

Course guide 205247 - COCKPIT - Towards a New Cockpit Generation Commercial Aircraft

Last modified: 02/04/2024

Academic year: 2024	ECTS Credits: 3.0 Languages: English
Degree:	BACHELOR'S DEGREE IN AEROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Optional subject). BACHELOR'S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Optional subject).
Unit in charge: Teaching unit:	Terrassa School of Industrial, Aerospace and Audiovisual Engineering 748 - FIS - Department of Physics.

LECTURER

Coordinating lecturer:

Tugores Kirtley, Jon

Others:

TEACHING METHODOLOGY

The course consists of lectures, personalized (and/or small group) tutorials, assignments, self-study and project preparation. During lectures, the instructor will offer theoretical concepts, and discuss reference materials. Homework will be assigned on a weekly basis in order to complement the content of lectures with practical exercises. Tutorials of small work groups will be carried out in order to monitor the progress of the elaboration of the final class project.

LEARNING OBJECTIVES OF THE SUBJECT

This course is designed as a undergraduate study module for students with a strong interest in the engineering of avionics, with the aim to provide a new perspective to the industry in the exploration and utilization of commercial aviation cockpits. Flight deck technology is in a new era, where humans can be though to be substituted gradually by robots or managed from ground. Until then, cockpit resources have to follow a safety and efficiency scenario. We'll analyze the evolution of cockpits and why their reduction in size and crew members are in a inverse proportion to the tech they have gained.

We'll have to develop concepts in order to propose new ideas. Inspirations may be based in previous studies, or even cinema and comics, etc... all as a valid source if you know how to present your proposal in a believable and coherent way.

The final class project will consist of a public presentation where a reduced group of invited professors will be part of a jury. Drawings, models (physical or virtual), text, will be the instruments to share your new cockpit concept.

STUDY LOAD

Туре	Hours	Percentage
Hours large group	30,0	40.00
Self study	45,0	60.00

Total learning time: 75 h



CONTENTS

Week 1: A historical review of flight decks, from the wright brothers to the Airbus + The Human Factor.

Description:

Transversal history of the evolution of cockpits and the consequences of their specific technology.

Related activities:

Elaboration of a short report on the main technologies described during the class.

Full-or-part-time: 12h 30m Theory classes: 5h Self study : 7h 30m

Week 2: Navigation systems, from VFR to early IFR. CFIT and human error.

Description:

We' will talk about the navigation strategies throughout the years, using several cockpits shown in a flight simulation program. We'll also talk about self safety instruments such as TCAS and EGPWS, and their consequences if safety.

Related activities:

An A4 where the students will present their conclusions in their analysis.

Full-or-part-time: 12h 30m Theory classes: 5h Self study : 7h 30m

Week 3: Flight simulation session.

Description:

We'll practice navigating in a 50 year old cockpit and an actual flight deck. We'll talk about the differences and their evolution in effectiveness and safety.

Related activities: Flight simulator session.

Full-or-part-time: 12h 30m Theory classes: 5h Self study : 7h 30m

Week 4: Table studio.

Description:

Review of previous classes, we'll share our knowledge and begin a pin-up session where first ideas will be presented.

Related activities:

An A3, where the student will present his/hers ideas. First drawings and texts. Any methodology is allowed for the presentation.

Full-or-part-time: 12h 30m Theory classes: 5h Self study : 7h 30m



Week 5: The industries proposals, from drones to self flown commercial aircraft.

Description:

With a certain knowledge of the evolution of cockpits, we'll confront our ideas with the big corporations ideas. What are Airbus, Boeing, Space X thinking today?. The 5G-to further G connection.

Related activities:

Re-view of self project and incorporation of new information given in class. Pre-preparation of final session.

Full-or-part-time: 12h 30m Theory classes: 5h

Self study : 7h 30m

Week 6: Pin Up.

Description:

Critical assessment of the students proposal in front of a 3 member jury.

Related activities:

Generation of final ideas presented in CAD or anyother vectorial drawings, + visual models +texts to complement the students proposal. 4 A3 (1 analisys and weakenesses of previous cockpits + 1 new idea proposed by student + 1 drawings + 1 images.

Full-or-part-time: 12h 30m Theory classes: 5h Self study : 7h 30m

GRADING SYSTEM

The course will be graded on the basis of:

- Final project : 45%
- Presentation final jury: 20%
- Week 4 analysis: 20%
- Participation in class: 15%