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.
The three main areas of IEM

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.

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 you 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.

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.
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.

Example of Courses

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
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.

Our challenging master program received the highest student appreciation amongst competitors.
The premaster program is fixed.

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

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

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 paid tuition fee.

• 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/onderwijsystemen/osiris/
• Apply? https://www.utwente.nl/en/education/master/