



UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II
POLYTECHNIC AND BASIC SCIENCES SCHOOL

DEPARTMENT OF CIVIL, BUILDING AND ENVIRONMENTAL
ENGINEERING

2nd Cycle Degree/Master

MSc in
Transportation Engineering and Mobility

Degree programme class: LM-23

THE ACADEMIC YEAR 2023/2024

A quick guide to the programme

The programme at a glance

The Master's degree in Transportation Engineering and Mobility aims to respond to the profound transformations taking place - or expected soon - in transportation. The goal is to train a new generation of engineers to meet transformation challenges and satisfy the demand for new skills and competencies in transportation and mobility, as required by the job market at a national and international level. The Master's degree trains transportation and mobility engineers to compete under changed conditions and perspectives by leveraging the acquired skills in modelling and simulation of transportation systems, thus boosting the economic growth in transportation and, simultaneously, ensuring sustainability goals.

To this aim, the Master's degree in transportation engineering and mobility at the University of Naples Federico II offers a learning approach oriented toward acquiring a wide range of specific skills. Training activities are integrated with experiential and laboratory teaching, corroborated by other helpful skills for rapid landing in the job market. Students explore applicative problems in their internship and thesis and develop and test solutions with industrial stakeholders. As a result, the master's graduates in Transportation Engineering and Mobility work in highly innovative professional contexts, characterised by a significant propensity to use new technologies.

Job opportunities

The job opportunities for the master's graduate in Transportation Engineering and Mobility are: in public administrations; in agencies responsible for mobility and transportation; in operational units dealing with transport infrastructures, networks and services; in large public and private companies dealing with the production and management of mobility services, transport systems and autonomous and connected vehicle fleets; in small and medium-sized companies with highly innovative characteristics in the mobility sector. The master's graduate covers job activities with highly specialised professional, intellectual and scientific functions in transport engineering, with technical functions in the early stages of the career.

The knowledge, skills and abilities acquired by the master's graduates in Transportation Engineering and Mobility allow for extensive employment opportunities, ranging over many sectors.

Admission to the programme and prerequisites

Joining the MSc in Transportation Engineering and Mobility requires a BSc in one of the classes L7 (Civil and Environmental Engineering), L8 (Computer Engineering), and L9 (Industrial Engineering). Otherwise, at least a level 6 qualification (European Qualifications Framework - EQF) is required, and admission will be subject to the assessment of basic knowledge, which should include at least 36 ETCS in basic sciences and at least 39 ETCS in industrial engineering or information and communication technology or civil engineering.

In all cases, evidence of English language proficiency at level B2 or above must be provided in the form of a certificate issued by the University or a higher-level body recognised by the University; otherwise, individual testing may be carried out.

For further details, refer to:

<https://www.universitaly.it/index.php/public/schedaCorso/anno/2021/corso/1572550#>

Enrolment (foreign students):

<http://www.international.unina.it/admission-regulation/>

Enrolment (Italian students):

<https://www.segrepass1.unina.it/GuidaAlleImmatricolazioniOnLine.pdf>

Study plan (the Academic Year 2023-24)

General Study Plan

The *General Study Plan* allows students to compose their programme according to the appropriate rules. The Master's Degree Course Management Board evaluates, according to the General Study Plan, all submitted programmes.

Course	ETCS	Scientific Field Code	Type (*)	Skill Area	Pre-requirements
First Year – first term					
Language Skills	3		6	Other skills	None
Positioning and location-based services	9	ICAR/06	2	Civil Engineering	None
<i>Choice from table III</i>	<i>A = 0 or 9</i>		<i>4</i>	<i>Measures, analyses, decision support</i>	
<i>Choice from table IV</i>	<i>B = 0 or 9</i>		<i>4</i>	<i>Enabling ICT and industrial technologies</i>	
First Year – second term					
Machine Learning and big data [1]	9	ING-INF/05	4	Enabling ICT and industrial technologies	None
Intelligent Transportation Systems	9	ICAR/05	2	Civil Engineering	None
Road Safety or Sustainable road materials	9	ICAR/04	2	Civil Engineering	None
<i>Choice from table III</i>	<i>9 - A</i>		<i>4</i>	<i>Measures, analyses, decision support</i>	
<i>Choice from table IV</i>	<i>9 - B</i>		<i>4</i>	<i>Enabling ICT and industrial technologies</i>	
<i>Autonomous Choice (see table V for suggestions)</i>	<i>C = 0 or 6 or 9</i>		<i>3</i>	<i>Autonomous choice</i>	
Second Year – first term					
<i>A course from Table I or II</i>	<i>9</i>		<i>2</i>	<i>Civil Engineering</i>	
<i>A course from table IV</i>	<i>9</i>		<i>4</i>	<i>Enabling ICT and industrial technologies</i>	
Second Year – second term					
<i>A course from Table I or II</i>	<i>9</i>		<i>2</i>	<i>Civil Engineering</i>	
<i>Autonomous Choice (see table V for suggestions)</i>	<i>15 - C</i>		<i>3</i>	<i>Autonomous choice</i>	
Lab / Internship	7		6	Other skills	
Lab “Smart Infrastructures”	2		6	Other skills	
MSC Thesis	12		5	Ing. Elettrica	

(*) Types of learning activities (Decree)

Learning Activity	1	2	3	4	5	6	7
Reference Decree 270/04	Art. 10 parag. 1, a)	Art. 10 parag. 1, b)	Art. 10 parag. 5, a)	Art. 10 parag. 5, b)	Art. 10 parag. 5, c)	Art. 10 parag. 5, d)	Art. 10 comma 5, e)

Table I + II: Transportation Engineering, roads and railways

Course	ETCS	Scientific Field Code	Type (*)	Pre-requirements
First-term				
Testing and validation of automated road vehicles	9	ICAR/05	2	
Traffic control	9	ICAR/05	2	Basic background on transportation modeling (ICAR/05)
Transport planning and appraisal	9	ICAR/05	2	Basic background on transportation modeling (ICAR/05)
Second term				
Freight and logistics	9	ICAR/05	2	Basic background on transportation modeling (ICAR/05)
Railway and transit services	9	ICAR/05	2	Basic background on transportation modeling (ICAR/05)
Demand analysis and forecasting (**)	9	ICAR/05	2	Basic background on transportation modeling (ICAR/05)
Road Safety	9	ICAR/04	2	
Sustainable Road Materials	9	ICAR/04	2	
Pavement Management Systems (**)	9	ICAR/04	2	
Civil Information Modeling – CIM (**)	9	ICAR/04	2	

Table III: Measures, analyses, decision support

Course	ETCS	Scientific Field Code	Type (*)	Pre-requirements
First-term				
Digital maps and geological 3D Models	9	GEO/05	4	
Statistical lab for industrial data analysis ^[2]	9	SECS-S/02	4	
Structural health monitoring for infrastructures	9	ICAR/09	4	Basic background on structural engineering (ICAR/09)
Measurement sensors and transducers (**)	9	ING-INF/07	4	
Second term				
Transport Geotechnics (**)	9	ICAR/07	4	Basic background on geotechniques (ICAR/07)

Table IV: Enabling ICT and industrial technologies

Course	ETCS	Scientific Field Code	Type (*)	Pre-requirements
First-term				
Electric systems in transportation	9	ING-IND/33	4	
Energy management for transportation	9	ING-IND/32	4	
Systems and Control fundamentals	9	ING-INF/04	4	
Second term				
Image processing for computer vision ^[4]	9	ING-INF/03	4	
Real-time systems	9	ING-INF/05	4	

Table V: Suggested alternatives for autonomous choices

Course	ETCS	Scientific Field Code	Type (*)	Pre-requirements
First-term				
Operational Research ^[5]	9	MAT/09	3	
Mathematical Physical Models ^[5]	9	MAT/07	3	
<i>All courses of the first term from Tables I to IV</i>	9		3	
Second term				
Resilience of Transportation Systems ^[8]	6	ICAR/05	3	
Smart Roads and cooperative driving ^[1]	6	ICAR/05	3	
Resilience of geotechnical systems ^[8]	6	ICAR/07	3	
Laboratorio di sicurezza stradale ^[6]	9	ICAR/04	3	
Fondamenti di diritto per l'ingegnere ^[6]	9	IUS/01	3	
Project Management per le opere civili ^[6]	9	ING-IND/35	3	
Meccanica del Veicolo ^[7]	9	ING-IND/13	3	
<i>All courses of the second term from Tables I to IV</i>	9		3	

Notes:

(**) Inactive courses for the year 2023-24

^[1] From LM MOVE^[2] From LM Ingegneria Aereospaziale^[3] From LM STREGA^[4] From LM Ingegneria delle Telecomunicazioni e dei media digitali^[5] From LM Mathematical Engineering^[6] From LM ISIT – in Italian^[7] From LM Ingegneria Meccanica della produzione e della progettazione – in Italian^[8] Didattica di eccellenza**Special training paths (minor)**

Starting from the Master's programme in Transportation And Mobility Engineering, it is possible to obtain the diploma supplement of *Smart Infrastructure Developer*. For this, additional activities for 10 extra ETCS are required.

The general study plan is structured in such a way that it ensures access to the diploma supplement if the additional activities are composed by 4 ETCS of Workshops, labs and seminars, together with a 6-ETCS-subject from table A or B (in correspondence of the “LM di Contesto” Transportation Engineering and Mobility), as approved by the Polytechnique School: http://www.scuolapsb.unina.it/downloads/materiale/allegati/Minor_SI_sintesi.pdf

Traineeship opportunities

Training activities are integrated with experiential and laboratory teaching, corroborated by other helpful skills preliminary to involvement in the job market. Students explore applicative problems in their internship and thesis (final exam dissertation) and develop and test solutions with industrial stakeholders.

The University of Naples Federico II supplies a wide selection of agreements with private companies and public institutions, aimed at carrying out training internships outside the University (<http://www.unina.it/didattica/tirocini-studenti>).

The University also offers post-graduate internships, made available by several companies (<http://www.orientamento.unina.it/tirocinio-post-laurea/>).

The competent Didactic Area Offices collect the students' curricular internship requests (both intra- and extra-moenia), they then provide the student with the internship booklet and the documents for the final registration by the university tutor. They also collect the requests for the stipulation of extra-moenia internship agreements by the professors belonging to the department and take care of the

transmission to the University Student Internship Office of the internship agreements already signed by the companies for subsequent signature by the Rector or his delegate.

Graduation thesis and exam

Characteristics

The Master's Degree in Transportation Engineering and Mobility is subject to a final dissertation. The test consists of the evaluation by a Commission appointed by the didactic structures of the master's degree thesis, presented by the graduate student and elaborated by him in an original way, under the guidance of one or more university supervisors and with the possible correlation of experts also external to the University. The thesis (final dissertation), however, characterized by originality, can be developed within a culturally homogeneous and coherent path that also involves laboratory activities and elective teaching; these activities can also be carried out in collaboration with qualified external parties. The thesis must demonstrate theoretical and / or methodological and / or numerical and / or experimental activities and must demonstrate mastery of the topics covered, the ability to operate with originality and autonomously and a high level of communication skills.

How to access the final dissertation:

To access the final exam, the student must have acquired all the credits required by his / her study path, except for those for the final dissertation, in accordance with the General Didactic Regulations and the Regulations of the Transportation Engineering and Mobility Master's Degree Course. The final dissertation is evaluated by a Commission appointed by the didactic structures and usually chaired by the Course Coordinator or his / her delegate. The final exam includes the discussion of the master's dissertation. During the discussion, the use of projection tools and audio-visual supports is encouraged. The discussion must be in English. The evaluation of the final exam is graded out of 110, with possible honours attributed by the Commission unanimously; the evaluation takes into account the weighted average of the marks of the curricular exams, weighted with the relative credits and compared to 110; it is also possible to take into account the student's entire career, in terms of quality, continuity and duration. The Didactic Coordination Commission of the Course can draw up more detailed regulations to regulate the procedures for requesting and assigning supervisors, co-supervisors and dissertation topics, as well as any timing and steps necessary for the notification of the dissertation to the Examination Commission, any details of the methods assessment and anything else useful to regulate access and conduct of the final exam; any such regulations must be widely disseminated and cannot be applied before 6 months from their issue.

International exchange programmes (Erasmus programme)

Erasmus agreements already active in the civil area are automatically extended to all degrees included in the learning activities of the department. More details on this argument can be found at: <https://www.dicea.unina.it/erasmus-2/>