# DIDACTIC REGULATIONS OF THE DEGREE PROGRAM AEROSPACE ENGINEERING

# CLASS L-9

**School: Polytechnic and Basic Sciences School**

**Department: Industrial Engineering**

**Regulations in force since the academic year 2025-2026**

## ACRONYMS

| | | |
|---|---|---|
| CCD | [Commissione di Coordinamento Didattico] | Didactic Coordination Commission |
| CdS | [Corso/i di Studio] | Degree Program |
| CFU | [Crediti Formativi Universitari = 1 ECTS] | University training credits |
| CPDS | [Commissione Paritetica Docenti-Studenti] | Joint Teachers-Students Committee |
| OFA | [Obblighi Formativi Aggiuntivi] | Additional Training Obligations |
| SUA-CdS | [Scheda Unica Annuale del Corso di Studio] | Annual single form of the Degree Program |
| RDA | [Regolamento Didattico di Ateneo] | University Didactic Regulations |

## INDEX

## Art. 1
## Object

1. These Didactic Regulations govern the organisational aspects of the CdS in Aerospace Engineering (class L-9). The CdS in Aerospace Engineering is hinged in the Department of Industrial Engineering. The Language of the course is Italian. The course is delivered according to a conventional method
2. The CdS is governed by the Didactic Coordination Commission (CCD), pursuant to Art. 4 of the RDA.
3. The Didactic Regulations are issued in compliance with the relevant legislation in force, the Statute of the University of Naples Federico II, and the RDA.

## Art. 2
## Training objectives

The training of the Aerospace Engineer is aimed primarily at a balanced study of basic disciplines, in the areas of mathematics, physics, chemistry and computer science, and disciplines in the areas of industrial engineering, with particular reference to those characterizing the aerospace engineering. This on the one hand guarantees adequate training to interpret and describe the classic problems of engineering, especially industrial ones, on the other it offers the possibility of entering the world of work in very specialized and advanced technology sectors.
The objective is to train graduates who, although focused on a particular professional profile, are able to follow the mobility and variability of the labor market and the continuous innovations, which, it is worth underlining, are particularly relevant in the aerospace sector . Specific cultural strands are fluid dynamics, flight mechanics, constructions, structures, technologies, aerospace systems and installations, air and space propulsion. The operational methodologies cover, at a first level of in-depth analysis, theoretical treatments, experimental tests and numerical resolution techniques, allowing the graduate to achieve adequate training to independently manage problems in the specific cultural area.
The graduate will possess general knowledge that will allow him to approach, describe and solve typical problems of industrial engineering, with particular regard to aerospace engineering. The studies will also be aimed at stimulating knowledge of contemporary contexts, the development of relational and decision-making skills, and the continuous updating of one's knowledge.
Finally, the graduate in Aerospace Engineering will possess the skills, methodological tools and specific knowledge, in particular the ability to reason in mathematical models, necessary to successfully face the possible continuation of the study path at a higher level, with specific reference to the LM-20 master's degree class -
Aerospace and astronautical engineering.
In the first year, students are expected to acquire knowledge in basic disciplines, particularly in the areas of mathematics, physics, chemistry and computer science. The second year, in addition to completing knowledge in basic disciplines, introduces students to the founding disciplines of aerospace engineering. Finally, in the third year, students complete their training with further specific courses in industrial engineering and aerospace engineering.

## Art. 3
## Professional profile and work opportunities

Junior Aerospace Engineer

function in a work context:
Graduates in Aerospace Engineering must be able to operate in a highly competitive and interdisciplinary context, such as aerospace, with high technological content and constantly evolving.
He will have the opportunity to enter the world of work with the role of supporting the design, management, operation and certification of advanced technology systems and processes in the fields of industrial engineering, with a predilection for those in which the disciplines and aerospace technologies have an important role or to effectively continue their studies towards the next Master's degree level.
He must be able to apply the knowledge acquired in the fields of fluid dynamics, flight mechanics, structures, propulsion and aerospace systems, to manage technologies and optimize functional and structural performance of components and systems with particularly stringent requirements such as: high aerodynamic efficiency, high performance, operation in critical environments and situations, weight reduction with attention to safety and reliability.

skills associated with the function:
The skills acquired in the Course of Studies will allow the Aerospace Engineer to identify, formulate and
solve simple problems specific to industrial engineering, and more specifically to aerospace engineering. To this end, he will be equipped with knowledge of updated methods, techniques and tools, and will be able to apply both basic scientific and technical knowledge and the ability of an engineer to translate them into operational tools for solving the problems encountered during the course. of his work activity. The skills acquired during the course of studies that will allow him to carry out his functions include, in particular, the basic and specialized knowledge and methodologies that characterize aerospace engineering in the disciplinary fields of fluid dynamics, aerospace constructions and structures, flight, aerospace installations and systems and aerospace propulsion.

employment opportunities:
The classic employment opportunities for graduates in Aerospace Engineering are: the aerospace industry, aeronautical and space industries; public and private bodies for research in the aerospace field; air transport companies; air traffic management bodies; high-tech industries in which industry-specific skills for machine and equipment manufacturing, aerodynamics and lightweight structures are relevant.

## Art. 4
## Admission requirements and knowledge required for access to the Degree Program[1]

1. To be admitted to the Degree Course, a secondary school diploma or other qualification obtained abroad and recognized as suitable is required.
2. For the successful attendance of the Degree Course, knowledge of the fundamentals of Mathematics and Science is required. Verbal synthesis and understanding skill ability is required, as well.
3. In the event that the knowledge test is not positive, the enrolled student is assigned specific Additional Formative Obligations (OFA) to be satisfied within the first year of the course.

[1] Artt. 7, 13, 14 of the University Didactic Regulations.

## Art. 5
## Procedures for access to the Degree Program (CdS)

1. The CCD of the Degree Program normally regulates the admission criteria and any scheduling of enrolments, except in cases subject to different provisions of law[2].
2. In the event of negative assessment of the adequate initial preparation regarding knowledge requirements for admission to the Degree Program, the CCD assigns specific Additional Formative Obligations (OFA), indicating the means of verification to be fulfilled within the Program's first year.
3. To access the Study Course it is necessary to take an Evaluation Test, which is mandatory but not selective, with the attribution, in case of failure, of Additional Formative Obligations (OFA). The Evaluation Test is prepared by CISIA (the Inter-university Consortium) with rules shared at national level, and consists in a multiple choice questionnaire on topics of Mathematics, Science, Logic and Verbal Understanding. The test is provided in person, at SPSB accredited computer laboratories, or online, in multiple sessions made available throughout the year as needed. If the test is not passed, enrolling students will be assigned Additional Formative Obligations (OFA). OFA are automatically awarded to enrolling students who have not taken the Evaluation Test. To support students with OFA to align their initial preparation, and, then, to fulfill the OFA, the Study Course refers students to specific teaching supports, made available through the FEDERICA Web learning platform, the University Center for innovation, experimentation and dissemination of multimedia teaching of the University of Naples Federico II. The OFA is considered fulfilled when the Student again takes, with a positive outcome, the CISIA Evaluation Test, or has passed a first-year course in one of the following Scientific Disciplinary Sectors: MATH-02, MATH-03/A and PHYS-(01÷06).

   More information on the test can be found at:
   www.cisiaonline.it/area-tematica-tolc-cisia/home-tolc-generale

   At this link, among other things, the calendar of test sessions is available, as well as access to a test site that allows the student to train. The test session calendars and other information can be found at: www.scuolapsb.unina.it/index.php/studiare-al-napoli/missione-ai-corsi

## Art. 6
## Teaching activities and university training credit (Teaching activities and CFU)

Each training activity, prescribed by the CdS detail sheet, is measured in CFU. Each CFU corresponds to 25 hours of overall training commitment[3] per student and includes the hours of teaching activities specified in the curriculum as well as the hours reserved for personal study or other individual training activities.
For the Degree Program covered by this Didactic Regulations, the hours of teaching specified in the curriculum for each CFU, established in relation to the type of training activity, are as follows [4]:

[2] National programmed access is regulated by L. 264/1999 and subsequent amendments and supplements.
[3] According to Art. 5, c. 1 of Italian Ministerial Decree No 270/2004, "25 hours of total commitment per student correspond to university training credits; a ministerial decree may justifiably determine variations above or below the aforementioned hours for individual classes, by a limit of 20 per cent".
[4] The number of hours considers the instructions in Art. 6, c. 5 of the RDA: "of the total 25 hours, for each CFU, are reserved: a) 5 to 10 hours for lectures or guided teaching exercises; b) 5 to 10 hours for seminars; c) 8 to 12 hours for

- Lecture or guided teaching exercises: 8 hours per CFU;
- Seminar: 8 hours per CFU;
- Laboratory activities or fieldwork: 8 hours per CFU;

For internship activities, each credit corresponds to 25 hours of overall training commitment [5].
The CFU corresponding to each training activity acquired by the student is awarded by satisfying the assessment procedures (examination, pass mark) indicated in the Course sheet relating to the course/activity attached to these Didactic Regulations.

## Art. 7
## Description of teaching methods

The didactic activity is carried out in modality of execution of type A: Conventional course of study[6]
If necessary, the CCD decides which courses also include teaching activities offered online.
Some courses may also take place in seminar form and/or involve classroom exercises, language, and computer laboratories.
Detailed information on how each course is conducted can be found in the course sheets.

## Art. 8
## Testing of training activities[7]

1. The CCD, within the prescribed regulatory limits[8], establishes the number of examinations and other means of assessment that determine the acquisition of credits. Examinations are individual and may consist of written, oral, practical, graphical tests, term papers, interviews, or a combination of these modes.

laboratory activities or fieldwork, except in the case of training activities with a high experimental or practical content, and subject to different legal provisions or different determinations by DD.MM.".

[5] For Internship activities (Inter-ministerial Decree 142/1998), subject to further specific provisions, the number of working hours equal to 1 CFU may not be less than 25.

[6] Please note that, according to Ministerial Decree 289 of 25 March 2021 (general guidelines for the three-year planning of universities 2021-2023), in Annex 4, letter A, the types of programs are as follows:

a) Conventional Degree Programs. Degree Programs delivered entirely in person, or which provide - for activities other than practical and laboratory activities - a limited teaching activity delivered electronically, to an extent not exceeding one tenth of the total.

b) Degree Programs with mixed modality. Degree Programs that provide - for activities other than practical and laboratory activities - a significant proportion of the training activities delivered electronically, but no more than two-thirds.

c) Degree Programs mainly delivered by distance teaching. Degree Programs delivered predominantly by telematic means, to an extent exceeding two-thirds (but not all) of the training activities.

d) Degree Programs delivered entirely by distance. In these Degree Programs all the training activities are delivered electronically; the presence of the examinations of profit and discussion of the final examinations remains unaffected.

[7] Article 22 of the University Didactic Regulations.

[8] Pursuant to the DD.MM. 16.3.2007 in each Degree Programs the examinations or profit tests envisaged may not be more than 20 (Bachelor's Degrees; Art. 4. c. 2), 12 (Master's Degrees; Art. 4, c. 2), 30 (five-year single-cycle Degrees) or 36 (six-year single-cycle Degrees; Art. 4, c. 3). Pursuant to the RDA, Art. 13, c. 4, "the assessments that constitute an eligibility evaluation for activities referred to in Art. 10, c. 5, letters c), d), and e) of Ministerial Decree no. 270/2004, including the final examination for obtaining the degree, are excluded from the calculation." For Master's Degree Program and single-cycle Master's Degree Program, however, pursuant to the RDA, Art. 14, c. 7, "the assessments that constitute a progress evaluation for activities referred to in Art.10, c. 5, letters d) and e) of Ministerial Decree no. 270/2004 are excluded from the exam count; the final examination for obtaining the Master's Degree and single-cycle Master's Degree is included in the maximum number of exams".

2. The examination procedures published in the course sheets and the examination schedule will be made known to students before the start of classes on the Department's website.[9]
3. Examinations are held subject to booking, which is made electronically. In case the student is unable to book an exam for reasons that the President of the Board considers justifiable, the student may still be admitted to the examination, following those students already booked.
4. Before examination, the President of the Board of Examiners verifies the identity of the student, who must present a valid photo ID.
5. Examinations are marked out of 30. Examinations involving an assessment out of 30 shall be passed with a minimum mark of 18; a mark of 30 may be accompanied by honours by a unanimous vote of the Board. Examinations are marked out of 30 or with a simple pass mark. Assessments following tests other than examinations are marked out with a simple pass mark.
6. Oral exams are open to the public. If written tests are scheduled, the candidate has the right to see his/her paper(s) after correction.
7. The University Didactic Regulations govern Examination Boards [10].

## Art. 9
## Degree Program structure and Study Plan

1. The legal duration of the Degree Program is 3 years. It is also possible to enrol, based on the contract, in compliance with the provisions of Article 24 of the RDA.
   The student must acquire 180 CFU[11], attributable to the following Types of Training Activities (TAF):
   A) basic,
   B) characterising,
   C) related or complementary,
   D) at the student's choice[12],
   E) for the final exam,
   F) further training activities.
2. The degree is awarded after having acquired 180 CFU by passing examinations, not exceeding 20, and the performance of other training activities.
   Unless otherwise provided for in the legal framework of University studies, examinations taken as part of basic, characterising, and related or supplementary activities, as well as activities chosen autonomously by the student (TAF D) are taken into consideration for counting purposes. Examinations or assessments relating to activities independently chosen by the student may be

[9] Reference is made to Art. 22, c. 8, of the University Teaching Regulations, which states that "the Department or School ensures that the dates for progress assessments are published on the portal with reasonable advance notice, which normally cannot be less than 60 days before the start of each academic period, and that an adequate period of time is provided for exam registration, which is generally mandatory."

[10] Reference is made to Art. 22, paragraph 4 of the RDA according to which "Examination Boards and other assessments committees are appointed by the Director of the Department or by the President of the School when provided for in the School's Regulations. This function may be delegated to the CCD Coordinator. The Commissions comprise of the President and, if necessary, other professors or experts in the subject. In the case of active courses, the President is the course instructor, and in such cases, the Board can validly make decisions even in the presence of the President alone. In other cases, the President is a professor identified at the time of the Board's appointment. In the comprehensive evaluation of the overall performance at the conclusion of an integrated course, the professors in charge of the coordinated modules participate, and the President is appointed when the Commission is appointed."

[11] The total number of CFU for the acquisition of the relevant degree must be understood as follows: six-year single-cycle Degree, 360 CFU; five-year single-cycle Degree, 300 CFU; Bachelor's Degree, 180 CFU; Master's Degree, 120 CFU.

[12] Corresponding to at least 12 ECTs for Bachelor's Degrees and at least 8 CFU for Master's Degrees (Art. 4, c. 3 of Ministerial Decree 16.3.2007).

taken into account in the overall calculation corresponding to one unit[13]. Tests constituting an assessment of suitability for the activities referred to in Article 10, paragraph 5, letters c), d) and e) of Ministerial Decree 270/2004[14] are excluded from the count. Integrated Courses comprising of two or more modules are subject to a single examination.

3. In order to acquire the CFU relating to independent choice activities, the student is free to choose among all the Courses offered by the University, provided that they are consistent with the training project. This consistency is assessed by the Didactic Coordination Commission. Also, for the acquisition of the CFU relating to autonomous choice activities, the "passing the exam or other form of profit verification" is required (Art. 5, c. 4 of Ministerial Decree 270/2004).
4. The study plan summarises the structure of the Degree Program, listing the envisaged teachings broken down by course year and, in case, by curriculum. At the end, the propedeuticities envisaged by the Degree Program are listed. The study plan offered to students, with an indication of the scientific-disciplinary sectors and the area to which they belong, of the credits, of the type of educational activity, is set out in Annex 1 to these Didactic Regulations.
5. Pursuant to Art. 11, paragraph 4-bis, of Ministerial Decree 270/2004, it is possible to obtain the Degree according to an individual study plan that also includes educational activities different from those specified in the Didactic Regulations, as long as they are consistent with the CdS detail sheet of the academic year of enrollment. The individual study plan is approved by the Didactic Coordination Commission.

## Art. 10
## Attendance requirements[15]

1. In general, attendance of lectures is strongly recommended but not compulsory.
   In the case of individual courses with compulsory attendance, this option is indicated in the relative teaching/activity course sheet available in Annex 2.
2. If the lecturer envisages a different syllabus modulation for attending and non-attending students, this is indicated in the individual Course details published on the CdS web page and on the teacher's UniNA website.
3. Attendance at seminar activities that award training credits is compulsory. The relative modalities for the attribution of CFU are the responsibility of the CCD.

[13] Pursuant to the D.M. 386/2007.

[14] Art. 10, c. 5 of Ministerial Decree. 270/2004: "In addition to the qualifying training activities, as provided for in paragraphs 1, 2 and 3, Degree Programs shall provide for: a) training activities autonomously chosen by the student as long as they are consistent with the training project [TAF D]; b) training activities in one or more disciplinary fields related or complementary to the basic and characterising ones, also with regard to context cultures and interdisciplinary training [TAF C]; c) training activities related to the preparation of the final exam for the achievement of the degree and, with reference to the degree, to the verification of the knowledge of at least one foreign language in addition to Italian [TAF E]; d) training activities, not envisaged in the previous points, aimed at acquiring additional language knowledge, as well as computer and telematic skills, relational skills, or in any case useful for integration in the world of work, as well as training activities aimed at facilitating professional choices, through direct knowledge of the job sector to which the qualification may give access, including, in particular, training and guidance programs referred to in Decree no. 142 of 25 March 1998 of the Ministry of Labour [TAF F]; e) in the hypothesis referred to in Article 3, paragraph 5, training activities relating to internships and apprenticeships with companies, public administrations, public or private entities including those of the third sector, professional orders and colleges, on the basis of appropriate agreements".

[15] Art. 22, c. 10 of the University Didactic Regulations.

## Art. 11
## Prerequisites and prior knowledge

1. The list of incoming and outgoing propedeuticities (necessary to sit a particular examination) can be found at the end of Annex 1 and in the teaching/activity course sheet (Annex 2).
2. Any prior knowledge deemed necessary is indicated in the individual Teaching Schedule published on the course webpage and on the teacher's UniNA website.

## Art. 12
## Degree Program Calendar

The Degree Program calendar can be found on the Department's website well before the start of the activities (Art. 21, c. 5 of the RDA).

## Art. 13
## Criteria for the recognition of credits earned in other Degree Programs in the same Class[16]

For students coming from Degree Programs of the same class, the Didactic Coordination Commission ensures the full recognition of CFU, when associated with activities that are culturally compatible with the training Degree Program, acquired by the student at the originating Degree Program, according to the criteria outlined in Article 14 below. Failure to recognise credits must be adequately justified. It is without prejudice to the fact that the number of credits relating to the same scientific-disciplinary sector directly recognised by the student may not be less than 50% of those previously achieved.

## Article 14
## Criteria for the recognition of credits acquired in Degree Programs of different classes, in university or university-level Degree Programs, through single courses, at online Universities and in international Degree Programs[17]; criteria for the recognition of credits acquired in extra-curricular activities

1. With regard to the criteria for the recognition of CFU acquired in Degree Programs of different Classes, in university or university-level Degree Programs, through single courses, at online Universities and in International Degree Programs, the credits acquired are recognised by the CCD on the basis of the following criteria:
   - analysis of the activities carried out;
   - evaluation of the congruity of the disciplinary scientific sectors and of the contents of the training activities in which the student has earned credits with the specific training objectives of the Degree Program and of the individual training activities to be recognised.

   Recognition is carried out up to the number of credits envisaged by the didactic system of the Degree Program. Failure to recognise credits must be adequately justified. Pursuant to Art. 5, c. 5-bis, of Ministerial Decree 270/2004, it is also possible to acquire CFU at other Italian universities on the basis of agreements established between the concerned institutions, in accordance with the regulations current at the time [18].

[16] Art. 19 of the University Didactic Regulations.
[17] Art. 19 of the University Didactic Regulations.
[18] Art. 6, c. 9 of the University Didactic Regulations.

2. Any recognition of CFU relating to examinations passed as single courses may take place within the limit of 36 CFU, upon request of the interested party and following the approval of the CCD. Recognition may not contribute to the reduction of the legal duration of the Degree Program, as determined by Art. 8, c. 2 of Ministerial Decree 270/2004, except for students who enrol while already in possession of a degree of the same level[19].
3. With regard to the criteria for the recognition of CFU acquired in extra-curricular activities, pursuant to Art. 3, par. 2, of Ministerial Decree (D.M.) 931/2024, within the limit of 48 CFU (Bachelor's Degrees and single-cycle Master's Degrees), or 24 CFU (Master's Degrees), the following activities may be recognised (Art. 2 of D.M. 931/2024):
   - Professional knowledge and skills, certified in accordance with the current regulations as well as knowledge and skills acquired in post-secondary-level training activities.
   - Training activities carried out in the cycles of study at the public administration training institutions as well as knowledge and skills acquired in post-secondary-level training activities, which the University contributed to developing and implementing.
   - Achievement of an Olympic or Paralympic medal or the title of absolute world champion, absolute European champion or absolute Italian champion in disciplines recognized by the Italian National Olympic Committee or the Italian Paralympic Committee.

## Art. 15
## Criteria for enrolment in individual teaching courses

Enrolment in individual teaching courses, provided for by the University Didactic Regulations[20], is governed by the "University Regulations for enrolment in individual teaching courses activated as part of the Degree Program"[21].

## Article 16
## Features and modalities for the final examination

The degree in Aerospace Engineering is achieved after passing a final test, consisting of the evaluation of a written report, prepared by the student under the guidance of a supervisor, which focuses on training activities carried out within one or more courses.
To be admitted to the degree exam, the student must have acquired all the credits required by his/her study plan, except those relating to the final exam.
The final test is taken by the Candidate before a Commission chaired by the Study Program Coordinator and consists of the presentation of the degree paper carried out under the guidance of a supervisor. The degree paper is a technical document concerning processing or design activities.
The degree commission will arrive at the formulation of the degree mark taking into account the average of the marks obtained in the courses included in the student's study plan, the quality of the final exam, and other considerations relating to the student's career.

## Article 17
## Guidelines for traineeship and internship

1. Students enrolled in the Degree Program may decide to carry out internships or training periods with organisations or companies that have an agreement with the University. Traineeship and internship are not compulsory and contribute to the award of credits for the other training

[19] Art. 19, c. 4 of the University Didactic Regulations.
[20] Art. 19, c. 4 of the University Didactic Regulations.
[21] R.D. No. 348/2021.

activities chosen by the student and included in the study plan, as provided for by Art. 10, par. 5, letters d and e, of Ministerial Decree 270/2004[22].

2. The CCD regulates the modalities and characteristics of traineeship and internship with specific regulations.
3. The University of Naples Federico II, through of the University Internship Office and of COINOR www.coinor.unina.it, ensures constant contact with the world of work to offer students and graduates of the University concrete opportunities for internships and work experience and to promote their professional integration.

## Article 18
## Disqualification of student status[23]

A student who has not taken any examinations for eight consecutive academic years incurs forfeiture unless his/her contract stipulates otherwise. In any case, forfeiture shall be notified to the student by certified e-mail or other suitable means attesting to its receipt.

## Article 19
## Teaching tasks, including supplementary teaching, guidance, and tutoring activities

1. Professors and researchers carry out the teaching load assigned to them in accordance with the provisions of the RDA and the Regulations on the teaching and student service duties of professors and researchers and on the procedures for self-certification and verification of actual performance[24].
2. Professors and researchers must guarantee at least two hours of reception every 15 days (or by appointment in any case granted no longer than 15 days) and, in any case, guarantee availability by e-mail.
3. The tutoring service has the task of orienting and assisting students throughout their studies and of removing the obstacles that prevent them from adequately benefiting from attending courses, also through initiatives tailored to the needs and aptitudes of individuals.
4. The University ensures guidance, tutoring and assistance services and activities to welcome and support students. These activities are organised by the Schools and/or Departments under the coordination of the University, as established by the RDA in Article 8.

## Article 20
## Evaluation of the quality of the activities performed

1. The Didactic Coordination Commission implements all the quality assessment forms of teaching activities envisaged by the regulations in force according to the indications provided by the University Quality Presidium.
2. In order to guarantee the quality of teaching to the students and to identify the needs of the students and all stakeholders, the University of Naples Federico II uses the Quality Assurance (QA)[25] System, developed in accordance with the document "Self-evaluation, Evaluation and Accreditation of the Italian University System" of ANVUR, using:

[22] Traineeships ex letter d can be both internal and external; traineeships ex letter e can only be external.
[23] Art. 24, c. 5 of the University Didactic Regulations.
[24] R.D No. 2482//2020.
[25] The Quality Assurance System, based on a process approach and adequately documented, is designed in such a way as to identify the needs of the students and all stakeholders, and then translate them into requirements that the training offer must meet.

- surveys on the degree of placement of graduates into the world of work and on post-graduate needs;
- data extracted from the administration of the questionnaire to assess student satisfaction for each course in the curriculum, with questions relating to the way the course is conducted, teaching materials, teaching aids, organisation, facilities.

The requirements deriving from the analysis of student satisfaction data, discussed, and analysed by the Teaching Coordination Committee and the Joint Teachers' and Students' Committee (CPDS), are included among the input data in the service design process and/or among the quality objectives.

3. The QA System developed by the University implements a process of continuous improvement of the objectives and of the appropriate tools to achieve them, ensuring that planning, monitoring, and self-assessment processes are activated in all the structures to allow the prompt detection of problems, their adequate investigation, and the design of possible solutions.

## Article 21
## Final Rules

The Department Council, on the proposal of the CCD, submits any proposals to amend and/or supplement these Rules for consideration by the Academic Senate.

## Article 22
## Publicity and Entry into Force

1. These Rules and Regulations shall enter into force on the day following their publication on the University's official notice board; they shall also be published on the University website. The same forms and methods of publicity shall be used for subsequent amendments and additions.
2. Annex 1 (CdS structure) and Annex 2 (Teaching/Activity course sheet) are integral parts of this Didactic Regulations.

# ANNEX 1.1

# DEGREE PROGRAM DIDACTIC REGULATIONS

# AEROSPACE ENGINEERING

# CLASS L-9

**School: Polytechnic and Basic Sciences**

**Department: Industrial Engineering**

**Didactic Regulations in force since the academic year 2025 -2026**

## STUDY PLAN

**KEY**

**Type of Educational Activity (TAF):**

**A** = Basic
**B** = Characterising
**C** = Related or Supplementary
**D** = At the student's choice
**E** = Final examination and language knowledge
**F** = Further training activities

| Year I – Semester I | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Title Course** | **SSD** | **Module** | **Credits** | **hours** | **Type Activities** | **Course Modalities** | **TAF** | **Disciplinary Area** | **Mandatory / Optional** |
| Mathematical Analysis I | MAT/05 (MATH-03/A) | single | 9 | 72 | Frontal lessons and exercises | In person | A | Mathematics, Computer Science, Statistics | Mandatory |
| Geometry and Algebra | MAT/03 (MATH-02/B) | single | 6 | 48 | Frontal lessons and exercises | In person | A | Mathematics, Computer Science, Statistics | Mandatory |
| Industrial Technical Drawing | ING-IND/15 (IIND-03/B) | single | 6 | 48 | Frontal lessons and exercises | In person | B | Mechanical Engineering | Mandatory |
| English Language | | single | 3 | 24 | Frontal Lessons | In person | E | | Mandatory |

| Year I –Semester II | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Title Course** | **SSD** | **Module** | **Credits** | **hours** | **Type Activities** | **Course Modalities** | **TAF** | **Disciplinary Area** | **Mandatory / Optional** |
| Mathematical Analysis II | MAT/05 (MATH-03/A) | single | 9 | 72 | Frontal lessons and exercises | In person | A | Mathematics, Computer Science, Statistics | Mandatory |
| Chemistry | CHIM/07 (CHEM-06/A) | single | 6 | 48 | Frontal lessons and exercises | In person | A | Physics and Chemistry | Mandatory |
| Elements of Computer Sciences | ING-INF/05 (IINF-05/A | single | 6 | 48 | Frontal lessons and exercises | In person | A | Mathematics, Computer Science, Statistics | Mandatory |
| General Physics I | FIS/01 | single | 9 | 72 | Frontal lessons and exercises | In person | A | Physics and Chemistry | Mandatory |

| Year II –Semester I | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Title Course** | **SSD** | **Module** | **Credits** | **hours** | **Type Activities** | **Course Modalities** | **TAF** | **Disciplinary Area** | **Mandatory / Optional** |
| Mathematical Physics | MAT/07 (MATH-04/A) | single | 6 | 48 | Frontal lessons and exercises | In person | C | Mathematics, Computer Science, Statistics | Mandatory |
| Aerodynamics | ING-IND/06 (IIND-01/F | single | 9 | 72 | Frontal lessons and exercises | In person | B | Aerospace Engineering | Mandatory |
| Gasdynamics | ING-IND/06 (IIND-01/F | Termo-fluidynamics | 6 | 48 | Frontal lessons and exercises | In person | B | Aerospace Engineering | Mandatory |
| Aerospace Systems | ING-IND/05 (IIND-01/E) | Aerospace Systems I | 6 | 48 | Frontal lessons and exercises | In person | B | Aerospace Engineering | Mandatory |
| Flight Mechanics | ING-IND/03 (IIND-01/C) | Performance | 6 | 48 | Frontal lessons and exercises | In person | B | Aerospace Engineering | Mandatory |

| Year II –Semester II | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Title Course** | **SSD** | **Module** | **Credits** | **hours** | **Type Activities** | **Course Modalities** | **TAF** | **Disciplinary Area** | **Mandatory / Optional** |
| Aerospace Structures | ING-IND/04 (IIND-01/D) | single | 9 | 72 | Frontal lessons and exercises | In person | B | Aerospace Engineering | Mandatory |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Gasdynamics | ING-IND/06 (IIND-01/F | Gasdynamics | 6 | 48 | Frontal lessons and exercises | In person | B | Aerospace Engineering | Mandatory |
| Aerospace Systems | ING-IND/05 (IIND-01/E) | Aerospace Systems II | 6 | 48 | Frontal lessons and exercises | In person | B | Aerospace Engineering | Mandatory |
| Flight Mechanics | ING-IND/03 (IIND-01/C) | Manoeuvres and Stability | 6 | 48 | Frontal lessons and exercises | In person | B | Aerospace Engineering | Mandatory |

| **Year III –Semester I** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Title Course** | **SSD** | **Module** | **Credits** | **hours** | **Type Activities** | **Course Modalities** | **TAF** | **Disciplinary Area** | **Mandatory / Optional** |
| Electromagnetism and Electrical Engineering | FIS/01 | General Physics II | 6 | 48 | Frontal lessons and exercises | In person | A | Physics and Chemistry | Mandatory |
| Aerospace Materials Technologies | ING-IND/16 (IIND-04/A) | Single | 6 | 48 | Frontal lessons and exercises | In person | C | Mechanical Engineering | Mandatory |
| Numerical Methods in Aerospace Engineering | ING-IND/06 (IIND-01/F) | Single | 6 | 48 | Frontal lessons and exercises | In person | B | Aerospace Engineering | Mandatory |
| Aerospace Construction I | ING-IND/04 (IIND-01/D) | Single | 9 | 72 | Frontal lessons and exercises | In person | B | Aerospace Engineering | Mandatory |
| At the student's choice (**note a**) | | | 0-12 | 0-96 | | In person | D | | To be selected among suggested courses (Tab. A) or approved in a study plane |
| Further training activities (**note b**) | | | 0-3 | 0-24 | | | F | | Mandatory |

| **Year III –Semester II** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Title Course** | **SSD** | **Module** | **Credits** | **hours** | **Type Activities** | **Course Modalities** | **TAF** | **Disciplinary Area** | **Mandatory / Optional** |
| Electromagnetism and Electrical Engineering | ING-IND/31 (IIET-01/A) | Electrical Engineering | 6 | 48 | Frontal lessons and exercises | In person | B | Electrical Engineering | Mandatory |
| Aerospace Propulsion | ING-IND/07 (IIND-01/G) | Single | 9 | 72 | Frontal lessons and exercises | In person | B | Aerospace Engineering | Mandatory |
| Probability and Statistics | SECS-S/02 (STAT-01/B) | Single | 6 | 48 | Frontal lessons and exercises | In person | C | Mathematics, Computer Science, Statistics | Mandatory |
| At the student's choice (**note a**) | | | 0-12 | 0-96 | | In person | D | | To be selected among suggested courses (Tab. A) or approved in a study plane |
| Further training activities (**note b**) | | | 0-3 | 0-24 | | | F | | Mandatory |
| Final examination | | | 3 | 24 | | | E | | |

**Note a**

The student can choose elective courses both in the first and second semester of the third year until the completion of the 12 credits reserved for these activities. The following courses suggested for the independent choice are automatically approved (without the need to submit a Study Plan):

| Course Title | SSD | Credits |
|---|---|---|
| Complements of Aerospace Constructions | ING-IND/04 (IIND-01/D) | 6 |
| Structure Calculation Laboratory | ING-IND/04 (IIND-01/D) | 6 |
| Aviation Regulation | ING-IND/04 (IIND-01/D) | 6 |
| On-Board Systems Laboratory | ING-IND/05 (IIND-01/E) | 6 |
| Special Technologies II | ING-IND/16 (IIND-04/A) | 6 |
| Aircraft Maintenance | ING-IND/04 (IIND-01/D) | 6 |
| Experimentation of Structures | ING-IND/04 (IIND-01/D) | 6 |

Table A - Courses Suggested for the Student's Choice

**Note b**

The assessment of Further Training Activities is certified by the Coordinator of the CCD on the basis of the certificate of attendance issued, for the successful participation in seminar cycles or other teaching activities, by the teachers responsible for the initiatives, or for the attendance of specific courses, organized at the University to provide students with further linguistic knowledge, computer and telematic skills, relational skills, or in any case useful for entering the world of work, which provide for the issuing of digital certifications through Open Badges, or Team Working initiatives.

In Further training activities, the student can request the recognition of linguistic knowledges (3 Credits) acquired through:
• the ENGLISH II exam, code U1038. For this exam there is no provision of a course, the credits are acquired with procedures defined by the University linguistic Center (CLA)
• or an ENGLISH certification, level B2 CEFR, acquired at a "certified" external center or with procedures defined by the University linguistic Center (CLA)
In both cases, the 3 credits are not awarded a grade but only passed or not passed.

**List of propaedeuticities**

Mathematical Analysis I for Mathematical Analysis II
Mathematical Analysis I and Geometry and Algebra for Mathematical Physics
Mathematical Analysis II for Aerodynamics
Mathematical Physics for Aerospace Structures
Mathematical Analysis II and General Physics I for Gasdynamics
Mathematical Analysis II, General Physics I, Geometry and Algebra for Aerospace Systems
Mathematical Analysis I, General Physics I, Geometry and Algebra for Flight Mechanics
General Physics I for Electromagnetism and Electrical Engineering
Chemistry for Aerospace Materials Technologies
Elements of Computer Sciences, Aerodynamics and Gasdynamics for Numerical Methods in Aerospace Engineering
Aerospace Structures for Aerospace Constructions I
Chemistry, Aerodynamics, Gasdynamics, for Aerospace Propulsion
Mathematical Analysis I for Probability and Statistics
Aerospace Structures for Aerospace Construction Complements
Aerospace Structures for Structure Calculation Laboratory
Aerospace Structures for Structures Experimentation
Aerospace Systems for On-Board Systems Laboratory
Aerospace Materials Technologies for Special Technologies II

# ANNEX 2.1

# DEGREE PROGRAM DIDACTIC REGULATIONS

# ARAEROSPACE ENGINEERING

# CLASS L-9

**School: Polytechnic and Basic Sciences**

**Department: Industrial Engineering**

**Didactic Regulations in force since the academic year 2025 -2026**

| | | |
|---|---|---|
| **Course:**<br>Mathematical Analysis I | **Teaching Language:**<br>Italian | |
| **SSD (Subject Areas):**<br>MAT/05 (new MATH-03/A) | | **CREDITS:**<br>9 |
| **Course year: I** | **Type of Educational Activity: A** | |
| **Teaching Methods:**<br>in-person | | |
| **Contents extracted from the SSD declaratory consistent with the training objectives of the course:**<br>The sector includes skills and research areas relating to mathematical analysis in all its aspects (harmonic, convex, functional, linear and non-linear), to the calculus of variations and to the theory of functions, both real and complex, as well as to the analytical theory of Numbers. The teaching skills of this sector also concern all the institutional aspects of basic mathematics. | | |
| **Objectives:**<br>Provide the fundamental concepts, in view of the applications, relating to infinitesimal, differential and integral calculus for real functions of a real variable; acquire adequate logical formalization skills and conscious operational skills | | |
| **Propaedeuticities:**<br><br>**Is a propaedeuticity for:**<br>Mathematical Analysis II, Mathematical Physics, Probability and Statistics | | |
| **Types of examinations and other tests:**<br>Written and oral | | |

| | |
|---|---|
| **Course:**<br>Geometry and Algebra | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>MAT/03 (new MATH-02/B) | **CREDITS:**<br>6 |
| **Course year: I** | **Type of Educational Activity: A** |
| **Teaching Methods:**<br>in-person | |
| **Contents extracted from the SSD declaratory consistent with the training objectives of the course:**<br>Institutional aspects of basic mathematics related to geometry and linear algebra. | |
| **Objectives:**<br>You will have to acquire the basic tools of linear algebra and geometry. The objective of this course is, on the one hand, to accustom the student to tackling formal problems, using adequate tools and correct language, and on the other to solve specific algebraic and geometric problems, with the classic tools of linear algebra | |
| **Propaedeuticities:**<br><br>**Is a propaedeuticity for:**<br>Mathematical Physics, Flight Mechanics, Aerospace Systems | |
| **Types of examinations and other tests:**<br>Written and oral | |

| | |
|---|---|
| **Course:**<br>Industrial Technical Drawing | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>ING-IND/15 (new IIND-03/B) | **CREDITS:**<br>6 |
| **Course year: I** | **Type of Educational Activity: B** |

**Teaching Methods:**

in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**

Introduction to the methods and tools needed to produce a technically valid project, in the field of industrial engineering. Morphological, functional and aesthetic study of construction solutions and technical representation methods. Design elements and related representation and modelling tools covered with reference to the various industrial sectors: aerospace, mechanical, naval and plant engineering. Conception of overall architectures and breakdown into components for manufacturing, down to the detail of the construction elements and the choice of tolerances, in relation to cost and functioning requirements. Elements of product documentation management and industrial product development.

**Objectives:**

Interpretation of technical drawings with evaluation of form, function, workability, surface finish and dimensional tolerances. Ability to represent machine parts and simple mechanical systems through construction drawings of details and assembly drawings in compliance with international regulations. Ability to develop drawings of machine parts starting from their functional study and the critical analysis of different design solutions. Ability to choose unified elements based on operating conditions

**Propaedeuticities:**

**Is a propaedeuticity for:**

**Types of examinations and other tests:**

Written and oral

| | |
|---|---|
| **Course:**<br>Mathematical Analysis II | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>MAT/05 (new MATH-03/A) | **CREDITS:**<br>9 |
| **Course year: I** | **Type of Educational Activity: A** |
| **Teaching Methods:**<br>in-person | |
| **Contents extracted from the SSD declaratory consistent with the training objectives of the course:**<br>The sector includes skills and research areas relating to mathematical analysis in all its aspects (harmonic, convex, functional, linear and non-linear), to the calculus of variations and to the theory of functions, both real and complex, as well as to the analytical theory of Numbers. The teaching skills of this sector also concern all the institutional aspects of basic mathematics.. | |
| **Objectives:**<br>Provide the fundamental concepts, in view of the applications, relating to differential and integral calculus for real functions of several real variables, and to ordinary differential equations; acquire conscious operational skills | |
| **Propaedeuticities:**<br>Mathematical Analysis I<br><br>**Is a propaedeuticity for:**<br>Aerodynamics, Gasdynamics, Aerospace Systems, Flight Mechanics | |
| **Types of examinations and other tests:**<br>Written and oral | |

| | |
|---|---|
| **Course:**<br>Chemistry | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>CHIM/07 (new CHEM-06/A) | **CREDITS:**<br>6 |
| **Course year: I** | **Type of Educational Activity: A** |
| **Teaching Methods:**<br>in-person | |
| **Contents extracted from the SSD declaratory consistent with the training objectives of the course:**<br>The sector is interested to scientific and educational - training activities in the field of the study of chemical and chemical-physical foundations in various technological fields, with particular regard to those that refer to materials, their properties and their interaction with the environment, providing a synthesis of the principles common to the different phenomenologies and the different categories of substances. | |
| **Objectives:**<br>Critical knowledge of the chemical and chemical-physical foundations necessary to interpret the behaviour and transformations of matter in relation to the main technologies and engineering problems: materials, energy production and accumulation, pollution | |
| **Propaedeuticities:**<br><br>**Is a propaedeuticity for:**<br>Aerospace Materials Technologies, Aerospace Propulsion | |
| **Types of examinations and other tests:**<br>Written and oral | |

| | | |
|---|---|---|
| **Course:**<br>Elements of Computer Science | **Teaching Language:**<br>Italian | |
| **SSD (Subject Areas):**<br>ING-INF/05 (new IINF-05/A) | | **CREDITS:**<br>6 |
| **Course year: I** | **Type of Educational Activity: A** | |
| **Teaching Methods:**<br>in-person | | |
| **Contents extracted from the SSD declaratory consistent with the training objectives of the course:**<br>The sector is interested in scientific and educational-training activities in the field of Information Processing Systems. The sector is characterized by the set of scientific fields and scientific-disciplinary skills relating to the design and creation of information processing systems, as well as their management and use in the various application contexts with engineering methodologies and techniques. | | |
| **Objectives:**<br>Knowledge of the theoretical foundations of computer science, computer architecture and high-level programming languages. Knowledge of methods and techniques for developing programs for solving problems of limited complexity. Ability to design and code algorithms in C/C++ language, according to structured and modular programming techniques. | | |
| **Propaedeuticities:**<br><br>**Is a propaedeuticity for:**<br>Numerical Methods in Aerospace Engineering | | |
| **Types of examinations and other tests:**<br>Written and oral | | |

| | |
|---|---|
| **Course:**<br>General Physics I | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>FIS/01 | **CREDITS:**<br>9 |
| **Course year: I** | **Type of Educational Activity: A** |

**Teaching Methods:**

in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**

Skills necessary to carry out experimental research, in particular those to investigate the physical processes and operating principles of the instrumentation suitable for the control and detection of phenomena, [...], metrology and the processing of experimental data. The skills of this sector also concern research in the fields […] of thermodynamics.

**Objectives:**

The student will acquire the fundamental concepts of Kinematics and Dynamics of material points and rigid bodies, favouring the phenomenological and methodological aspects. They will also acquire a conscious operational ability in solving numerical exercises.

**Propaedeuticities:**

**Is a propaedeuticity for:**

Electromagnetism and Electrotechnics, Gasdynamics, Aerospace Systems, Flight Mechanics

**Types of examinations and other tests:**

Written and oral

| | |
|---|---|
| **Course:**<br>Mathematical Physics | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>MAT/07 (new MATH-04/A) | **CREDITS:**<br>6 |
| **Course year: II** | **Type of Educational Activity: C** |

**Teaching Methods:**

in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**

The sector includes skills and research areas related to the study, from both a theoretical and applied point of view, of Mathematical Physics and Rational Mechanics. The teaching skills of this sector also concern all the institutional aspects of basic mathematics.

**Objectives:**

Learning of some basic physical-mathematical tools of Mechanics: Rigid kinematics and kinematics of relative motions with constraints; Cardinal Equations of Dynamics (ECD) for systems of isolated particles and/or solids; Mass geometry and use of the inertia tensor in the formulation of ECD for a solid; Statics of articulated structures, i.e. theoretical and practical tools and operational strategies for the analysis of their equilibrium and isostaticity, for the calculation of the constraint reactions and the internal characteristic of the stress.

**Propaedeuticities:**

Mathematical Analysis I, Geometry and Algebra

**Is a propaedeuticity for:**

Aerospace Structures

**Types of examinations and other tests:**

Written and oral

| | |
|---|---|
| **Course:**<br>Aerodynamics | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>ING-IND/06 (new IIND-01/F) | **CREDITS:**<br>9 |
| **Course year: II** | **Type of Educational Activity: B** |

**Teaching Methods:**

in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**

The sector studies the motion of fluids and its applications in engineering. Starting from the balance equations of the fluid continuum, it includes constitutive relations for Newtonian fluids, vorticity dynamics and potential flows, compressible and non-compressible flow fields, mass and energy transport phenomena, boundary layers, wakes and jets, acoustic waves and shock, stability and transition, turbulence dynamics, passive scalars and multiphase flows. Theoretical methodologies and numerical simulation and experimental investigation techniques complete the relevant topics. Essential parts are aerodynamic, gasdynamic and hydrodynamic design with applications regarding transport systems, heat transfer and combustion processes, aeroacoustics, transition and turbulence control.

**Objectives:**

Introduce the physical principles of aerodynamics; explain the genesis of aerodynamic forces; derive the general equations for the different regimes of Aerodynamics; provide the cultural background for the study of Aerodynamics problems by introducing the general concepts of characteristic numbers, the analysis of orders of magnitude and small perturbations.

**Propaedeuticities:**

Mathematical Analysis II, General Physics I

**Is a propaedeuticity for:**

Numerical Methods in Aerospace Engineering

**Types of examinations and other tests:**

oral

| | | |
|---|---|---|
| **Course:**<br>Aerospace Structures | **Teaching Language:**<br>Italian | |
| **SSD (Subject Areas):**<br>ING-IND/04 (new IIND-01/D) | | **CREDITS:**<br>9 |
| **Course year: II** | **Type of Educational Activity: B** | |
| **Teaching Methods:**<br>in-person | | |
| **Contents extracted from the SSD declaratory consistent with the training objectives of the course:**<br>Among the contents of the SSD there is the study, the project, the static analysis of the structures and the materials that constitute them. In particular, the sector studies all the problems of structural safety in the aeronautical and space fields. | | |
| **Objectives:**<br>The course presents the basic elements of the theory of elasticity applied to aerospace structures. The student should, at the end of the course, be able to: (i) verify (from the point of view of punctual stress) trusses and flat frames; (ii) dimension (with a given safety margin) the aforementioned structures assembled with one-dimensional elements; (iii) verify the shear flows in a multi-connected thin section. | | |
| **Propaedeuticities:**<br>Mathematical Physics<br><br>**Is a propaedeuticity for:**<br>Aerospace Construction I, Complements of Aerospace Constructions, Expérimentation of Structures, Structure Calculation Laboratory | | |
| **Types of examinations and other tests:**<br>Written and oral | | |

| | |
|---|---|
| **Course:**<br>Gasdynamics | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>ING-IND/06 (new IIND-01/F)<br>ING-IND/06 (new IIND-01/F) | **CREDITS:**<br>Thermofluid Dynamics module: 6<br>Gasdynamics Module: 6 |
| **Course year: II** | **Type of Educational Activity: B** |

**Teaching Methods:**
in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**
The sector studies the motion of fluids and its applications in engineering. Starting from the balance equations of the fluid continuum, it includes constitutive relations for Newtonian fluids, vorticity dynamics and potential flows, compressible and non-compressible flow fields, mass and energy transport phenomena, boundary layers, wakes and jets, acoustic waves and shock, stability and transition, turbulence dynamics, passive scalars and multiphase flows. Theoretical methodologies and numerical simulation and experimental investigation techniques complete the relevant topics. Essential parts are aerodynamic, gasdynamic and hydrodynamic design with applications regarding transport systems, heat transfer and combustion processes, aeroacoustics, transition and turbulence control.

**Objectives:**
The course is aimed at aerospace engineering students and intends to introduce the physical principles of thermodynamics of equilibrium states and thermodynamic cycles; provide the basic cultural background for the study of problems in fluid mechanics, highlighting the connections with the thermodynamics of evolutionary systems (i.e. irreversible processes); describe the fundamental mechanisms of heat transmission and their applications.
Furthermore, the course includes the acquisition of the fundamentals of Gasdynamics and in particular the analysis of motions in a compressible regime. Education in the use of elementary methods for the calculation of supersonic flows and one-dimensional motions. Resolution of dissipative motions with integral methods, with reference to both momentum and heat exchanges.

**Propaedeuticities:**
Mathematical Analysis II, General Physics I

**Is a propaedeuticity for:**
Numerical Methods in Aerospace Engineering

**Types of examinations and other tests:**
Written and oral

| **Course:** | **Teaching Language:** |
|---|---|
| Aerospace Systems | Italian |

| **SSD (Subject Areas):** | **CREDITS:** |
|---|---|
| ING-IND/05 (new IIND-01/E)<br>ING-IND/05 (new IIND-01/E) | Aerospace Systems I module: 6<br>Aerospace Systems II Module: 6 |

| **Course year: II** | **Type of Educational Activity: B** |
|---|---|

**Teaching Methods:**

in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**

The sector studies aeronautical and space systems as a whole and in the aspects of interaction and integration of the subsystems composing the configuration, in relation to the achievement of mission objectives. Aspects of the study include: the definition of the functional architecture of the individual units and the design; the identification of the components in functional terms; the influence on the system and subsystems of the external environment and dynamic interactions. The sector makes use of specific investigation methodologies, such as simulation for experimental, analytical and numerical modelling

**Objectives:**

The first module intends to provide the essential elements for mathematical-physical modelling, the study of dynamics and control and the analysis of the dynamic performance of aerospace systems. Some integrated implementation solutions are studied in detail, with particular reference to applications in the aeronautical field, with the aim of enabling the student to master, at a first level of in-depth analysis, the basic theoretical problems that lead to the definition of a controller .

The second module also intends to provide the essential elements for mathematical-physical modelling and the study of problems of astrodynamics and stabilization of the attitude of aerospace systems. Some classic operating conditions are studied in detail, with particular reference to space applications, with the aim of enabling the student to master, at a first level of in-depth analysis, the basic theoretical problems that lead to the definition of a space mission in terms of orbit and attitude.

**Propaedeuticities:**

Mathematical Analysis II, General Physics I, Geometry and Algebra

**Is a propaedeuticity for:**

**Types of examinations and other tests:**

Written and oral

| **Course:** | **Teaching Language:** |
|---|---|
| Flight Mechanics | Italian |

| **SSD (Subject Areas):** | **CREDITS:** |
|---|---|
| ING-IND/03 (new IIND-01/C)<br>ING-IND/03 (new IIND-01/C) | Performance module: 6<br>Manoeuvres and Stability Module: 6 |

| **Course year: II** | **Type of Educational Activity: B** |
|---|---|

**Teaching Methods:**

in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**

The sector studies the basis for the aeromechanical design of the aircraft, the flight mission, the manual control of vehicles operating in the atmospheric environment. The sector's expertise concerns performance, stability, control and the study of the trajectory of fixed-wing aircraft. The methodologies for analysing and verifying the aircraft's performance and balance play a fundamental role.

**Objectives:**

Starting from the principles of aircraft flight, the course provides the student with the tools for the analysis and calculation of the flight, take-off and landing performance of an aircraft. In particular, it provides the student with the ability to numerically evaluate performance, autonomy, etc. In fact, numerous application examples are foreseen.
Furthermore, the course aims to provide the student with the elements necessary to interpret flight manoeuvres and predict the behaviour of the aircraft and the loads deriving from them. All stability derivatives, the aerodynamics of the aircraft and the effects of propulsion are explored in depth. Finally, the course provides the tools for evaluating the balance and static stability characteristics of the aircraft both with locked controls and free controls in the longitudinal and lateral-directional plane.

**Propaedeuticities:**

Mathematical Analysis II, General Physics I, Geometry and Algebra

**Is a propaedeuticity for:**

**Types of examinations and other tests:**

Written

| | |
|---|---|
| **Course:**<br>Aerospace Materials Technologies | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>ING-IND/16 (new IIND-04/A) | **CREDITS:**<br>6 |
| **Course year: III** | **Type of Educational Activity: C** |

**Teaching Methods:**

in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**

The sector studies the transformation processes that affect manufacturing products, made up of traditional and innovative materials, and range from manufacturing, to assembly, controls and recycling; the mechanical and technological characterization of the transformed materials and the link of their properties with the parameters that govern the processes; methodologies and tools for the design of processes, components and transformation systems; the planning, management and control of processing, assembly, control and recycling systems; quality management and environmental protection with a view to sustainable development.

**Objectives:**

The course aims to provide students with both an understanding of the potential and applications of the most innovative processing technologies in the aerospace field, and the engineering tools necessary for the design of production processes with these technologies. Furthermore, the objective is to train a professional figure capable of adequately addressing the problems and aspects related to the innovative technologies sector.

**Propaedeuticities:**

Chemistry

**Is a propaedeuticity for:**

Special Technologies II

**Types of examinations and other tests:**

Oral and/or Written

| **Course:** Numerical Methods in Aerospace Engineering | **Teaching Language:** Italian |
|---|---|
| **SSD (Subject Areas):** ING-IND/06 (new IIND-01/F) | **CREDITS:** 6 |
| **Course year: III** | **Type of Educational Activity: B** |

**Teaching Methods:**
in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**
The sector studies the motion of fluids and its applications in engineering. Starting from the balance equations of the fluid continuum, it includes constitutive relations for Newtonian fluids, vorticity dynamics and potential flows, compressible and non-compressible flow fields, mass and energy transport phenomena, boundary layers, wakes and jets, acoustic waves and shock, stability and transition, turbulence dynamics, passive scalars and multiphase flows. Theoretical methodologies and numerical simulation and experimental investigation techniques complete the relevant topics. Essential parts are aerodynamic, gasdynamic and hydrodynamic design with applications regarding transport systems, heat transfer and combustion processes, aeroacoustics, transition and turbulence control.

**Objectives:**
The course aims to provide the student with the fundamentals of numerical methods for solving typical aerospace engineering problems using the computer. In particular, we will consider models governed by ordinary differential equations and partial differential equations that are typically encountered in mathematical physics and engineering. The student will also be provided with operational expertise in the production of numerical codes. During the course, in fact, the theoretical concepts introduced will be used to write numerical codes in the classroom implementing the illustrated techniques.

**Propaedeuticities:**
Elements of Computer Sciences, Aerodynamics, Gasdynamics

**Is a propaedeuticity for:**

**Types of examinations and other tests:**
Written and oral

| | |
|---|---|
| **Course:**<br>Aerospace Construction I | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>ING-IND/04 (new IIND-01/D) | **CREDITS:**<br>9 |
| **Course year: III** | **Type of Educational Activity: B** |

**Teaching Methods:**
in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**
Among the contents of the sector, structural and construction skills relating to atmospheric and space aircraft are developed. In particular, the skills concern the design, determination of loads, static and fatigue analysis, materials and construction. The problems of structural safety in the aeronautical and space fields are also highlighted.

**Objectives:**
The course aims to acquire theoretical and practical tools for the resolution of structural problems through the calculation of the stress state mainly in shell structures, the calculation of the stability of the elastic equilibrium, the post-buckling behaviour. Critical load conditions are analysed as per CS-23 and CS-25 regulations. Finally, the principles of fatigue, static aeroelasticity and composite materials are introduced.

**Propaedeuticities:**
Aerospace Structures

**Is a propaedeuticity for:**

**Types of examinations and other tests:**
Written and oral

| | |
|---|---|
| **Course:**<br>Electromagnetism and Electrical Engineering | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>FIS/01<br>ING-IND/31 (new IIET-01/A) | **CREDITS:**<br>General Physics II Module: 6<br>Electrical Engineering Module: 6 |
| **Course year: III** | **Type of Educational Activity:**<br>General Physics II Module: A<br>Electrical Engineering Module: B |

**Teaching Methods:**

in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**

FIS/01

Skills necessary to carry out experimental research, in particular those to investigate the physical processes and operating principles of the instrumentation suitable for the control and detection of phenomena, [...], metrology and the processing of experimental data. The skills of this sector also concern research in the fields […] of electromagnetism […]..

ING-IND/31

The sector studies the theoretical and experimental aspects of the two complementary branches of electromagnetic fields and circuits and the development of related applications in the various sectors of engineering. [..] In the second line we study electrical and electronic, signal and power circuits, nanocircuits, biocircuits and related models: linear, non-linear and time-varying, with concentrated and distributed parameters, analog and digital, neural. The two complementary approaches are applied to the analysis, synthesis, physical and numerical modelling and automatic design of electrical and electronic equipment, devices and systems [...].

**Objectives:**

In the first module, the student will acquire the fundamental concepts of Electromagnetism, with particular focus on the phenomenological and methodological aspects. They will also acquire a conscious operational ability in solving simple numerical exercises.

In the second module, the course aims to provide students with the basic notions of circuit theory in stationary, sinusoidal and periodic operating conditions and of first-order linear dynamic circuits; to systematically introduce the general properties of the circuit model, the main theorems and the main analysis methodologies. The course also provides students with some elements of electrical energy distribution systems, electrical safety, and electromechanical conversion

**Propaedeuticities:**

General Physics I

**Is a propaedeuticity for:**

**Types of examinations and other tests:**

Written and oral

| | |
|---|---|
| **Course:**<br>Aerospace Propulsion | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>ING-IND/07 (new IIND-01/G) | **CREDITS:**<br>9 |
| **Course year: III** | **Type of Educational Activity: B** |

**Teaching Methods:**

in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**

The Sector studies the basic concepts, operating principles, criteria and fields of use, performance analysis, development, implementation and integration of aeronautical and space propulsion systems and their components, the analysis of the chemical-physical processes underlying the their operation and control.

**Objectives:**

The course intends to provide the student with the fundamental notions underlying the functioning of aerospace propulsion systems. In particular, the student must be able to analyse thermal engine thermodynamic cycles, apply one-dimensional aero-thermodynamics, in order to understand the functioning of the different aerospace propulsion systems, know the main configurations of aerojets and endojets currently used and under development, with particular reference to the methodologies for evaluating the most important propulsion parameters.

**Propaedeuticities:**

Chemistry, Aerodynamics, Gasdynamics

**Is a propaedeuticity for:**

**Types of examinations and other tests:**

oral

| | |
|---|---|
| **Course:**<br>Probability and Statistics | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>SECS-S/02 (new STAT-01/B) | **CREDITS:**<br>6 |
| **Course year: III** | **Type of Educational Activity: C** |

**Teaching Methods:**

in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**

The sector is characterized by specific attention to modern statistical problems arising in the field of experimental sciences (statistics and probability calculation, design and analysis of experiments) and in particular engineering (reliability, statistical quality control) and biomedical sciences (anthropometry, biometry, medical statistics). The main application fields concern technology, safety, the environment, the territory, production processes, products, natural resources.

**Objectives:**

The course introduces the student to the fundamental notions of probability calculus, data analysis and statistical inference and their engineering applications. At the end of the course the student will be able to apply probabilistic models in the field of engineering and to apply statistical methods in the analysis and control of non-deterministic phenomena in general, with particular attention to applications of aerospace interest.

**Propaedeuticities:**

Mathematical Analysis I

**Is a propaedeuticity for:**

**Types of examinations and other tests:**

Written and oral

| | |
|---|---|
| **Course:**<br>Special Technologies II | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>ING-IND/16 (new IIND-04/A) | **CREDITS:**<br>6 |
| **Course year: III** | **Type of Educational Activity: D** |

**Teaching Methods:**

in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**

The sector studies the transformation processes that affect manufacturing products, made up of traditional and innovative materials, and range from manufacturing, to assembly, controls and recycling; the mechanical and technological characterization of the transformed materials and the link of their properties with the parameters that govern the processes; methodologies and tools for the design of processes, components and transformation systems; the planning, management and control of processing, assembly, control and recycling systems; the management of quality and environmental protection with a view to sustainable development based on the heat hardening treatments that can be performed on it.

**Objectives:**

The course aims to provide both an understanding of the potential and applications of the most innovative processing technologies, and the engineering tools necessary for the design of production processes with these technologies. Furthermore, the module aims to provide knowledge and skills on the behaviour of metallic and non-metallic materials of aerospace interest and on methods to improve and control their characteristics of interest.

**Propaedeuticities:**

Aerospace Materials Technologies

**Is a propaedeuticity for:**

**Types of examinations and other tests:**

Written

| | |
|---|---|
| **Course:**<br>Aviation Regulations | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>ING-IND/04 (new IIND-01/D) | **CREDITS:**<br>6 |
| **Course year: III** | **Type of Educational Activity: D** |

**Teaching Methods:**

in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**

Aims and objectives of aeronautical legislation and correlation between civil aviation authorities and the aeronautical and air transport industry. Navigation Code and its impact on legislation and industry. ICAO: purposes, regulations and recommendations. ENAC: its role in the Italian and international aeronautical sector. FAA and FAR: influence on Italian and European legislation. JAA and JAR: impact on European standards. EASA: role of the agency and presentation of the main community regulations in the sector (Reg. (EC) 1592/02; Reg. (EC) 1702/03; Reg. (EC) 2042/03). Considerations on the impact of the main aeronautical standards on aircraft design. Considerations on the Quality System and certification of aircraft design, production, maintenance and operation companies.

**Objectives:**

The Course intends to provide all the useful information to fully cover the contents of module 10 (Aeronautics legislation) of the program required by law (EASA Part 66 and AER.P-66), useful for obtaining the Aeronautical Maintenance License (LMA)/ Military Aircraft Maintenance License (MAML).

In this context the student will be able to know:

-the most significant aspects of aeronautical legislation in the civil and military sectors;

-the main standards used by the Civil and Military Aviation Authorities as part of the certification process of aeronautical companies and products;

-the complex correlation between the various regulations, not limiting itself solely to their knowledge.

**Propaedeuticities:**

**Is a propaedeuticity for:**

**Types of examinations and other tests:**

Written and oral

| | |
|---|---|
| **Course:**<br>Aircraft Maintenance | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>ING-IND/04 (new IIND-01/D) | **CREDITS:**<br>6 |
| **Course year: III** | **Type of Educational Activity: D** |

**Teaching Methods:**

in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**

The mission and requirements of the Public Transport Air Operator. The organizational structure of the Operator in harmony with the sound principles of the company and in compliance with community and international aeronautical regulations.

The meaning and relevance of the “Continuing Airworthiness” of aircraft in the fleet; the Technical Organization responsible for it, with particular emphasis on the role ascribed to Engineering. Aeronautical Maintenance as the main tool to guarantee the "Continuing Airworthiness" of Aircraft: the evolution of Maintenance Philosophies with reference to the criteria for identifying "Maintenance Significant Items" and defining "Maintenance Tasks".

“Maintainability” as the primary quality of the aircraft design; the evolution from Project Maintenance to the Air Operator Maintenance Program, through the MRB (Maintenance Review Board) process.

The execution of maintenance of aircraft, its components and engines. The basic factors of the reliability of Aeronautical Maintenance; the “Risk Assessment” methods

& Risk Management”; the relevance of "Human Factors" in Maintenance processes and the implementation of the "Quality/Safety Management System" in the Operation and Maintenance of Aircraft.

**Objectives:**

The Course intends to provide all the useful information to fully cover the contents of modules 7 (Maintenance Practices) and 9 (Human Factors) of the program required by law (EASA Part 66/AER.P-

66) useful for obtaining the Aeronautical Maintenance License (LMA)/Military Aircraft Maintenance License (MAML). The main objectives are:

- make students participate in issues relating to the Technical Management of Aircraft used in public transport, aimed at "Continuous Airworthiness", as completion of the "virtuous circle" which includes Design and Construction. Outline the central role of Engineering within the Airline Operator and Aviation Maintenance Companies, indicating possible professional opportunities for young engineers.
- Acquire awareness of the maintenance needs of an aircraft or aeronautical item as well as the necessary basic knowledge underlying the supervision of more or less complex maintenance activities both in technical and managerial terms, paying particular attention to risk-assessment theories, management of areas of work, socio-psycho-physiological limits of maintenance technicians and in general the Human Factor in the maintenance processes of aeronautical material.

**Propaedeuticities:**

**Is a propaedeuticity for:**

**Types of examinations and other tests:**

oral

| | |
|---|---|
| **Course:**<br>Experimentation of Structures | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>ING-IND/04 (new IIND-01/D) | **CREDITS:**<br>6 |
| **Course year: III** | **Type of Educational Activity: D** |
| **Teaching Methods:**<br>in-person | |
| **Contents extracted from the SSD declaratory consistent with the training objectives of the course:**<br>Among the contents of the SSD there is the study, the project, the static analysis of the structures and the materials that constitute them. In particular, the sector studies all the problems of structural safety in the aeronautical and space fields. | |
| **Objectives:**<br>The course is predominantly applicative in nature and provides the elements, tools and methods for carrying out experiments on structures and materials for aerospace use.<br>The course includes an educational path that, starting from the principles of experimentation, introduces the concepts of static, fatigue, dynamic and vibro-acoustic experimentation of structures for aerospace use. The classroom lessons will be accompanied by sessions in the laboratory for the direct management of the experiments by the students. | |
| **Propaedeuticities:**<br>Aerospace Structures<br><br>**Is a propaedeuticity for:** | |
| **Types of examinations and other tests:**<br>oral | |

| | |
|---|---|
| **Course:**<br>Structure Calculation Laboratory | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>ING-IND/04 (new IIND-01/D) | **CREDITS:**<br>6 |
| **Course year: III** | **Type of Educational Activity: D** |
| **Teaching Methods:**<br>in-person | |
| **Contents extracted from the SSD declaratory consistent with the training objectives of the course:**<br>Among the contents of the SSD there is the study, the project, the static analysis of the structures and the materials that constitute them. In particular, the sector studies all the problems of structural safety in the aeronautical and space fields | |
| **Objectives:**<br>The course is an introduction to the computational mechanics of solids and structures. The course concerns the description and modelling of the static properties of structures through the application of the finite element method, in a linear regime, to the solution of aerospace engineering problems in the structural field. The objective of the course is to provide students with the fundamental concepts and operational tools to solve current structural problems using computer technology. | |
| **Propaedeuticities:**<br>Aerospace Structures<br><br>**Is a propaedeuticity for:** | |
| **Types of examinations and other tests:**<br>Written and oral | |

| | |
|---|---|
| **Course:**<br>On-board Systems Laboratory | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>ING-IND/05 (new IND-01/E) | **CREDITS:**<br>6 |
| **Course year: III** | **Type of Educational Activity: D** |

**Teaching Methods:**

in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**

The sector studies aeronautical and space systems as a whole and in the aspects of interaction and integration of the subsystems composing the configuration, in relation to the achievement of mission objectives. Aspects of the study include: the definition of the functional architecture of the individual units and the design; the identification of the components in functional terms; the influence on the system and subsystems of the external environment and dynamic interactions. The sector makes use of specific investigation methodologies, such as simulation for experimental, analytical and numerical modelling.

**Objectives:**

On the one hand, the course aims to provide fundamental concepts relating to hardware, software and processes used in the development of on-board systems, on the other hand it has a highly practical characterization and is aimed at giving students confidence and learning by doing experience on embedded systems for the acquisition and processing of sensor data and/or for the implementation of advanced functions. It is therefore a preparatory course for professional use, as a system engineer, of these technologies.

**Propaedeuticities:**

Aerospace Systems

**Is a propaedeuticity for:**

**Types of examinations and other tests:**

oral

| | |
|---|---|
| **Course:**<br>Complements of Aerospace Constructions | **Teaching Language:**<br>Italian |
| **SSD (Subject Areas):**<br>ING-IND/04 (new IIND-01/D) | **CREDITS:**<br>6 |
| **Course year: III** | **Type of Educational Activity: D** |

**Teaching Methods:**

in-person

**Contents extracted from the SSD declaratory consistent with the training objectives of the course:**

Among the contents of the SSD there is the study, the project, the static analysis of the structures and the materials that constitute them. In particular, the sector studies all the problems of structural safety in the aeronautical and space fields

**Objectives:**

The training objective of the course is to provide the fundamental elements of structural analysis, with particular reference to a calculation methodology called "Matrix Method" applied to the analysis of simple structures. Furthermore, the course intends to build the foundations for structural analysis using numerical techniques in the linear and static field (Finite Element Method). At the end of the course the student will be able to model simple structures using the finite element technique; in particular he will be able to choose the typology of the finished elements with the most suitable formulation to represent the structure under study as well as the correct representation of the boundary conditions and the attribution of the mechanical characteristics of the materials. Finally, the student will be able to correctly interpret the structural behaviour of generic structures, to propose an appropriate numerical modelling and to use software for structural analysis.

**Propaedeuticities:**

Aerospace Structures

**Is a propaedeuticity for:**

**Types of examinations and other tests:**

Written

# ANNEX 2.2

# DEGREE PROGRAM DIDACTIC REGULATIONS

# AEROSPACE ENGINEERING

# CLASS L-9

**School: Polytechnic and Basic Sciences School**

**Department: Industrial Engineering**

**Didactic Regulations in force since the academic year 2025-2026**

<table>
<tr><td colspan="2">Training Activity:<br>under Art. 10, c. 5, letter d</td><td>Training Activity Language:<br>Italian, English</td></tr>
<tr><td colspan="2">Content of the activities consistent with the training objectives of the course:<br>• Additional language skills<br>• training and orientation periods<br>• IT and telematics skills<br>• Other knowledge useful for job placement<br>• Activities that contribute to the issuing of Open Badges</td><td>CFU:<br>• 0-3<br>• 0-3<br>• 0-3<br>• 0-3</td></tr>
<tr><td colspan="2">Course year: III</td><td>Type of Training Activity: F</td></tr>
<tr><td colspan="3">Teaching Methods:<br>In person, except in special cases in which telematic lessons are foreseen</td></tr>
<tr><td colspan="3">Objectives:<br>These activities contribute to the achievement of linguistic, computer-based and/or vocational training objectives for the world of work</td></tr>
<tr><td colspan="3">Propaedeuticities:<br>none<br><br>Is a propaedeuticity for:<br>none</td></tr>
<tr><td colspan="3">Types of examinations and other tests:<br>aptitude</td></tr>
</table>