

Mobilities in Mega-Cities (M2C)

Research-based Master's degree in science and technology

Field: Mechanics and Civil Engineering - Lyon1 University / ENTPE

<https://emob-lab.eu/master-m2c/>

The Master 2 “**Mobilities in Mega-Cities**” is a one-year course (60 ECTS) designed for students who have completed a Master 1 in Science and Technology or a second year at an engineering school. The aim of this course is to develop specialized skills in the study of transport systems on an urban scale.

Training objectives

This Master's program trains experts in urban mobility who are able to:

- Design and evaluate efficient and sustainable transportation systems.
- Implement skills in data analysis, modeling, and management of intelligent transport systems.
- Address future mobility challenges, such as sustainable urban mobility, vehicle automation, and the integration of new mobility services.

Course Content

The Master's year is structured around four modules (about 300 hours of courses), fully taught in English, focusing on mobility modelling and data science for mobility, and complemented by a research internship.

Unit 1 “Mobility Modelling” 9 ECTS

- 1- Dynamic macroscopic modelling
- 2- Micro-Mobility: Experimental Methods and Modelling
- 3- Managing a Simulation Project
- 4- Demand analysis and forecasting

This unit explores large-scale traffic dynamics and simulation tools, focusing on predictive models for urban and interurban mobility. Students learn to analyze traffic flow, simulate micro-mobility behaviors, and manage complex simulation projects using platforms like MnMs and Hubsim. The courses combine theoretical foundations with hands-on projects to address real-world mobility challenges.

Unit 2 “Data Science for mobility” 12 ECTS

- 1- Data Science: Principles and Applications
- 2- Deep Learning for Dynamic Network Analysis
- 3- Modelling choice behaviour
- 4- Introduction to computer vision

This unit equips students with advanced data science techniques, including machine learning, deep learning, and computer vision, tailored for mobility applications. Through Python-based projects, students analyze traffic data, build predictive models, and explore AI-driven solutions for dynamic network analysis. A hackathon consolidates skills in data-driven mobility innovation.

Unit 3 “Mobility management and optimization” 9 ECTS

- 1- Mobility control & management
- 2- Design and Optimization of Transport Networks
- 3- Sustainable Mobility and Impacts

Students delve into intelligent transport systems, multimodal network design, and sustainable mobility strategies to mitigate environmental and social impacts. The unit emphasizes practical tools for traffic control, accessibility analysis, and resilience assessment, preparing students to optimize urban mobility systems. Projects and case studies bridge theory with real-world implementation.



Unit 4 “Research Practice”

3 ECTS

- 1- Language
- 2- Bibliography
- 3- Scientific Seminars

This unit strengthens research skills through scientific seminars, English proficiency, and bibliographic analysis, fostering critical thinking and academic communication. Students engage with cutting-edge mobility research and prepare for their internship by refining their ability to synthesize and present complex ideas. The focus is on building a solid foundation for independent research.

Unit 5 “Research Internship”

27 ECTS

This unit involves a minimum 20-week research internship, where students apply their theoretical knowledge to a professional or academic project in mobility, under expert supervision.

Evaluation Methods

Evaluation methods vary across units (written exams, projects, reports, oral presentations) to assess both academic knowledge and its practical application.

Acquired Skills

- Ability to analyze and model complex transportation systems.
- Expertise in mobility data processing and analysis.
- Project management and communication skills.
- English proficiency and scientific literature comprehension.

Further Studies

Opportunity to pursue a PhD.

Career Opportunities

Graduates can work in a variety of sectors:

- Research (universities, government agencies, private companies)
- Engineering and consulting (engineering firms)
- Public administration (urban planning and transportation)
- Mobility start-ups

How to Apply

If you are an international student, please contact our international office at international.student@entpe.fr to learn about the application procedure.

All applicants must complete the application form available on our website <https://emob-lab.eu/master-m2c/> and submit it to delphine.sengelin@entpe.fr by **March 13, 2026**.

