

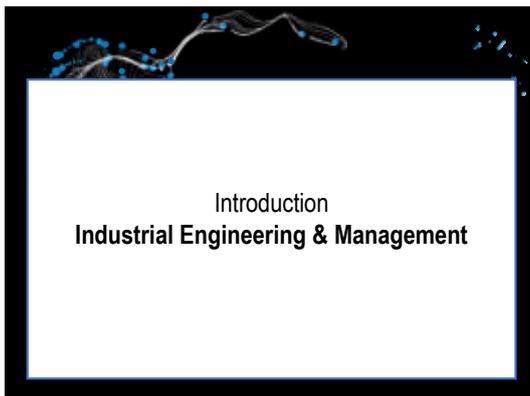


INDUSTRIAL ENGINEERING AND MANAGEMENT

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.



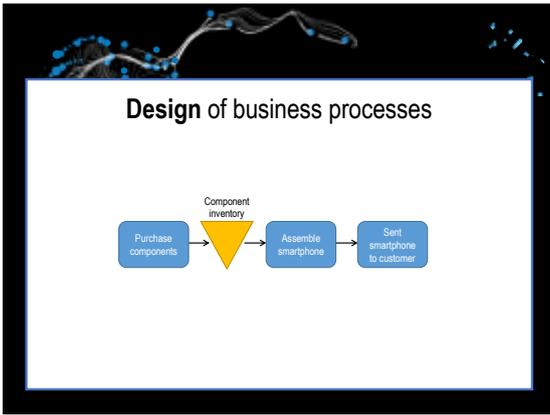
First part: Introduction Industrial Engineering & Management



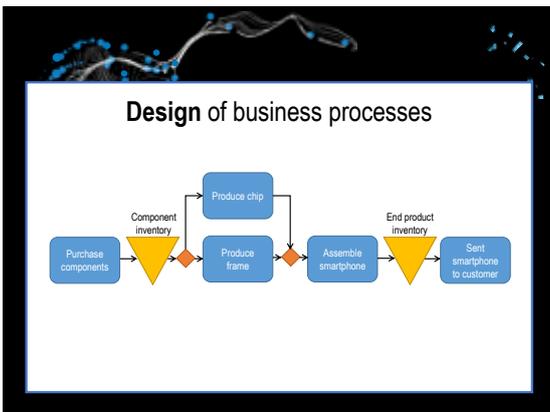
The Master Industrial Engineering & Management focuses on the **design, management and improvement of business processes**. We are facing business processes almost everywhere: each company produces something. The easiest examples are production companies, think about the car industry, food processing 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.



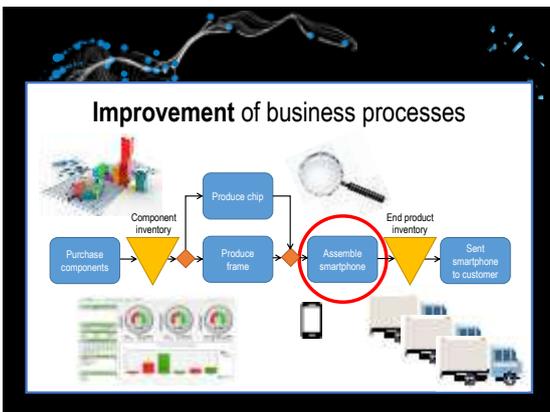
When you have made a clear business strategy, you can start to design the processes that you need in order to produce value. The most simple smartphone production process could be performed at home: establish enough tools at your working area, purchase the components needed, assemble the different components 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).



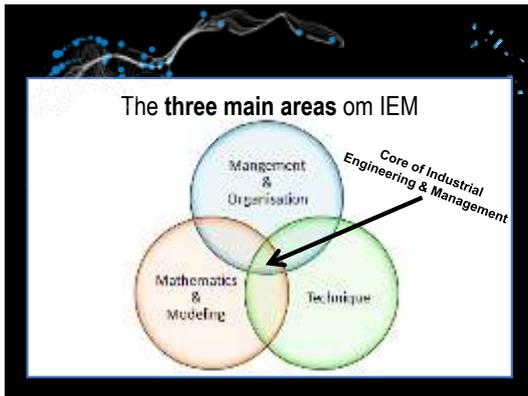
An alternative process design is also possible: you could for example divide the task "assemble smartphone" into more sub activities. We can choose to produce our own frame and chips, instead of purchasing these components. With smart designs, you are able to use your resources more effectively (more 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.



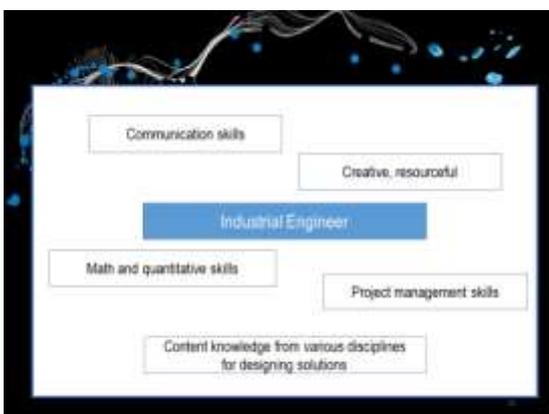
What if there arises a problem within the production? For example, the total amount of smartphones assembled is far too low in comparison with the total demand. You could easily solve this problem by increasing the production capacities, but that is a solution without the knowledge of the core problems. 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.



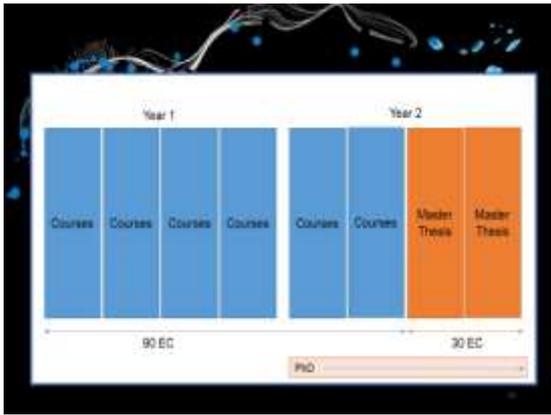
At Industrial Engineering & Management, we are using a quantitative modelling approach, where we focus on: 1) the technologies used in business processes; 2) the behaviour of people and 3) the business environment. Industrial Engineering & Management forms the overlapping area of Management & Organisation,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

The education offered at
Industrial Engineering & Management

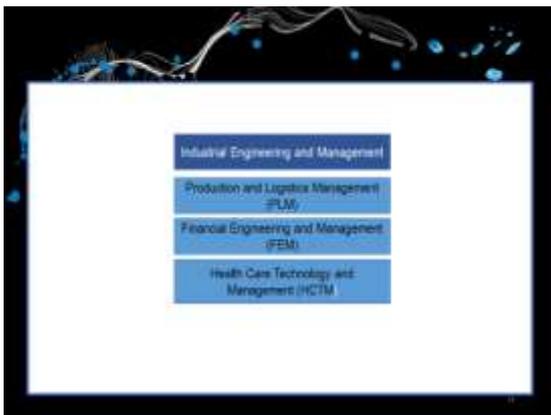
Part two: The education offered at Industrial Engineering & Management



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.



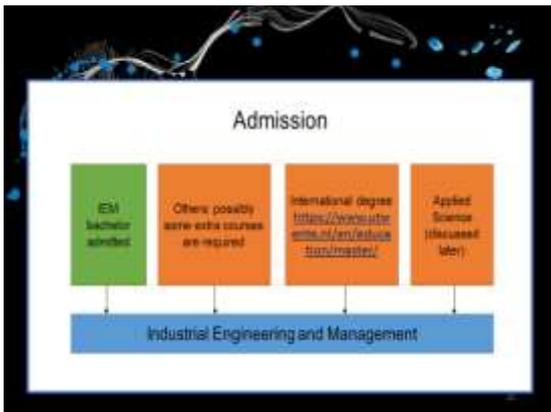
In the first one and a half year, there are 90 EC of courses in the Master. Four common courses are obligatory for all IEM students. Within your specialization you have (research oriented) mandatory and elective courses. Besides that, there is a lot of choice. Extra courses within the specialization 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.

WO Premaster

Research University Technical programs

BACHELOR Technical programs			
Course Code	Course Name	ECT	available
191104020	Statistics & accessibility for premaster ISM	5	1
201100012	ICT-requires for premaster ISM	10	1
		15	

BACHELOR Technical program ChemE			
Course Code	Course Name	ECT	available
201100010	Linear algebra	5	1
191100006	Probability Theory	5	1
201100012	ICT-requires 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.

WO Premaster (2)

BSC Technical programs			
Course Code	Course Name	ECT	available
191104020	Statistics & accessibility for premaster ISM	5	1
201100010	Financial Engineering for premaster ISM	10	1
		15	

BSC Technical program ChemE			
Course Code	Course Name	ECT	available
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 Business Analytics			
Prerequisite and related programmes (with level and language)			
Code	Name	Level	Language
31000000	Mathematics B	B	Dutch
31000001	Mathematics B	B	Dutch
31000002	Mathematics B	B	Dutch
31000003	Mathematics B	B	Dutch
31000004	Mathematics B	B	Dutch
31000005	Mathematics B	B	Dutch
31000006	Mathematics B	B	Dutch
31000007	Mathematics B	B	Dutch
31000008	Mathematics B	B	Dutch
31000009	Mathematics B	B	Dutch
31000010	Mathematics B	B	Dutch
31000011	Mathematics B	B	Dutch
31000012	Mathematics B	B	Dutch
31000013	Mathematics B	B	Dutch
31000014	Mathematics B	B	Dutch
31000015	Mathematics B	B	Dutch
31000016	Mathematics B	B	Dutch
31000017	Mathematics B	B	Dutch
31000018	Mathematics B	B	Dutch
31000019	Mathematics B	B	Dutch
31000020	Mathematics B	B	Dutch
31000021	Mathematics B	B	Dutch
31000022	Mathematics B	B	Dutch
31000023	Mathematics B	B	Dutch
31000024	Mathematics B	B	Dutch
31000025	Mathematics B	B	Dutch
31000026	Mathematics B	B	Dutch
31000027	Mathematics B	B	Dutch
31000028	Mathematics B	B	Dutch
31000029	Mathematics B	B	Dutch
31000030	Mathematics B	B	Dutch
31000031	Mathematics B	B	Dutch
31000032	Mathematics B	B	Dutch
31000033	Mathematics B	B	Dutch
31000034	Mathematics B	B	Dutch
31000035	Mathematics B	B	Dutch
31000036	Mathematics B	B	Dutch
31000037	Mathematics B	B	Dutch
31000038	Mathematics B	B	Dutch
31000039	Mathematics B	B	Dutch
31000040	Mathematics B	B	Dutch
31000041	Mathematics B	B	Dutch
31000042	Mathematics B	B	Dutch
31000043	Mathematics B	B	Dutch
31000044	Mathematics B	B	Dutch
31000045	Mathematics B	B	Dutch
31000046	Mathematics B	B	Dutch
31000047	Mathematics B	B	Dutch
31000048	Mathematics B	B	Dutch
31000049	Mathematics B	B	Dutch
31000050	Mathematics B	B	Dutch
31000051	Mathematics B	B	Dutch
31000052	Mathematics B	B	Dutch
31000053	Mathematics B	B	Dutch
31000054	Mathematics B	B	Dutch
31000055	Mathematics B	B	Dutch
31000056	Mathematics B	B	Dutch
31000057	Mathematics B	B	Dutch
31000058	Mathematics B	B	Dutch
31000059	Mathematics B	B	Dutch
31000060	Mathematics B	B	Dutch
31000061	Mathematics B	B	Dutch
31000062	Mathematics B	B	Dutch
31000063	Mathematics B	B	Dutch
31000064	Mathematics B	B	Dutch
31000065	Mathematics B	B	Dutch
31000066	Mathematics B	B	Dutch
31000067	Mathematics B	B	Dutch
31000068	Mathematics B	B	Dutch
31000069	Mathematics B	B	Dutch
31000070	Mathematics B	B	Dutch
31000071	Mathematics B	B	Dutch
31000072	Mathematics B	B	Dutch
31000073	Mathematics B	B	Dutch
31000074	Mathematics B	B	Dutch
31000075	Mathematics B	B	Dutch
31000076	Mathematics B	B	Dutch
31000077	Mathematics B	B	Dutch
31000078	Mathematics B	B	Dutch
31000079	Mathematics B	B	Dutch
31000080	Mathematics B	B	Dutch
31000081	Mathematics B	B	Dutch
31000082	Mathematics B	B	Dutch
31000083	Mathematics B	B	Dutch
31000084	Mathematics B	B	Dutch
31000085	Mathematics B	B	Dutch
31000086	Mathematics B	B	Dutch
31000087	Mathematics B	B	Dutch
31000088	Mathematics B	B	Dutch
31000089	Mathematics B	B	Dutch
31000090	Mathematics B	B	Dutch
31000091	Mathematics B	B	Dutch
31000092	Mathematics B	B	Dutch
31000093	Mathematics B	B	Dutch
31000094	Mathematics B	B	Dutch
31000095	Mathematics B	B	Dutch
31000096	Mathematics B	B	Dutch
31000097	Mathematics B	B	Dutch
31000098	Mathematics B	B	Dutch
31000099	Mathematics B	B	Dutch
31000100	Mathematics B	B	Dutch

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
Operations Management & Logistics (OM)	68	70	74	73	82	63	73	4
Management of Technology (MET)	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/ToegiftaWetenschappelijk>

- 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/>

