



POLYTECHNIC UNIVERSITY OF BARI

CLASS LM-32 COMPUTER ENGINEERING

**DIDACTIC REGULATIONS OF THE MASTER'S DEGREE COURSE
IN**

**COMPUTER SCIENCE ENGINEERING
(2ND DEGREE COURSE)**

Courses will be delivered in English

www.poliba.it

BARI

POLYTECHNIC UNIVERSITY OF BARI

**LM-32 CLASS OF MASTER'S DEGREES IN
COMPUTER ENGINEERING**

**MASTER'S DEGREE COURSE IN
COMPUTER ENGINEERING**

ACADEMIC REGULATIONS A.Y. 2024/25

A) TEACHING STRUCTURE

MASTER'S DEGREE PROGRAMME IN COMPUTER ENGINEERING

Class LM-32 – Master's Degree in Computer Engineering

Academic Regulations – A.Y. 2026/2027

Affiliated Teaching Structure

Department of Electrical and Information Engineering
University Campus "Ernesto Quagliariello"
via Orabona 4, Bari – Italy

Head of the Department

Prof. Ing. Francesco Prudeniano

Programme Coordinator

Prof. Fedelucio Narducci

Language of Instruction

All courses of the Master's Degree Programme in Computer Engineering are delivered in English.

Reference Websites

Politecnico di Bari: <http://www.poliba.it>

Department of Electrical and Information Engineering: <http://dei.poliba.it/>

B) CURRICULA OFFERED

The Master's Degree Programme in Computer Engineering offers the following curricula:

- Artificial Intelligence and Data Science
- Cybersecurity and Cloud
- Cyberphysical Systems

Each curriculum is designed to offer a coherent and in-depth educational pathway, combining solid core disciplinary knowledge with advanced and specialized courses aligned with current technological developments and research trends.

Students are required to choose one curriculum upon enrolment. The selected curriculum determines the set of mandatory and elective courses included in the individual study plan.

Rules for Submitting Individual Study Plans

Students must submit an individual study plan in accordance with the selected curriculum. The study plan shall comply with the structure, credit allocation, and constraints defined by the Degree Programme and laid down in the official teaching regulations.

Any request for deviations from the standard curriculum structure, including the selection of courses not explicitly listed among the available options, must be duly justified and submitted for approval to the Teaching Committee of the Master's Degree Programme. Approval is granted on the basis of the coherence of the proposed study plan with the educational objectives and learning outcomes of the Programme.

C) SPECIFIC TRAINING OBJECTIVES

KNOWLEDGE, SKILLS AND PROFESSIONAL PROFILES

Specific Learning Objectives

The Master's Degree Programme in Computer Engineering aims to educate engineers who are capable not only of addressing traditional engineering problems using established methods and tools, but also of developing and applying innovative solutions to emerging and complex challenges.

Graduates will be able to conceive, design, implement, and manage complex systems and services through the integration of information technologies, telecommunications, automation, and advanced computational methodologies. Achieving these objectives requires a strong aptitude for research, innovation, and continuous learning.

Master's Degree graduates in Computer Engineering will therefore acquire an in-depth scientific and technical education, supported by a broad interdisciplinary background. This preparation enables them to effectively interact with specialists from different engineering fields as well as from the economic and management domains, and to tackle complex problems by adopting advanced and innovative technological solutions.

The Programme aims to consolidate and deepen the knowledge previously acquired at Bachelor's level, while also providing advanced expertise in specific areas of Computer Engineering, including artificial intelligence, data science, cybersecurity, cloud computing, automation of cyber-physical systems, and large-scale information systems.

Taking into account the inherently interdisciplinary nature of Computer Engineering, as well as the need for advanced specialization in selected domains, the Programme includes courses focused on the design and implementation of complex information systems, automation of cloud-based and cyber-physical services, secure and resilient system architectures, process modelling and automation, as well as the development of intelligent and data-driven systems.

In addition to foundational competencies, graduates will acquire specialized skills related to one of the three curricula offered, allowing them to develop a professional profile aligned with current and emerging technological scenarios.

Knowledge and Understanding

Graduates will acquire advanced knowledge and understanding that consolidates and extends the competencies developed during the Bachelor's Degree. They will gain broad expertise in Computer Engineering and a solid understanding of related disciplines, while also developing advanced and specialized knowledge in selected cutting-edge areas.

These learning outcomes are achieved through characterizing, related, and supplementary courses, particularly those of a formal and methodological nature, and are assessed through the corresponding examinations. The learning process combines theoretical lectures, practical exercises, seminars, and laboratory activities, including work with complex hardware and software systems.

A fundamental component of the educational path is the preparation of the Master's thesis, which requires the development of an original work of a theoretical, experimental, or design-oriented nature, contributing to the acquisition of critical awareness of recent advancements in Computer Engineering.

The skills acquired will enable graduates to effectively participate in and lead interdisciplinary teams engaged in the development of innovative information systems and services.

Ability to Apply Knowledge and Understanding

Graduates will be able to apply their knowledge to the analysis, design, implementation, testing, and management of complex information systems, with full awareness of the interaction between software and underlying hardware architectures.

They will be capable of addressing high-complexity problems in Computer Engineering contexts, integrating knowledge across different disciplines, and operating autonomously in multidisciplinary environments. These competencies are developed through courses that emphasize conceptual reasoning, system design, technical reporting, and experimental activities.

Graduates will also demonstrate a deep understanding of the techniques adopted in practice, including their applicability and limitations.

Autonomy of Judgment

Graduates will possess the ability to design and conduct analytical investigations using models and experimental methods, critically evaluate obtained data, and draw informed conclusions.

They will be able to assess and adopt emerging technologies in the field of Information Engineering, with particular reference to Computer Engineering. Teaching activities are designed to foster active participation through examples, applications, individual and group work, and experimental tests.

Advanced courses may also include laboratory activities conducted in collaboration with industrial partners, allowing students to develop teamwork skills and critical analysis capabilities. These competencies enable graduates to make autonomous decisions in complex projects and contribute actively to decision-making processes in multidisciplinary contexts.

Communication Skills

Graduates will be able to communicate effectively, both orally and in writing, with specialist and non-specialist audiences on disciplinary and interdisciplinary topics.

They will be capable of clearly presenting technical knowledge, project outcomes, and designed solutions, using appropriate technical language and, where necessary, multimedia and digital tools. These skills are acquired through course assessments that involve discussion of design projects and through the preparation and defense of the final thesis.

Learning Skills

Graduates will develop lifelong learning skills that allow them to adapt to technological innovation and the evolving demands of the labour market, particularly in the field of Information Engineering.

They will be aware of issues related to risk management, change management, and continuous professional development, and will be capable of autonomously acquiring new knowledge throughout their professional careers. Teaching methodologies based on problem analysis and solution, interdisciplinary integration, and group discussion support the development of these competencies, which are further strengthened through thesis work and internship activities in research or industrial environments, both nationally and internationally.

Professional Profiles of Reference

Graduates in Computer Engineering will be qualified to operate in a wide range of application domains, including smart systems and smart cities, digitalisation of cultural heritage and buildings, automation of services in public and private organisations, robotics, e-business, cloud-based information systems, multimedia applications, cybersecurity, Internet of Things, artificial intelligence, and safety-critical systems.

Functions in a Work Context

Graduates typically operate in roles related to innovation, advanced design, planning, development, and management of complex systems. Employment opportunities are found in

both freelance professional practice and in private and public organisations, including manufacturing and service companies, public administrations, and research institutions.

Skills Associated with Professional Functions

Graduates will be capable of:

- designing and implementing complex information systems for industrial, commercial, and service sectors;
- automating innovative services for public administrations and enterprises;
- modelling environments and automating complex processes and integrated systems;
- developing artificial intelligence-based systems;
- addressing cybersecurity challenges at different system levels;
- designing complex information and telecommunication architectures.

Career Opportunities

Graduates may find employment in hardware and software industries, Industry 4.0 contexts, cloud and information system companies, IT service providers for public administration, and public or private research laboratories.

The Master's Degree Programme in Computer Engineering prepares graduates for the professional profile of **Information Engineer (second level)**. Access to the profession requires passing the State Examination and registration with the Professional Order of Engineers, Section A – Information Engineering.

Graduates may also apply for admission to PhD programmes, representing the third level of university education, aimed at the preparation of highly qualified professionals and researchers.

D) LIST OF COURSES DIVIDED BY YEAR WITH AN INDICATION OF THE TYPE OF TRAINING ACTIVITY, THE DISCIPLINARY FIELD, THE SCIENTIFIC DISCIPLINARY SECTORS OF REFERENCE, ANY DIVISION INTO MODULES AND THE CREDITS ASSIGNED FOR EACH COURSE OR MODULE

The educational activities provided to achieve the learning objectives of the Master's Degree Programme in Computer Engineering all belong to the Disciplinary Area (AD) of Computer Engineering, which represents the sole characterizing area of the LM-32 class of Master's Degrees in Computer Engineering.

The disciplinary field of Computer Engineering encompasses a set of scientifically and professionally homogeneous Scientific Disciplinary Sectors (SSDs), which group together subjects belonging to the same scientific area. In addition to the characterizing training activities, the Programme includes related and supplementary educational activities, aimed at completing and integrating the core educational path.

The Master's Degree Programme also includes educational activities independently chosen by the student, provided that they are consistent with the educational objectives of the Programme, as well as training activities related to the preparation of the final examination, activities aimed at

deepening knowledge of at least one foreign language, and additional training activities intended to strengthen transversal and professional skills.

Some courses may be organised into modules; however, the final assessment is unified. The credits assigned to each course are acquired by passing the corresponding examination or through other forms of assessment of learning outcomes, as specified in the teaching regulations. All courses are delivered in English.

The curriculum includes the educational activities detailed in the tables below, classified as characterizing, related or supplementary training activities, and other educational activities.

Educational activities	Subject areas	SSD	TEACHING SUBJECTS	POSSIBLE ARTI-BREAKFAST IN MODULES	ECTS Module	ECTS Course	YEAR
Characterizing	Computer Engineering	ING-INF/05	Information System Design and Big Data		12	12	II
		ING-INF/05	Foundations of Machine Learning		6	6	I
		ING-INF/05	Ambient Intelligence	Web Engineering	6	12	II
				Cyberphysical Systems	6		
		Curriculum Artificial Intelligence and Data Science					
	Computer Engineering	ING-INF/05	Information Retrieval and Personalization		6	6	II
		ING-INF/05	Deep Learning		6	6	I
		ING-INF/05	Formal Languages and Compilers		6	6	I
		ING-INF/05	Agent-based Artificial Intelligence		6	6	I
		ING-INF/05	Computer Vision	Artificial Vision	6	12	I
				Image processing	6		
	Curriculum Cybersecurity and Cloud						
	Computer Engineering	ING-INF/04	Control of Networks Systems		6	6	I
		ING-INF/05	Deep Learning		6	6	I
		ING-INF/05	Software architecture and pattern design		6	6	I
		ING-INF/05	Secure Programming Laboratory		6	6	I
		ING-INF/05	Information Systems Security and Privacy		6	6	II
	Curriculum Cyberphysical Systems						
	Computer Engineering	ING-INF/04	Artificial Intelligence for Automation		6	6	I
		ING-INF/05	Software architecture and pattern design		6	6	I
		ING-INF/05	Human-Machine Interaction & Data Visualization		6	6	II
		ING-INF/05	Computer Vision	Artificial Vision	6	12	I
				Image processing	6		
		ING-INF/05	Engineered Intelligent Systems		6	6	I
	OFFER OF CHARACTERIZING TRAINING ACTIVITIES				108	108	
	CFU CORE EDUCATIONAL ACTIVITIES				66	66	

Educational activities	Subject areas	SSD	TEACHING SUBJECTS	POSSIBLE ARTI-BREAKFAST IN MODULES	ECTS Module	ECTS Course	YEAR
	Related and supplementary training activities	ING-IND/35	Digital Business		6	6	I
	Curriculum Artificial Intelligence and Data Science						
Educational activities	Subject areas	SSD	TEACHING SUBJECTS	POSSIBLE ARTI-BREAKFAST IN MODULES	ECTS Module	ECTS Course	YEAR
	Related and supplementary training activities	MAT/08	Statistical and Mathematical Methods for Artificial Intelligence		6	6	I
		ING-INF/03	Internet of Things		6	6	I
	Curriculum Cybersecurity and Cloud						
	Related and supplementary training activities	MAT/03	Cryptography		6	6	I
		ING-INF/03	Security by Design	Network Security	6	12	I
				Ethical Hacking Laboratory	6		I
	Curriculum Cyberphysical Systems						
	Related and supplementary training activities	ING-INF/07	Advanced data acquisition and intelligent data processing		6	6	I
		ING-INF/01	Digital Programmable Systems		6	6	I
	OFFER OF RELATED OR SUPPLEMENTARY ACTIVITIES				48*	48*	
	CFU FORRELATED OR SUPPLEMENTARY ACTIVITIES				18	18	
TOTAL CREDITS CHARACTERIZING, RELATED OR SUPPLEMENTARY ACTIVITIES				84	84		

Educational activities	Subject areas		TEACHING	ECTS	YEAR
Other training activities	Choice			6*	I
	Choice			6*	II
	For the final exam and the foreign language	For the final exam		18	II
		For knowledge of at least one foreign language			II
	Further training activities	Training and orientation internships		6	II
	TOTAL CREDITS OTHER EDUCATIONAL ACTIVITIES			36	
TOTAL CREDITS CHARACTERIZING, RELATED OR SUPPLEMENTARY ACTIVITIES, OTHER EDUCATIONAL ACTIVITIES				120	

* Among the elective courses is the discipline of Satellite Systems for Remote sensing and Geolocation FIS/01 – 6CFU

LIST OF COURSES DIVIDED BY YEAR AND SEMESTER

The courses are divided by year. Since the academic year is divided into semesters, the courses have semester development.

I year: Curriculum Artificial Intelligence and Data Science

FIRST SEMESTER		SECOND SEMESTER	
COURSES	ECTS (CFU)	COURSES	ECTS (CFU)
Statistical and Mathematical Methods for Artificial Intelligence (AF: similar or integrative, AD: Related or supplementary training activities, SSD: MAT/08)	6	Formal Languages and Compilers (AF: characterizing, AD: Computer Engineering, SSD: ING-INF/05)	6
Computer Vision 1st module: Image Processing (AF: characterizing, AD: Computer Engineering, SSD: INGINE/05)	6	Agent-based Artificial Intelligence (AF: characterizing, AD: Computer Engineering, SSD: ING-INF/05)	6

Computer Vision 2nd module: Artificial Vision (AF: characterizing, AD: Computer Engineering, SSD: INGINF/05)	6	Digital Business (AF: related or integrative, AD: Related or supplementary training activities, SSD: ING-IND/35)	6
Foundations of Machine Learning (AF: characterizing, AD: Computer Engineering, SSD: INGINF/05)	6	Deep Learning (AF: characterizing, AD: Computer Engineering, SSD: ING-INF/05)	6
Internet of Things (AF: related or integrative, AD: Related or supplementary training activities, SSD: ING-INF/03)	6	Elective course	6
TOTAL NUMBER OF ECTS <i>(TOTAL CFU)</i>	30	TOTAL NUMBER OF ECTS <i>(TOTAL CFU)</i>	30

II year: Curriculum Artificial Intelligence and Data Science

FIRST SEMESTER		SECOND SEMESTER	
COURSES	ECTS <i>(CFU)</i>	COURSES	ECTS <i>(CFU)</i>
Information Retrieval and Personalization (AF: characterizing, AD: Computer Engineering, SSD: ING-INF/05)	6	Elective course	6
Information Systems Design and Big Data (AF: characterizing, AD: Computer Engineering, SSD: INGINF/05)	12	Internship	6
Ambient Intelligence 1st module: Cyberphysical Systems (AF: characterizing, AD: Computer Engineering, SSD: INGINF/05)	6	Final Examination	18
Ambient Intelligence 2nd module: Web Intelligence (AF: characterizing, AD: Computer Engineering, SSD: INGINF/05)	6		
TOTAL NUMBER OF ECTS <i>(TOTAL CFU)</i>	30	TOTAL NUMBER OF ECTS <i>(TOTAL CFU)</i>	30

I year: Cybersecurity and Cloud Curriculum

FIRST SEMESTER		SECOND SEMESTER	
COURSES	ECTS <i>(CFU)</i>	COURSES	ECTS <i>(CFU)</i>
Cryptography (AF: similar or integrative, AD: Related or supplementary training activities, SSD: MAT/03)	6	Secure Programming Laboratory (AF: characterizing, AD: Computer Engineering, SSD: ING-INF/05)	6
Control of Networks Systems (AF: characterizing, AD: Computer Engineering, SSD: INGINF/04)	6	Security by Design: 2nd module: Ethical Hacking Laboratory (AF: related or integrative, AD: Related or supplementary training activities, SSD: ING-INF/03)	6
Software Architecture and Pattern Design (AF: characterizing, AD: Computer Engineering, SSD: INGINF/05)	6	Digital Business (AF: related or integrative, AD: Related or supplementary training activities, SSD: ING-IND/35)	6
Foundations of Machine Learning (AF: characterizing, AD: Computer Engineering, SSD: INGINF/05)	6	Deep Learning (AF: characterizing, AD: Computer Engineering, SSD: ING-INF/05)	6
Security by Design 1st module: Network Security (AF: related or integrative, AD: Related or supplementary training activities, SSD: ING-INF/03)	6	Elective course	6
TOTAL NUMBER OF ECTS <i>(TOTAL CFU)</i>	30	TOTAL NUMBER OF ECTS <i>(TOTAL CFU)</i>	30

II year: Cybersecurity and Cloud Curriculum

FIRST SEMESTER		SECOND SEMESTER	
COURSES	ECTS (CFU)	COURSES	ECTS (CFU)
Information Systems Security and Privacy (AF: characterizing, AD: Computer Engineering, SSD: ING-INF/05)	6	Elective course	6
Information Systems Design and Big Data (AF: characterizing, AD: Computer Engineering, SSD: INGINF/05)	12	Internship	6
Ambient Intelligence 1st module: Cyberphysical Systems (AF: characterizing, AD: Computer Engineering, SSD: INGINF/05)	6	Final Examination	18
Ambient Intelligence 2nd module: Web Intelligence (AF: characterizing, AD: Computer Engineering, SSD: INGINF/05)	6		
TOTAL NUMBER OF ECTS (TOTAL CFU)	30	TOTAL NUMBER OF ECTS (TOTAL CFU)	30

I year: Curriculum Cyberphysical Systems

FIRST SEMESTER		SECOND SEMESTER	
COURSES	ECTS (CFU)	COURSES	ECTS (CFU)
Software Architecture and Pattern Design (AF: characterizing, AD: Computer Engineering, SSD: INGINF/05)	6	Artificial Intelligence for Automation (AF: characterizing, AD: Computer Engineering, SSD: ING-INF/04)	6
Computer Vision 1st module: Image Processing (AF: characterizing, AD: Computer Engineering, SSD: INGINF/05)	6	Engineered Intelligent Systems (AF: characterizing, AD: Computer Engineering, SSD: ING-INF/05)	6
Computer Vision 2nd module: Artificial Vision (AF: characterizing, AD: Computer Engineering, SSD: INGINF/05)	6	Digital Business (AF: related or integrative, AD: Related or supplementary training activities, SSD: ING-IND/35)	6
Advanced Data Acquisition and Intelligent Data Processing (AF: related or integrative, AD: Related or supplementary training activities, SSD: ING-INF/07)	6	Digital Programmable Systems (AF: similar or integrative, AD: Related or supplementary training activities, SSD: ING-INF/01)	6
Foundations of Machine Learning (AF: characterizing, AD: Computer Engineering, SSD: INGINF/05)	6	Elective course	6
TOTAL NUMBER OF ECTS (TOTAL CFU)	30	TOTAL NUMBER OF ECTS (TOTAL CFU)	30

II year: Curriculum Cyberphysical Systems

FIRST SEMESTER		SECOND SEMESTER	
COURSES	ECTS (CFU)	COURSES	ECTS (CFU)
Ambient Intelligence 1st module: Cyberphysical Systems (AF: characterizing, AD: Computer Engineering, SSD: INGINF/05)	6	Elective course	6
Ambient Intelligence 2nd module: Web Intelligence (AF: characterizing, AD: Computer Engineering, SSD: INGINF/05)	6	Internship	6
Information Systems Design and Big Data (AF: characterizing, AD: Computer Engineering, SSD: INGINF/05)	12	Final Examination	18
Human-Machine Interaction and Data Visualization (AF: characterizing, AD: Computer Engineering, SSD: ING-INF/05)	6		
TOTAL NUMBER OF ECTS (TOTAL CFU)	30	TOTAL NUMBER OF ECTS (TOTAL CFU)	30

As part of the "Cyberphysical Systems" curriculum, the course of "Satellite Systems for Remote sensing and Geolocation" FIS/01 – 6CFU has been activated among the elective disciplines

The standard duration of the Master's Degree Programme is two years for full-time students.

Part-time students, who do not have full availability to devote to their studies, may opt, at the time of enrolment or during subsequent academic years, for a reduced study path corresponding to a number of credits ranging from **24 to 36 ECTS per year**, instead of the standard full-time workload of **60 ECTS per year**.

A student who has attended the educational activities planned for the final year is considered *out of course* if he or she has not acquired the total number of credits required to obtain the degree.

The amount of annual tuition fees for part-time students is determined by the Board of Directors in accordance with current regulations.

Students enrolled in the Master's Degree Programme in Computer Engineering who intend to undertake a part-time study path must submit a specific request to the competent Teaching Committee. The request will be evaluated and approved within the deadlines established by the Academic Senate, provided that the proposed study path is compatible with the organisational structure of full-time teaching or that specific organisational arrangements can be adopted.

E) PREREQUISITES

There are no prerequisites for the examinations of the Master's Degree Programme in Computer Engineering.

Students who are regularly enrolled and in good standing with their administrative position may take all examinations without limitations, in compliance with attendance requirements and within the examination sessions scheduled by the competent teaching structure. Examination sessions are normally not fewer than eight per academic year and are spaced by intervals of no less than fifteen days.

For students who are not progressing according to the prescribed study plan, examination sessions are usually scheduled on a monthly basis.

F) TYPE OF TEACHING FORMS ADOPTED AND METHODS OF ASSESSMENT OF PREPARATION

Type of Teaching Forms

In accordance with the relevant national and university regulations, one university training credit (ECTS) corresponds to **25 hours of student workload**. This workload includes both the hours devoted to lectures, exercises, laboratory activities, seminars, and other educational activities provided for in the teaching regulations, and the individual study time and personal commitment

required to complete the learning activities, pass examinations, or carry out training activities not directly supervised by university teaching staff.

Teaching activities are structured so as to ensure a balanced combination of theoretical instruction and practical learning, with the aim of fostering the acquisition of solid methodological knowledge, operational skills, and critical thinking abilities.

Methods of Assessment of Preparation

Examinations are aimed at assessing the level of knowledge, understanding, and maturity achieved by students with reference to the learning objectives of each course and to the educational pathway followed.

To be admitted to examinations, students must be regularly enrolled in the current academic year and must have attended the relevant courses, in accordance with the procedures established by the competent teaching structure. Examinations may consist of oral tests, written tests, or a combination of both, depending on the assessment methods specified for each course.

Oral examinations are public. In the case of written examinations, students are entitled to review their corrected papers, in accordance with university regulations.

The teaching methods adopted and the corresponding assessment methods for each course are detailed in the table below, which specifies the distribution of teaching hours, laboratory activities, other educational activities, and the modalities for verifying learning outcomes.

TEACHING METHODS ADOPTED AND METHODS OF ASSESSMENT OF PREPARATION

AF	TEACHING	MODULES	HOURS RESERVED FOR THE STUDY STAFF	LESSONS		LABORATORY		EXERCISES, SEMINARS, INTERNSHIPS		ASSESSMENT METHODS
				ECTS	HOURS IN THE CLASSROOM	ECTS	LABORATORY HOURS	ECTS	OTHER HOURS	
CHARACTERIZING	Formal Languages and compilers		94	4.5	36	0	0	1.5	24	SOS
	Human-Machine Interaction and Data Visualization		94	4.5	36	0	0	1.5	24	SOS
	Computer Vision	Image processing	94	4.5	36	0	0	1.5	24	SOS
		Artificial Vision	94	4.5	36	0	0	1.5	24	SOS
	Foundations of Machine Learning		94	4.5	36	0	0	1.5	24	SOS
	Agent-based Artificial Intelligence		94	4.5	36	0	0	1.5	24	SOS
	Software Architecture and Pattern Design		94	4.5	36	0	0	1.5	24	SOS
	Information Systems Design and Big Data		188	9	72	0	0	3	48	SOS
	Ambient Intelligence	Cyberphysical Systems	94	4.5	36	0	0	1.5	24	SOS
		Web Intelligence	94	4.5	36	0	0	1.5	24	SOS
	Deep Learning		94	4.5	36	0	0	1.5	24	SOS
	Information Retrieval and Personalization		94	4.5	36	0	0	1.5	24	SOS
	Secure Programming Laboratory		94	4.5	36	0	0	1.5	24	SOS
	Information Systems Security and Privacy		94	4.5	36	0	0	1.5	24	SOS
	Engineered Intelligent Systems		94	4.5	36	0	0	1.5	24	SOS
	Artificial Intelligence for Automation		94	4.5	36	0	0	1.5	24	SOS
	Control of Networks Systems		94	4.5	36	0	0	1.5	24	SOS
RELATED SUPPLEMENTA	Digital Programmable Systems		94	4.5	36	0	0	1.5	24	SOS
	Advanced Data Acquisition and Intelligent Data Processing		94	4.5	36	0	0	1.5	24	SOS
	Statistical and Mathematical Methods for Artificial Intelligence		94	4.5	36	0	0	1.5	24	SOS
	Cryptography		94	4.5	36	0	0	1.5	24	SOS
	Digital Business		94	4.5	36	0	0	1.5	24	SOS
	Ethical Hacking Laboratory		94	4.5	36	0	0	1.5	24	SOS

OTHER ACTIVITIES	Network Security		94	4.5	36	0	0	1.5	24	SOS
	Internet of Things		94	4.5	36	0	0	1.5	24	SOS
	Satellite Systems for Remote sensing and Geolocation [Elective course]		94	4.5	36	0	0	1.5	24	SOS

Key to how to verify preparation:

O=Oral – S=written – SOC= joint written and oral – SOS = separate written and oral – UD = partial tests on the teaching units.

Approved by the Department Council on 10/05/2022

G) ELECTIVE ACTIVITIES AND THEIR TOTAL NUMBER OF CREDITS

Elective courses are chosen independently by each student from among all the courses activated at the Politecnico di Bari, provided that they are consistent with the educational objectives of the Master's Degree Programme.

The acquisition of additional educational credits in basic, related, and supplementary disciplines is also permitted. The total number of credits assigned to elective activities is **12 ECTS**.

Among the elective courses, students may select the course **Satellite Systems for Remote Sensing and Geolocation (FIS/01 – 6 ECTS)**, which is included among the Other Educational Activities and delivered in the first semester of the first year.

Requests for the inclusion of elective examinations from degree programmes offered by the Department of Electrical and Information Engineering are normally considered automatically approved. Elective examinations may be taken starting from the first semester of the first year of the programme, regardless of their position within the original study plan.

H) OTHER EDUCATIONAL ACTIVITIES AND RELATED CREDITS

TRAINING AND ORIENTATION INTERNSHIPS

The Master's Degree Programme in Computer Engineering provides **6 ECTS** for training and orientation internship activities. Upon request submitted to the competent teaching structure, these activities may also be carried out as part of the activities foreseen for the final examination.

I) METHODS FOR VERIFYING OTHER REQUIRED SKILLS AND RELATED CREDITS

Graduates who do not fully meet the required curricular requirements may supplement their educational background by enrolling in individual courses and passing the corresponding examinations.

The assessment methods and the related credits are those established for the individual courses that the student intends to take in order to integrate his or her curriculum.

J) METHODS FOR VERIFYING THE RESULTS OF INTERNSHIPS AND STUDY PERIODS ABROAD AND RELATED CREDITS

Methods for Verifying Internship Results

Internship activities may be carried out at public or private institutions officially recognised through a specific agreement with the Politecnico di Bari. Internship activities are performed under the supervision of a university tutor, who agrees with the host institution on the content and schedule of the activities to be carried out.

The completion of the internship is certified by a written report prepared by the student, accompanied by a positive final evaluation issued by the host institution and jointly validated by the university tutor.

Assessment Methods for Study Periods Abroad

The recognition of study periods completed abroad within student mobility programmes (such as Socrates/Erasmus or other programmes recognised by universities of the European Union) is governed by the regulations of the respective programmes.

Recognition becomes effective following approval, or, in the case of bilateral agreements, ratification by the competent teaching structure.

K) METHODS FOR VERIFYING KNOWLEDGE OF FOREIGN LANGUAGES AND RELATED CREDITS

For admission to the Master's Degree Programme in Computer Engineering, students must demonstrate adequate knowledge of the English language, at a level not lower than **B2** of the Common European Framework of Reference for Languages.

The Student Secretariat verifies the possession of these language skills at the time of enrolment. Students holding a recognised B2 or higher language certification must submit a copy of the certificate among the required enrolment documents.

Students who do not possess such certification must demonstrate the required level of competence within the deadline established by the Academic Senate, either by presenting a recognised language certification obtained after enrolment or by passing a specific examination at the University Language Centre.

Native English speakers are exempt from the requirement to provide certification or undergo verification of language proficiency.

L) CREDITS AWARDED FOR THE FINAL EXAMINATION AND CHARACTERISTICS OF THE FINAL TEST

Students who have acquired **120 ECTS**, including those related to the preparation of the final examination, are admitted to take the final examination in order to obtain the degree.

The Master's thesis consists of an original work carried out by the student under the supervision of a thesis advisor and may be of a theoretical, experimental, or design-oriented nature. The preparation of the final examination is normally awarded **12 ECTS**.

In the case of an approved individual study plan, up to **18 ECTS** may be attributed to activities related to the preparation of the final examination. In addition, the internship activity of **6 ECTS** may be included.

Requests for the attribution of a higher number of credits for the final examination must be submitted through the individual study plan within the deadlines established by the Academic Senate and are

subject to approval by the competent teaching structure, provided that they are consistent with the educational objectives of the Programme.

M) POSSIBLE DELIVERY OF THE PROGRAMME IN A FOREIGN LANGUAGE

All courses of the Master's Degree Programme in Computer Engineering are delivered in English. Seminars are generally held in English and are often delivered by international experts.

N) CASES IN WHICH THE FINAL EXAMINATION MAY BE HELD IN A FOREIGN LANGUAGE

The final examination may be held in English upon request by the student. Such a request must be approved by the thesis advisor and submitted to the Head of the competent teaching structure.

O) CRITERIA AND PROCEDURES FOR THE RECOGNITION OF PREVIOUS KNOWLEDGE AND PROFESSIONAL ACTIVITIES

The recognition of university credits for certified professional knowledge and skills, as well as for other competencies acquired through post-secondary educational activities in which a university institution has participated, is permitted up to a maximum of **12 ECTS**, in accordance with current legislation.

Requests for credit recognition must be submitted through the individual study plan and are subject to evaluation and approval by the competent teaching structure within the deadlines established by the Academic Senate, provided that they are consistent with the educational objectives of the Programme.

P) STUDENT ATTENDANCE REQUIREMENTS

Regular attendance of lectures and laboratory activities is strongly recommended.

Q) ADMISSION REQUIREMENTS AND ASSESSMENT METHODS

Admission Requirements

Admission to the Master's Degree Programme in Computer Engineering requires possession of a Bachelor's degree or another equivalent academic qualification obtained in Italy or abroad and recognised as suitable.

Admission is subject to verification of curricular requirements and assessment of the adequacy of individual preparation.

Curricular Requirements

Applicants must have acquired at least **48 ECTS** in the Scientific Disciplinary Sectors listed in these regulations, covering core areas of engineering, computer science, mathematics, physics, and related disciplines.

Any curricular integrations must be completed by enrolling in individual courses and passing the corresponding examinations. Admission with educational debts is not permitted.

Adequate knowledge of the English language at level B2 or higher is also required.

Assessment of Individual Preparation

The adequacy of individual preparation is normally assessed through evaluation of the final examination of the Bachelor's Degree (or equivalent foreign qualification). Individual preparation is considered adequate unless otherwise communicated by the Programme Coordinator.

R) TRANSFER PROCEDURES FROM OTHER DEGREE PROGRAMMES

Transfers from other degree programmes or universities are permitted in accordance with the deadlines established by the Academic Senate, subject to verification of curricular requirements and, if necessary, assessment of individual preparation through interviews.

Credits already acquired may be recognised by the competent teaching structure on the basis of equivalence between courses and subject areas. In the case of recognised examinations, the original grades will be retained.

S) TEACHING STAFF AND REQUIREMENTS

The teaching staff of the Master's Degree Programme in Computer Engineering is adequate in terms of number and qualifications to ensure achievement of the Programme's learning objectives.

Courses corresponding to more than **60 ECTS** are taught by tenured professors or researchers of the Politecnico di Bari, belonging to the relevant Scientific Disciplinary Sectors. The requirements concerning teaching coverage and faculty qualifications, as established by current regulations, are fully met.

MASTER'S DEGREE IN COMPUTER ENGINEERING

TEACHING	MODULES	ECTS	SSD	TEACHER		ROLE POLIBA	QUALIFICATION
				NAME	SSD		
Formal Languages and Compilers		6	ING-INF/05	SCIOSCIA Floriano	ING-INF/05	Yes	PA
Human-Machine Interaction and Data Visualization		6	ING-INF/05				
Foundations of Machine Learning		6	ING-INF/05	DI NOIA Tommaso	ING-INF/05	Yes	PO
Computer Vision	Image processing	6	ING-INF/05	WARRIOR Andrea	ING-INF/05	Yes	PA
	Artificial Vision	6	ING-INF/05	MARINO Francescomaria		Yes	PA
Information Systems Design and Big Data		12	ING-INF/05	COLUCCI Simona	ING-INF/05	Yes	PA
Information Systems Security and Privacy		6	ING-INF/05		ING-INF/05		
Secure Programming Laboratory		6	ING-INF/05				
Information Retrieval and Personalization		6	ING-INF/05	NARDUCCI Fedelucio	ING-INF/05	Yes	PO
Software Architecture and Pattern Design		6	ING-INF/05	MONGIELLO Marina	ING-INF/05	Yes	PA
Digital Programmable Systems		6	ING-INF/01	COVIELLO Giuseppe	ING-INF/01	Yes	RUTD
Deep Learning		6	ING-INF/05	RINGS Vito Walter	ING-INF/05	Yes	RUTD
Agent-based Artificial Intelligence		6	ING-INF/05	DI NOIA Tommaso	ING-INF/05	Yes	PO
Ambient Intelligence	Cyberphysical Systems	12	ING-INF/05	SCIOSCIA Floriano	ING-INF/05	Yes	PA
	Web Intelligence			RUTA Michele		Yes	PO
Engineered Intelligent Systems		6	ING-INF/05	DI LECCE Vincenzo	ING-INF/05	Yes	PA
Statistical and Mathematical Methods for Artificial Intelligence		6	MAT/08	POPOLIZIO Marina	MAT/08	Yes	PA
Cryptography		6	MAT/03	AGUGLIA Angela	MAT/03	Yes	PA
Artificial Intelligence for Automation		6	ING-INF/04	FANTI Maria Pia	ING-INF/04	Yes	PO
Control of Networks Systems		6	ING-INF/04	MASCOLO Saverio	ING-INF/04	Yes	PO
Advanced Data Acquisition and Intelligent Data Processing		6	ING-INF/07	DI NISIO Attilio	ING-INF/07	Yes	PA
Satellite Systems for Remote sensing and Geolocation [Elective course]		6	FIS/01				
Internet of Things		6	ING-INF/03	GRIECO Alfredo	ING-INF/03	Yes	PO

TEACHING	MODULES	ECTS	SSD	TEACHER		ROLE POLIBA	QUALIFICATION
				NAME	SSD		
Security by Design	Network Security	12	ING-INF/03				
	Ethical Hacking Laboratory						
Digital Business		6	ING-IND/35	PANNIELLO Umberto	ING-IND/35	Yes	PA

REFERENCE TEACHERS

Throughout their university career, students may contact the reference professors for guidance and information regarding the Master's Degree Programme attended, the choice of courses, the preparation of an individual study plan, the final examination, and post-graduate opportunities.

The reference professors of the Master's Degree Programme in Computer Engineering are:

(TO BE COMPLETED)

TUTORS AVAILABLE FOR STUDENTS

Tutoring activities are aimed at guiding and supporting students throughout their course of study, encouraging their active participation in the learning process and helping to remove obstacles to effective course attendance. Tutoring initiatives are also designed to address the specific needs, aptitudes, and individual requirements of students.

Tutoring includes a wide range of student support activities intended to make university studies more effective and productive.

The tutoring function does not end during the initial orientation phase but continues throughout the entire course of study. As the informational aspect of tutoring becomes less central, the role of academic support becomes increasingly important. Tutors assist students in their academic careers by helping them overcome difficulties, improve the quality of learning, and receive advice on study plans, international mobility opportunities, and educational and training pathways both before and after the Master's Degree.

Tutoring activities are also closely connected with job placement initiatives and play an important role in guiding and supporting students in their transition to the labour market.

The tutors of the Master's Degree Programme in Computer Engineering are:

(TO BE COMPLETED)

T) ELECTIVE COURSES ALREADY APPROVED BY THE PROGRAM REGULATIONS*

The courses listed below may be selected to obtain the 12 ECTS credits required for elective exams. If the student chooses courses from this group, the study plan will be automatically approved without the need for further evaluation by the Department bodies.

- ADVANCED NETWORKING AND QUANTUM INTERNET
- DIGITAL ADMINISTRATIVE LAW, PRIVACY AND DATA PROTECTION
- MARKETING AND CUSTOMER ANALYTICS
- RISK MANAGEMENT

- ROBOTICS
- SATELLITE SYSTEMS FOR REMOTE SENSING AND GEOLOCATION

*All courses belonging to other curricula of the degree program are automatically approved.

Note: The course must not have already been taken by the student during their previous Bachelor's degree program.