

# MASTER OF SCIENCE IN INDUSTRIAL ENGINEERING AND OPERATIONS RESEARCH (MANUFACTURING AND SUPPLY CHAIN ENGINEERING)

120 ECTS CREDITS - LANGUAGE: ENGLISH

The Faculty of Engineering and Architecture (FEA) offers most of its Master's Programmes in Engineering in English. This underlines the faculty's international ambition, as well as the importance of international education and multiple language skills for students.

## WHAT

The Master's programme combines the disciplines of Industrial Engineering and Operations Research into a single study programme.

**Industrial Engineering (IE)** is the engineering discipline that deals with analysing, designing, and optimising complex operational systems, with the aim of improving their effectiveness and efficiency, and thus increasing their productivity in a sustainable manner. A unique feature of IE is the consideration of the human element as a crucial factor in these systems.

**Operations Research (OR)** is the discipline that studies mathematical models, both deterministic and stochastic, and a wide range of simulation and optimisation techniques. For an IE engineer, these OR tools are essential in designing and managing operational systems.

The combination of Industrial Engineering and Operations Research thus creates an engineering profile that can play a key role in various industries. Some pertinent application disciplines include Industry 5.0, connected robotics, sustainable smart cities. The IE/OR programme effectively prepares students for taking up leading roles in manufacturing and service industries worldwide, by thoroughly training them in technical principles of the design, planning and control of systems.

## STRUCTURE

The programme consists of a general module, main subject modules, elective course units, and a Master dissertation's. The general module contains thirty-six credits worth of course units that cover the core competencies of Industrial Engineering and Operations Research.

Students choose from two main subject modules, with thirty credits of specialist course units in distinct application domains. The **Manufacturing & Supply Chain**

**Engineering** main subject focuses on analysing, optimising, and designing systems in production and logistics, e.g., from the detailed time and methods study of an operator at a semi-automated workstation in a plastic recycling facility to the strategic network study of a global supply chain of electrical cars assembled in Belgium using components sourced from three different continents. The **Transport & Mobility Engineering** main subject focuses on analysing,

optimising, and designing systems that move around people and goods, from the detailed analysis of road traffic at an intersection to the development of sustainable intermodal mobility services that integrate public and private transport. Through thirty credits of electives, students can further deepen and/or broaden their knowledge and skills in technical and non-technical subjects. As part of the electives, students can obtain a minor in either Artificial Intelligence or Automotive Production Engineering, two domains closely related to Industrial Engineering and Operations Research.

In the Master's Dissertation, covering the final twenty-four credits of the two-year programme, students conduct academic research using OR tools to tackle challenging IE problems in manufacturing, supply chain, transport or mobility.

## LABOUR MARKET

Companies in all branches of industry, public services, and scientific research are eager to recruit IE/OR engineers. They have the skills to lead the continuous day-to-day improvement of systems that create products and services, but also to innovate and develop new products and services. IE/OR engineers are typically recruited as production manager, business analyst, project manager, supply chain consultant, etc. and they usually grow into senior technically specialised roles, or management positions quickly.

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## TOELATINGSVOORWAARDEN VOOR HOUDERS VAN EEN VLAAMS DIPLOMA

### 1 Rechtstreeks:

#### a opleidingen nieuwe structuur:

- Een diploma van een opleiding 'Bachelor of Science in de ingenieurswetenschappen' (met uitzondering van 'architectuur')
- Een diploma van een opleiding 'Master of Science in de ingenieurswetenschappen' leidend tot de titel van 'burgerlijk ingenieur' (met uitzondering van architectuur)
- Een diploma van een opleiding 'Master of Science in Engineering' leidend tot de titel van 'burgerlijk ingenieur' (met uitzondering van Architecture)

#### b opleidingen oude structuur:

- Een diploma van 'Burgerlijk Ingenieur' (met uitzondering van 'Burgerlijk Ingenieur-Architect')

### 2 Na het met succes voltooien van een

#### voorbereidingsprogramma:

**MIN 30 SP - MAX 90 SP**

#### a opleidingen nieuwe structuur:

- Bachelor handelsingenieur
- Bachelor in de bio-ingenieurswetenschappen
- Bachelor in de fysica
- Bachelor in de fysica en de sterrenkunde
- Bachelor in de geografie en de geomatica
- Bachelor in de informatica
- Bachelor in de ingenieurswetenschappen (KMS)
- Bachelor in de ingenieurswetenschappen: architectuur
- Bachelor in de toegepaste economische wetenschappen: handelsingenieur
- Bachelor in de toegepaste economische wetenschappen: handelsingenieur in de beleidsinformatica
- Bachelor in de wiskunde
- Bachelor of Engineering Technology
- Een diploma van een opleiding 'Bachelor of Science in de industriële wetenschappen'
- Een diploma van een opleiding 'Master of Bioscience Engineering' leidend tot de titel van 'bio-ingenieur'
- Een diploma van een opleiding 'Master of Science in de bio-ingenieurswetenschappen' leidend tot de titel van 'bio-ingenieur'
- Master in de fysica
- Master in de fysica en de sterrenkunde
- Master in de geografie en de geomatica

- Master in de ingenieurswetenschappen: architectuur

- Master in de wiskunde
- Master in de wiskundige informatica
- Master of Architectural Engineering
- Master of Mathematics
- Master of Physics

#### b opleidingen oude structuur:

- Een diploma van 'Bio-ingenieur'
- Licentiaat in de informatica
- Licentiaat in de natuurkunde
- Licentiaat in de wiskunde

### MAX 60 SP

#### a opleidingen nieuwe structuur:

- Master in de toegepaste economische wetenschappen: handelsingenieur
- Master in de toegepaste economische wetenschappen: handelsingenieur in de beleidsinformatica
- Master of Business Engineering

#### b opleidingen oude structuur:

- Handelsingenieur

### 3 Rechtstreekse toelating voor het volgen van een brugprogramma (horizontale instroom):

#### a opleidingen nieuwe structuur:

- Een diploma van 'Master in Engineering Technology'
- Een diploma van een opleiding 'Master of Science in de industriële wetenschappen'

#### b opleidingen oude structuur:

- Een diploma van 'Industrieel Ingenieur' (met uitzondering van Industrieel ingenieur in landbouw en biotechnologie)

## ADMISSION REQUIREMENTS FOR INTERNATIONAL DEGREE STUDENTS

Information on admission requirements and the administrative procedure for admission on the basis of a diploma obtained abroad, can be found on the following page: [www.ugent.be/admission](http://www.ugent.be/admission)

Additional information:

Students who wish to enrol for the Master of Science in Industrial Engineering and Operations Research can enter the programme without any prerequisites if they hold the following diploma: an academic diploma of Bachelor (or Master) of Science in Engineering (university level, minimum three years), and/or a Master of Science in BioScience Engineering or an equivalent to this.

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Admission can only be granted after an individual application procedure. The Study Programme Committee will make the final decision whether to accept the application or not. The Study Programme Committee can decide that students need to follow a preparatory course or an individual Master's programme, for instance for students with another diploma of Bachelor or Master.

Important: Students who wish to enrol must add the result of a GRE test to their application, more specifically the result of the Quantitative Reasoning of the General Test. The GRE test result will be assessed using the [faculty's grading scale](#).

**Learning path counsellor**  
[studietrajectir.ea@ugent.be](mailto:studietrajectir.ea@ugent.be)

## Contact (for international degree students)

International Relations Officer  
+32 9 264 36 99  
[internationalLea@ugent.be](mailto:internationalLea@ugent.be)

<https://ea18.ugent.be/education/IEOR>

## LANGUAGE REQUIREMENTS

Language requirements Dutch: no language requirements  
English: CEFR level B2

## PRACTICAL INFORMATION

### Study programme

[studiekiezer.ugent.be/master-of-science-in-industrial-engineering-and-operations-research-manufacturing-and-supply-chain-engineering-en/programma](http://studiekiezer.ugent.be/master-of-science-in-industrial-engineering-and-operations-research-manufacturing-and-supply-chain-engineering-en/programma)

### Information sessions

#### Graduation Fair

[afstudeerbeurs.gent/en/students/further-studies](http://afstudeerbeurs.gent/en/students/further-studies)

### Enrolling institution

Information on enrolment at Ghent University.

### Application Deadline (for International degree students)

For students who **need a visa**: before 1st of April

For students who **do not need a visa**: before 1st of June

[Read more](#)

### Tuition fee

More information is to be found on: [www.ugent.be/tuitionfee](http://www.ugent.be/tuitionfee)