction for IEM	WBIE018-05	5
Mechanical Craftsmanship	WBIE057-05	5

Sustainable Process Engineering track

Course unit name	Course code	ECTS
Operations Research	WBIE007-05	5
Outlining & Implementing Innovation Strategy	WBIE013-05	5
Research and Design Methodology	WBIE015-05	5
Dynamics of Engineering Systems	WBIE035-05	5
Production Planning and Quality Control	WBIE014-05	5
Sustainable Engineering Design	WBIE052-05	5
Industrial Biotechnology (for IEM)	WBIE051-05	5
Reactor Engineering	WBIE029-05	5
Technical Thermodynamics (IEM)	WBIE031-05	5
Gas-Liquid Mass Transfer	WBIE036-05	5
Process Design and Equipment	WBIE039-05	5
Applied Transport Phenomena for Sustainable Processes	WBIE058-05	5
Design Science	WBIE019-05	5
Bachelor Integration Project	WBIE901-15	15
Capita Selecta SPE	WBIE046-05	5
Product Technology (IEM)	WBIE028-05	5

- 140 ECTS of Bachelor IEM programme, and Research and Design Methodology must have been completed to start Design Science.
- 140 ECTS of Bachelor IEM programme, Research and Design Methodology, and the first to parts of Design Science (see Ocasys) must have been completed to start Bachelor Integration Project.
- The assessment method of the courses can be found in the assessment plan of the degree programme and on ocasys.rug.nl.
- The teaching method of the courses can be found on ocasys.rug.nl.

Year three optional module packages
In the first semester of year 3, all students choose an optional module package of 30 ECTS.

Optional module package 1: IEM specialisation
Both tracks have a specialisation package containing 25 ECTS of mandatory courses and 5 ECTS of elective courses from the Faculty of Economics and Business.

Specialisation package Production Technology and Logistics

Course unit name	Course code	ECTS
Nanoscience and Nanotechnology	WBIE045-05	5
Numerical Methods (for IEM)	WBIE049-05	5
Entrepreneurship for Engineers	WBIE047-05	5
Mechatronics	WBIE011-05	5
Principles of Measurement Systems	WBPH029-05	5
Elective FEB course	Various; see below	5

Specialisation package Sustainable Process Engineering

Course unit name	Course code	ECTS
Circular Economy for Process Industry	WBIE053-10	10
Chemical Process Development and Design	WBCE007-05	5
Entrepreneurship for Engineers	WBIE047-05	5
Special Process Equipment	WBCE012-05	5
Elective FEB course	Various; see below	5

Elective courses Faculty of Economics and Business

Course unit name	Course code	ECTS
Digital Transformation in IB	EBB632B05	5
Teamwork – Theories, Design and Dynamics	EBB110A05	5
Purchasing & Supply Chain Management	EBB742B05	5
Health Economics	EBB120A05	5
Junior Business Research and Consulting	EBB123A05	5
Finance and Risk Management for IB	EBB631B05	5
Macroeconomics for EOR	EBB027B05	5
Introduction to Science Education*	WBEC002-05	5

* This Dutch-taught course is not a FEB course, but can also be chosen instead.

In addition, students from the PTL track can choose a specialisation package in Mechanical Engineering containing 30 ECTS of mandatory courses.

Specialisation package Mechanical Engineering

Course unit name	Course code	ECTS
Dynamics and Vibrations	WBIE054-05	5
Numerical Methods (for IEM)	WBIE049-05	5
Solid Mechanics (for IEM)	WBIE055-05	5
Materials Science and Engineering	WBPH071-05	5
Mechatronics	WBIE011-05	5
Principles of Measurement Systems	WBPH029-05	5

- For information on the courses of other degree programmes see the teaching and examination regulations of the corresponding programme.
- The assessment method of the courses can be found in the assessment plan of the degree programme and on ocasys.rug.nl.
- The teaching method of the courses can be found on ocasys.rug.nl.

Optional module package 2: approved minor packages
The minor programmes are approved for both tracks. Mini-minors of 15 ECTS can be combined to 30 ECTS.

Faculty of Science and Engineering Minors

Mini-minor Einstein's physics: space-time and parallel Worlds (15 ECTS, Semester 1a)
Mini-minor Astronomy through space and time (15 ECTS, Semester 1b)
Minor Neurosciences
Minor Future Planet Innovation

Faculty of Economics and Business Minors

Minor Finance		
Minor Innovation & Entrepreneurship This minor can only be chosen without the course Innovation Management B&M (EBB107A05). A replacement course must be chosen from the following list of courses:		
Course unit name	**Course code**	**Specialisation**
Nanoscience and Nanotechnology	WBIE045-05	PTL
Numerical Methods (for IEM)	WBIE049-05	PTL / ME
Mechatronics	WBIE011-05	PTL / ME
Principles of Measurement Systems	WBPH029-05	PTL / ME
Dynamics and Vibrations	WBIE054-05	ME
Solid Mechanics (for IEM)	WBIE055-05	ME
Materials Science and Engineering	WBPH071-05	ME
Circular Economy for Process Industry	WBIE053-10	SPE
Chemical Process Development and Design	WBCE007-05	SPE
Special Process Equipment	WBCE012-05	SPE
Introduction to Science Education	WBEC002-05	N/A

University of Groningen Minors

Minor Energy (Faculty of Economics and Business)
Minor Philosophy (Faculty of Philosophy)
Minor Education* (Faculty of Science and Engineering in cooperation with other Faculties)
Minor Rhetorics (Faculty of Arts)
Minor Data Wise (Faculty of Behavioural and Social Sciences)
Minor Psychology in Society (Faculty of Behavioural and Social Sciences)

*This minor results in a qualification "Tweedegraads docent wiskunde"
- For information on the courses of other degree programmes see the teaching and examination regulations of the corresponding programme.
- The assessment method of the courses can be found in the assessment plan of the degree programme and on ocasys.rug.nl.
- The teaching method of the courses can be found on ocasys.rug.nl.

Optional module package 3: studying abroad
Dedicated IEM-oriented packages have been arranged with certain universities abroad.
Approval from the Board of Examiners and the International Office of the Faculty of Science and Engineering is required to follow a minor abroad.

Optional module package 4: custom minor package
Minors not on the approved list are subject to approval by the Board of Examiners. The Board of Examiners decides if the proposed minor package is a valuable addition to the bachelor degree programme Industrial Engineering and Management.

In addition, the Board of Examiners reviews if the proposed minor package:
1. Has no overlap with the curriculum of the bachelor degree programme Industrial Engineering and Management.
2. Has a sufficient technical, engineering, and/or business character.
3. Contains no first year courses not on the sufficient level.
4. Contains a coherent set of course units.
5. Has enough information provided about the proposed minor package to evaluate the proposal.

Appendix V Admission to the post-propaedeutic phase (Article 6.1.1)

The following candidates will be admitted to the post-propaedeutic phase:

a. Students who have been issued a positive study advice from the degree programme in question
b. Students who have been issued a positive study advice from one of the degree programmes:
   -

Appendix VI Contact hours propaedeutic phase (Article 3.6)

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

Appendix VII Additional requirements open degree programmes (Article 7.3)

In exceptional circumstances, students wishing to pursue an open degree programme may file a request with the Board of Examiners. The Board of Examiners will evaluate whether the proposed curriculum meets the learning outcomes of the degree programme and can determine further conditions in their rules and regulations.

Appendix VIII Transitional provisions (Article 12.1)

Transitional arrangement for the Bachelor's IEM								
Discontinued course units				**Substitute course units**				
Course unit code	*Course unit name*	*ECTS*	*Final exam period*	*Course unit code*	*Course unit name*	*ECTS*	*Explanation*	*Equivalent?*
WBIE042-05	Transport Phenomena 2	5	2022-23	WBIE058-05	Applied Transport Phenomena for Sustainable Processes	5	The course has a new name, but the content is mostly unaltered.	Yes
WBPH020-05	Materials Science	5	2022-2023	WBPH071-05	Materials Science and Engineering	5	New course code due to a name change of the course that better reflects its contents.	Yes