



UNIVERSITÀ DEGLI STUDI DI NAPOLI FEDERICO II
SCUOLA POLITECNICA E DELLE SCIENZE DI BASE

DEPARTMENT OF INDUSTRIAL ENGINEERING

STUDENT GUIDE

MASTER'S DEGREE PROGRAM IN MECHANICAL ENGINEERING FOR DESIGN AND MANUFACTURING

Master's Degree Class in Mechanical Engineering (LM-33)

ACADEMIC YEAR 2026/2027

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Program Overview

The Degree Program in Brief

The Master's Degree Program in Mechanical Engineering for Design and Manufacturing aims to broaden the foundation provided in the first cycle of studies in Mechanical Engineering by providing the necessary tools to conceive, plan, design, and manage complex and/or innovative mechanical systems, processes, and services.

The training provided by the Master's Degree Program in Mechanical Engineering for Design and Manufacturing is designed to meet the demands for a wide range of roles typically filled by Mechanical Engineers, including those at companies producing goods and/or services, engineering firms, design studios, etc. These roles involve addressing issues related to mechanical design and drafting, the study and development of mechanisms, processing and manufacturing technologies, and the management and safety of industrial plants.

The broad spectrum of knowledge, skills, and competencies acquired during the program provides graduates of the Master's Degree Program in Mechanical Engineering for Design and Manufacturing with the necessary flexibility to undertake diverse professional roles through the application of advanced methodologies, tools, and technologies, also with a view to the environmental sustainability of projects, materials, and industrial production.

The curriculum is designed to identify, define, and utilize advanced professional tools characteristic of mechanical engineering across all its industrial and research facets (software, experimental tests, etc.).

Furthermore, graduates of the Master's Degree Program in Mechanical Engineering for Design and Manufacturing must be able to use the English language correctly in both written and oral forms and possess adequate knowledge enabling the use of IT tools, which are necessary within their specific area of competence and for general information exchange.

Communication skills in the technical-scientific field and the ability to utilize relevant scientific literature equip graduates with the capacity to acquire new knowledge and methodologies throughout their professional careers, or to successfully pursue advanced postgraduate training paths (postgraduate specialized master's programs (known in Italy as 'Master di I e II livello'), PhD programs).

The Degree Program (Corso di Studio - CdS) also offers a strongly interdisciplinary study path called the Minor in Applied Machine Learning. This is typically obtained by acquiring an additional 6 extra-curricular CFU (126 total CFU), along with an appropriate selection of at least 21 CFU.

The Degree Program is based at the Department of Industrial Engineering (<https://www.dii.unina.it/?&lang=en>), which is part of the Polytechnic and Basic Sciences School (Scuola Politecnica e delle Scienze di Base, SPSB) (<http://www.scuolapsb.unina.it/en>).

Teaching activities take place at the Engineering facilities located in the western part of Naples, between Fuorigrotta and Bagnoli.

For further information, please see <https://meccanica.dii.unina.it/en/info-lmpp-en>

Career Opportunities

Career and professional opportunities for graduates of the Master's Degree Program in Mechanical Engineering for Design and Manufacturing are those offered by the manufacturing industry in its diverse applications.

Graduates of the Master's Degree Program in Mechanical Engineering for Design and Manufacturing find employment in industries involved in the production and management of goods and services, specifically in areas such as advanced design, production development, process planning and optimization, management of complex systems, and generally in industrial innovation, including roles in:

- all industrial sectors for the study and design of machine elements/components or production plants;
- all industrial sectors for the management, operation, and maintenance of plants;
- all manufacturing sectors for the design, production, development of new technologies, measurement techniques, and the selection of the most appropriate materials.

Admission Requirements: Terms and Procedures

Admission to the Master's Degree Program in Mechanical Engineering for Design and Manufacturing requires holding a Bachelor's Degree (Laurea Triennale) or an equivalent three-year university degree, or another equivalent degree obtained abroad. Access to the Master's Degree Program in Mechanical Engineering for Design and Manufacturing is open, subject to verification of the possession of the curricular requirements specified in the Program's Teaching Regulations, as well as verification of the adequacy of the student's personal preparation.

Detailed information is available at the following link:

<https://meccanica.dii.unina.it/en/orientation-lmpp-en>

STUDY PLAN

The curriculum structure is based on five defined tracks, each with a pre-approved study plan:

- **A - Advanced and Smart Mechanical Design**
- **B - Advanced and Smart Manufacturing**
- **C - Road Vehicle Design**
- **D - Technological Processes**
- **E - Mechatronics**

Additionally, there is a specific **Curriculum in Railway Mechanics** and a **Curriculum in Sustainable Development (in English)**.

Students have significant flexibility to customize their study plan between the first and second years.

In the **first year**, each track includes 4 mandatory courses, each worth 9 CFU, chosen from a restricted list of options:

- Assisted Design of Mechanical Structures (Progettazione Assistita di Strutture Meccaniche)
- Mechanical Vibrations (Dinamica dei Sistemi Meccanici)
- Logistics and Operation Management (Gestione della Produzione Industriale)
- Digital Modeling and Simulation for Industrial Engineering (Modellazione Geometrica e Prototipazione Virtuale)
- Advanced and Resource Efficient Manufacturing (Tecnologie Speciali)

The **first year** for each track is completed by:

- a) curricular elective courses chosen from a dedicated list, totalling between 0 and 18 CFU
- b) elective courses chosen from a dedicated list of related and supplementary subject areas, totalling between 0 and 12 CFU
- c) free-choice elective(s) selected by the student, totalling between 0 and 9 CFU
- d) foreign language proficiency (e.g., English B2 level certification or equivalent), 3 CFU.

In the **second year, building upon the first year**, each track includes:

- a) curricular elective courses chosen from a dedicated list, totalling between 0 and 18 CFU
- b) elective courses chosen from a dedicated list of related and supplementary subject areas, totalling between 0 and 12 CFU
- c) free-choice elective(s) selected by the student, totalling between 0 and 9 CFU
- d) Internship, 9 CFU
- e) Final Thesis, 15 CFU

The **Curriculum in Railway Mechanics** is structured as follows:

Year 1

Three mandatory courses, each worth 9 CFU:

- Railway Vehicle Dynamics (Dinamica del veicolo ferroviario)
- Railway Construction (Costruzioni ferroviarie)
- Product Management and Maintenance for Railways (Elementi di gestione e manutenzione del prodotto ferroviario)

Two mandatory courses, each worth 6 CFU:

- Electric Drives for Railway Traction (Azionamenti Elettrici per la Trazione Ferroviaria)
- Hybrid Diesel-Electric Propulsion (Propulsione Ibrida Diesel-Elettrica)

One elective course worth 9 CFU chosen from:

- Digital Modeling and Simulation for Industrial Engineering (Modellazione Geometrica e Prototipazione Virtuale)
- Advanced and Resource Efficient Manufacturing (Tecnologie Speciali)

The **first year** is completed by:

- a) curricular elective courses chosen from a dedicated list, totalling between 0 and 18 CFU
- b) free-choice elective(s) selected by the student, totalling between 0 and 9 CFU
- c) foreign language proficiency (e.g., English B2 level certification or equivalent), 3 CFU

Year 2

Two mandatory courses, each worth 9 CFU:

- Organization and Safety of Railway Network Operations (Organizzazione e sicurezza dell'esercizio delle reti ferroviarie)
- Railway Construction Techniques (Tecnica delle costruzioni ferroviarie)

To complete the requirements from Year 1:

- a) Curricular elective courses chosen from a dedicated list, totalling between 0 and 18 CFU.
- b) Free-choice elective(s) selected by the student, totalling between 0 and 9 CFU.
- c) Internship, 9 CFU.
- d) Final Thesis, 15 CFU

The **Curriculum in Sustainable Development (in English)** is structured as follows:

Year 1

Four courses, each worth 9 CFU, chosen from:

- Advanced and Resource Efficient Manufacturing
- Advanced Structural Mechanics
- Digital Modeling and Simulation for Industrial Engineering
- Logistics and Operation Management
- Mechanical vibrations

Completing the **first year**:

- a) curricular elective courses chosen from a dedicated list, totalling between 0 and 18 CFU
- b) elective courses chosen from a dedicated list of related and supplementary subject areas, totalling between 0 and 12 CFU
- c) free-choice elective(s) selected by the student, totalling between 0 and 9 CFU
- d) foreign language proficiency (e.g., English B2 level certification or equivalent), 3 CFU.

In the **second year, building upon the first year**, each track includes:

- a) curricular elective courses chosen from a dedicated list, totalling between 0 and 18 CFU
- b) elective courses chosen from a dedicated list of related and supplementary subject areas, totalling between 0 and 12 CFU
- c) free-choice elective(s) selected by the student, totalling between 0 and 9 CFU.
- d) Internship, 9 CFU.
- e) Final Thesis, 15 CFU.

For detailed information, please refer to the following link:

<https://meccanica.dii.unina.it/en/manifesto-lmpp-en>

Minor in Applied Machine Learning

Students can further personalize their study path by choosing the Minor in **Applied Machine Learning**. Developments in the broad field of data science have generated methodologies based on artificial intelligence that are of great interest in the fields of engineering and applied sciences. The Minor in Applied Machine Learning aims to supplement the training of a professional profile with a solid foundation in the use of these AI/ML-based methodologies, capable of providing qualified support for the implementation of effective, safe, and sustainable solutions through the application of the most advanced analysis methodologies and enabling technologies.

The curriculum includes 27 CFU, of which at least 6 are reserved for extra-curricular activities, divided into 4 courses and training activities for the development of transferable skills, organized into three groups:

Foundational Alignment Activities

Courses that provide basic knowledge on Artificial Intelligence and Machine Learning technologies. For this reason, these activities should be undertaken at the beginning of the Minor program.

Applied Training Activities

Courses that present the implementation of Machine Learning technologies in specific application domains.

Training Activities for the Development of Transferable Skills

Seminars, Soft Skills, Internships at qualified public or private institutions.

Students are required to select at least two courses related to the Asymmetric Alignment Activities and at least one course related to the Applied Training Activities.

For detailed information and regarding the procedures for submitting the study plan for admission to the Minor, please refer to the link:

<https://meccanica.dii.unina.it/en/manifesto-lmpp-en>.

**Study Plan of the Degree Program of Mechanical Engineering for Design and Manufacturing
(Class LM-33)
A.A. 2026-2027**

ACRONYMS

CCD	[Commissione di Coordinamento Didattico]	Didactic Coordination Commission
CdS	[Corso/i di Studio]	Degree Program
CFU	[Crediti Formativi Universitari = 1 ECTS]	University training credits
CPDS	[Commissione Paritetica Docenti-Studenti]	Joint Teachers-Students Committee
OFA	[Obblighi Formativi Aggiuntivi]	Additional Training Obligations
RDA	[Regolamento Didattico di Ateneo]	University Didactic Regulations
SSD	[Settore Scientifico Disciplinare]	Scientific Disciplinary Sector
SUA-CdS	[Scheda Unica Annuale del Corso di Studio]	Annual single form of the Degree Program
TAF	[Tipologia di Attività Formativa]	Type of Educational Activity

KEY

Type of Educational Activity (TAF):

B = Characterising

C = Related or Supplementary

D = At the student's choice

E = Final examination and language knowledge

F = Further training activities

Year I

Course Name	SSD	Module	CFU	Hours	Type Activities (lectures, workshops, etc.)	TAF	Disciplinary area	Mandatory/ optional
Mandatory curricular activities (36 CFU) chosen from the following subjects depending on the path (see note a)								
Assisted Design of Mechanical Structures	IIND-03/A	Single	9	72	Frontal lesson and exercises	B	Mechanical Engineering	36 CFU Mandatory electives
Dynamics of Mechanical Systems	IIND-02/A	Single	9	72	Frontal lesson and exercises	B		
Industrial Production Management	IIND-05/A	Single	9	72	Frontal lesson and exercises	B		
Geometric modeling and virtual prototyping	IIND-03/B	Single	9	72	Frontal lesson and exercises	B		
Special Technologies	IIND-04/A	Single	9	72	Frontal lesson and exercises	B		
Curricular training activities (see note a)		Single	A ⁽¹⁾	A*8	Frontal lesson and exercises	B	Mechanical Engineering	To be chosen from suggested or approved courses in a study plan
Affiliated or Integrative Activity (see note a)		Single	B ⁽²⁾	B*8	Frontal lesson and exercises	C		To be chosen from suggested or approved courses in a study plan
Free choice activities (see note a)		Single	C ⁽³⁾	C*8	Frontal lesson and exercises	D		To be chosen from suggested or approved courses in a study plan
Additional language skills (see note c)			3			F		Mandatory

Year II

Course Name	SSD	Module	CFU	Hours	Type Activities (lectures, workshops, etc.)	TAF	Disciplinary area	Mandatory/ optional
Curricular training activities (see note a)		Single	36-A ⁽¹⁾	(36-A)*8	Frontal lesson and exercises	B	Mechanical Engineering	To be chosen from suggested or approved courses in a study plan
Affiliated or Integrative Activity (see note a)		Single	12-B ⁽²⁾	(12-B)*8	Frontal lesson and exercises	C		To be chosen from suggested or approved courses in a study plan
Free choice activities (see note a)		Single	9-C ⁽³⁾	(9-C)*8	Frontal lesson and exercises	D		To be chosen from suggested or approved courses in a study plan
Internship (see note b)			9			F		
Final Exam (see note d)			15			E		

1) The curricular activities mentioned in note a) amount to a total of 36 CFU, distributed between the first year (max 18 CFU) and the second year, depending on the choices made.

2) The affiliated or integrative activities mentioned in note a) amount to a total of 12 CFU, distributed between the first and second year, depending on the choices made.

3) The free choice activities mentioned in note a) amount to a total of 9 CFU, distributed between the first and second year, depending on the choices made.

Notes:

- a) The choice of curricular activities by the student, in accordance with what is reported in tables A, B, C, D, and E, defines **a study plan that is automatically approved for the following pathways:**
- **Table A – Advanced and Smart Mechanical Design Pathway**
 - **Table B – Advanced and Smart Production Pathway**
 - **Table C – Road Vehicle Design Pathway**
 - **Table D – Technological Processes Pathway**
 - **Table E – Mechatronics Pathway**

The student can indicate their pathway choice and the automatically approved study plan during enrollment without any further formalities.

Students who opt for an individual study plan during enrollment must use the appropriate forms/procedures, which will be available on the website of the Master's Degree Course in Mechanical Engineering for Design and Manufacturing. The same forms must be used to modify the study plan for subsequent years. The Coordination Committee for the Master's Degree Course reserves the right to approve or reject such requests based on clear reasoning provided by the student, as required by law. It should be noted that, in all cases, an exam can only be taken after the respective course has been offered during the academic year when the study plan is presented.

- b) The internship can be external (extramoenia) or internal (intramoenia). The external internship is carried out at companies, research centers, or other public and/or private entities, with the aim of acquiring specialized knowledge while working alongside personnel involved in design, production, and management activities, in order to gain initial exposure to the professional world. The internal internship is carried out at university research laboratories to acquire specialized knowledge by collaborating with faculty members and researchers in conducting research and development activities. In all cases, the internship must be documented in an internship booklet and certified by the university tutor using the AC form.
- c) Students who do not possess certification of English language proficiency at least at the B2 level of the Common European Framework of Reference for Languages (CEFR) must include a sufficient number of CFUs for Additional Language Skills in their study plan to ensure they achieve this level of proficiency (3 CFUs). These credits can be acquired through external institutions or at the university's language center (cla.unina.it) and will be recognized upon presentation of the certification. Students who already hold a B2 level English certificate at the time of enrollment may request recognition of this for the Additional Language Skills (3 CFUs).
- d) The thesis work can also be carried out at companies in Italy or abroad. It must always be carried out under the direct and full responsibility of a faculty member from the Didactic Area of Engineering at the University of Naples Federico II (the procedures for assigning the thesis advisor are specified in the Didactic Regulations of the Course of Study) and may include the collaboration of an external company tutor. The procedures for assigning the company tutor are regulated by the Didactic Regulations of the Course of Study and by specific agreements.

Table A – Advanced and Smart Mechanical Design Pathway

<i>Course name or training activity</i>	<i>Semester</i>	<i>SSD</i>	<i>CFU</i>	<i>TAF</i>
Mandatory pathway exams				
Assisted Design of Mechanical Structures Progettazione Assistita di Strutture Meccaniche	I	IIND-03/A	9	B
Dynamics of Mechanical Systems Dinamica dei Sistemi Meccanici	I	IIND-02/A	9	B
Geometric modeling and virtual prototyping Modellazione Geometrica e Prototipazione Virtuale	II	IIND-03/B	9	B
at least one course to be chosen from:				
Special Technologies Tecnologie Speciali	II	IIND-04/A	9	B
Industrial Production Management Gestione della Produzione Industriale	I	IIND-05/A	9	B
Affiliated or Integrative Activity, 12 CFU to be chosen from:				
Electrical Machines Macchine Elettriche	I	IIND-08/A	6	C
Electronic Power Converters Convertitori Elettronici di Potenza	I	IIND-08/A	6	C
Surface Engineering Ingegneria delle Superfici	I	IIND-03/C	12	C
Economics and Business Organization Economia ed Organizzazione Aziendale	I	IEGE-01/A	6	C
Business Management Gestione Aziendale	II	IEGE-01/A	6	C
Statistics for Technology Statistica per la Tecnologia	II	STAT-01/B	6	C
Statistical Learning for Industrial Engineering (*)	I	STAT-01/B	6	C
Electronics for Intelligent Mechanical Systems Elettronica per Sistemi Meccanici Intelligenti	I	IINF-01/A	6	C
Machine Learning for Engineering	II	IINF-05/A	6	C
Curricular training activities, choose at least three courses from:				
Machine Construction Complements Complementi di Costruzione di Macchine	I	IIND-03/A	9	B
Experimental Mechanics Meccanica Sperimentale	II	IIND-03/A	9	B
Mechanical Design Progettazione meccanica	II	IIND-03/A	9	B
Product Design and Development Progettazione e Sviluppo di Prodotto	I	IIND-03/B	9	B
Applied Mechanics for Energy Efficiency	II	IIND-02/A	9	B
Curricular training activities, choose one course from Table 1			9	B
Recommended courses for free choice: Table 1 and Table 2			9	D

(*) The course can only be chosen if the student has documented prior knowledge of basic statistics.

Table B – Advanced and Smart Production Pathway				
<i>Course name or training activity</i>	<i>Semester</i>	<i>SSD</i>	<i>CFU</i>	<i>TAF</i>
Mandatory pathway courses				
Assisted Design of Mechanical Structures Progettazione Assistita di Strutture Meccaniche	I	IIND-03/A	9	B
Industrial Production Management Gestione della Produzione Industriale	I	IIND-05/A	9	B
Special Technologies Tecnologie Speciali	II	IIND-04/A	9	B
at least one course to be chosen from:				
Dynamics of Mechanical Systems Dinamica dei Sistemi Meccanici	I	IIND-02/A	9	B
Geometric modeling and virtual prototyping Modellazione Geometrica e Prototipazione Virtuale	II	IIND-03/B	9	B
Affiliated or Integrative Activity, 12 CFU to be chosen from:				
Electrical Machines Macchine Elettriche	I	IIND-08/A	6	C
Electronic Power Converters Convertitori Elettronici di Potenza	I	IIND-08/A	6	C
Surface Engineering Ingegneria delle Superfici	I	IIND-03/C	12	C
Economics and Business Organization Economia ed Organizzazione Aziendale	I	IEGE-01/A	6	C
Business Management Gestione Aziendale	II	IEGE-01/A	6	C
Statistics for Technology Statistica per la Tecnologia	II	STAT-01/B	6	C
Statistical Learning for Industrial Engineering(*)	I	STAT-01/B	6	C
Electronics for Intelligent Mechanical Systems Elettronica per Sistemi Meccanici Intelligenti	I	IINF-01/A	6	C
Machine Learning for Engineering	II	IINF-05/A	6	C
Polymer Science Scienza dei Polimeri	I	IMAT-01/A	6	C
Polymer Technology Tecnologia dei Polimeri	II	IMAT-01/A	6	C
Curricular training activities, choose at least three courses from:				
Computer-Aided Manufacturing Produzione Assistita da Calcolatore	I	IIND-04/A	9	B
Project Management for Industrial Production Project Management per la Produzione Industriale	I	IIND-05/A	9	B
Safety and Maintenance of Industrial Plants Sicurezza e manutenzione degli Impianti Industriali	II	IIND-05/A	9	B
Smart Modelling of Industrial Production Systems	I	IIND-05/A	9	B
Automated Production Systems Sistemi di Produzione Automatizzati	II	IIND-05/A	9	B
Green Manufacturing and Sustainability	I	IIND-04/A	9	B
Management and Control of Manufacturing Systems Gestione e Controllo dei Sistemi di Lavorazione	II	IIND-04/A	9	B
Curricular training activities, choose one course from Table 1	I/II		9	B
Recommended courses for free choice: Table 1 and Table 2	I/II		9	D

(*) The course can only be chosen if the student has documented prior knowledge of basic statistics.

Table C- Road Vehicle Design Pathway

<i>Course name or training activity</i>	<i>Semester</i>	<i>SSD</i>	<i>CFU</i>	<i>TAF</i>
Mandatory pathway courses				
Assisted Design of Mechanical Structures Progettazione Assistita di Strutture Meccaniche	I	IIND-03/A	9	B
Dynamics of Mechanical Systems Dinamica dei Sistemi Meccanici	I	IIND-02/A	9	B
Geometric modeling and virtual prototyping Modellazione Geometrica e Prototipazione Virtuale	II	IIND-03/B	9	B
at least one course to be chosen from:				
Special Technologies Tecnologie Speciali	II	IIND-04/A	9	B
Industrial Production Management Gestione della Produzione Industriale	I	IIND-05/A	9	B
Affiliated or Integrative Activity, 12 CFU to be chosen from:				
Electrical Machines Macchine Elettriche	I	IIND-08/A	6	C
Electronic Power Converters Convertitori Elettronici di Potenza	I	IIND-08/A	6	C
Surface Engineering Ingegneria delle Superfici	I	IIND-03/C	12	C
Economics and Business Organization Economia ed Organizzazione Aziendale	I	IEGE-01/A	6	C
Business Management Gestione Aziendale	II	IEGE-01/A	6	C
Statistics for Technology Statistica per la Tecnologia	II	STAT-01/B	6	C
Statistical Learning for Industrial Engineering (*)	I	STAT-01/B	6	C
Electronics for Intelligent Mechanical Systems Elettronica per Sistemi Meccanici Intelligenti	I	IINF-01/A	6	C
Machine Learning for Engineering	II	IINF-05/A	6	C
Polymer Science Scienza dei Polimeri	I	IMAT-01/A	6	C
Polymer Technology Tecnologia dei Polimeri	II	IMAT-01/A	6	C
Curricular training activities, choose at least three courses from:				
Automotive Design Costruzione di Autoveicoli	I	IIND-03/A	9	B
Vehicle Mechanics Meccanica del Veicolo	II	IIND-02/A	9	B
Tribology and Diagnostics of Mechanical Systems Tribologia e Diagnostica dei sistemi meccanici	I	IIND-02/A	9	B
Bio-Inspired Generative Design for Additive Manufacturing	II	IIND-03/B	9	B
Curricular training activities, choose one course from Table 1			9	B
Recommended courses for free choice: Table 1 and Table 2			9	D

(*) The course can only be chosen if the student has documented prior knowledge of basic statistics.

Table D – Technological Processes Pathway

<i>Course name or training activity</i>	<i>Semester</i>	<i>SSD</i>	<i>CFU</i>	<i>TAF</i>
Mandatory pathway courses				
Assisted Design of Mechanical Structures Progettazione Assistita di Strutture Meccaniche	I	IIND-03/A	9	B
Special Technologies Tecnologie Speciali	II	IIND-04/A	9	B
Industrial Production Management Gestione della Produzione Industriale	I	IIND-05/A	9	B
at least one course to be chosen from:				
Dynamics of Mechanical Systems Dinamica dei Sistemi Meccanici	I	IIND-02/A	9	B
Geometric modeling and virtual prototyping Modellazione Geometrica e Prototipazione Virtuale	II	IIND-03/B	9	B
Affiliated or Integrative Activity, 12 CFU to be chosen from:				
Electrical Machines Macchine Elettriche	I	IIND-08/A	6	C
Electronic Power Converters Convertitori Elettronici di Potenza	I	IIND-08/A	6	C
Surface Engineering Ingegneria delle Superfici	I	IIND-03/C	12	C
Economics and Business Organization Economia ed Organizzazione Aziendale	I	IEGE-01/A	6	C
Business Management Gestione Aziendale	II	IEGE-01/A	6	C
Statistics for Technology Statistica per la Tecnologia	II	STAT-01/B	6	C
Statistical Learning for Industrial Engineering (*)	I	STAT-01/B	6	C
Electronics for Intelligent Mechanical Systems Elettronica per Sistemi Meccanici Intelligenti	I	IINF-01/A	6	C
Machine Learning for Engineering	II	IINF-05/A	6	C
Polymer Science Scienza dei Polimeri	I	IMAT-01/A	6	C
Polymer Technology Tecnologia dei Polimeri	II	IMAT-01/A	6	C
Curricular training activities, choose at least three courses from:				
Simulation and Modeling of Plastic Deformation Processes Simulazione e Modellazione dei Processi per Deformazione Plastica	I	IIND-04/A	9	B
Welding and Joining Techniques Tecnica della Saldatura e delle Giunzioni	I	IIND-04/A	9	B
Non-Conventional Materials Technologies Tecnologie dei Materiali non Convenzionali	II	IIND-04/A	9	B
Safety and Maintenance of Industrial Plants Sicurezza e manutenzione degli Impianti Industriali	II	IIND-05/A	9	B
Additive Manufacturing	I	IIND-04/A	9	B
Curricular training activities, choose one course from Table 1	I/II		9	B
Recommended courses for free choice: Table 1 and Table 2	I/II		9	D

(*) The course can only be chosen if the student has documented prior knowledge of basic statistics.

Table E – Mechatronics Pathway

<i>Course name or training activity</i>	<i>Semester</i>	<i>SSD</i>	<i>CFU</i>	<i>TAF</i>
Mandatory pathway courses				
Dynamics of Mechanical Systems Dinamica dei Sistemi Meccanici	I	IIND-02/A	9	B
Special Technologies Tecnologie Speciali	II	IIND-04/A	9	B
Geometric modeling and virtual prototyping Modellazione Geometrica e Prototipazione Virtuale	II	IIND-03/B	9	B
at least one course to be chosen from:				
Industrial Production Management Gestione della Produzione Industriale	I	IIND-05/A	9	B
Assisted Design of Mechanical Structures Progettazione Assistita di Strutture Meccaniche	I	IIND-03/A	9	B
Affiliated or Integrative Activity, 12 CFU to be chosen from:				
Electrical Machines Macchine Elettriche	I	IIND-08/A	6	C
Electronic Power Converters Convertitori Elettronici di Potenza	I	IIND-08/A	6	C
Surface Engineering Ingegneria delle Superfici	I	IIND-03/C	12	C
Economics and Business Organization Economia ed Organizzazione Aziendale	I	IEGE-01/A	6	C
Business Management Gestione Aziendale	II	IEGE-01/A	6	C
Statistics for Technology Statistica per la Tecnologia	II	STAT-01/B	6	C
Statistical Learning for Industrial Engineering (*)	I	STAT-01/B	6	C
Electronics for Intelligent Mechanical Systems Elettronica per Sistemi Meccanici Intelligenti	I	IINF-01/A	6	C
Machine Learning for Engineering	II	IINF-05/A	6	C
Curricular training activities, choose at least three courses from:				
Modeling and Simulation of Mechatronic Systems Modellazione e Simulazione di Sistemi Meccatronici	I	IIND-03/B	9	B
Mechanical Systems Control Controllo dei sistemi meccanici	II	IIND-02/A	9	B
Integration of Advanced Systems in Industrial Production Integrazione di sistemi avanzati nella produzione industriale	II	IIND-04/A	9	B
Robot Mechanics Meccanica dei Robot	I	IIND-02/A	9	B
Design of Mechatronic Systems	I	IIND-03/A	9	B
Curricular training activities, choose one course from Table 1	I/II		9	B
Recommended courses for free choice: Table 1 and Table 2	I/II		9	D

(*) The course can only be chosen if the student has documented prior knowledge of basic statistics.

Table 1 - Curricular Courses

<i>Course name</i>	<i>Semester</i>	<i>CFU</i>	<i>SSD</i>	<i>TAF</i>
Applied Mechanics for Energy Efficiency	II	9	IIND-02/A	B/D
Mechanical Systems Control Controllo dei sistemi meccanici	II	9	IIND-02/A	B/D
Dynamics of Mechanical Systems Dinamica dei Sistemi Meccanici	I	9	IIND-02/A	B/D
Dynamics of Railway Vehicles Dinamica del veicolo ferroviario	I	9	IIND-02/A	B/D
Vehicle Mechanics Meccanica del Veicolo	II	9	IIND-02/A	B/D
Robot Mechanics Meccanica dei Robot	I	9	IIND-02/A	B/D
Tribology and Diagnostics of Mechanical Systems Tribologia e Diagnostica dei sistemi meccanici	I	9	IIND-02/A	B/D
Machine Construction Complements Complementi di Costruzione di Macchine	I	9	IIND-03/A	B/D
Automotive Design Costruzione di Autoveicoli	I	9	IIND-03/A	B/D
Railway Construction Costruzioni Ferroviarie	I	9	IIND-03/A	B/D
Design of Mechatronic Systems	I	9	IIND-03/A	B/D
Experimental Mechanics Meccanica Sperimentale	II	9	IIND-03/A	B/D
Assisted Design of Mechanical Structures Progettazione Assistita di Strutture Meccaniche	I	9	IIND-03/A	B/D
Mechanical Design Progettazione meccanica	II	9	IIND-03/A	B/D
Railway Constructions Techniques Tecnica delle costruzioni ferroviarie	II	9	IIND-03/A	B/D
Modeling and Simulation of Mechatronic Systems Modellazione e Simulazione di Sistemi Meccatronici	I	9	IIND-03/B	B/D
Bio-Inspired Generative Design for Additive Manufacturing	II	9	IIND-03/B	B/D
Geometric modeling and virtual prototyping Modellazione Geometrica e Prototipazione Virtuale	II	9	IIND-03/B	B/D
Product Design and Development Progettazione e Sviluppo di Prodotto	I	9	IIND-03/B	B/D
Additive Manufacturing	I	9	IIND-04/A	B/D
Management and Control of Manufacturing Systems Gestione e Controllo dei Sistemi di Lavorazione	II	9	IIND-04/A	B/D
Green Manufacturing and Sustainability	I	9	IIND-04/A	B/D
Integration of Advanced Systems in Industrial Production Integrazione di sistemi avanzati nella produzione industriale	II	9	IIND-04/A	B/D
Computer-Aided Manufacturing Produzione Assistita da Calcolatore	I	9	IIND-04/A	B/D
Simulation and Modeling of Plastic Deformation Processes Simulazione e Modellazione dei Processi per Deformazione Plastica	I	9	IIND-04/A	B/D
Welding and Joining Techniques Tecnica della Saldatura e delle Giunzioni	I	9	IIND-04/A	B/D
Non-Conventional Materials Technologies Tecnologie dei Materiali non Convenzionali	II	9	IIND-04/A	B/D
Special Technologies Tecnologie Speciali	II	9	IIND-04/A	B/D
Industrial Production Management Gestione della Produzione Industriale	I	9	IIND-05/A	B/D
Smart Modelling of Industrial Production Systems	I	9	IIND-05/A	B/D

Project Management for Industrial Production Project Management per la Produzione Industriale	I	9	IIND-05/A	B/D
Safety and Maintenance of Industrial Plants Sicurezza e manutenzione degli Impianti Industriali	II	9	IIND-05/A	B/D
Automated Production Systems Sistemi di Produzione Automatizzati	II	9	IIND-05/A	B/D

Table 2 - Additional courses recommended for Free Choice

<i>Course name</i>	<i>Semester</i>	<i>CFU</i>	<i>SSD</i>	<i>TAF</i>	<i>Disciplinary Area</i>
Modeling and Experimentation for Smart Vehicles	I	9	IIND-02/A	B/D	LM-IMPP
AI aided Structural Design	II	9	IIND-03/A	B/D	LM-IMPP
Design Methods for Sustainable Products	II	9	IIND-03/B	B/D	LM-IMPP
Sustainable Manufacturing Technologies	I	9	IIND-04/A	B/D	LM-IMPP
Smart Production Systems	II	9	IIND-05/A	B/D	LM-IMPP
Internal Combustion Engines Motori a combustione interna	I	9	IIND-06/A	D	Mutua da LM-IMEA
Hydraulics and Pneumatics Oleodinamica e Pneumatica	II	9	IIND-06/B	D	Mutua da LM-IMEA
Heat Transfer Trasmissione del calore	I	9	IIND-07/A	D	Mutua da LM-IMEA
Applied Acoustics Acustica Applicata	I	9	IIND-07/A	D	Mutua da LM-IMEA
Air Conditioning Systems Impianti di Climatizzazione	II	9	IIND-07/A	D	Mutua da LM-IMEA
Elettrotecnica per l'Automotive e la Meccatronica Electrical Engineering for Automotive and Mechatronics	II	9	IJET-01/A	D	Mutua da LM-IMEA
Electric Systems for Renewable Energy Sistemi Elettrici per le Fonti Rinnovabili	II	9	IIND-08/B	D	Mutua da LM-IELN
Design of Electronic Circuits and Systems	I	9	IINF-01/A	D	Mutua da LM-IELN
Power Devices and Circuits	I	9	IINF-01/A	D	Mutua da LM-IELN
Energy Management for Transportation	I	9	IIND-08/A	D	Mutua da LM-TEAM
Electric Technologies for Mobility Tecnologie elettriche per la mobilità	I	9	IIND-08/A	D	LM-IMPP
Surface Engineering Ingegneria delle Superfici	I	12	IIND-03/C	C/D	LM-IMPP
Economics and Business Organization Economia ed Organizzazione Aziendale	I	6	IEGE-01/A	C/D	LM-IMPP
Business Management Gestione Aziendale	II	6	IEGE-01/A	C/D	LM-IMPP
Statistics for Technology Statistica per la Tecnologia	II	6	STAT-01/B	C/D	LM-IMPP
Statistical Learning for Industrial Engineering (*)	I	6	STAT-01/B	C/D	LM-IMPP
Electronics for Intelligent Mechanical Systems Elettronica per Sistemi Meccanici Intelligenti	I	6	IINF-01/A	C/D	LM-IMPP
Machine Learning for Engineering	II	6	IINF-05/A	C/D	LM-IMPP
Polymer Science Scienza dei Polimeri	I	6	IMAT-01/A	C/D	LM-IMPP
Polymer Technology Tecnologia dei Polimeri	II	6	IMAT-01/A	C/D	LM-IMPP

(*) The course can only be chosen if the student has documented prior knowledge of basic statistics.

Curriculum Railway Mechanics								
Year I								
Course Name	SSD	Module	CFU	Hours	Type Activities (lectures, workshops, etc.)	TAF	Disciplinary area	Mandatory/ optional
Semester I								
Dynamics of Railway Vehicles Dinamica del veicolo ferroviario	IIND-02/A	Single	9	72	Frontal lesson and exercises	B	Mechanical Engineering	Mandatory
Railway Construction Costruzioni Ferroviarie	IIND-03/A	Single	9	72	Frontal lesson and exercises	B	Mechanical Engineering	Mandatory
Product Management and Maintenance for Railways Elementi di gestione e manutenzione del prodotto ferroviario	IIND-05/A	Single	9	72	Frontal lesson and exercises	B	Mechanical Engineering	Mandatory
Semester II								
Electric Drives for Railway Traction Azionamenti Elettrici per la Trazione Ferroviaria	IIND-08/A	Single	6	48	Frontal lesson and exercises	C	Ingegneria Elettrica	Mandatory
Hybrid Diesel-Electric Propulsion Propulsione Ibrida Diesel-Elettrica	IIND-06/A	Single	6	48	Frontal lesson and exercises	B	Mechanical Engineering	Mandatory
Special Technologies Tecnologie Speciali	IIND-04/A	Single	9	72	Frontal lesson and exercises	B	Mechanical Engineering	9 CFU mandatory choices
Geometric modeling and virtual prototyping Modellazione Geometrica e Prototipazione Virtuale	IIND-03/B	Single	9	72	Frontal lesson and exercises	B	Mechanical Engineering	
Curricular training activities, chosen by the student (Table F1)		Single	A ⁽¹⁾	A*8	Frontal lesson and exercises	B	Mechanical Engineering	To be chosen from suggested or approved courses in a study plan
Free choice activities (see note a)		Single	B ⁽²⁾	B*8	Frontal lesson and exercises	D		To be chosen from suggested or approved courses in a study plan
Additional language skills (see note c)			3			F		Mandatory
Year II								
Course Name	SSD	Module	CFU	Hours	Type Activities (lectures, workshops, etc.)	TAF	Disciplinary area	Mandatory/ optional
Organization and Safety of Railway Network Operations Organizzazione e sicurezza dell'esercizio delle reti ferroviarie	CEAR-03/B	Single	9	72	Frontal lesson and exercises	C		Mandatory
Railway Constructions Techniques Tecnica delle costruzioni ferroviarie	IIND-03/A	Single	9	72	Frontal lesson and exercises	B	Mechanical Engineering	Mandatory
Curricular training activities, chosen by the student (Table F1)		Single	18-A ⁽¹⁾	(18-A)*8	Frontal lesson and exercises	B	Mechanical Engineering	To be chosen from suggested or approved courses in a study plan
Free choice activity by the student (Table F2 and Table F1)		Single	9-B ⁽²⁾	(9-B)*8	Frontal lesson and exercises	D		To be chosen from suggested or approved courses in a study plan
Internship (see note b)			9			F		
Final Exam (see note d)			15			E		

1) The curricular training activities in note a) total 18 CFU, distributed between the first and second year depending on the choices made.

2) The free choice activities in note a) total 9 CFU, distributed between the first and second year depending on the choices made.

Notes:

a) A student who wishes to follow the Railway Mechanics Curriculum must notify this in writing at the time of enrollment. The selection of curricular activities by the student, in accordance with what is stated in Tables F1 and F2, defines an automatically approved study plan. Alternative solutions can be followed by presenting an individual study plan. The Coordinating Committee of the Master's Degree Program reserves the right to approve or reject such plans based on the justification provided by the student, as required by law. It should be noted that, in all cases, an exam can only be taken after the corresponding course has been delivered in the academic year of the study plan submission.

b) The internship can be either external (extramoenia) or internal (intramoenia). The external internship is carried out at companies, research centers, or other public and/or private entities, aiming to acquire specialized knowledge by working alongside professionals involved in design, production, and management of production or research plants, providing a first introduction to the professional world. The internal internship is conducted at university research laboratories to acquire specialized knowledge by collaborating with faculty members and researchers in carrying out research and development activities. In all cases, the internship must be documented in an internship booklet and certified by the university tutor using the AC form.

c) Students who do not possess certification of English language proficiency at least at the B2 level of the Common European Framework of Reference for Languages (CEFR) are required to include in their study plan a sufficient number of CFUs for Additional Language Skills to ensure they achieve this level of proficiency (3 CFUs). These credits can be acquired from external institutions or at the university's language center (cla.unina.it) and will be recognized upon submission of the certification. Students who already possess an English certificate at least at the B2 level at the time of enrollment may request its recognition for Additional Language Skills (3 CFUs).

d) The thesis work can also be carried out at companies in Italy or abroad. It must always be conducted under the direct and full responsibility of a faculty member from the Didactic Area of Engineering at the University of Naples Federico II (the procedures for assigning the thesis supervisor are specified in the Didactic Regulations of the Course of Study) and may, if necessary, include the collaboration of a company tutor. The procedures for assigning the company tutor are governed by the Didactic Regulations of the Course of Study as well as specific agreements.

TABLE F1 – Curricular Courses

<i>Course name</i>	<i>Semester</i>	<i>CFU</i>	<i>SSD</i>	<i>TAF</i>
Applied Mechanics for Energy Efficiency	II	9	IIND-02/A	B/D
Mechanical Systems Control Controllo dei sistemi meccanici	II	9	IIND-02/A	B/D
Dynamics of Mechanical System Dinamica dei Sistemi Meccanici	I	9	IIND-02/A	B/D
Vehicle Mechanics Meccanica del Veicolo	II	9	IIND-02/A	B/D
Robot Mechanics Meccanica dei Robot	I	9	IIND-02/A	B/D
Tribology and Diagnostics of Mechanical Systems Tribologia e diagnostica dei sistemi meccanici	I	9	IIND-02/A	B/D
Machine Construction Complements Complementi di Costruzione di Macchine	I	9	IIND-03/A	B/D
Automotive Design Costruzione di Autoveicoli	I	9	IIND-03/A	B/D
Design of Mechatronic Systems	I	9	IIND-03/A	B/D
Experimental Mechanics Meccanica Sperimentale	II	9	IIND-03/A	B/D
Assisted Design of Mechanical Structures Progettazione Assistita di Strutture Meccaniche	I	9	IIND-03/A	B/D
Mechanical Design Progettazione meccanica	II	9	IIND-03/A	B/D
Modeling and Simulation of Mechatronic Systems Modellazione e Simulazione di Sistemi Meccatronici	I	9	IIND-03/B	B/D
Bio-Inspired Generative Design for Additive Manufacturing	II	9	IIND-03/B	B/D
Geometric Modeling and Virtual Prototyping Modellazione Geometrica e Prototipazione Virtuale	II	9	IIND-03/B	B/D
Product Design and Development Progettazione e Sviluppo di Prodotto	I	9	IIND-03/B	B/D
Additive Manufacturing	I	9	IIND-04/A	B/D
Management and Control of Manufacturing Systems Gestione e Controllo dei Sistemi di Lavorazione	II	9	IIND-04/A	B/D
Green Manufacturing and Sustainability	I	9	IIND-04/A	B/D
Integration of Advanced Systems in Industrial Production Integrazione di sistemi avanzati nella produzione industriale	II	9	IIND-04/A	B/D
Computer-Aided Manufacturing Produzione Assistita da Calcolatore	I	9	IIND-04/A	B/D
Simulation and Modeling of Plastic Deformation Processes Simulazione e Modellazione dei Processi per Deformazione Plastica	I	9	IIND-04/A	B/D
Welding and Joining Techniques Tecnica della Saldatura e delle Giunzioni	I	9	IIND-04/A	B/D
Non-Conventional Materials Technologies Tecnologie dei Materiali non Convenzionali	II	9	IIND-04/A	B/D
Special Technologies Tecnologie Speciali	II	9	IIND-04/A	B/D
Industrial Production Management Gestione della Produzione Industriale	I	9	IIND-05/A	B/D
Smart Modelling of Industrial Production Systems	I	9	IIND-05/A	B/D
Project Management for Industrial Production Project Management per la Produzione Industriale	I	9	IIND-05/A	B/D
Safety and Maintenance of Industrial Plants Sicurezza e manutenzione degli Impianti Industriali	II	9	IIND-05/A	B/D
Automated Production Systems Sistemi di Produzione Automatizzati	II	9	IIND-05/A	B/D

TABLE F2 - Additional courses recommended for Free Choice

<i>Course name</i>	<i>Semester</i>	<i>CFU</i>	<i>SSD</i>	<i>TAF</i>	<i>Disciplinary Area</i>
Modeling and Experimentation for Smart Vehicles	I	9	IIND-02/A	B/D	LM-IMPP
AI aided Structural Design	II	9	IIND-03/A	B/D	LM-IMPP
Design Methods for Sustainable Products	II	9	IIND-03/B	B/D	LM-IMPP
Sustainable Manufacturing Technologies	I	9	IIND-04/A	B/D	LM-IMPP
Smart Production Systems	II	9	IIND-05/A	B/D	LM-IMPP
Applied Acoustics Acustica Applicata	I	9	IIND-07/A	D	LM-IMEA
Air Conditioning Systems Impianti di Climatizzazione	II	9	IIND-07/A	D	LM-IMEA
Hydraulics and Pneumatics Oleodinamica e Pneumatica	II	9	IIND-06/B	D	LM-IMEA
Probability and Statistics Probabilità e Statistica	I	9	STAT-01/B	D	L-IGLP
Electronics for Intelligent Mechanical Systems Elettronica per Sistemi Meccanici Intelligenti	I	6	IINF-01/A	D	LM-IMPP
Machine Learning for Engineering	II	6	IINF-05/A	D	LM-IMPP
Energy Management for Transportation	I	9	IIND-08/A	D	LM_TEAM
Railway and Transit Services	II	9	CEAR-03/B	D	LM_TEAM

Curriculum Sustainable Development

Year I

Course Name	SSD	Module	CFU	Hours	Type Activities (lectures, workshops, etc.)	TAF	Disciplinary area	Mandatory/ optional
Mandatory curricular activities (36 CFU) chosen from the following subjects depending on the path (see note a)								
Advanced Structural Mechanics	IIND-03/A	Single	9	72	Frontal lesson and exercises	B	Mechanical Engineering	36 CFU Mandatory electives
Mechanical vibrations	IIND-02/A	Single	9	72	Frontal lesson and exercises	B		
Logistics and Operation Management	IIND-05/A	Single	9	72	Frontal lesson and exercises	B		
Digital Modeling and Simulation for Industrial Engineering	IIND-03/B	Single	9	72	Frontal lesson and exercises	B		
Advanced and Resource Efficient Manufacturing	IIND-04/A	Single	9	72	Frontal lesson and exercises	B		
Curricular training activities (see note a)		Single	A ⁽¹⁾	A*8	Frontal lesson and exercises	B	Mechanical Engineering	To be chosen from suggested or approved courses in a study plan
Affiliated or Integrative Activity (see note a)		Single	B ⁽²⁾	B*8	Frontal lesson and exercises	C		To be chosen from suggested or approved courses in a study plan
Free choice activities (see note a)		Single	C ⁽³⁾	C*8	Frontal lesson and exercises	D		To be chosen from suggested or approved courses in a study plan
Additional language skills (see note c)			3			F		Mandatory

Year II

Course Name	SSD	Module	CFU	Hours	Type Activities (lectures, workshops, etc.)	TAF	Disciplinary area	Mandatory/ optional
Curricular training activities (see note a)		Single	36-A ^(^)	36-A ⁽¹⁾	Frontal lesson and exercises	B	Mechanical Engineering	To be chosen from suggested or approved courses in a study plan
Affiliated or Integrative Activity (see note a)		Single	12-B ^(°)	12-B ⁽²⁾	Frontal lesson and exercises	C		To be chosen from suggested or approved courses in a study plan
Free choice activities (see note a)		Single	9-C ^(°)	9-C ⁽³⁾	Frontal lesson and exercises	D		To be chosen from suggested or approved courses in a study plan
Internship (see note b)			9			F		
Final Exam (see note d)			15			E		

1) The curricular activities mentioned in note a) amount to a total of 36 CFU, distributed between the first year (max 18 CFU) and the second year, depending on the choices made.

2) The affiliated or integrative activities mentioned in note a) amount to a total of 12 CFU, distributed between the first and second year, depending on the choices made.

3) The free choice activities mentioned in note a) amount to a total of 9 CFU, distributed between the first and second year, depending on the choices made.

Notes:

a) A student who wishes to follow the Sustainable Development Curriculum must notify this in writing at the time of enrollment. The selection of curricular activities by the student, in accordance with what is stated in Tables G1, G2, and G3, defines an **automatically approved study plan**. Alternative solutions can be followed by presenting an individual study plan. The Coordinating Committee of the Master's Degree Program reserves the right to approve or reject such plans based on the justification provided by the student, as required by law. It should be noted that, in all cases, an exam can only be taken after the corresponding course has been delivered in the academic year of the study plan submission.

b) The internship can be either external (extramoenia) or internal (intramoenia). The external internship is carried out at companies, research centers, or other public and/or private entities, aiming to acquire specialized knowledge by working alongside professionals involved in design, production, and management of production or research plants, providing a first introduction to the professional world. The internal internship is conducted at university research laboratories to acquire specialized knowledge by collaborating with faculty members and researchers in carrying out research and development activities. In all cases, the internship must be documented in an internship booklet and certified by the university tutor using the AC form.

c) Students who do not possess certification of English language proficiency at least at the B2 level of the Common European Framework of Reference for Languages (CEFR) are required to include in their study plan a sufficient number of CFUs for Additional Language Skills to ensure they achieve this level of proficiency (3 CFUs). These credits can be acquired from external institutions or at the university's language center (cla.unina.it) and will be recognized upon submission of the certification. Students who already possess an English certificate at least at the B2 level at the time of enrollment may request its recognition for Additional Language Skills (3 CFUs).

d) The thesis work can also be carried out at companies in Italy or abroad. It must always be conducted under the direct and full responsibility of a faculty member from the Didactic Area of Engineering at the University of Naples Federico II (the procedures for assigning the thesis supervisor are specified in the Didactic Regulations of the Course of Study) and may, if necessary, include the collaboration of a company tutor. The procedures for assigning the company tutor are governed by the Didactic Regulations of the Course of Study as well as specific agreements.

TABLE G1 – Curricular Courses

<i>Course name</i>	<i>Semester</i>	<i>CFU</i>	<i>SSD</i>	<i>TAF</i>
Applied Mechanics for Energy Efficiency	II	9	IIND-02/A	B/D
Mechanical vibrations	I	9	IIND-02/A	B/D
Modeling and Experimentation for Smart Vehicles	I	9	IIND-02/A	B/D
Advanced Structural Mechanics	I	9	IIND-03/A	B/D
AI aided Structural Design	II	9	IIND-03/A	B/D
Design of Mechatronic Systems	I	9	IIND-03/A	B/D
Bio-Inspired Generative Design for Additive Manufacturing	II	9	IIND-03/B	B/D
Design Methods for Sustainable Products	II	9	IIND-03/B	B/D
Digital Modeling and Simulation for Industrial Engineering	II	9	IIND-03/B	B/D
Additive Manufacturing	I	9	IIND-04/A	B/D
Advanced and Resource Efficient Manufacturing	II	9	IIND-04/A	B/D
Green Manufacturing and Sustainability	I	9	IIND-04/A	B/D
Sustainable Manufacturing Technologies	I	9	IIND-04/A	B/D
Logistics and Operation Management	I	9	IIND-05/A	B/D
Smart Modelling of Industrial Production Systems	I	9	IIND-05/A	B/D
Smart Production Systems	II	9	IIND-05/A	B/D

TABLE G2 – *Affiliated or Integrative Activities chosen by the Student*

Course Name	<i>Semester</i>	<i>CFU</i>	<i>SSD</i>	<i>TAF</i>	<i>Disciplinary Area</i>
Advanced and Sustainable Materials Selection	I	6	IMAT-01/A	C	LM-IMPP
Machine Learning for Engineering	II	6	IINF-05/A	C	LM-IMPP
Statistical Learning for Industrial Engineering ⁽¹⁾	I	6	STAT-01/B	C	LM-IMPP
Sustainable Metallurgy	II	6	IIND-03/C	C	LM-IMPP

(1) The course can only be chosen if the student has documented prior knowledge of basic statistics.

TABLE G3 – Additional courses recommended for Free Choice

<i>Course name</i>	<i>Semester</i>	<i>CFU</i>	<i>SSD</i>	<i>TAF</i>	<i>Disciplinary Area</i>
Principles and Applications of Fluid Machinery	II	9	IIND-06/A	D	LM-IMEA
Heat Transfer Principles in Engineering	I	9	IIND-07/A	D	LM-IMEA
Design of Electronic Circuits and Systems	I	9	IINF-01/A	D	LM-IELN
Power Devices and Circuits	I	9	IINF-01/A	D	LM-IELN
Energy Management for Transportation	I	9	IIND-08/A	D	LM_TEAM
Railway and Transit Services	II	9	CEAR-03/B	D	LM_TEAM

Minor in Applied Machine Learning

Table A			
Course of Studies	Selectable training activities	SSD	ECTS
CdS in Computer Science LM-18	Advanced Databases – Modules: 1) DB Technologies 2) NoSql	INFO-01/A	12
	Machine Learning - Modules: 1) Statistical Learning 2) Neural Networks and Deep Learning	INFO-01/A	12
	Methods for Artificial Intelligence	INFO-01/A	6
	Generative AI	INFO-01/A	6
CdS in Telecommunications and Digital Media Engineering LM-27	Multimedia Signal Processing	IINF-03/A	9
	Image Processing for Computer Vision	IINF-03/A	6
CdS in Computer Engineering - L8	Databases	IINF-05/A	9
	Advanced Computer Programming	IINF-05/A	9
	Elements of Artificial Intelligence	IINF-05/A	6
CdS in Computer Engineering LM-32	Cognitive Computing Systems	IINF-05/A	6
CdS in Industrial Bioengineering LM-21	Programming Laboratory	IINF-05/A	9
CdS in Mechanical Engineering for Design and Production LM-33	Machine Learning for Engineering	IINF-05/A	6
CdS in Autonomous Vehicle Engineering (MOVE) LM-33	Image and Video Processing for Autonomous Driving	IINF-03/A	6
CdS in Transportation Engineering And Mobility LM-23	Machine Learning and big data	IINF-05/A	9

Table B			
Course of Studies	Selectable training activities	SSD	ECTS
CdS in Chemical Engineering LM-22	Machine learning for Product and Process Engineering (Modular course)	ICHI-01/C ICHI-02/A ICHI-02/B	6
CdS in Mechanical Engineering for Design and Manufacturing LM-33	Bio-inspired Generative Design for Additive Manufacturing	IIND-03/B	9
	Statistics for Technology	STAT-01/B	6
	Statistical Learning for Industrial Engineering	STAT-01/B	6
CdS in Chemical Sciences LM-54	Chemistry and Catalysis Technology	CHEM-03/A	6
	Integrated modeling approaches in molecular catalysis: from ab initio to data driven (lab)	CHEM-02/A CHEM-03/A	6
CdS in Transportation Engineering and Mobility LM23	Unmanned Aircraft Systems for Transportation and Mobility	CEAR-03/B IIND-01/E	6
	Resilience of Transportation Systems	CEAR-03/B	6
	Structural Health Monitoring for Infrastructures	CEAR-07/A	9

The training activities correspond to 27 ECTS and are divided into 4—teaching and training activities for the promotion of transversal skills, organised in three groups: Alignment courses shown in Table A that provide the basic knowledge on Machine Learning technologies, Application courses shown in Table B that present the implementation of Machine Learning technologies in specific application domains, training activities for the promotion of transversal skills such as seminars, Soft Skills, Internships at qualified public or private institutions.

These activities may be recognised within the career of students enrolled in Degree Program in Mechanical Engineering for Design and Manufacturing; in any case, at least 6 ECTSs must be reserved for extracurricular activities in addition to the ECTSs of the statutory plan for obtaining the degree (pursuant to Art. 18, c. 1 of the RDA).

Students can integrate the Minor Pathway into their Study Plan by selecting courses worth up to 21 CFU of the 27 CFU among the curricular activities; the remaining CFU are acquired with extracurricular courses and activities; students are required to select at least two courses from Table A and at least one course from Table B.

COURSE SHEETS

The course sheets (name of the Professor, contents, objectives, methods of implementation and verification) can be consulted at the link

<http://meccanica.dii.unina.it/it/info-lmpp>

in the section Teachers/Teachings

Admission requirements, required knowledge, and access procedures for the Master's Degree in Mechanical Engineering for Design and Manufacturing (LM-33)

(pursuant to the Academic Regulations of the Degree Programme and as established by the Didactic Coordination Commission (CCD) in the meeting of 23 July 2024)

Admission requirements and required knowledge for access to the Degree Programme

Enrolment in the Master's Degree in Mechanical Engineering for Design and Manufacturing requires possession of a Bachelor's degree, including those awarded under the system in force prior to Ministerial Decree (D.M.) 509/1999, or a three-year university diploma, or another equivalent qualification obtained abroad.

For enrolment in the Master's Degree in Mechanical Engineering for Design and Manufacturing, in compliance with art. 6, paragraph 2 of Ministerial Decree (DM) 270/04, specific access criteria are established regarding **the possession of curricular requirements and the adequacy of the student's personal preparation.**

Curricular requirements

Specifically, curricular requirements state that the applicant must hold a Bachelor's degree in the L-9 class of Industrial Engineering or an equivalent qualification, or have obtained at least 90 ECTS credits (CFU) in specific academic subject areas (SSD), broken down as follows:

At least 40 CFU in the sectors:

MATH-02/A - Algebra
MATH-02/B - Geometry
MATH-03/A - Mathematical Analysis
MATH-03/B - Probability and Mathematical Statistics
MATH-04/A - Mathematical Physics
MATH-05/A - Numerical Analysis
MATH-06/A - Operations Research
STAT-01/A - Statistics
STAT-01/B - Statistics for Experimental and Technological Research
IINF-05/A - Information Processing Systems
PHYS-01/A - Experimental physics of fundamental interactions and applications
PHYS-03/A - Experimental physics of matter and applications
PHYS-04/A - Theoretical physics of matter, models, mathematical methods and applications
CHEM-03/A - General and Inorganic Chemistry
CHEM-04/A - Science and Technology of Polymeric Materials
CHEM-06/A - Principles of Chemistry for Applied Technologies

At least 50 CFU in the sectors:

CEAR-06/A - Structural Mechanics
IIND-01/D - Aerospace Structures and Constructions
IIND-01/F - Fluid dynamics
IIND-01/G - Aerospace propulsion
IIND-06/A - Fluid Machinery
IIND-06/B - Energy Systems And Power Generation
IIND-07/A - Thermal Engineering And Industrial Energy Systems
IIND-07/B - Building Physics And Building Energy Systems
IMIS-01/A - Mechanical And Thermal Measurements
IIND-02/A - Applied Mechanics

IIND-03/A - Mechanical Design And Machine Construction
IIND-03/B - Design Methods For Industrial Engineering
IIND-04/A - Manufacturing Technology And Systems
IIND-05/A - Industrial Mechanical Systems Engineering
IIND-03/C - Metallurgy
IMAT-01/A - Materials Science And Technology
IIET-01/A - Electrical Engineering
IIND-08/A - Power Electronic Converters, Electrical Machines And Drives
IEGE-01/A - Business And Management Engineering

At least 24 CFU in the sectors:

IIND-02/A - Applied Mechanics
IIND-03/A - Mechanical Design And Machine Construction
IIND-03/B - Design Methods For Industrial Engineering
IIND-04/A - Manufacturing Technology And Systems
IIND-05/A - Industrial Mechanical Systems Engineering

Compliance with curricular requirements is verified by examining the graduate's academic record.

The aforementioned conditions are necessary but not sufficient for enrolment in the Master's Degree in Mechanical Engineering for Design and Manufacturing. The Didactic Coordination Commission (CCD) of the Degree Programme will assess the possession of the academic background deemed necessary for successful attendance of the Master's Degree programme by analysing the student's curriculum in detail.

Admission requirements include, among other things, documented proficiency in at least one European Union language other than Italian, both in written and oral form, with specific reference to disciplinary lexicons. In particular, since students must be able to use a European Union language fluently in addition to Italian to obtain the Master's Degree, the regulations require that the study plan includes a number of ECTS credits (CFU) for 'Additional Language Skills' sufficient to ensure the attainment of at least a B2 level of the CEFR for students who do not already meet this requirement upon enrolment.

Procedures for access to the Degree Programme

Enrolment in the Master's Degree programme is not permitted if the minimum curricular requirements specified above are not met. The CCD of the Degree Programme, after assessing the possession of the academic background necessary for successful attendance and analysing the student's curriculum in detail, may identify and justify any equivalences for credits from academic subject areas (SSD) different from those listed in the previous section. The CCD will then establish the procedure through which the student can complete the necessary curricular integration, to be selected from the following options based on the extent and nature of the required integrations:

- 1) Curricular integrations to be completed prior to enrolment, pursuant to art. 6, paragraph 1 of Ministerial Decree (D.M.) of 16 March 2007, by enrolling in individual course units offered by the University and passing the relevant exams. The regulations for enrolling in individual course units, pursuant to art. 16, paragraph 6 of the University Academic Regulations (RDA), are available for download at the following link: www.unina.it/documents/11958/18338949/3241_2019-09-04_IscrizioneCorsiSingoli.pdf; The FAQ are available at the following link: www.unina.it/-/5601348-iscrizione-ai-corsi-singoli).

- 2) Enrolment in a Bachelor's Degree programme that grants automatic access to the Degree Programme (CdS), with a shortened programme duration and the assignment of a Study Plan that includes the curricular integrations required for enrolment in the Master's Degree.
- 3) Enrolment in the Master's Degree programme with the assignment of a Study Plan that includes alignment paths, in accordance with art. 6, paragraph 3 of the Ministerial Decree (D.M.) of 16 March 2007, without any additional ECTS credits (CFU).

Requirements for the Adequacy of the Student's Personal Preparation

Art. 6, paragraph 2 of the Ministerial Decree (D.M.) of 16 March 2007 mandates the verification of the adequacy of the student's personal preparation for the purpose of admission to the Master's Degree programme.

The Academic Coordination Committee (CCD) regulates the procedures for verifying the adequacy of the student's personal preparation, following guidelines established uniformly for all Master's Degree programmes in Engineering of the Scuola Politecnica e delle Scienze di Base.

Students are exempt from this verification if the weighted average of the grades (out of 30) obtained in the exams for the Bachelor's degree that grants access to the Master's Degree programme is not less than 24.

Admission requests for the Master's Degree programme from students who do not meet the criteria for automatic admission will be reviewed by the CCD. The CCD will assess the eligibility of the request with a final and unappealable decision, establishing any requirements the applicant must fulfill for admission to the programme. The CCD may examine the applicant's curriculum, possibly considering the grades obtained in core subjects or in subjects otherwise deemed particularly relevant for the successful completion of the Master's Degree path. Alternatively, it may arrange assessment methods (interviews, tests) to verify the adequacy of the student's personal preparation, or adopt procedures 1 or 3 as outlined for curricular integrations.

The admission test consists of a questionnaire with 35 multiple-choice questions, randomly selected from a pool of 140. Specifically, to ensure homogeneous coverage of the seven core areas of Mechanical Engineering (IIND-06/A, IIND-07/A, IIND-02/A, IIND-03/A, IIND-03/B, IIND-04/A, IIND-05/A), 5 questions are randomly drawn from a set of 20 available for each area. The test is considered passed if the student answers at least 21 of the 35 questions correctly.

The full pool of 140 available questions can be consulted at the following link:

http://meccanica.dii.unina.it/images/Impp/Lista_domande_Test.pdf

The test will be administered by a dedicated committee according to a schedule available at the following link:

<http://meccanica.dii.unina.it/it/orientamento-Impp> (Section: "Admission Requirements")

To register for the test, please complete the form at the following link:

forms.office.com/Pages/ResponsePage.aspx?id=auLPL2K7sEax4yj52gxF_SXeNKE0iP1loIr3mbJyvztUMDZRWDFIQVRHSzVMQVdQVEJWUudHMAxQy4u&wdLOR=cDF03A002-AA49-4E38-B095-EF4FDA099754

Students may also take the test before obtaining their Bachelor's degree in order to assess their preparation for future enrolment in the Master's Degree programme.

The test may be retaken a maximum of three times, with a minimum interval of one month between consecutive attempts.

Curricular Internship Activities

Students have access to a wide selection of agreements with companies and public and private institutions, aimed at carrying out internships outside the University. These agreements are signed by the University based on survey and promotion activities undertaken by the University Service Center for the Coordination of Special Projects and Organizational Innovation (COINOR), the SPSB, and the Department the Degree Program is affiliated with.

The competent Teaching Area Offices of the SPSB collect students' requests for curricular internships (both internal and external), consisting of the training project signed by the student and potentially by the host company/institution, which is also signed by the Head of the Department or the Coordinator of the Teaching Coordination Committee or the faculty member responsible for internships designated by the Committee. They then provide the student with the internship logbook and the forms for the final evaluation by the university tutor. Furthermore, they collect requests for the stipulation of external internship agreements from faculty members affiliated with the department and handle the transmission of internship agreements already signed by companies to the University's Student Internship Office for subsequent signing by the Rector or their delegate.

The procedure for activating the internship is managed through the platform:

<https://collabora.unina.it/tirocinistudenti/SitePages/Pagina%20iniziale.aspx>;

for viewing the Agreements signed with companies, please refer to the website:

<https://www.unina.it/it/didattica/tirocini/tirocini-studenti>

Details on the procedures for carrying out a curricular internship are available at the link:

<https://meccanica.dii.unina.it/en/internship>

Final Thesis Preparation and Examination

The Master's Degree in Mechanical Engineering for Design and Manufacturing is awarded upon successful completion of a final assessment, consisting of the evaluation by an academic committee of the Master's thesis. This thesis is prepared by the student under the guidance of one or more university supervisors and with the potential contribution of experts, including those external to the University. The thesis should involve theoretical, methodological, numerical, or experimental work. Activities carried out at research laboratories external to the university, as well as at Italian and foreign companies and entities, may contribute to the thesis preparation, provided they are part of a training path guided by the university supervisor. External tutors (i.e., not university faculty) who assisted the student in the specific aspects of effective use of IT tools. of the developed work may be invited to the final defense session in the role of co-supervisors without being members of the Master's degree examination committee. The written thesis and the defense may be presented in English and must demonstrate the work undertaken, command of the subject matter, acquired maturity, the ability to work independently, and a good level of communication skills, including the effective use of IT tools.

The final assessment is publicly defended by the Candidate before a Committee chaired by the Program Coordinator (or, in case of their unavailability, by a faculty member designated by them). It consists of the presentation of the work carried out under the guidance of a faculty Supervisor and the subsequent discussion with the Committee members. During the session, the candidate will discuss the thesis, which must be available in the examination room; they are permitted to use audio-visual support to project a summary of the work carried out, or, alternatively, to prepare a summary booklet, providing a copy to each member of the Committee. At the end of the presentation, each faculty member may address observations and questions to the candidate, pertaining to the topic of the thesis work. The presentation normally lasts up to 15 minutes.

Study Abroad Periods – ERASMUS Programs

The Degree Program provides assistance for undertaking study periods abroad, both within the scope of Erasmus mobility for study purposes, utilizing funds made available to the University by the National Erasmus Agency, and within the framework of international mobility initiatives based on specific non-Erasmus agreements.

For Erasmus mobility for study purposes, the selection call is issued centrally by the University's International Relations Office (<https://www.unina.it/didattica/opportunita-studenti/erasmus/programma>), which annually prepares a list of available grants for each degree program or groups of degree programs based within the Department. Selection is carried out by a committee appointed by the Head of the Department, which compiles one or more rankings for each degree program or groups of degree programs based on the general criteria outlined in the call.

For mobility carried out under international agreements that involve student exchanges, the same procedures adopted for Erasmus are followed (Erasmus-like procedure).

International mobility initiatives are also activated for undertaking traineeships and internships abroad, both within the scope of Erasmus mobility for traineeships (Placement), in which case the student receives a scholarship using funds made available to the University by the National Erasmus Agency (limited, however, only to EU countries participating in the Erasmus project), and within the framework of other specific programs also valid for other non-EU countries (e.g., Vulcanus in Japan), also with a scholarship.

It is also possible to carry out internships at foreign companies/entities/institutions with which the University has stipulated an internship agreement, following the normal procedure adopted for internships in Italy. In this case, the student does not receive a scholarship but may receive a small salary/reimbursement of expenses offered by the host company/entity/institution.

More detailed information is available at the following [link](#).

Orientation and Tutoring

Admissions Orientation

Prospective students can obtain information by interacting directly with university staff responsible for orientation, through online and in-person events that take place throughout the year.

The calendar of individual events is available on the University website at the portal www.orientamento.unina.it which is also provided on the website of the SPSB, www.scuolapsb.unina.it/en/ in the orientation section.

Specifically, the Degree Program organizes various admissions orientation initiatives coordinated at the Departmental, School, and University levels.

Each year, the event Magistrali@SPSB is organized, showcasing the program offerings for Master's degrees, career opportunities, and thesis and internship opportunities. YouTube recordings of these events are also subsequently available through the SPSB website mentioned in previous sections.

During the period March-July, 'Open Days' events are organized for in-person visits to facilities or attending specific events. The dates for these events are provided during the Magistrali@SPSB event, and participation details can be found on the website of the Department of Industrial Engineering (www.dii.unina.it/?&lang=en).

Ongoing Orientation and Tutoring

The Degree Program organizes ongoing orientation initiatives, in close coordination with the other degree programs of the Department and in collaboration with the SPSB. These initiatives aim to facilitate students in defining a study plan suited to their aptitudes, providing detailed information on the knowledge and competencies related to each course.

Outbound Orientation and Placement Activities

The Degree Program organizes outbound orientation activities in coordination with its Department, the SPSB, and the University.

A list of opportunities for extra-curricular internships (i.e., postgraduate) and job offers is available on the University website at www.orientamento.unina.it. Furthermore, the SPSB manages a dynamic job placement platform at www.jobservice.unina.it. The platform is aimed at students and companies to facilitate the matching of supply and demand for curricular internships (pre-graduation), extra-curricular internships (post-graduation), and employment.

To reduce placement time and make career choices more informed, in the spring, the degree program contributes to the SPSB's "Career Day@SPSB" event, generally held in person. During this event, students and recent graduates have the opportunity to learn more in person about the business areas of individual companies and the job profiles offered.

Furthermore, the presentation of professional opportunities and career and research prospects is also promoted through thematic seminars organized by the Degree Program throughout the year.

Finally, specific soft-skills training events (e.g., communication and interpersonal skills and competencies, preparation for entering the workforce) are organized periodically.

Calendar, Deadlines, and Important Dates

Terms and Deadlines

The terms and deadlines for enrollment and registration for subsequent years are set by the University, with procedures made known through a specific Guide to Enrollment and Fee Payment published at the URL:

<https://www.unina.it/didattica/sportello-studenti/guide-dello-studente>

Further deadlines (deadlines for submitting study plans, deadlines for ERASMUS applications, etc.) are indicated on the Degree Program website:

<https://meccanica.dii.unina.it/en/info-lmpp-en>

Academic and Exam Calendar

Details on the academic calendar and exams are available at the link:

<https://www.scuolapsb.unina.it/calendario-delle-attivita-didattiche/>

The detailed and dynamically updated Exam Calendar can be consulted at the link:

<https://meccanica.dii.unina.it/en/info-lmpp-en>

Class Schedule

The detailed and dynamically updated Class Schedule can be consulted at the link:

<https://easyacademy.unina.it/agendastudenti/index.php?view=rooms&include=rooms& lang=en>

Graduation Session Calendar

The detailed and dynamically updated Graduation Session Calendar can be consulted at the link:

<http://www.scuolapsb.unina.it/index.php/laurea-ingegneria>

Degree Program Contacts

Program Coordinator: Prof. Eng. Enrico Armentani – Department of Chemical, Materials, and Industrial Production Engineering - tel. 0817682450 - e-mail: enrico.armentani@unina.it



ERASMUS Program Contact: Prof. Eng. Antonello Astarita – Department of Chemical, Materials, and Industrial Production Engineering - tel. 0817682364 - e-mail: antonello.astarita@unina.it



Internship Coordinator: Prof. Eng. Michele Perrella – Department of Chemical, Materials, and Industrial Production Engineering - tel. 0817682453 - e-mail: michele.perrella@unina.it



Orientation Contact: Prof. Eng. Alfonso William Mauro – Department of Industrial Engineering - tel. 0817682198 e-mail: alfonsowilliam.mauro@unina.it



Student Representative:

Cristofaro Daniele - e-mail: d.cristofaro@studenti.unina.it

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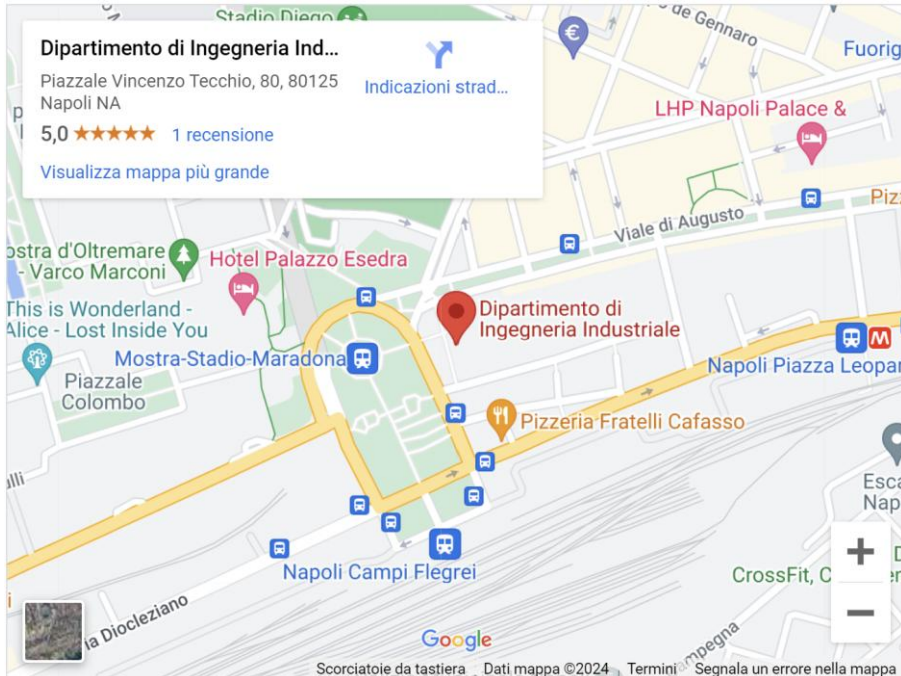
Place and Links

Degree Program Location

Dipartimento di Ingegneria Industriale

Piazzale Tecchio 80, 80125 Napoli

<https://www.google.com/maps/@40.8247332,14.1919721,16z?entry=ttu>



Degree Program Website

<http://meccanica.dii.unina.it/it/info-lmpp>

Department Website

<http://www.dii.unina.it/>

School Website

<http://www.scuolapsb.unina.it/>

University Website

<https://www.unina.it/>

Orientation Portal

<http://www.orientamento.unina.it/>

Official Social Media Channels



[@meccanica.uninaofficial](https://www.instagram.com/meccanica.uninaofficial)



[Ingegneria Meccanica UNINA](https://www.facebook.com/IngegneriaMeccanicaUNINA)