



UNIVERSITÀ
DI PAVIA

FACULTY OF ENGINEERING

DEPARTMENT OF INDUSTRIAL AND INFORMATION ENGINEERING

COURSE REGULATIONS
(art. 12 - D.M. 22 October 2004 n. 270)

SECOND-CYCLE DEGREE
IN
ELECTRICAL ENGINEERING
Class LM-25
(Second Cycle Degree in Automation Engineering)

2022/2023 Academic Year

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PART ONE – GENERAL PROVISIONS

Art. 1 – Course title, class, department and duration

1. The Second-Cycle Degree (C.d.L.M.) in Electrical Engineering at the Department of Industrial and Information Engineering, coordinated by the Faculty of Engineering at the University of Pavia, belongs to the LM-25 Class of Second-Cycle Degrees in Automation Engineering under the DM (Ministerial Decree) of March 16, 2007.
2. The duration of the degree programme is two years.

Art. 2 – Regulatory texts

1. In respect of teaching freedom and the rights-duties of faculty and students, the didactic organization and the course activities for the Second Cycle Degree in Industrial Automation Engineering are regulated by the present document, the statutes of the University of Pavia, the general regulations of the university, the didactic regulations of the university, the student regulations, the regulations for part-time enrolment, the regulations for the composition and functioning of the Department Board, the regulations of the Department of Industrial and Information Engineering, and the regulations of the Faculty of Engineering.
2. The regulations referred to above can be viewed from the following university links:
 - <https://web.unipv.it/ateneo/statuto-regolamenti/>
 - http://ecb.unipv.it/dipartimento/REGOLAMENTO_DIII.pdf
 - http://webing.unipv.eu/wp-content/uploads/2020/03/Regolamento_Ingegneria_2018-1.pdf
3. For anything not expressly provided for in the present Regulations, the current provisions of the law apply.

Art. 3 - Body responsible for didactic and organizational coordination

1. Under the competences and criteria established in the Statutes and Regulations mentioned in art. 1, the structure responsible for the course of study is the Department of Industrial and Information Engineering, which has delegated to the Faculty of Engineering the responsibilities for didactic coordination provided for in art. 25 and 26 of the Statutes. The Academic Advisory Board of Industrial Engineering (hereafter referred to as the Department Board) is responsible for the didactic and organizational coordination of the course of study, in respect of the competences and indications of the aforementioned Department and Faculty, with particular reference to art. 4 of the Regulations regarding the composition and functioning of the Academic Advisory Board.
2. The president of the Faculty, the Department director, the president of the Academic Advisory Board, the course of study coordinator, the list of member of the Quality Assurance Committee, and the list of members of the review commission are indicated on the Faculty of Engineering website (<http://webing.unipv.eu/governance/>).

Art. 4 - Administrative services

1. The administrative services in support of the course of study are the following:
 - The student administration office deals with the administration of students' academic records (enrolment, transfers, fees, recognition of degrees, student mobility, etc.). The student administration office is located in Via Ferrata 1, Pavia, and its website is: <https://web.unipv.it/ateneo/amministrazione/area-didattica-servizi-studenti/>
 - The Center of Orientation (C.OR), which undertakes activities and promotes projects to help students in choosing their course of study and in job placement when they graduate. To this end, it organizes group and individual activities, advisory services and orientation meetings. The C.OR website is at: <http://www-orientamento.unipv.it/>

- The administrative office of the president of the faculty, whose website is at: <http://webing.unipv.eu/home/contacts/>
- The administrative office of the Department of Industrial and Information Engineering, whose website is at: <http://iii.unipv.it/index.php?pag=dipartimento/segreteria.html>.

PART TWO – ORGANIZATION OF DIDACTIC ACTIVITIES

Art. 5 – Annual degree programme report

1. The Annual Degree Programme Report, taken from the Ministerial database, can be consulted at: <https://sonl.unipv.it/ava/index.php/2022SUA06419.pdf>

Art. 6 - Admission requirements

A) Requirements

1. Admission to the Second-Cycle Degree in Industrial Automation Engineering, the procedure for which is explained below, requires that the candidate:
 - a) possess the proper educational qualification
 - b) have taken the required courses during his or her previous studies (curricular requirements)
 - c) possess the proper personal preparation
2. Students requesting transfer to the Second-Cycle Degree programme in Industrial Automation Engineering from other degree programmes at Pavia or from other universities are subject to the same admission requirements as matriculating students.

B) Academic degrees

4. To be admitted to the Second-Cycle Degree programme in Industrial Automation Engineering students must possess a five-year degree (previous regulation in D.M. 509/99), a first-cycle degree (ex D.M. 509/99 or ex D.M. 270/04), or a three-year university diploma, that is, another academic degree from abroad that is recognized by the current legislation.

C) Previous courses completed by candidates

5. In their previous academic activities (Bachelor's degree, Master's degree, or enrolment in individual university courses) students must have completed a minimum of 36 CFUs (course credits) in the general subject areas and 45 CFUs in courses in the specific scientific-disciplinary sectors (SDS) shown in the table below. The student may self-certify the satisfaction of these requirements.

Course	Scientific-disciplinary sector (SDS)	minimum number of CFUs
General	CHIM/03; CHIM/07; FIS/01; FIS/02; FIS/03; ING-INF/05; MAT/01; MAT/02; MAT/03; MAT/04; MAT/05; MAT/06; MAT/07; MAT/08; MAT/09;	36
Specialized	ING-INF/01; ING-INF/04; ING-INF/05; ING-IND/08; ING-IND/09; ING-IND/10; ING IND/12; ING-IND/13; ING-IND/31; ING-IND/32; ING-IND/33; ING-INF/07	45
Total		81

6. Graduates from foreign universities, graduates of five-year degree programmes (previous regulations in D.M. 509/99), or anyone who presents academic activities to fulfill the curricular requirements that are not recognized as belonging to a proper SDS and/or satisfy the CFU requirement, will have their previous academic activities assessed by a Committee appointed by the Board to determine whether it meets the admission requirements.
7. In order to allow graduates, whose previous coursework does not perfectly meet the required curricular requirements but who have a strong academic background and high motivation, to gain entry into the programme, the Committee appointed by the Board, taking into account the candidate's previous academic performance (as demonstrated in the appropriate documents attached

to the admission request), and assessing if necessary (even through an interview) the candidate's motivation, can determine as an exception that the candidate has the proper curricular requirements for admission to the Second-Cycle Degree Programme (SCDP), subject to an examination of the appropriateness of the candidate's personal preparation (see '*Adequacy of personal preparation*' section below). In this case the Board will present a report that highlights any curricular insufficiency and indicates any courses the candidate will consequently be required to include in his or her study plan, including courses that are not indicated in the standard study plan presented in Attachment 1, up to a maximum of 12 CFUs. In any event, the existing Didactic Regulations and total number of CFUs needed to graduate (120 CFUs) must be respected. If instead the curricular insufficiency is judged incompatible with the SCDP, the Board will indicate the exams the candidate must pass prior to enrolment in individual courses in order to gain admission to the SCDP.

8. All candidates falling within clauses 6 and 7 above must request that the Board, which in will rely on the appointed Committee mentioned above, assess the candidate's previous academic record in order to decide on admission to the SCDP. The request can be made at any time, even by students who have not yet graduated and, at the moment of the request, have an approved three-year study plan. The evaluation of the curricular requirements will also take into account the exams still to be undertaken that are contained in the most recently approved study plan. Any subsequent change in the study plan will require an additional evaluation.

D) Adequacy of personal preparation

9. The candidate profile for admission to the second-cycle degree course is reported in the *Requirements* section. Candidates will be deemed to be adequately prepared if they possess:
 - a) Knowledge of English to B2 level on the CEF (Common European Framework).
 - b) A solid grounding in the basics of engineering and as well as good theoretical and practical knowledge in advanced engineering disciplines.
10. Knowledge of English to B2 level may be demonstrated when registering through the presentation of one of the certificates listed in art. 19 or by presenting a higher-level certificate. In the absence of a certificate, the knowledge of the English language may be verified by the Committee, the same described in the "Requirement" section, upon documented request by the candidate and it can also be held online. Candidates able to demonstrate that they have passed a 3 CFU-level English examination or an examination held in the English language during their university career do not have to sit the assessment. No certificates are required from students from countries where English is one of the main languages and/or who hold a degree awarded by an institution where the teaching is in English; these students must provide documentation that attests to their status.
11. A solid grounding in the basics of engineering and as well as good theoretical and practical knowledge in advanced engineering disciplines will be verified by an assessment held over two sessions: the first in September-October and the second in January-February. Students yet to graduate may participate in the personal preparation assessment provided, when sitting the assessment, they hold at least 150 CFUs. The format and topics covered in the assessment can be consulted at the faculty website (<http://webing.unipv.eu/enrollment/assessment-test/>).
12. Candidates are considered suitable and exempt from the assessment referred to in the previous paragraph, if his or her degree mark is equal to or greater than 90/110. Candidates yet to graduate and who conditionally enrol (see the subsequent section entitled *Conditional enrolment*), are automatically considered suitable and need not undergo any specific assessment if, when conditionally enrolling, their weighted average mark is greater than or equal to 23,5/30 (calculated from at least 150 CFUS). If, subsequent to conditionally enrolling under the conditions outlined above the candidate obtains a score lower than 90/110, his/her personal preparation will, nonetheless, be automatically considered satisfactory.
13. The result of degrees awarded in a foreign country will be investigated by the Commission appointed by the Board. The Commission will evaluate, on a case-by-case basis, the final degree mark in order to establish its Italian equivalent. Requests for an evaluation of this type must be submitted to the Board.

E) Conditional admission

14. Candidates who possess the curricular requirements and whose personal preparation is deemed satisfactory, under the conditions detailed in the preceding *Adequacy of candidates' personal preparation* section but who have not graduated by the usual enrolment date may conditionally enrol on the condition that this was requested within the deadline established by the university governance offices.
15. Conditional enrolment allows the student to attend lessons in the first semester but not sit examinations until fully enrolled, that is having graduated and, in any case, within the deadline established by the university governance offices. If the student fails to graduate by within the deadline established by the university governance offices enrolment on the second-cycle degree course will be forfeited and any enrolment fees will be automatically reimbursed, net of the duty stamp fee.
16. Candidates, even if not conditionally enrolled but who satisfy all the entry requirements, may enrol within the deadline established by the university governance offices by paying an additional fee.

Art. 7 - Didactic organization

1. The courses offered by the Second Cycle Degree provide the student with university course credits (CFU) in accordance with existing laws and regulations.
2. The average yearly number of CFUs for a full-time university student is 60.
3. Each CFU corresponds to 25 hours of average coursework per student, of which 50% is reserved for personal study or other individual educational activities, except when the educational activities are highly experimental or practical in nature. There are different types of courses: lessons, supplementary lessons and practicals, each of which is subdivided as determined by the teacher on the basis of the number of credits for the course, taking as a reference the following average number of hours:
 - 1 CFU = 7.5 hours of frontal teaching
 - 1 CFU = 12.5 hours of supplementary lessons
 - 1 CFU = 22.5 hours of practicals
4. Practical activities refer to those activities which entail a direct 'physical' approach to the topics of the course (lab or field work, guided visits to facilities or companies, project illustrations, etc.) and require from the student a modest number of additional hours for development of the material presented in the activity itself.
5. The CFUs for each educational activity are earned after a student passes an exam or are awarded based on some other form of assessment of his or her preparation or acquired competencies.
6. The credits earned do not expire during the student's university studies, no matter how long this should last, except in cases where the student's enrolment has lapsed or he or she has left university. In this case, should the student decide to re-enroll the validation of the acquired credits will depend, among other things, on whether or not they are no longer pertinent, as judged by the Committee appointed by the Board (see article 16 below). In special and well-justified cases, the obsolescence of the academic credits for particular educational activities can be discussed by the Department Board, after it has heard the opinion of the Faculty Executive Committee. The decision regarding the obsolescence of credits will also indicate how the obsolete credits can be re-acquired and any supplementary exams the students may be required to take.
7. Courses are given on a semester basis, with the academic year divided into the following academic sessions:
 - a) first semester: at least 13 weeks of courses starting from the end of September/beginning of October
 - b) winter exam session: 6-7 weeks (January-February)
 - c) second semester: at least 13 weeks of courses starting from the beginning of March

- d) summer exam session: 6-7 weeks (June-July)
 - e) autumn exam session: 3-4 weeks (September)
7. By May of each year the Faculty Executive Committee will determine the starting and ending dates of the periods mentioned above (academic calendar) for the following academic year; the approved calendar is then published on the Faculty website.
 8. For the final degree exam (Second-Cycle exam), six sessions per year are scheduled, indicatively in February, March, April, July, September, November and December. Each year by the end of December the Faculty Executive Committee will determine the dates of the Second-Cycle degree examination for the next year; the approved calendar will be published on the Faculty website.
 9. Each year the course schedule, rooms and a detailed calendar of exams for all the sessions for the following year will be published by the deadline for the writing of the annual degree programme report (*Scheda Unica Annuale*).

Art. 8 - Study plans

1. All students must present their plan of study within the deadline established by the university.
2. The study plans prepared in conformity with those indicated in Attachment 1 to the present Regulations, and with the recommended curriculum (*standard study plans*), are automatically approved.
3. A student may follow a different study plan (individual study plan) on condition it satisfies the requirements established in the annual report (*Scheda Unica Annuale*) mentioned in article 5. Individual study plans must be approved by the Committee appointed by the Board.
4. The inclusion of the individual study plans (see article 10, clause 5, letter a) of D.M. 270/04 is regulated by the subsequent article 11.
5. Students who opt to enroll part-time, under the conditions set forth in article 50 of the university didactic regulations and article 13 of the student regulation and the regulations for part-time student enrolment, must submit an individual study plan that is coherent with the length of time chosen for completing the degree programme and agreed upon by the degree programme coordinator.

Art. 9 – Double Degree programmes

There are currently no Double Degree programmes for the Second-Cycle degree in Industrial Automation Engineering.

Art. 10 - Attendance requirements and preparatory courses

1. The academic plan for the Second-Cycle degree assumes the student will attend the various educational activities.
2. Lab or experimental activities may have specific attendance requirements, based on a proposal by the teachers involved which is approved by the Department Board.
3. The Teaching Council may establish pre-requisites for certain courses if considered appropriate.
4. Such preparatory courses will not be required for courses given in the same year of the programme.
5. In cases where a preparatory course is required, the student must first pass the exam for this course before taking that for the more advanced course.
6. Attachment 2 presents an outline of the required preparatory courses as determined by the Department Board.

Art. 11 - Student elective activities

1. Regarding student elective activities (see art. 10, clause 5, letter a) of D.M. 270/04 (TAF of type D), the Department Board will suggest a list of recommended courses or activities, although the student can choose any course or activity (taught in Italian and English) from among those offered and accredited by the University of Pavia, so long as it is coherent with the academic plan.
 2. Study plans that differ from those recommended must be approved by the degree programme coordinator. Study plans with courses non coherent with the study course learning plan or which

include more than 20% of subjects already covered during the student's previous academic career will not be approved.

3. Students cannot choose educational activities already completed during previous university work, unless they have received specific validation of these outside of the 180 credits necessary for the attainment of the First-Cycle degree. The competent offices will verify the correct application of this rule by students during a review of the academic record before admission to the final second-cycle degree exam. If the student has violated this rule, he or she will not be admitted to the exam and must modify the study plan.
4. Students may not include as part of their elective activities (see art. 10 comma 5.a DM 270/2004 - c.d. "TAF D") nationally-planned closed-enrolment courses in medicine.
5. It is possible to add a maximum to 24 credits for extra learning activities.

Art. 12 - Internships and placements

The Second-Cycle degree in Industrial Automation Engineering does not offer internships and placement activities.

Art. 13 - Examinations and end-of-course assessments

A) General regulations

1. All credit-earning activities have a final mark. This assessment and the official result statement will be issued by the professor in charge of the subject that may work with a committee. The committee is formed in compliance with Teaching University Rule Book.
2. The Second Cycle Degree cannot include a total of more than 12 final exams or student evaluations. The number of final exams and evaluations takes into account the fundamental educational activities, other related or supplemental activities, and elective courses. The exams (or final marks) for elective courses are counted as a single unit, even if the assigned credits entail several final exams or marks. All other educational activities (see art. 10, clause 5, sub-clauses c), d), e) of D.M. 270/2004) are not counted toward the maximum number of final exams or evaluations. There can be no more than 5 exams or evaluations for such activities, including the final mark.
3. For courses or activities involving several integrated and coordinated modules given by different teachers, the final mark is jointly determined by teachers from all the modules. The mark assessment can occur in different stages and at different times, even with regard to different parts of the programme, as long as the final mark is decided on jointly.
4. The exam sessions are distributed over the winter, summer and autumn sessions for all courses and activities, independently of the semester in which the course activity takes place.
5. The minimum number of exam sessions and the decision to add extraordinary sessions are regulated by the university's Didactic Regulations, as described in the 'Examination procedure' section below.
6. The exams during each session are distributed based on a calendar prepared by the Department Board with the aid of the faculty administrative office.
7. The calendar of exams for all sessions and courses in the current academic year is published on the faculty website, as described in art. 7, subsection 10.
8. The publication of the calendar of exams is final, except in cases of proven justification after a written request is made to the faculty president. In any event, the exam session cannot be eliminated or, apart from exceptional cases, moved up.

B) Examination procedure

9. The teachers of the individual educational activities define the mark assessment procedure following the guidelines presented below and any coordination activities undertaken by the faculty and/or Department Board.
10. The co-ordinating professor will publish the assessment methods for each educational activity at the beginning of the academic year using the 'teaching report' available on the online course catalogue

(also called *Syllabus*: http://www-4.unipv.it/offertaformativa/portale/ricerca_insegnamenti.php?lingua=2). The information must state:

- the type of assessment (written; oral; written + oral);
 - in instances where assessments are held in two phases (e.g. written + oral), the minimum mark necessary to pass the first phase and access the second, the pre-requisites needed to pass each phase as well as the approximate weighting assigned to each individual phase in calculating the final mark.
11. Exam marks must be expressed out of 30. The CFUs are deemed to have been acquired if the mark is equal or superior to 18/30. In the event of a student obtaining 30/30, the commission may award *cum laude* honours. An 'unsatisfactory' mark, even when expressed through a mark, is not reported on the student's career record.
 12. For certain educational activities, e.g. internships or other activities included in the teaching programme and published on the *Syllabus*, as stated in the previous subsection 10, assessments may be awarded only two types of grade: 'approved'/'not approved' or 'satisfactory'/'unsatisfactory'.
 13. Any examination carrying a mark can only be scheduled during an exam session listed in the course calendar. The Faculty Dean may approve a request for an extra session, beyond the mandatory ones as described in the following subsections, for motivated reasons. Any assessment leading to a self-evaluation and that does not carry a mark can, at the discretion of the teacher, be held during lessons.
 14. There are at least six exams for each course, distributed over three sessions (winter, summer and autumn), which are open to all students (regular or repeating). 'Exam' means an examination that takes place during a session, which usually includes more than one exam. If the exam occurs over several stages (for example, written and oral), 'exam' refers to the entire group of stages.
 15. By regulation, each exam session has at least two exams, scheduled at least 14 days apart. The teacher has the faculty of scheduling only one exam in the September session; in this case, however, at least three exams must be scheduled in the session (winter or summer) immediately following the semester in which the course ends.
 16. Teachers of courses that are taught for two semesters or teachers of the single teaching activity (part of the two semester exam) may set an exam in between the first and the second semester, in the January/February exam session. With respect to the information in clause 2 above, the teacher must specify the weight, which cannot be zero, which the outcome of this intermediate exam has on the overall mark.
 17. In addition to the exams indicated in the preceding clauses, an extraordinary exam will be scheduled over a period of at least 15 days (usually March or April) as determined by the faculty president, which is also used in determining admission to the final graduation session for students enrolled in the previous academic year. Only students enrolled in the second year of the second-cycle degree may sign up for the extraordinary exam.
 18. The teacher has the prerogative of scheduling at any time of the year exams reserved for students who have attended the first semester of the second year of the second-cycle degree programme.
 19. For student-athletes in fields recognized by the Italian National Olympic Committee or by the Italian Paralympic Committee, extraordinary exams will be scheduled upon request by a student in substitution of those in the calendar when the latter are scheduled at the same time as important sporting events at the national level and higher. The event that conflicts with the scheduled exam must be documented to the faculty president, who, in agreement with the teacher, will set a date for an extraordinary exam.
 20. Students who have not passed an exam can retake it during subsequent exam dates. Teachers are not permitted to limit the possibility for the student to enroll in at least 6 exams per year, as described in clause 14 above.
 21. Students can refuse a passing mark and take the exam again the exam. The refusal must respect the time frame and manner determined by the teacher. Once the mark is accepted and registered, the student may not take the exam again and change his or her mark.
 22. The teacher shall determine the procedure for students to see their corrected exams.

Art. 14 - Final examination and awarding of degree

1. The student is awarded the second-cycle degree in Industrial Automation Engineering upon passing the final degree exam, which is aimed at verifying that the educational objectives of the Second Cycle Degree programme have been met.
2. The final exam, which earns the student an additional 18 CFUs, consists in the writing and discussion in public before a special committee of an original written thesis supervised by one or more faculty members. The discussion aims at evaluating the quality of the work, the candidate's general preparation, his mastery of the subject-matter, and his or her ability to present and discuss a technical, professional and/or scientific topic with rigor, clarity and command of the language.
3. The final thesis consists of a theoretical or experimental work, or a project, whose required time to complete is proportionate to the number of credits awarded according to the study plan (24 credits imply 600 hours of overall work). It must be thorough and contain a critical and/or creative contribution that is produced independently, and documented by, the candidate. The final thesis must develop topics specifically related to the educational objectives of the course of study and represent an advanced and original stage of research or a meaningful project in terms of its complexity.
4. The final thesis is prepared under the guidance of a supervisor, who can be a member of the University of Pavia teaching staff or in charge of a teaching activity offered by the Faculty of Engineering. The role of supervisor is independent of the scientific disciplinary sector of the faculty member assigned that role, as long as the thesis topic falls within his or her competencies and scientific interests. The supervisor:
 - assists the candidate as part of his or her institutional academic tasks, guiding and motivating the student in the choice and definition of the thesis content;
 - helps the student to finish his or her university studies in a reasonable period of time;
 - monitors the continuity in the development of the thesis in order to achieve a well-analyzed and well-structured result, as well as verifying the congruity between the drafting of the report and the final version of the thesis;
 - presents the candidate to the examining committee, describing the time and intensity of the effort put into the thesis, adding to its presentation if necessary, with the approval of the committee president.
5. The candidate chooses his supervisor from among the faculty indicated in clause 4 above, requesting that the thesis be assigned with advance notice with respect to the date of the final thesis presentation. The candidate will proceed with his or her work on the thesis in the best way possible with respect to his or her strategies, based on what has been discussed with and agree upon with the supervisor.
6. When the candidate has finished the thesis, the supervisor will certify that the thesis activity corresponds to the number of credits attributed to the final exam by the study plan. The supervisor, if he or she is not a member of the examining committee, must send the president of the committee a short report describing the candidate's work, in which the length of time and intensity of the activity is described.
7. The examining committee is appointed by the faculty president on the proposal of the president of the Department Board or the course of study coordinator, and is composed of at least seven individuals, at least four of whom must be professors or researcher who teach classes offered by the Faculty or borrow by other university departments. Any co-supervisors who are not members of the committee can participate in its work without a voting right. By regulation, a committee must be appointed for each exam. If the circumstances so warrant, more than one committee may be appointed. It is preferable that the committee include the supervisors of those theses that will be examined by the committee.
8. The committee is chaired by the senior-most professor from the highest category. The president designates the secretary in charge of keeping the minutes from among the committee members.
9. By regulation, six final exams are scheduled during the year, based on a calendar approved yearly by the faculty's executive committee, as indicated in art. 7, clause 9 above.
10. At the time of proposing the committee to the faculty president, the president of the Department Board, or the course of study coordinator if the Board delegates one, chooses from among the

committee members a co-supervisor for each candidate, or delegates this choice to the committee president. The role of the co-supervisor is to examine the candidate's thesis in order to provide a well-supported judgment on its readability and organization. The candidate has to send a digital copy to the external examiner within the deadline decided by the Administrative Office.

11. The final exam mark, expressed out of 110 points, is determined by the sum of a base mark and an incremental one. The base mark takes into account the candidate's final course marks, excluding those for extra activities, and is calculated based on the procedure set forth in clause 12 below. The incremental mark is awarded by the commission during the final exam based on the procedure set forth in clause 13 below.
12. The base mark is calculated from the weighted average of the marks on exams for academic activities that call for a final mark; the weight is based on the number of credits for each activity. The weighted average is then converted to a scale of 1-110.
13. The increment (up to a maximum of 6 points) is jointly decided on by the committee at the end of the exam and is the sum of the following three items:
 - from 0 to 2 points for the quality of the candidate's presentation during the final exam;
 - from 0 to 2 points for the quality and thoroughness of the written thesis, after hearing the opinion of the co-supervisor
 - from 0 to 2 points after taking account of the supervisor's opinion of the presentation.The three increments mentioned above (which can also include partial scores) are derived from the arithmetical average of the points awarded by each committee member.
14. The final mark (the sum of the base mark and of the three incremental items) is rounded to the nearest whole number. *Cum laude* is awarded only when the sum of the base mark and the increment previously decided on by the committee is equal to at least 112/110. The awarding of *cum laude* requires the unanimous agreement of the committee.
15. The faculty reserves the right to adopt 'anti-plagiarism' computer tools to uncover any parts of the written thesis copied from the writings of others without the use of inverted commas and a reference to the source. In the event serious plagiarism is discovered by a committee made up of the faculty president, the president of the Department Board and the supervisor, the candidate will not be allowed to take the final degree examination, and disciplinary proceedings will be undertaken. In the event the finding comes after the candidate has presented his thesis defense, all necessary actions will be undertaken to correct the situation.
16. The thesis can be written in Italian or English and, when authorized by the supervisor, in one of the main European Union languages (French, German and Spanish). If the thesis is written in a foreign language, the student must provide a summary in Italian and the title in Italian on the front page. The thesis discussion can be done in either Italian or English.

PART THREE – PROVISIONS REGARDING STUDENTS' COURSE OF STUDY

Art. 15 - Criteria for recognition of duly-certified extra-university knowledge and skills

1. Under article 2 c. 147 of L. 286/2006 and article 14 of L. 240/2010, the Committee appointed by the Board can validate as university credits (up to 12 credits) any individually certified professional knowledge and skills, under current regulations, as well as other knowledge and skills acquired in educational activities at the post-secondary level which have been planned with the participation of a university.

The Committee appointed by the Board can also validate (up to 6 credits, constituting part of the 12 credits mentioned above) the winning of Olympic or Paralympic medals, or world championship titles, European titles or national titles in those disciplines recognized by the Italian National Olympic Committee or the Italian Paralympic Committee (under L. 240/2010, art. 14). Student participating in the Dual Career programme may apply for a maximum to 6 credits to be validated as part of the aforementioned credits in compliance with the directives from the Academic Senate.

2. The validation of acquired credits is determined by the Committee appointed by the Board on a case by case. The type of educational activity (TAF) for which credits are recognized and the number of

credits (within the eventual limits provided by law) are determined based on the discipline the activity falls under, taking into account the contribution of the recognized activity to the achievement of the educational objectives of the study plan, the specific content of the activity and its possible obsolescence, as well as the time commitment (in hours) required. To this end, the request for recognition must be accompanied by all official documentation demonstrates the above aspects; the Committee appointed by the Board can undertake additional investigations that are necessary in this matter.

3. In the event that, subsequent to recognition of the acquired credits, the student's study plan is changed to an individual study plan, the latter must be approved by the Committee appointed by the Board in conformity with the provisions of article 8.

Art. 16 - Criteria for recognition of credits earned

1. The Committee appointed by the Board decides whether or not to recognize credits earned by students who have already earned a degree from the University of Pavia or another Italian university and request at the time of admission for a reduced credit requirement for graduation. Such a request may be granted pending an evaluation and validation of the credits considered valid under clause 5 below.
2. The Committee appointed by the Board decides whether or not to recognize credits for a student whose matriculation has expired or who has left university and, at the time of re-admission, requests a reduced credit requirement for graduation. Such a request may be granted pending an evaluation and validation of the credits considered valid under clause 5 below.
3. The Committee appointed by the Board can validate credits already earned by the student from enrolment in individual courses at the University of Pavia or at other universities.
4. In the case of a transfer from another university or from another course of study at the university, the recognition of credits is decided on by the Committee appointed by the in accordance with current law, the university Didactic Regulations, and any decisions regarding the course of study taken by the faculty Executive Committee and/or Department Board.
5. Credit validation is decided on by the Committee appointed by the on a case by case basis. The type of educational activity (TAF) for which credits are recognized and the number of credits (within the eventual limits provided by law) are determined based on the discipline the activity falls under, taking into account the contribution made by the activity to be recognized to the achievement of the educational objectives of the study plan, the specific content of the activity and its possible obsolescence, as well as the time commitment (in hours) required. To this end, the request for recognition must be accompanied by all official documentation that demonstrates the above aspects; the Committee appointed by the Board can undertake additional investigations if necessary in this matter.
6. In the event that, subsequent to recognition of the acquired credits, the student's study plan is changed to an individual study plan, the latter must be approved by the Committee appointed by the Board in conformity with the provisions of article 8.
7. When a student is transferring from a course of the same class of study, the credits validated from the same scientific sector cannot be less than 50% of the credits already gained by the student.

Art. 17 - Criteria for recognition of educational activities undertaken at foreign universities

1. Studies undertaken at foreign universities by students from the Second-Cycle degree programme (in accordance with international agreements, such as the European Erasmus+ programme or other agreements stipulated by the university) are recognized as an activity providing a similar academic experience as that offered by the faculty, on condition they involve the same student commitment and are consonant with the Department's study plan. Such programmes are also promoted as a means of cultural exchange and to provide an additional aspect to the student's personal and professional preparation as he or she works toward earning a degree.
2. The 'Learning Agreement' (LA) is the document that defines the plan for the academic activities the student will undertake abroad in substitution of certain activities required for the Second-Cycle degree. The student must fill in this document making sure not to focus so much on following the

exact same content regarding these activities as ensuring the resulting ‘curriculum’ is coherent with the academic objectives of the Second-Cycle degree programme.

3. For students who intend to study abroad for a period of time, the possibility of gaining recognition for the credits earned is established ahead of time by reference to the LA, which must be signed for approval by the faculty member the Department Board designates as the coordinator for study abroad. The coordinator must ensure the LA is coherent with the academic objectives of the Second-Cycle degree programme.
4. At the end of the period of study abroad, by request of the student and on the basis of the Learning Agreement and considering the student’s results as properly documented by the foreign university (in the case of the Erasmus+ Programme, through the ‘Transcript of Records’), the Committee appointed by the Board will recognize the academic activity undertaken abroad and any associated marks.
5. The Committee appointed by the Board will proceed with recognition of the direct correspondence between one or more academic activities in the study plan and one or more activities whose credits have been earned at the foreign university.
6. If the content of the academic activities whose credits have been earned at a foreign university are consonant with the academic objectives of the Second-Cycle degree but there is no direct correspondence with any of the academic activities in the study plan, the Committee appointed by the Board, on a proposal from the coordinator, can authorize, under article 50 clause 5 of the university’s Didactic Regulations, that the student present an individual study plan that respects the stated class and organization of the study plan. For each academic activity undertake abroad, the corresponding Italian scientific disciplinary sector (if available) and the number of academic credits must be indicated.
7. For each exam taken at a foreign university which is recognized by the University of Pavia, the Committee appointed by the Board will assign a mark that corresponds to the assessment obtained from the foreign university. When there are differing criteria for marks in the case of exchange programmes within the European Union, reference will be made to the correspondence with the European Credit Transfer System (ECTS).
8. The Committee appointed by the Board recognizes studies and research undertaken abroad in preparation for the final degree exam as well as educational internships based on international agreements (for example, the Erasmus Traineeship), as long as the nature of the activity, the commitment involved and the results are documented.

Art. 18 - Admission to subsequent years

1. Enrolment in the second year is not subject to any special conditions.

Art. 19 - Certifications

1. The following linguistic certifications (issued as a result of an examination) are considered appropriate and automatically approved, for the purpose of proving that students have the level of English required for admission to a degree course; they also correspond to level B2 of the Common European Framework of Reference for Languages (the same kind of certificate but for higher level of knowledge will be accepted):

Ente Certificatore	Certificazione corrispondente al livello B2 del Quadro Comune Europeo di Riferimento per le Lingue
Cambridge English Language Assessment (Part of the University of Cambridge)	Cambridge English: First (FCE) and Business Vantage (BEC) Minimum score: 160 [Also English for Speakers of Other Languages (ESOL International) Level 1 B2]

Cambridge English Language Assessment (Part of the University of Cambridge)	International English Language Testing System (IELTS) Minimum score: 5.5
Cambridge English Language Assessment (Part of the University of Cambridge)	Business Language Testing Service (BULATS)* Reading/Language Knowledge Test Minimum score: 60 [not used anymore after the end of 2019 and it is called now Linguaskill Business]
Educational Testing Service (ETS)	Test of English as a Foreign Language Internet Based Test (TOEFL iBT) Minimum score: 77
Educational Testing Service (ETS)	TOEIC Listening and Reading Test: punteggio minimo 785 + TOEIC Speaking and Writing Test Minimum score: 310
English Speaking Board (ESB)	Also English for Speakers of Other Languages (ESOL International) Level 1 B2
Oxford University Press University of Oxford	Oxford Test of English B2 Minimum score: 111
Pearson	Pearson English Language Test (PTE Academic) Minimum score: 59
Trinity College London	Integrated Skills in English (ISE II)** [Anche English for Speakers of Other Languages (ESOL International) Level 1 B2] **[valid only if completed on the all modules (ISE II)]
City & Guilds	Communicator B2 *** [*** until available]
Duolingo	Duolingo English Test: minimum score 90.

2. The suitability of certifications not included in the table shown at comma 1 or different tests held by other universities or of diploma awarded by university in English speaking countries is assessed on a case-by-case basis by the Faculty Dean who will work in collaboration with the language and, if necessary, by the expertise of the Language Centre of the University. A certificate that proves that the candidate has attended a class of the required level of English, both in Italy and abroad, but it is not completed by any of the certificates in the list above will not be accepted. Partial certificates (only Speaking & Listening or only Spoken English) are not valid.

University of Pavia

Study Course: ELECTRICAL ENGINEERING - 06419

Classe LM-28 Ingegneria elettrica

Regulations 2021/2022 - Course Regulations a.y. 2022/2023

Study Plan academic year 2022/2023

To be submitted online from october to november 2022 (enrolled student only)

STUDENT NUMBER N. SURNAME- NAME

1° Year - academic year 2022/2023

Learning Activity	CFU	N°	N° (ind.)	Compulsory	Scientific Area	Type of learning activity	Period
509665 - APPLIED ELECTROMAGNETISM*	12	1		X			All Year
Teaching Unit APPLIED ELECTROMAGNETISM							
509666 - NUMERICAL METHODS IN ELECTROMAGNETISM *	6				ING-IND/31	Distinctive	First Semester
509667 - OPTIMAL DESIGN IN ELECTROMAGNETISM AND ELECTROMAGNETIC ENVIRONMENTAL COMPATIBILITY *	6				ING-IND/31	Distinctive	Second Semester
509668 - ELECTRICAL SYSTEMS*	12	2		X			First Semester
Teaching Unit ELECTRICAL SYSTEMS							
509669 - ADVANCED ELECTRICAL MACHINES *	6				ING-IND/32	Distinctive	First Semester
509670 - ELECTRIC POWER SYSTEMS*	6				ING-IND/33	Distinctive	First Semester
509671 - INDUSTRIAL MEASUREMENTS AND COMMUNICATION SYSTEMS*	9	3		X			First Semester
Teaching Unit INDUSTRIAL MEASUREMENTS AND COMMUNICATION SYSTEMS							
509672 - INDUSTRIAL COMMUNICATION SYSTEMS*	3				ING-IND/32	Related/Supplementary	First Semester
509673 - INDUSTRIAL ELECTRICAL MEASUREMENTS*	6				ING-INF/07	Distinctive	First Semester
509674 - POWER ELECTRONICS*	6	4		X	ING-IND/32	Distinctive	Second Semester
509675 - DESIGN AND TECHNOLOGY OF ELECTRICAL MACHINES*	6	5		X	ING-IND/32	Distinctive	Second Semester
509676 - ENERGY MANAGEMENT*	9	6		X			Second Semester
Teaching Unit ENERGY MANAGEMENT							
508286 - PLANNING OF ENERGY CONVERSION SYSTEMS*	6				ING-IND/32	Distinctive	Second Semester
509677 - MICROGRIDS*	3				ING-IND/32	Related/Supplementary	Second Semester
<i>FREE CHOICE FROM THE UNIVERSITY COURSE OFFER</i>	6	7				<i>Optional</i>	
509079 - ENERGY MARKETS AND SUPPLY STRUCTURE*	6	7			ING-IND/32	Optional	First Semester
504115 - IMPIANTI DI ENERGIA SOLARE E DI ENERGIA DA BIOMASSE	6	7			ING-IND/32	Optional	First Semester
501062 - TERMOFISICA DELL'EDIFICIO	6	7			ING-IND/11	Optional	First Semester

504462 - PROCESS CONTROL	6	7			ING-INF/04	Optional	First Semester
504463 - ROBOT CONTROL	6	7			ING-INF/04	Optional	Second Semester
504719 - ROBOTICS	6	7			ING-INF/05	Optional	First Semester
504717 - INDUSTRIAL CONTROL	6	7			ING-INF/04	Optional	Second Semester
507218 - ELECTRONICS FOR INDUSTRIAL MEASUREMENTS	6	7			ING-INF/01	Optional	First Semester
502993 - MICROSENSORI, MICROSISTEMI INTEGRATI E MEMS*	6	7			ING-INF/07	Optional	First Semester
502156 - ACCUMULO E CONVERSIONE DI ENERGIA	6	7			CHIM/07	Optional	First Semester
509712 - SCENARI ENERGETICI	6	7			GEO/02	Optional	First Semester
503297 - IMPIANTI EOLICI*	3	7			ING-IND/03	Optional	Second Semester
504126 - IMPIANTI IDROELETTRICI*	3	7			ICAR/01	Optional	First Semester
508741 - INTRODUZIONE ALLA NORMAZIONE TECNICA*	3	7			ING-IND/33	Optional	Second Semester
503313 - TRAZIONE ELETTRICA*	3	7			ING-IND/31	Optional	Second Semester
509609 - MANAGEMENT OF PHOTOVOLTAIC SYSTEMS*	3	7			ING-INF/01	Optional	Second Semester
509631 - DIAGNOSTICS FOR ELECTRICAL MACHINES*	3	7			ING-IND/32	Optional	First Semester
510151 - SUSTAINABILITY MANAGEMENT	3	7			ING-IND/32	Optional	Second Semester
503356 - COMPLEMENTI DI ELETTRONICA*	3	7			ING-INF/01	Optional	Second Semester
TOT. 60 CFU							

*Learning activities included in the lecture schedule

2° Year - academic year 2023/2024

Learning Activity	CFU	N°	N° (ind.)	Compulsory	Scientific Area	Type of learning activity	Period
509678 - INDUSTRIAL DRIVES*	12	8		X			All Year
Teaching Unit INDUSTRIAL DRIVES							
504723 - ELECTRICAL DRIVES FOR INDUSTRIAL APPLICATIONS*	9				ING-IND/32	Distinctive	First Semester
508303 - ENERGY EFFICIENCY IN COMPRESSED AIR SYSTEMS*	3				ING-IND/32	Related/Supplementary	Second Semester
504710 - NUMERICAL METHODS IN ENGINEERING SCIENCES*	6	9			MAT/08	Related/Supplementary	First Semester
502886 - SISTEMI DINAMICI: TEORIA E METODI NUMERICI	6	9			MAT/08	Related/Supplementary	First Semester
504464 - ORGANIZATION THEORY AND DESIGN*	6	10			SECS-P/06	Related/Supplementary	Second Semester
509679 - PLANNING AND OPERATION OF POWER SYSTEMS*	6	10			ING-IND/33	Related/Supplementary	Second Semester
509680 - ELECTRIC VEHICLES*	6	10			ING-IND/32	Related/Supplementary	Second Semester
509681 - SYSTEMS AND TECHNOLOGIES FOR THE SMART GRID*	6	10			ING-IND/32	Related/Supplementary	First Semester
509079 - ENERGY MARKETS AND SUPPLY STRUCTURE*	6	10			ING-IND/32	Related/Supplementary	First Semester

504115 - IMPIANTI DI ENERGIA SOLARE E DI ENERGIA DA BIOMASSE*	6	10			ING-IND/32	Related/Supplementary	First Semester
501062 - TERMOFISICA DELL'EDIFICIO*	6	10			ING-IND/11	Related/Supplementary	First Semester
509679 - PLANNING AND OPERATION OF POWER SYSTEMS*	6	11			ING-IND/33	Related/Supplementary	Second Semester
509680 - ELECTRIC VEHICLES*	6	11			ING-IND/32	Related/Supplementary	Second Semester
509681 - SYSTEMS AND TECHNOLOGIES FOR THE SMART GRID*	6	11			ING-IND/32	Related/Supplementary	First Semester
509079 - ENERGY MARKETS AND SUPPLY STRUCTURE*	6	11			ING-IND/32	Related/Supplementary	First Semester
504464 - ORGANIZATION THEORY AND DESIGN*	6	11			SECS-P/06	Related/Supplementary	Second Semester
504115 - IMPIANTI DI ENERGIA SOLARE E DI ENERGIA DA BIOMASSE*	6	11			ING-IND/32	Related/Supplementary	First Semester
501062 - TERMOFISICA DELL'EDIFICIO*	6	11			ING-IND/11	Related/Supplementary	First Semester
504462 - PROCESS CONTROL*	6	11			ING-INF/04	Related/Supplementary	First Semester
504463 - ROBOT CONTROL	6	11			ING-INF/04	Related/Supplementary	Second Semester
504719 - ROBOTICS	6	11			ING-INF/05	Related/Supplementary	First Semester
504717 - INDUSTRIAL CONTROL*	6	11			ING-INF/04	Related/Supplementary	Second Semester
507218 - ELECTRONICS FOR INDUSTRIAL MEASUREMENTS	6	11			ING-INF/01	Related/Supplementary	First Semester
510150 - MICROSENSORS, INTEGRATED MICROSYSTEMS AND MEMS*	6	11			ING-INF/07	Related/Supplementary	First Semester
502156 - ACCUMULO E CONVERSIONE DI ENERGIA	6	11			CHIM/07	Related/Supplementary	First Semester
<i>FREE CHOICE FROM THE UNIVERSITY COURSE OFFER</i>	6	12				<i>Optional</i>	
509679 - PLANNING AND OPERATION OF POWER SYSTEMS*	6	12			ING-IND/33	Optional	Second Semester
509680 - ELECTRIC VEHICLES*	6	12			ING-IND/32	Optional	Second Semester
509681 - SYSTEMS AND TECHNOLOGIES FOR THE SMART GRID*	6	12			ING-IND/32	Optional	First Semester
509079 - ENERGY MARKETS AND SUPPLY STRUCTURE	6	12			ING-IND/32	Optional	First Semester
510188 - ECONOMICS OF DIGITAL MARKETS	6	12			SECS-P/06	Optional	Second Semester
504464 - ORGANIZATION THEORY AND DESIGN*	6	12			SECS-P/06	Optional	Second Semester
504115 - IMPIANTI DI ENERGIA SOLARE E DI ENERGIA DA BIOMASSE*	6	12			ING-IND/32	Optional	First Semester
509682 - HISTORY OF TECHNOLOGY	6	12			ING-IND/31	Optional	First Semester
501062 - TERMOFISICA DELL'EDIFICIO*	6	12			ING-IND/11	Optional	First Semester
504462 - PROCESS CONTROL*	6	12			ING-INF/04	Optional	First Semester
504463 - ROBOT CONTROL	6	12			ING-INF/04	Optional	Second Semester
504719 - ROBOTICS	6	12			ING-INF/05	Optional	First Semester
504717 - INDUSTRIAL CONTROL*	6	12			ING-INF/04	Optional	Second Semester
507218 - ELECTRONICS FOR INDUSTRIAL MEASUREMENTS	6	12			ING-INF/01	Optional	First Semester
510150 - MICROSENSORS, INTEGRATED MICROSYSTEMS AND MEMS*	6	12			ING-INF/07	Optional	First Semester
502156 - ACCUMULO E CONVERSIONE DI ENERGIA	6	12			CHIM/07	Optional	First Semester
509712 - SCENARI ENERGETICI	6	12			GEO/02	Optional	First Semester

508100 - AUTOMATED MECHANICAL SYSTEM DESIGN*	6	12			ING-IND/13	Optional	Second Semester
509683 - SAFETY IN ENGINEERING AND TECHNOLOGY*	3	12			ING-IND/31	Optional	Second Semester
503297 - IMPIANTI EOLICI*	3	12			ING-IND/03	Optional	Second Semester
504126 - IMPIANTI IDROELETTRICI*	3	12			ICAR/01	Optional	First Semester
510267 - AN INTRODUCTION TO STANDARDS: PRINCIPLES AND PRACTICE*	3	12			ING-IND/33	Optional	Second Semester
503313 - TRAZIONE ELETTRICA*	3	12			ING-IND/31	Optional	Second Semester
509609 - MANAGEMENT OF PHOTOVOLTAIC SYSTEMS*	3	12			ING-INF/01	Optional	Second Semester
509631 - DIAGNOSTICS FOR ELECTRICAL MACHINES*	3	12			ING-IND/32	Optional	First Semester
503356 - COMPLEMENTI DI ELETTRONICA*	3	12			ING-INF/01	Optional	Second Semester
510151 - SUSTAINABILITY MANAGEMENT*	3	12			ING-IND/32	Optional	Second Semester
507220 - PLANNING, MANAGEMENT AND SUPPLY OF GOODS AND SERVICES*	3	13**			ING-IND/35	Other	Second Semester
500376 - PROGRESSO UMANO E SVILUPPO SOSTENIBILE	3	13**			SECS-P/02	Other	Second Semester
509683 - SAFETY IN ENGINEERING AND TECHNOLOGY*	3	13**			ING-IND/31	Other	Second Semester
503297 - IMPIANTI EOLICI*	3	13**			ING-IND/03	Other	Second Semester
504126 - IMPIANTI IDROELETTRICI*	3	13**			ICAR/01	Other	First Semester
510267 - AN INTRODUCTION TO STANDARDS: PRINCIPLES AND PRACTICE*	3	13**			ING-IND/33	Other	Second Semester
503313 - TRAZIONE ELETTRICA*	3	13**			ING-IND/31	Other	Second Semester
509609 - MANAGEMENT OF PHOTOVOLTAIC SYSTEMS*	3	13**			ING-INF/01	Other	Second Semester
509631 - DIAGNOSTICS FOR ELECTRICAL MACHINES*	3	13**			ING-IND/32	Other	First Semester
503356 - COMPLEMENTI DI ELETTRONICA*	3	13**			ING-INF/01	Other	Second Semester
510151 - SUSTAINABILITY MANAGEMENT*	3	13**			ING-IND/32	Other	Second Semester
509536 - ITALIAN LANGUAGE FOR FOREIGN STUDENTS	3	13			NN	Other	First Semester
503327 - MASTER THESIS	18				PROFIN_S	Final Exam	
TOT. 60 CFU							

* Learning activities included in the lecture schedule

** Choose 6 CFU for choice n° 13

- [The semester assigned to each learning activity may change. Refer to the time schedule published in the faculty website for confirmation.](#)
- [For more information please refer to the course catalogue.](#)

Date

Signature

The study plan is not to be modified. Students can apply for an exception but they have to submit a valid motive. When a student submit a change which is not proposed in a standard study plan, the study plan becomed an individual study plan.
In order to do so, draw a line on the subject you wish to change, add the new subject in the orange boxes at the end of the study plan.
Insert the progressive number assigned to the subject you wish to change.
Please note that a revenue stamp of 16€ is due to apply for an individual study plan. This new plan will have to be approved
by the committee designated by the competent Teaching Council.

University of Pavia

Faculty of Engineering

Department of Electrical, Computer and Biomedical Engineering

Study Course: ELECTRICAL ENGINEERING
Classe LM-28

INTRODUCTORY COURSES

There are no introductory courses for the Master Programme in Industrial Automation Engineering