

# Premaster's programmes 'Industrial Engineering and Management' (IEM)

## 2019-2020

The master's programme Industrial Engineering and Management has three specialisations:

- Production and Logistics Management (PLM)
- Health Care Technology and Management (HCTM)
- Financial Engineering and Management (FEM)

### Production and Logistics Management (PLM)

This specialisation focuses on the heart of the design and control of manufacturing processes in the supply chain from raw material delivery to delivering end products to customers. PLM is a broad field requiring people with knowledge of and insight in models in production and logistics in the tradition of management science. Modern production and logistic processes are becoming increasingly complex. Product lifetimes are decreasing, the geographic distance between suppliers and buyers becomes increasingly large (globalization) and more and more activities are outsourced. Important issues in supply chain design include:

- Location of production facilities and distribution centres;
- Allocation of resources in production and distribution centres;
- Management of operations in production, warehousing, transport and distribution, purchasing;
- Maintenance of desired service levels to customers;
- Reliability of processes and its interaction with maintenance planning.

Any mismatch in the supply of raw materials, semi-raw materials, components or finished products will lead to overstock or production delays with service consequences.

The Health Care Technology and Management (HCTM) specialisation highlights the issues playing a role in the management of health care organisations. The special emphasis of this specialisation is on the organisational aspects of hospitals from an Industrial Engineering and Management point of view. Furthermore we focus on the managerial and organisational aspects of the development and implementation of biomedical technology; some of the courses will be given along with the master's degree programme in Biomedical Engineering.

You will learn how to increase the organisational effectiveness, efficiency and safety of health care. In addition to knowledge of medical aspects this requires effective managerial insight. The HCTM specialisation of the 'Industrial Engineering and Management' master's degree programme differs from other educational programmes in that, in preparing you for a career in the health care sector, its emphasis lies on the quantitative analysis of problems and the methods used in producing goods or services.

### Financial Engineering and Management (FEM)

Over the past decades the increasing complexity of financial products, the size of the markets and the ever increasing variety in the products traded have generated a growing demand for skilled professionals to create, price and hedge complex derivatives and, more generally, to manage risk. Acquiring such skills requires mastering both mathematical and managerial knowledge. To meet this demand we offer a master's specialisation in financial engineering and risk management.

Students are trained to identify and quantify risk. Moreover, they learn to determine the extent to which risk should be dealt with using financial engineering instruments or other types of solutions, such as reengineering business processes, adapting the firm's strategy, switching customers/suppliers or

taking different investment decisions. Finally students receive comprehensive management training, learning to apply strategic skills to manage the firm's innovation and technology.

### **Admittance**

Students with a BSc in Industrial Engineering and Management from a Dutch Research University<sup>1</sup> are admitted directly to the master's programme. Students with other prior knowledge may have to do a premaster's programme first to be admitted. The fulltime IEM premaster's programmes start once a year in September.

For students with a technical programme from a Research University, the premaster's programme takes 15EC minimum. For students with a technical programme from a University of Applied Sciences<sup>2</sup> or a social science programme from a Research University, the premaster's programme takes 30EC.

### **Admission Criteria for the premaster's programme**

Admission to the premaster's programme is an individual assessment, based on the following criteria:

- Level of Mathematics (at least equal to the Dutch pre university<sup>3</sup> Mathematics B)
- Prior education
- CGPA (excellent on quantitative courses)
- Study progress
- Motivation
- CV (extra-curricular activities)

### **Brush up on English**

The IEM programme is taught in English. We strongly advise you to test your level of English. Take the diagnostic Dialang test on <http://dialangweb.lancaster.ac.uk/>. This test gives you insight into where you stand in understanding English, in listening, writing, reading, vocabulary and language structures. The test will take up about 105 minutes of your time. The assessment will result in a baseline measurement of your English proficiency, as well as in potential points for improvements.

Bear in mind that the required level of English is at least C1 on each separate subject. When you don't meet these requirements, we recommend you to freshen brush up your knowledge of English before starting with the pre-Master's programme.

### **Students who do not meet the mathematics criteria can upgrade their deficiencies, through for instance:**

1. Via <http://www.boswell-beta.nl/>
2. A State exam, see <http://www.ccvx.nl/>
3. Some Universities of Applied Sciences, like Saxion, offer extra 'Technical Mathematics' courses themselves.

### **Applying**

You can apply for admittance online, see <https://www.utwente.nl/en/education/master/>.

Students who integrate the premaster's programme in their programme of a University of Applied Sciences, can apply via <https://www.kiesopmaat.nl/>

The programme consists of lecturers, tutorials, assignments and self-study. Study slots are scheduled over the week and a lot of self-study is required.

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<sup>1</sup> In Dutch: Universiteit

<sup>2</sup> In Dutch: HBO

<sup>3</sup> In Dutch: Wiskunde B op VWO niveau

The premaster's programme has to be completed successfully within one academic year (with no more than 2 exams per course) to be admitted to the master's programme.

Each specialisation has a premaster's programme. For the specialisations PLM and HCTM the premaster's programme is the same. The premaster's programme for the specialisation FEM differs from the other two specialisations.

## The premaster's programmes

### 1. Research University : Technical Programme

If you are a student with a technical programme from a Research University and you are admitted to one of the premaster's programmes, you have to take up to 15EC of courses. Below you find the premaster's programmes per specialisation:

<b>Research University Technical BSc Programmes</b>		
<b>Production and Logistics Management (PLM) / Health Care Technology and Management (HCTM)</b>		
<i>First quartile (Sept-Oct)</i>		
<i>Course code</i>	<i>Course name</i>	<i>EC</i>
191530420	Statistics & probability for premaster IEM	5
201500012	OR models for premaster IEM	10
		<b>15</b>
<b>Financial Engineering and Management (FEM)</b>		
<i>First quartile (Sept-Oct)</i>		
<i>Course code</i>	<i>Course name</i>	<i>EC</i>
191530420	Statistics & probability for premaster IEM	5
201500020	Financial Engineering for premaster IEM	10
		<b>15</b>
<b>BSc Create (UT)</b>		
<b>Production and Logistics Management (PLM) / Health Care Technology and Management (HCTM)</b>		
<i>First quartile (Sept-Oct)</i>		
<i>Course code</i>	<i>Course name</i>	<i>EC</i>
201500292	Lineair algebra	3
201700018	Probability Theory	2
201500012	OR models for premaster IEM	10
		<b>15</b>
<b>Financial Engineering and Management (FEM)</b>		
<i>First quartile (Sept-Oct)</i>		
<i>Course code</i>	<i>Course name</i>	<i>EC</i>
201500292	Lineair algebra	3
201700018	Probability Theory	2
201500020	Financial Engineering for premaster IEM	10
		<b>15</b>

## 2. University of Applied Sciences: technical programme or Research University: social science programme

If you are a student with a technical programme from a University of Applied Science or a student with a social science programme from a Research University and you are admitted to one of the premaster's programmes, you have to take up to 30EC of courses. The premaster's courses depend on the specialisation you chose. Below you find the premaster's programmes per specialisation:

Applied Sciences and Research University Social Sciences programmes(Obligatory VWO Mathematics B)					
Production and Logistics Management (PLM) / Health Care Technology and Management (HCTM)					
First quartile (Sept-Oct)			Second quartile (Nov-Feb)		
Course code	Course name	EC	Course code	Course name	EC
191512001	Calculus A	4	191530420	Statistics & probability for premaster IEM	5
201500014	Academic skills for premaster IEM	1	201500014	Academic skills for premaster IEM	4
201500012	OR models for premaster IEM	10	201500015	Excel/VBA	3
			201400317	Operations Strategy*	3
			201500019	Project OM for premaster IEM (3 EC)	
		15			15
					30
Financial Engineering and Management (FEM)					
First quartile (Sept-Oct)			Second quartile (Nov-Feb)		
Course code	Course name	EC	Course code	Course name	EC
191512001	Calculus A	4	191530420	Statistics & probability for premaster IEM	5
201500014	Academic skills for premaster IEM	1	201500014	Academic skills for premaster IEM	4
201500020	Financial Engineering for premaster IEM	10	201500015	Excel/VBA	3
			201400317	Operations Strategy*	3
			201500019	Project OM for premaster IEM (3 EC)	
		15			15
					30

\* students with prior knowledge on this topic will have to do Project OM for premaster IEM instead.

### Course information

In the course catalogue of Osiris you can find course descriptions

<https://osiris.utwente.nl/student/OnderwijsCatalogus.do>.

When a course is not yet available, you can find the information by searching at the previous academic year.

### Literature

Below you find the literature you will need for the premaster's courses, as far as they are known at the moment of writing. You can order your books, with discount, via the Study association Stress. But first you have to register as a member of Stress, see <https://www.stress.utwente.nl/>

Calculus A: Thomas' Calculus, early transcendentals, G.B. Thomas, M.D. Weir and J.R. Hass New International Edition, ISBN 9781783991587.

Academic skills for premaster: 'Business Research Methods' (D.R. Cooper & P.S. Schindler, McGraw Hill) ISBN 978-007-126333-7.

OR models for premaster IEM: Winston, W. (2003). Operations Research: Applications and Algorithms ISBN 0-534-42362-0 (4th ed.).

Financial Engineering for the premaster IEM: Brealey, Myers and Allen, Principles of Corporate Finance, most recent international edition, with access to the self-study tool Connect. (ISBN 9780077155070)

Excel/VBA: Online material.

Statistics and Probability: Online material and readers "Probability Theory for Engineers" and "Statistics for Engineers".

Operation Strategy: Slack, N., Chambers, S., & Johnston, R. (2010). Operations Management. Harlow: FT Prentice Hall.

## Examination

Per course the examination differs:

	Exam type	Lecturer
1. Calculus (191512001, 4 EC)	Exam	dr. J.C.W. van Ommeren
2. Academic skills for premaster IEM (201500014, 5 EC)	Assignment (individual)	dr.ir. S.J.A. Löwik
3. OR models for premaster IEM (201500012, 10 EC)	Exam + group assignment	dr.ir. L.L.M. van der Wegen
4. Statistics & Probability (191530420, 5 EC)	Exam	ir. T.M.J. Meijer
5. Excel/VBA (201500015, 3 EC)	Assignment(s) + exam	prof.dr.ir. E.W. Hans
6. Operations Strategy (201400317, 3EC) *	Exam	dr.ir. P. Hoffmann
7. Project OM for premaster (201500019, 3EC)	Assignment (group)	dr.ir. L.L.M. van der Wegen
8. Financial Engineering for premaster IEM (201500020)	Exam + assignment	dr. B. Roorda

\*students with prior knowledge on this topic will have to do Project OM for premaster IEM instead

Per course you can take one exam and one re-sit. If the premaster's programme is not finished successfully within one academic year, admission to the master's programme is no longer possible. Students encountering special circumstances have to ask the exam committee for exemption of the rules mentioned above and inform their study counsellor as soon as the circumstances come up. After finishing your premaster's programme and your Bachelor's or BSc programme, you can start the master's. The master's programme comprises 120EC.

## General Information

### Introduction

An introduction for (pre)master's students takes place during the last week of August. This introduction, called Kick-In at the University of Twente, is important to get acquainted with fellow students and educational facilities of the University. **This information is not offered again during the (pre)master's programme.** If you cannot be present you can gather your information via our website or ask fellow students. For participation in the introduction programme you have to register: <http://www.kick-in.nl/>

### Readers

If readers are used, you can buy them in the first week of education at the Union shop in the 'Bastille' building.

### Electronic systems

Below you find additional information about a few electronic systems.

These systems can be accessed through: <http://my.utwente.nl>

Additional information about the kick-in can be found on <http://www.utwente.nl/bms/kick-in/>

### Osiris

Grades and progress are registered in Osiris. Before starting your courses you have to register yourself for them in Osiris. When you are registered in Osiris you also are registered for the exam of that course and you automatically have access to Canvas, the electronic learning environment.

You can register yourself in Osiris with your student account + password. For further information see <http://www.utwente.nl/onderwijssystemen/en/>

### Canvas

The University uses Canvas as an electronic learning environment.

Canvas is our communication channel for course content, exams etc.

### Time schedule + programme + rules

- Information concerning time schedules can be found on *mytimetable*, through <http://my.utwente.nl>
- Information concerning programmes can be found on <http://www.utwente.nl/bms/kick-in/> → further information → Information for specific groups
- Information concerning rules can be found on: <https://www.utwente.nl/en/organization/structure/faculties/bms/education/regulations/>

During the introduction an overview of the most important issues will be given.

### Contact

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