Universidad Europea

1. BASIC DATA

Course	Navigation Systems I
Degree program	Aerospace Engineering in Aircrafts
School	Architecture, Engineering and Design
Year	Second Course
ECTS	6 ECTS
Credit type	Mandatory
Language(s)	English
Delivery mode	Face to face
Semester	First Semester
Academic Year	2020/2021
Coordinating 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 (first academic year)
3. Navigation Systems II 6 ECTS (second academic year)
4. Air Transport 6 ECTS (second academic year)

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

3. COMPETENCIES AND LEARNING OUTCOMES

Core competencies:

- CB2. That students can apply their knowledge to their work or vocation in a professional manner and have competences typically demonstrated through devising and sustaining arguments and solving problems within their field of study.
- CB3: That 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. That students can transmit information, ideas, problems and solutions to both a specialized and non-specialized public.
- CB5: That 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, which will enable you to learn new methods, theories and technologies, as well as to give you great versatility to adapt to new situations (autonomous learning).
- CT18. Commit to fulfil 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 applied 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 its 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 which are developed in the competencies of this modules
- LO3: From a series of requirements, and prior information, to conceptualize an engineering problem, proposes an approach to solve it, and obtain the better 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 table below shows the relation between the competencies developed during the course and the envisaged learning outcomes:

Competencies	Learning outcomes
CB2, CB3, CB4, CB5, CT12, CT18, CT19, CE17, CE19	**LO2.** To conduct studies by integrating the technologies and engineering procedures which are developed in the competencies of this modules
CB2, CB5, CT12, CT18, CE17, CE19	**LO3.** From a series of requirements, and prior information, to conceptualize an engineering problem, proposes an approach to solve it, and obtain the better 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 Aircrafts
- Unit 5. Introduction to Electronics. Diodes
- Unit 6. Introduction to Transistors
- Unit 7. Introduction to Power Electronics
- Unit 8. Introduction to Radio and its use in Aviation.

5. TEACHING-LEARNING METHODOLOGIES

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

- Lecture-based class
- Integration of team work
- Self study
- Mentoring, academic monitoring and assessment

6. LEARNING ACTIVITIES

Relationship between the different educational activities and student work related to them in hours.

Educational 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

Next, the evaluation systems are related, as well as their weight on the total grade of the subject:

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

Transversal competences (rubrics)	10-15%

In the Virtual Campus, when you access the subject, you will be able to consult in detail the evaluation activities that you must carry out, as well as the delivery dates and the evaluation procedures of each one of them.

7.1. Ordinary exam call

To pass the subject in ordinary call you must obtain a grade greater than or equal to 5.0 out of 10.0 in the final grade (weighted average) of the subject.

In addition to that, it will be necessary for you to obtain a grade greater than or equal to 5.0 in both, the final exam and in final work.

When the minimum required to perform the weighted average of the assessable activities is not met (the minimum is not reached in any of the previous points), the final grade will be:

- the weighted average if its value is less than or equal to 4
- 4 if the value of the weighted average is greater than 4

The grade in 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. Extraordinary exam call

To pass the subject in ordinary call you must obtain a grade greater than or equal to 5.0 out of 10.0 in the final grade (weighted average) of the subject.

In addition to that, it will be necessary for you to obtain a grade greater than or equal to 5.0 in both, the final exam and in final work.

When the minimum required to perform the weighted average of the assessable activities is not met (the minimum is not reached in any of the previous points), the final grade will be:

- the weighted average if its value is less than or equal to 4
- 4 if the value of the weighted average is greater than 4

The failed activities in ordinary call must be delivered, after having received the corresponding corrections to them by the teacher. Also, undelivered or unrealized activities, should be realized/delivered.

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 section indicates the schedule with delivery dates of evaluable activities of the subject:

Assessed activities	Approximated dates
Lab Exercise 1	Weeks 4-6
Lab Exercise 2	Weeks 6-10

Final Work	Weeks 9-14
First Exam	Weeks 12-15
Final work presentation	Weeks 18-19
Final Exam	Weeks 18-19

This schedule may undergo modifications for logistical reasons of the activities. Any modification will be notified to the student in a timely manner.

9. BIBLIOGRAPHY

Here is the basic recommended bibliography:

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

10. DIVERSITY MANAGEMENT UNIT

Students with specific educational support needs:

Adaptations or curricular adjustments for students with specific educational support needs, in order to guarantee equal opportunities, will be guided by the Diversity Attention Unit (UAD).

The issuance of a report of curricular adaptations / adjustments by said Unit will be essential, so that students with specific educational support needs should contact through: unidad.diversidad@universidadeuropea.es at the beginning of each semester.