1. BASIC INFORMATION

Course	Navigation Systems I
Degree program	Aerospace Engineering in Aircraft
School	School of Architecture, Engineering and Design
Year	Second Year
ECTS	6 ECTS
Credit type	Mandatory
Language(s)	English
Delivery mode	Face to face
Semester	First Semester
Academic year	2024/2025
Coordinating professor	Víctor Manuel Padrón Nápoles
Professor	Víctor Manuel Padrón Nápoles

2. PRESENTATION

This course belongs to the "Aerospace systems and infrastructures" module:

1. Aerospace Technology 6 ECTS (first academic year)
2. Navigation Systems I 6 ECTS (second academic year)
3. Navigation Systems II 6 ECTS (second academic year)
4. Air Transport 6 ECTS (second academic year)

The course includes the next topics: Electrical engineering, electronic engineering, basics of telecommunications and air navigation systems.

3. COMPETENCIES AND LEARNING OUTCOMES

Core competencies:

- CB2. Students can apply their knowledge to their work or vocation in a professional manner and have competencies typically demonstrated through devising and sustaining arguments and solving problems within their field of study.
- CB3: Students have the ability to gather and interpret relevant data (usually within their area of study) to make judgments that include a reflection on relevant social, scientific or ethical issues.
- CB4. Students can transmit information, ideas, problems and solutions to both a specialized and non-specialized public.
- CB5: Students have developed those learning skills necessary to undertake further studies with a high degree of autonomy.

Cross-curricular competencies:

- CT12. Knowledge of basic subjects and technologies that will enable students to learn new methods, theories and technologies, as well as to give them great versatility to adapt to new situations (autonomous learning).
- CT18. Commit to fulfilling the tasks entrusted (Responsibility).
- CT19. Work in interdisciplinary teams, providing the greatest effectiveness on the basis of cooperation, assuming their role within the team, establishing good relationships and exchanging information, and practicing the culture of peace and solidarity (Teamwork).

Specific competencies:

- CE17. Adequate knowledge and application to the engineering of the fundamental elements of the various types of aircraft; the functional elements of the air navigation system and associated electrical and electronic installations; the fundamentals of the design and construction of airports and their various elements.
- CE19. Applied knowledge of: the science and technology of materials; mechanics and thermodynamics; fluid mechanics; aerodynamics and flight mechanics; navigation and air circulation systems; aerospace technology; structure theory; air transport; economy and production; projects; environmental impact.

Learning outcomes:

- LO2: To conduct studies by integrating the technologies and engineering procedures that are developed in the competencies of these modules
- LO3: From a series of requirements, and prior information, to conceptualize an engineering problem, proposes an approach to solve it, and obtain the best solution. All this related to the competencies of this module
- LO4: To transfer some parts of an engineering problem to the laboratory, and utilize this resource as support to resolve it.

The following table shows the relationship between the competencies developed during the course and the learning outcomes pursued:

Competencies	Learning outcomes
CB2, CB3, CB4, CB5, CT12, CT18, CT19, CE17, CE19	**LO2.** To conduct studies by integrating the technologies and engineering procedures that are developed in the competencies of these modules
CB2, CB5, CT12, CT18, CE17, CE19	**LO3.** From a series of requirements, and prior information, conceptualize an engineering problem, propose an approach to solve it, and obtain the best solution. All this related to the competencies of this module
CB2, CB3, CB4, CB5, CT12, CT18, CT19, CE17, CE19	**LO4.** To transfer some parts of an engineering problem to the laboratory, and utilize this resource as support to resolve it.

4. CONTENT

The course covers the content stated in the official description of the Degree:

- Fundamentals of circuit theory and analog and power electronics
- Fundamentals of electric machines
- Electrical engineering in aircraft, airports and navigation systems
- Fundamentals of communication theory and wave propagation

In order to do that, the course material is organized in eight learning units as shown below:

- Unit 1. Introduction to Circuit Analysis
- Unit 2. AC Waveforms, Phasors and Impedances
- Unit 3. Introduction to AC Power and AC Power Circuits
- Unit 4. Complementary Material. Electrical Systems of Aircraft
- Unit 5. Introduction to Electronics. Diodes
- Unit 6. Introduction to Transistors
- Unit 7. Introduction to Power Electronics

Fundamentals of communication and wave propagation are currently taught in the course "Navigation Systems II", jointly with radars and radio navigation systems.

5. TEACHING-LEARNING METHODOLOGIES

The types of teaching-learning methodologies used are indicated below:

- Lecture-based class
- Laboratory Exercises. Simulation
- Integration of teamwork. Research by groups or problem solving by groups
- Self-study
- Mentoring, academic monitoring and assessment

6. LEARNING ACTIVITIES

Listed below are the types of learning activities and the number of hours the student will spend on each one:

Campus-based mode:

Learning activity	Number of hours
Lecture-based class	40
Lab Exercises	20
Integration of team work	50
Self-study	60
Mentoring, academic monitoring and assessment	20
TOTAL	**150**

7. ASSESSMENT

Listed below are the assessment systems used and the weight each one carries towards the final course grade:

Campus-based mode:

Assessment system	Weight
Exams, tests and other knowledge tests	30-35%
Elaboration of articles, reports or reports	15-30%
Alternative evaluation techniques	15-30%
Field experiences, conferences and visits	10%
Transversal competencies (rubrics)	10-15%

When you access the course on the *Campus Virtual*, you'll find a description of the assessment activities you have to complete, as well as the delivery deadline and assessment procedure for each one.

7.1. First exam period

To pass the course in the first exam period, you must obtain a final course grade of at least 5 out of 10 (weighted average).

In addition to that, it will be necessary for you to obtain a grade greater than or equal to 5.0 in all assessments: the final exam, the final work, the integrating project activities and, the average grade of the lab exercises and the rest of evaluation activities.

The grade in the ordinary call will be considered as NP (Not Presented) when the student has not delivered any evaluable activity of those that are part of the weighted average.

7.2. Second exam period

To pass the course in the second exam period, you must obtain a final grade of at least 5 out of 10 (weighted average).

In addition to that, it will be necessary for you to obtain a grade greater than or equal to 5.0 in all assessments: the final exam, the final work, the integrating project activities and, the average grade of the lab exercises and the rest of evaluation activities.

The student must deliver the activities not successfully completed in the first exam period after having received the corresponding corrections from the professor, or those that were not delivered in the first place.

The grade in extraordinary call will be considered as NP (Not Submitted/No Attendance/Not show up) when the student has not delivered or done any new activity with respect to what was presented in the ordinary call.

8. SCHEDULE

This table shows the delivery deadline for each assessable activity in the course:

Assessable activities	Deadline
Lab Exercise 1	Weeks 2-3
Lab Exercise 2	Weeks 6-8
Lab Exercise 3	Weeks 11-13
Lab Exercise 4	Weeks 13-15
Integrating project activities	Weeks 3-14
Midterm Exam	Weeks 12-15
Final work presentation	Weeks 17-18
Final Exam	Weeks 17-18

This schedule may be subject to changes for logistical reasons relating to the activities. The student will be notified of any change as and when appropriate.

9. BIBLIOGRAPHY

The recommended Bibliography is:

1. R. L. Boylestad and B. A. Olivari. “Introductory Circuit Analysis, Global Edition”, 14th edition. Pearson, 2023.
2. H. Robbins and W. C. Miller. “Circuit Analysis: Theory and Practice”, 5 th Edition. Cengage, 2013.
3. D. R. Cunningham and J. A. Stuller. “Circuit Analysis”, 2nd Edition. John Wiley and Sons, 1995.
4. M. Nahvi and J. A. Edminister. “Schaums’s outline of theory and problems of electric circuits”, 6th Edition. Mc-Graw-Hill Education, 2013.
5. J. O’Malley. “Schaums’s outline of theory and problems of basic circuit analysis”, 2nd Edition. McGraw-Hill, 1992.
6. Malvino and D. Bates. “Electronic Principles”, 8th Edition. Mc-Graw-Hill Education, 2015.
7. S. Sedra and K. C. Smith. “Microelectronic Circuits”, 7Th Edition. Oxford University Press, 2014.
8. N. Mohan, T. M. Undeland and W. P. Robbins. “Power Electronics: Converters, Applications and Design”, 3rd Edition. Wiley, 2002.
9. Manuals and documentation of Aircraft, simulation tools and aviation professional organizations.

10. EDUCATIONAL GUIDANCE AND DIVERSITY UNIT

From the Educational Guidance and Diversity Unit we offer support to our students throughout their university life to help them reach their academic achievements. Other main actions are the students inclusions with specific educational needs, universal accessibility on the different campuses of the university and equal opportunities.

From this unit we offer to our students:

1. Accompaniment and follow-up by means of counselling and personalized plans for students who need to improve their academic performance.
2. In terms of attention to diversity, non-significant curricular adjustments are made in terms of methodology and assessment for those students with specific educational needs, pursuing an equal opportunities for all students.

3. We offer students different extracurricular resources to develop different competences that will encourage their personal and professional development.
4. Vocational guidance through the provision of tools and counselling to students with vocational doubts or who believe they have made a mistake in their choice of degree.

Students in need of educational support can write to us at:
orientacioneducativa@universidadeuropea.es

11. ONLINE SURVEYS

Your opinion matters!

The Universidad Europea encourages you to participate in several surveys which help identify the strengths and areas we need to improve regarding professors, degree programs and the teaching-learning process.

The surveys will be made available in the “surveys” section in virtual campus or via e-mail.

Your assessment is necessary for us to improve.

Thank you very much for your participation.