



COURSE CATALOGUE OF THE MASTER'S DEGREE PROGRAM IN ELECTRICAL ENGINEERING (CLASS LM-28) A. Y. 2026/27

School: Polytechnic School and Basic Sciences

Department: Department of Electrical Engineering and Information Technologies

Regulations in force since the academic year 2025-2026

STUDY PLAN A.Y. 2026-27

KEY

TYPE OF EDUCATIONAL ACTIVITY (TAF):

A = Basic

B = Characterising

C = Related or Supplementary

D = At the student's choice

E = Final examination and language knowledge

F = Further training activities

Year 1									
Course Title	SSD	Module	Credits	Hours	Type of Activities (lectures, workshop, ecc.)	Course modality (in person, by distance)	TAF	Disciplinary area	Mandatory/optional
SEMESTER 1									
Automatica	IINF-04/A ING-INF/04		6	48	Lecture	In person	C	Related or supplementary activity	Mandatory
Campi quasi-stazionari e applicazioni	IJET-01/A ING-IND/31		12	96	Lecture	In person	B	Electrical Engineering	Mandatory
Strumentazione numerica di misura	IMIS-01/B ING-INF/07		12	96	Lecture	In person	B	Electrical Engineering	Mandatory
SEMESTER 2									
Dinamica dei convertitori elettrici	IIND-08/A ING-IND/32		6	48	Lecture	In person	B	Electrical Engineering	Mandatory
Macchine elettriche e simulazioni	IIND-08/A ING-IND/32		6	48	Lecture	In person	B	Electrical Engineering	Mandatory
Attività formative affini a scelta dello studente dalla Tabella "B"			A-6	48	Lecture	In person	C	Related or supplementary activity	Student's choice
Modellistica dei sistemi elettrici	IIND-08/B ING-IND/33		12	96	Lecture	In person	B	Electrical Engineering	Mandatory

Year 2									
Course Title	SSD	Module	Credits	Hours	Type of Activities (lectures, workshop, ecc.)	Course modality (in person, by distance)	TAF	Disciplinary area	Mandatory/optional
SEMESTRE 1									
Mandatory Course (student's choice program from tab. II.1, II.2, II.3)	IIND-08/A ING-IND/32	Module 1 and 2	15	120	Lecture /Laboratory	In person	B	Electrical Engineering	Student's choice
Mandatory Course (student's choice program from tab. II.1, II.2, II.3)	IIND-08/B ING-IND/33	Module 1	9	72	Lecture /Laboratory	In person	B	Electrical Engineering	Student's choice

Student's choice program from tab. A.1, A.2, A.3)	Characterizing		0≤A≤6	48	Lecture /Laboratory	In person	B	Electrical Engineering	Student's choice
Program chosen autonomously by student			0≤A≤9	72	Lecture /Laboratory	In person	D		Student's choice
SEMESTER 2									
Mandatory Course (student's choice program from tab. II.1, II.2, II.3)	IIND-08/BING-IND/33	Module 2	6	48	Lecture /Laboratory	In person	B	Electrical Engineering	Student's choice
Student's choice program from tab. A.1, A.2, A.3)	Characterizing		6-A	48	Lecture /Laboratory	In person	B	Electrical Engineering	Student's choice
Program chosen autonomously by student			9-A	72	Lecture /Laboratory	In person	D		Student's choice
Further training activities ⁽¹⁾			3		Lecture /Laboratory	In person	F		Student's choice
Final verification			12		Lecture	In person	E		

The 3 credits intended for "Further knowledge" can be acquired in whole or in part through external internships or seminars organized by the Degree Course, possibly with the contribution of external companies; to start an internship you must have obtained at least 80 credits from the master's degree course.

List of propaedeutics: none.

The second year of the course includes three structured paths as shown in the following tables II.1, II.2 and II.3. The student must choose only one of the three path and follow the courses provided in the chosen path.

Year 2: ELECTRIC MOBILITY PATH (Tab. II.1)									
Course Title	SSD	Module	Credits	Semester	Hour	Type of Activities	TAF	Disciplinary area	Mandatory/optional
Propulsione elettrica	IIND-08/AING-IND/32	Module 1: Azionamenti elettrici con progetto di controllo digitale	9	I	72	Lecture /Laboratory	B	Electrical Engineering	Mandatory
		Module 2: Sistemi di accumulo per reti e mobilità	6	I	48				
Sistemi Elettrici per la mobilità	IIND-08/BING-IND/33	Module 1: Pianificazione e Gestione dei Sistemi Elettrici	9	I	72	Lecture /Laboratory	B	Electrical Engineering	Mandatory

		Module 2: Sistemi Elettrici per i Trasporti	6	II	48				
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A.1 Table of curricular choices for ELECTRIC MOBILITY

Course title	SSD	Semester	Credits	Hours	Type of activity	TAF	Disciplinary area	Mandatory /optional
Tecniche e soluzioni innovative per l'efficientamento dei sistemi di trasporto	IIND-08/B ING-IND/33	II	6	48	Lecture /Laboratory	B	Electrical Engineering	Student's choice
Sistemi elettrici di bordo	IIND-08/B ING-IND/33	II	6	48	Lecture /Laboratory	B	Electrical Engineering	Student's choice
Electric and hybrid vehicles (Engl)	IIND-08/A ING-IND/32	II	6	48	Lecture /Laboratory	B	Electrical Engineering	Student's choice
Propulsione ferroviaria	IIND-08/A ING-IND/32	II	6	48	Lecture /Laboratory	B	Electrical Engineering	Student's choice
Misure e collaudi su macchine e impianti elettrici	IMIS-01/B ING-INF/07	II	6	48	Lecture /Laboratory	B	Electrical Engineering	Student's choice

Year 2: ELECTRICAL ENERGY AND SMART GRID PATH (Tab. II.2)

Course Title	SSD	Module	Credits	Semester	Hour	Type of Activities	TAF	Disciplinary area	Mandatory/optional
Generazione da fonti rinnovabili e accumulo dell'energia elettrica	IIND-08/A ING-IND/32	Module 1: Sistemi di generazione fotovoltaica e eolica	6	I	48	Lecture /Laboratory	B	Electrical Engineering	Obbligatorio di orientamento
		Module 2: Sistemi di accumulo per reti e mobilità con project work	9	I	72				
Energia Elettrica e Reti Intelligenti	IIND-08/A ING-IND/33	Module 1: Pianificazione e Gestione dei Sistemi Elettrici	9	I	72	Lecture /Laboratory	B	Electrical Engineering	Obbligatorio di orientamento
		Module 2: Smart Grid e Risorse Energetiche Distribuite	6	II	48				

A.2 Table of curricular choices for ELECTRICITY AND SMART GRID								
Course title	SSD	Semester	Credits	Hours	Type of activity	TAF	Disciplinary area	Mandatory/optional
Modellistica dei Mercati dell'energia elettrica	IIND-08/B ING-IND/33	I	6	48	Lecture /Laboratory	B	Electrical Engineering	Student's choice
Integrazione delle fonti rinnovabili e dei vettori energetici	IIND-08/B ING-IND/33	II	6	48	Lecture /Laboratory	B	Electrical Engineering	Student's choice
Plasmi e fusione termonucleare	IJET-01/A ING-IND/31	II	9	72	Lecture /Laboratory	D	Electrical Engineering	Student's choice (*)
Sensori e Smart Metering	IMIS-01/B ING-INF/07	II	9	72	Lecture /Laboratory	D	Electrical Engineering	Student's choice (*)
Reti elettriche complesse e simulazione circuitale	IJET-01/A ING-IND/31	I	9	72	Lecture /Laboratory	D	Electrical Engineering	Student's choice (*)
Elettronica industriale di potenza	IIND-08/A ING-IND/32	I	6	48	Lecture /Laboratory	B	Electrical Engineering	Student's choice

(*) Recommended as an autonomous choice

Year 2: INDUSTRIAL AND DESIGN PATH (Tab. II.3)									
Course Title	SSD	Module	Credits	Semester	Hour	Type of Activities (lezione frontale, laboratorio ecc.)	TAF	Disciplinary area	Mandatory/optional
Sistemi di generazione e utilizzazione per l'industria	IIND-08/A ING-IND/32	Module 1: Azionamenti elettrici con progetto di controllo digitale	9	I	72	Lecture /Laboratory	B	Electrical Engineering	Obbligatorio di orientamento
		Module 2: Sistemi di generazione fotovoltaica e eolica	6	I	48				
Sistemi Elettrici per l'Industria	IIND-08/B ING-IND/33	Module 1: Metodologie di progettazione e degli impianti elettrici	9	I	72	Lecture /Laboratory	B	Electrical Engineering	Obbligatorio di orientamento
		Module 2: Elettificazione degli usi finali	6	II	48				

A.3 Table of curricular choices for INDUSTRIAL and DESIGN								
Course title	SSD	Semester	Credits	Hours	Type of activity	TAF	Disciplinary area	Mandatory/optional
Modellistica dei Mercati dell'energia elettrica	IIND-08/B ING-IND/33	I	6	48	Lecture /Laboratory	B	Electrical Engineering	Student's choice
Automazione dei Sistemi Elettrici	IIND-08/B ING-IND/33	II	6	48	Lecture /Laboratory	B	Electrical Engineering	Student's choice
Design of electric machines (Engl)	IIND-08/A ING-IND/32	II	6	48	Lecture /Laboratory	B	Electrical Engineering	Student's choice
Modelli numerici per campi, circuiti e sistemi	IJET-01/A ING-IND/31	I	9	72	Lecture /Laboratory	D	Electrical Engineering	Student's choice (*)
Misure e collaudi su macchine e impianti elettrici	IMIS-01/B ING-INF/07	II	6	48	Lecture /Laboratory	B	Electrical Engineering	Student's choice
Elettronica industriale di potenza	IIND-08/A ING-IND/32	I	6	48	Lecture /Laboratory	B	Electrical Engineering	Student's choice
Tecnica e diagnostica di isolamenti in Alta Tensione	IJET-01/A ING-IND/31	II	6	48	Lecture /Laboratory	B	Electrical Engineering	Student's choice

(*) Recommended as an autonomous choice. Offered within the Degree Programme in Electronic Engineering

Tabella B: Additional curricular educational activities chosen by the student (within the “Related and Supplementary Training Activities” area)

Course or Training activity	Credits	Semester	SSD	TAF	Ambito Disciplinare	Propedeuticità
Fondamenti di economia manageriale per l'ingegneria	6	I	ECON-04/A SECS-P/06	C	Related or supplementary activity	
Nozioni giuridiche fondamentali	6	I	GIUR-01/A IUS-01	C	Related or supplementary activity	
Sistemi energetici innovativi	6	I	IIND-06/A ING-IND/08	C	Related or supplementary activity	
Metodi matematici per l'ingegneria	6	I	MATH-03/A MAT/05	C	Related or supplementary activity	
Elementi di meccanica strutturale e del metodo degli elementi finiti	6	II	CEAR-06/A ICAR/08	C	Related or supplementary activity	
Dinamica delle macchine	6	II	IIND-02/A ING-IND/13	C	Related or supplementary activity	
Introduzione alla Fisica quantistica	6	II	FIS/02	C	Related or supplementary activity	
Sistemi elettrochimici avanzati e sostenibili per la transizione energetica	6	II	CHEM-06/A CHIM/07	C	Related or supplementary activity	

As "autonomous-chosen" training activities, the student will be able to draw not only from the teachings in Tables A1, A2, A3, B but also, and for a total of 9 credits, from training activities indicated in the following Table C. These activities are recommended but the student can freely draw from any University teaching consistent with the educational path.

Table C: Recommended choices - "Training activities chosen autonomously by the student"

Course or Training activity	Module (if present)	Credits	SSD	Prerequisites	Hosted within
Any teaching from tables A1, A2, A3, B					
SEMESTER 1					
Dispositivi e sistemi fotovoltaici		9	IINF-01/A ING-INF/01		LM ELN
Quantum circuit electrodynamics and quantum devices (Corso in lingua inglese) cod U4764		9	IJET-01/A ING-IND/31		LM Quantum Science and Engineering (D60-P65) (**)
Economia delle Utilities e delle Infrastrutture		9	ECON-04/A SECS-P/06		LM ELT
Tecnologia, innovazione e management per l'organizzazione di eventi culturali e spettacoli		9	ECON-04/A SECS-P/06		LM ELT
SEMESTER 2					
Misure per la compatibilità elettromagnetica		9	IMIS-01/B ING-INF/07		LM IELN
Controlli non lineari per convertitori e macchine elettriche		3	IIND-08/A ING-IND/32		LM ELT
Micromagnetismo e spintronica		3	IJET-01/A ING-IND/31		LM ELT
Progettazione di controllori industriali robusti e applicazioni		6	IINF-04/A		LM AUT/ROB
Foundations of Robotic (in lingua inglese)		9	IINF-04/A		LM AUT/ROB
Reti Wireless		9	IINF-03/A ING-INF/03		LM TELMD
Electrical technologies for smart infrastructures	Smart technologies for new power infrastructures	3	IIND-08/B ING-IND/33		LM ELT
	Measurements for infrastructure monitoring	3	IMIS-01/B ING-INF/07		LM ELT
Electrical technologies for the ecological transition	Electric mobility and generation from renewables	4	IIND-08/A ING-IND/32		LM ELT
	Electric energy storage	2	IJET-01/A ING-IND/31		LM ELT

Note:

- It is not possible to include in the study plans as "curricular activities chosen from Tables A.1, A.2, A.3 and "autonomously chosen by the student" more than one course in the same scientific-disciplinary sector (SSD).
- The "compulsory orientation" courses and the "further elective orientation courses" must be selected within the same orientation.
- Courses marked with (Engl) are taught in English.

** P65 for Academic Year 26/27, D60 for the successive years.

The inclusion of any of the courses in Table C as an activity of the student's independent choice and compliance with the instructions in Notes a) and b) make the study plan automatically approved. In other cases the plan must be specifically approved by the Educational Coordination Commission of the Course

of Studies.

It is explicitly noted that:

- Students who have not taken the "Mathematical methods for engineering" exam, or an equivalent, in the degree course of origin, must necessarily include this teaching (6 CFU) in the study plan within the subject " Similar/integrative".
- The student cannot take an exam already taken during the Degree Course during the Master's Degree Course.

ENGINEERING FOR TRANSITIONS

Recognition of educational activities carried out within the interdisciplinary training pathways "Minor IT"

Students enrolled in the Master's Degree Programme in Electrical Engineering may participate in the interdisciplinary educational pathways "Minor IT – Green Technologies" and "Minor IT – Smart Infrastructures", activated by the University within the inter-university flagship project "Engineering for Transitions".

Each minor is awarded upon completion of at least 30 ECTS credits of dedicated educational activities, normally including 12 extra-curricular ECTS credits. Participation in the project requires the submission of an individual Study Plan indicating the courses selected for the minor pathway. The Study Plan will be evaluated and approved by the Degree Programme Committee in accordance with the eligibility criteria established by the Committee through a specific resolution.