

# MASTER OF SCIENCE IN INDUSTRIAL ENGINEERING AND OPERATIONS RESEARCH (SUSTAINABLE MOBILITY ANALYTICS)

120 ECTS CREDITS - LANGUAGE: ENGLISH

Note: students need to submit **two parallel applications**, both at UGent and at the EIT Urban Mobility Master School. Only students accepted for both applications, will receive a letter of admission for this programme.

## WHAT

This Master's programme combines the core disciplines of Industrial Engineering and Operational Research. Industrial Engineering is a branch of engineering that deals with analysing, designing and optimising complex operational systems. The set of the mathematical tools these engineers rely on for designing operational systems is known under the term Operations Research.

**Sustainable Mobility Analytics** aims to improve urban mobility in our cities and around the world. This requires not only the improvement of transport infrastructure but also a system approach towards a better planning, execution and operation. Today, new data coming from smartphones or intelligent transport systems are becoming available. As we continue to urbanise and gather more data on our mobility patterns and urban systems, the challenge is not simply the amount of data, but also how to manage it, critically understand its quality, and utilise it to support decision-making on our cities' most pressing challenges.

There is an expanding need to forge a new generation of engineers, capable of analysing complex flows and relations in an urban environment and extracting meaningful insights. Such work is critical to support cities' strategic decisions and push towards a more sustainable future, centred on efficient resource use, a clean environment, equitable citizen engagement, and a healthy, low-carbon society. The Sustainable Mobility Analytics programme is designed in an interdisciplinary fashion to analyse, start and manage new and emerging transport and mobility technologies and services for citizens and logistics.

## STRUCTURE

The track is a double degree programme. You will spend each year at a different university - the "entry" university (first year) and the "exit" university (second year). You will be able to choose from leading European universities in the field of urban mobility: Ghent University, TU Eindhoven, KTH

Royal Institute of Technology, UPC Barcelona, the University of Tartu, and the University of Lisbon. Graduating students will be awarded two Master's degrees, one from each university where they carried out their studies. Moreover, the programme is designed so that students attain a certificate awarded by the European Institute of Innovation and Technology.

The programme consists of a general module, main subject modules, elective course units, and a Master's dissertation. The track has integrated technical content and business content (on Innovation & Entrepreneurship). The general module contains thirty credits of course units that cover the core competencies of Industrial Engineering and Operations Research. The main subject modules cover thirty credits of specialist course units in the discipline of Sustainable Mobility Analytics. Through thirty credits of elective course units, students can further deepen and/or broaden their knowledge and skills in technical and non-technical subjects. In the Master's Dissertation, students conduct academic research in close collaboration with a company or organisation in transport or mobility.

Between the first and second year, students will participate in a Summer School applying new skills to two different cities in Europe, with all students active in the EIT Urban Mobility Master School.

## LABOUR MARKET

You will have a wide range of career opportunities, within the public and private sector, as well as the business know-how to start your own business or conduct rigorous research.

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## TOELATINGSVOORWAARDEN VOOR HOUDERS VAN EEN VLAAMS DIPLOMA

### 1 Na onderzoek van de bekwaamheid van de student om de opleiding te volgen:

#### 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')

#### Additional Information on Admission (Flemish Degree)

The *MSc in Industrial Engineering and Operations Research, main subject Sustainable Mobility Analytics* is accessible only to students pursuing a double-degree through either the **MSc Sustainable Urban Mobility Transitions (SUMT)** programme or the **MSc Smart Mobility Data Science and Analytics (SMDSA)** programme offered by the EIT Urban Mobility Master School. Students applying for this double degree programme (students holding a degree of the Flemish Community as well as international degree students) must submit, in parallel, two applications for admission:

1. application for admission to the master's programme *Master of Science in Industrial Engineering and Operations Research, Main Subject: Sustainable Mobility Analytics* at Ghent University Online Application Platform.

2. application for admission to the MSc Sustainable Urban Mobility Transitions (SUMT) or the MSc Smart Mobility Data Science and Analytics (SMDSA) double degree programme (and possibly also for an EIT scholarship) on the EIT Urban Mobility Master School Office admission portal.

Only students accepted for both applications, will receive a letter of admission for this track.

Please note that, apart from the double degree in itself, different conditions apply as to participation cost, language requirements, study progress monitoring...).

## ADMISSION REQUIREMENTS FOR INTERNATIONAL DEGREE STUDENTS

The programme welcomes candidates who have a solid foundation in analytical problem solving with an eye for detail, as demonstrated by a bachelor's degree of minimum 180 ECTS in Engineering, Computer Science, Information Technology, Software Engineering, Computer Engineering, Information Systems or a related field.

The *MSc in Industrial Engineering and Operations Research, main subject Sustainable Mobility Analytics* is accessible only to students pursuing a double-degree through either the **MSc Sustainable Urban Mobility Transitions (SUMT)** programme or the **MSc Smart Mobility Data Science and Analytics (SMDSA)** programme offered by the EIT Urban Mobility Master School. Students applying for this double degree programme (students holding a degree of the Flemish Community as well as international degree students) must submit, in parallel, two applications for admission:

- 1 application for admission to the master's programme *Master of Science in Industrial Engineering and Operations Research, Main Subject: Sustainable Mobility Analytics* at [Ghent University Online Application Platform](#).
- 2 application for admission to the [MSc Sustainable Urban Mobility Transitions \(SUMT\)](#) or the [MSc Smart Mobility Data Science and Analytics \(SMDSA\)](#) double degree programme (and possibly also for an EIT scholarship) on the [EIT Urban Mobility Master School Office admission portal](#).

Only students accepted for both applications, will receive a letter of admission for this track.

Please note that, apart from the double degree in itself, different conditions apply as to participation cost, language requirements, study progress monitoring...).

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/prospect/en/administration/enrolment-or-registration](http://www.ugent.be/prospect/en/administration/enrolment-or-registration).

## LANGUAGE REQUIREMENTS

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Language requirements Dutch: no language requirements

Language requirements for the MSc in Industrial Engineering and Operations Research - main subject Sustainable Mobility Analytics differ from the required standard level for English taught study programmes as specified in the Ghent University Education and Examination Code:

**English:** IELTS: 6.5 (minimum 6 for each part) - TOEFL: 92 ((internet-based) (with score 21 or higher for reading, listening and speaking, and minimum 22 for writing))

English proficiency tests may be waived for applicants who have completed a bachelor degree given in English at a university that is physically located in one of the following countries: Australia, Canada, the United Kingdom, New Zealand or USA.

## PRACTICAL INFORMATION

### Study programme

[studiekiezer.ugent.be/master-of-science-in-industrial-engineering-and-operations-research-sustainable-mobility-analytics-en/programma](https://studiekiezer.ugent.be/master-of-science-in-industrial-engineering-and-operations-research-sustainable-mobility-analytics-en/programma)

### Information sessions

#### Graduation Fair

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

### Enrolling institution

The MSc in Industrial Engineering and Operations Research, main subject Sustainable Mobility Analytics is accessible only to students taking a double degree between this programme and another master's programme of a partner university within the context of the MSc in Smart Mobility Data Science and Analysis double degree programme of the EIT Urban Mobility. Students applying for this double degree programme (students holding a degree of the Flemish Community as well as international degree students) must submit, in parallel, two applications for admission:

1. application for admission to the master's programme Master of Science in Industrial Engineering and Operations Research, Main Subject: Sustainable Mobility Analytics at Ghent University Online Application Platform.
2. application for admission to the MSc in Smart Mobility Data Science and Analytics double degree programme (and possibly also for an EIT scholarship) on the EIT Urban Mobility Master School Office admission portal.

Only students accepted for both applications, will receive a letter of admission for this track. Please note that, apart from the double degree in itself, different conditions apply as to participation cost, language requirements, study progress monitoring...).

### Application Deadline (for International degree students)

Please check the application deadlines and tuition fees on EIT Urban Mobility Master School's detailed information page.

### Tuition fee

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

### Contact

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[masterschool@eiturbanmobility.eu](mailto:masterschool@eiturbanmobility.eu)

### Learning path counsellor

The study progress of all EIT Urban Mobility students is monitored by the EIT Master School Office, in collaboration with the Partner Universities. The study progress regulations for this programme implies that students who do not pass at least 80% of the credits in the first year of the programme (entry year) may not continue the programme in the following year. For counselling and study advice contact [studietrajectir.ea@ugent.be](mailto:studietrajectir.ea@ugent.be)

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## **Contact (for international degree students)**

International Relations Officer

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