

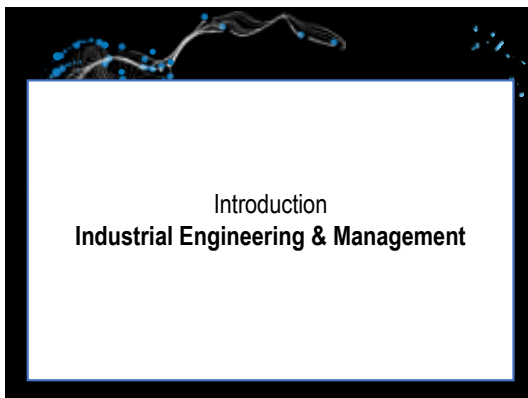


INDUSTRIAL ENGINEERING AND MANAGEMENT

Hand-out master presentation



Welcome at the presentation of Industrial Engineering and Management. This presentation gives insight in the master programme and the different master tracks.



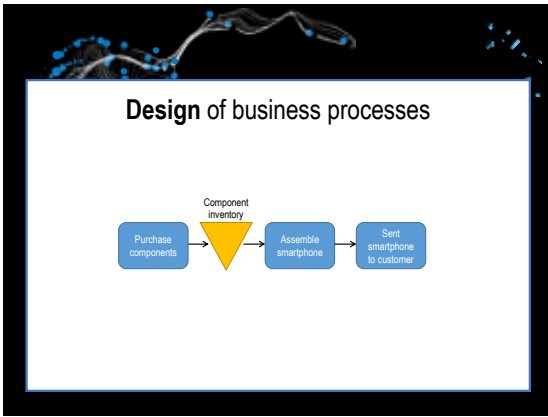
First part: Introduction Industrial Engineering & Management



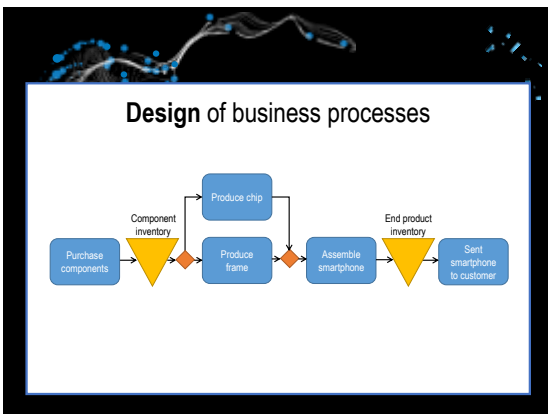
The Master Industrial Engineering & Management focuses on the **design, management and improvement of business processes**. We are facing business processes almost everywhere: each company produces something. The easiest examples are production companies, think about the car industry, food processing industry or chemical industry. But we also see business processes in the supply chain and logistics, healthcare, financial markets, etc. It doesn't matter in which industry you are going to work, in the end we can define all business processes as following: **transforming resources into products and/or services with the use of production equipment, in order to satisfy customer needs.**



Let's take an example from our daily life, the smartphone. A smartphone consists of different components, which all have to be assembled into a useful product which allows to communicate, entertain, work, etc.. Think about all the processes that are needed to produce a smartphone. Don't think about the production alone, but also keep in mind the activities performed with logistics, sales, marketing, product design, etc.. An Industrial Engineer pays attention to all these activities, before a process design could be developed.



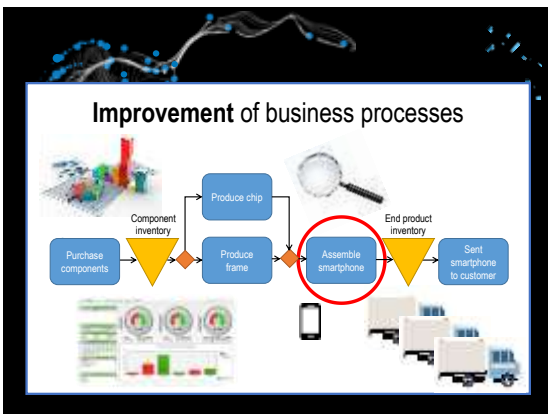
When you have made a clear business strategy, you can start to design the processes that you need in order to produce value. The most simple smartphone production process could be performed at home: establish enough tools at your working area, purchase the components needed, assemble the different components together and send the smartphone to your customer. This design has both advantages and disadvantages. For example, you could easily design a smartphone that perfectly matches specific customer demand, but it's very hard to increase your total production (you may have to hire personnel and buy additional tools).



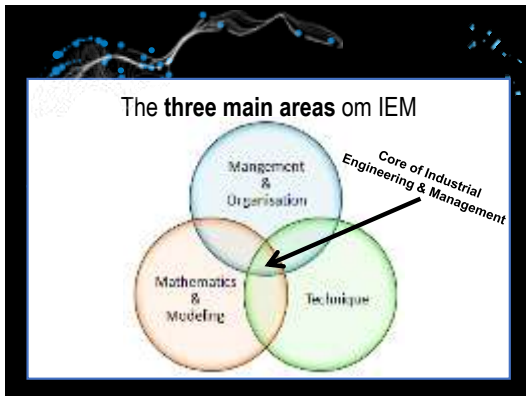
An alternative process design is also possible: you could for example divide the task "assemble smartphone" into more sub activities. We can choose to produce our own frame and chips, instead of purchasing these components. With smart designs, you are able to use your resources more effectively (more targeted) and more efficiently (optimizing the resource usage), in order to maintain higher throughput numbers. In the example of the smartphone production, you can choose use mass production by implementing an assembly line.



When we are designing business processes, we are looking how a product or service is produced. The process design determines how the working place will look like. Because there are numerous different alternatives possible, it's important to make calculations for each alternative, in such a way that we can measure the process performances. Therefore, an Industrial Engineer is looking for the best process design that meets the business strategy. In order to do so, we have to apply mathematical models, production techniques, information technologies and organisation theories.



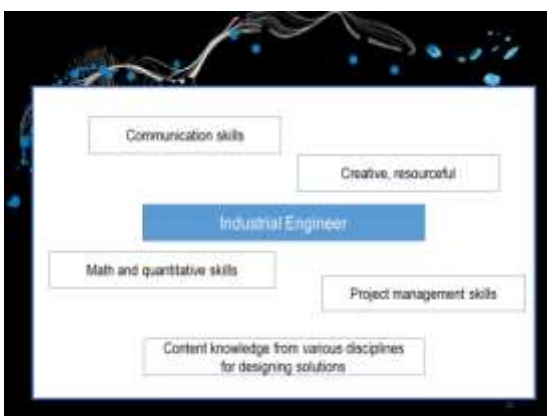
What if there arises a problem within the production? For example, the total amount of smartphones assembled is far too low in comparison with the total demand. You could easily solve this problem by increasing the production capacities, but that is a solution without the knowledge of the core problems. Therefore, we have to perform more research before process improvements can be made. We do this by applying the Managerial Problem Solving Method, existing of: 1) the problem identification; 2) set up the problem approach; 3) perform the problem analysis; 4) generate alternative solutions; 5) choose the best solution; 6) implement the solution and evaluate the results. We are going to optimize the business process using mathematics and technique, in order to determine which problems are negatively influencing the processes.



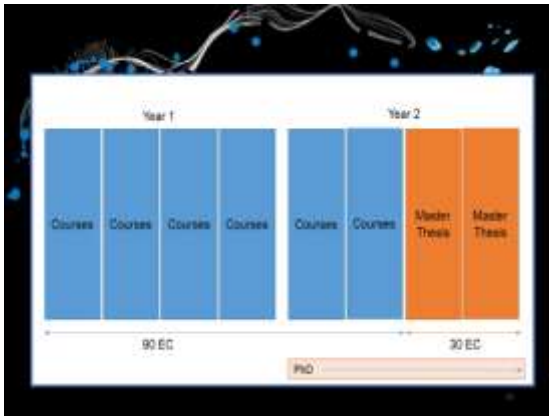
At Industrial Engineering & Management, we are using a quantitative modelling approach, where we focus on: 1) the technologies used in business processes; 2) the behaviour of people and 3) the business environment. Industrial Engineering & Management forms the overlapping area of Management & Organisation, Mathematics & Modelling and Technique

The education offered at
Industrial Engineering & Management

Part two: The education offered at Industrial Engineering & Management



The skills that an industrial engineer acquires during the study period are mostly technical, social, and mathematical skills.



The master of IEM is a 2-years programme. The first one and half year you follow courses and the last half year you do your master thesis at a company.



Within the master of Industrial Engineering and Management, there are three specialization tracks: Production and Logistics Management, Financial Engineering and Management, and Health Care Technology and Management.



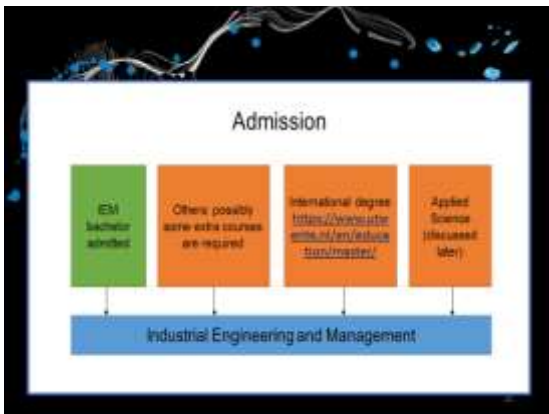
In the first one and a half year, there are 90 EC of courses in the Master. Four common courses are obligatory for all IEM students. Within your specialization you have (research oriented) mandatory and elective courses. Besides that, there is a lot of choice. Extra courses within the specialization could be an option, but also extra courses from other IEM specializations. Or you might be interested in studying abroad or a series of courses from another UT (engineering) program, the so called 'packages' – a minor within your master programme.



The IEM program has strong relationships with other (UT-engineering) programs. Elective packages are (and will be) developed to encourage students to shape their personal study program and achieve their individual ambitions.



During the last half year of the master programme, the master thesis takes place. This means that you are doing a project, conducting research, and writing a report in a company, and about a real issue that this company faces. In this research, you combine all you're knowledge and skills in an environment with high professional standards. You use scientific knowledge and provide solid support for your solutions and recommendations.



Admission is depending on the educational level and background.

Research University Technical programs				
Course Code	Course Name	ECT	prerequisite	
19110420	Statistics & accessibility for premaster ISM	5	1	
201100012	ICT-reports for premaster ISM	10	1	
		15		

Research University Other's				
Course Code	Course Name	ECT	prerequisite	
201100010	Linear algebra	5	1	
191100006	Probability Theory	5	1	
201100012	ICT-reports for premaster ISM	10	1	
		15		

After finishing a technical program BSc from a Research University (WO), a premaster of 15 EC is needed. The program is tailored per specialization. See also the next slide for the specialization Financial Engineering and Management.

Technical programs				
Course Code	Course Name	ECT	prerequisite	
19110420	Statistics & accessibility for premaster ISM	5	1	
201100010	Financial Engineering for premaster ISM	10	1	
		15		

Technical program Other's				
Course Code	Course Name	ECT	prerequisite	
201100010	Linear algebra	5	1	
191100006	Probability Theory	5	1	
201100010	Financial Engineering for premaster ISM	10	1	
		15		

WO Premaster Social Science
Mandatory VWO Mathematics B

Mathematical Foundations and Tools for Operations Research		Mathematical Foundations and Tools for Logistics Management	
Course Code	Course Name	Course Code	Course Name
60000001	Mathematics I	60000002	Mathematics II
60000003	Mathematics III	60000004	Mathematics IV
60000005	Mathematics V	60000006	Mathematics VI
60000007	Mathematics VII	60000008	Mathematics VIII
60000009	Mathematics IX	60000010	Mathematics X
60000011	Mathematics XI	60000012	Mathematics XII
60000013	Mathematics XIII	60000014	Mathematics XIV
60000015	Mathematics XV	60000016	Mathematics XVI
60000017	Mathematics XVII	60000018	Mathematics XVIII
60000019	Mathematics XIX	60000020	Mathematics XX
60000021	Mathematics XXI	60000022	Mathematics XXII
60000023	Mathematics XXIII	60000024	Mathematics XXIV
60000025	Mathematics XXV	60000026	Mathematics XXVI
60000027	Mathematics XXVII	60000028	Mathematics XXVIII
60000029	Mathematics XXIX	60000030	Mathematics XXX

Dutch VWO Mathematics B level is mandatory before starting a premaster.
After finishing a Social Science program from a Research University (WO), a premaster of 30 EC is needed. The program is tailored per specialization.



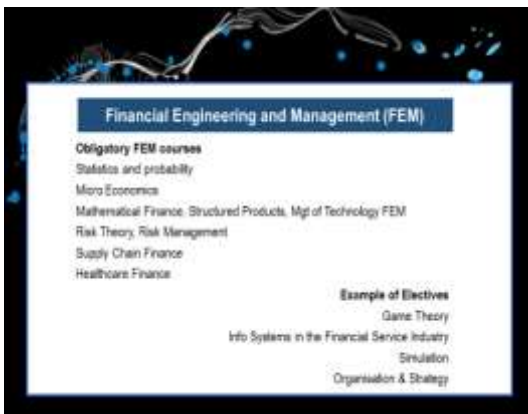
The focus of the **Production and Logistic Management** track is understanding the impact of customized logistical designs on overall performance. Take for example the port of Rotterdam. Containerships drop their containers at terminals which have to be picked up by barges. How to plan this in such a way that waiting time is minimized for both barge and terminal operators would be a question that a PLM student would dive into.

- Production and Logistics Management (PLM)**
- Obligatory PLM courses**
- Operations Management
 - Discrete Optimization of Business Processes
 - Simulation
 - Supply Chain - & Transport Management
 - Advanced Production Planning
 - Warehousing
 - Supply Chain Finance
- Example of Electives**
- Reverse Logistics & re-manufacturing
 - Optimization of Healthcare Processes
 - Reliability engineering & Maintenance management

Example of Courses



The **Financial Engineering and Management** track focuses on the optimization of financial processes. Expanding markets and the increasing complexity and variety of financial products have generated a growing demand for financial risk management; skilled professionals to create, price, and hedge complex derivatives.



Example of courses



The **Healthcare Technology and Management** track highlights the role of management in healthcare. It centres on two main themes: entrepreneurship in technological innovation and healthcare logistics. The focus is on optimization of quality of care, productivity, and quality of labour.



Example of courses

Unique, individual programme

- Students may also propose an individual program, combining courses from various master programmes
- The program should meet the objectives of the IEM master, but the emphasis can be adapted to the student's intellectual curiosity
- Application to program director, and official permission of the examination committee is required.

Another possibility for a master Industrial Engineering and Management is an individual programme combining courses from various master programmes. The programme should be approved by the examination committee.

Why IEM at UT?

Highest student appreciation amongst competitors



	Facilities	Quality	Programme structure	Lecturers	Examinations	Organization & Administration	Tuition costs	Ranking
Industrial Engineering & Management (IEM)	78	73	78	82	75	65	76	1
Industrial Management (IM)	68	74	76	73	77	60	75	2
Industrial Engineering, Major Applied & Management (IEM)	66	70	76	73	74	71	75	3
Quantitative Management & Logistics (Mq)	68	70	74	73	82	63	73	4
Management of Technology (MOT)	64	66	68	64	65	77	64	5
Industrial Engineering & Management (IEM)	59	61	62	62	62	59	62	6

(source: Elsevier 2016)

Our challenging master program received the highest student appreciation amongst competitors.

Program break

WO students join Erwin Hans for a Q&A
MSc students available for questions

Applied Science students now remain in this room



Dorethea Pui

Admission criteria Applied Sciences

- Mathematics B at "VWO-level"
- Applied Science TBK (not automatic, we still select)
- More general: all quantitative and technical Applied Science students: Engineering, physics, electronics, production, econometrics
- Individual academic (quantitative) qualities more important than Applied science study program! (best 20%)
- Apply to know for sure

Apply to know for sure:

<https://www.utwente.nl/en/education/master/how-to-apply/>

Pre-master program Applied Sciences

- Pre-master program
 - Up to 30 EC in total
 - mathematics and probability/statistics
 - preparation courses for specialization
- This program must be successfully completed within 12 months – one academic year (within two exam attempts)
- To be admitted to the master program
- Costs premaster: 30EC = approximately 953 EURO (1/2 tuition fee), to be paid in total and no restitution if premaster is not successful

The premaster program is fixed.

Costs: 30EC = approximately 953 euro, to be paid in total and no restitution if premaster is not successful

Applied Science Premaster

Mandatory VWO Mathematics B

Course name	ECTS	Prerequisites	Notes
Mathematics B	6		
Probability and Statistics	6		
Mathematics A	6		
Mathematics B	6		
Mathematics C	6		
Mathematics D	6		
Mathematics E	6		
Mathematics F	6		
Mathematics G	6		
Mathematics H	6		
Mathematics I	6		
Mathematics J	6		
Mathematics K	6		
Mathematics L	6		
Mathematics M	6		
Mathematics N	6		
Mathematics O	6		
Mathematics P	6		
Mathematics Q	6		
Mathematics R	6		
Mathematics S	6		
Mathematics T	6		
Mathematics U	6		
Mathematics V	6		
Mathematics W	6		
Mathematics X	6		
Mathematics Y	6		
Mathematics Z	6		

This program must be successfully completed within 12 months – one academic year (within two exam attempts) to be admitted to the master program

Pre-master as 'transfer minor'

You still need to do your minor? → Check the 'Kies Op Maat'

<https://www.kiesopmaat.nl/voor/duo/ToegiftaWetenschap&duo/du>

- Financial Engineering and Management Transfer minor
- Production and Logistics Management/Health Care and Technology Management Transfer minor

Extra information: <https://www.utwente.nl/onderwijs/master/pre-master/>

No extra costs, premaster is part of Applied Science program

Admittance: a) Your program management has to approve
b) admittance criteria as mentioned above

Apply as soon as possible on the website. **Deadline June 2017**

You still need to do your minor? Check the 'Kies Op Maat'

Pre-master courses during your time at Saxion? Check the 'doorstroom minor'

<https://www.utwente.nl/onderwijs/master/pre-master/> or doorstroom@saxion.nl

Applied Science student; no costs if you show evidence of payed tuition fee.

More information

- Information on (premaster) Industrial Engineering & Management: <https://www.utwente.nl/onderwijs/master/>
- Information on course content: https://www.utwente.nl/vulect/chockowiak/calculus_en/
Type course code and look into 2016

Information Market today

mail

- m.g.vandermeulen@utwente.nl
- study@mb.utwente.nl

Apply: <https://www.utwente.nl/onderwijs/master/>

- Questions about the pre-master or IEM in general: m.g.vandermeulen@utwente.nl
- Information on Industrial Engineering & Management: <https://www.utwente.nl/en/education/master/programmes/industrial-engineering-management/>
- Information on courses: <https://www.utwente.nl/onderwijssystemen/osiris/>
- Apply? <https://www.utwente.nl/en/education/master/>

