

300247 - SEA - Sustainability of Aerospace Engineering

Coordinating unit:	300 - EETAC - Castelldefels School of Telecommunications and Aerospace Engineering
Teaching unit:	707 - ESAII - Department of Automatic Control
Academic year:	2018
Degree:	BACHELOR'S DEGREE IN AEROSPACE SYSTEMS ENGINEERINGS/BACHELOR'S DEGREE IN TELECOMMUNICATIONS SYSTEMS ENGINEERING - NETWORK ENGINEERING (AGRUPACIÓ DE SIMULTANEÏTAT) (Syllabus 2015). (Teaching unit Compulsory) BACHELOR'S DEGREE IN AEROSPACE SYSTEMS ENGINEERING (Syllabus 2015). (Teaching unit Compulsory) BACHELOR'S DEGREE IN AEROSPACE SYSTEMS ENGINEERING/BACHELOR'S DEGREE IN TELECOMMUNICATIONS SYSTEMS ENGINEERING (Syllabus 2015). (Teaching unit Compulsory) BACHELOR'S DEGREE IN AEROSPACE SYSTEMS ENGINEERING/BACHELOR'S DEGREE IN NETWORK ENGINEERING (Syllabus 2015). (Teaching unit Compulsory)
ECTS credits:	3
Teaching languages:	English

Teaching staff

Coordinator:	Definit a la infoweb de l'assignatura.
Others:	Definit a la infoweb de l'assignatura.

Degree competences to which the subject contributes

Specific:

CE 17 AERO. CE 22 AERON. Conocimiento adecuado y aplicado a la Ingeniería de: Los fundamentos de sostenibilidad, mantenibilidad y operatividad de los sistemas de navegación aérea. (CIN/308/2009, BOE 18.2.2009)

Generical:

CG7. (ENG) CG7 - Capacidad de analizar y valorar el impacto social y medioambiental de las soluciones técnicas.

Transversal:

03 TLG. THIRD LANGUAGE. Learning a third language, preferably English, to a degree of oral and written fluency that fits in with the future needs of the graduates of each course.

02 SCS N1. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 1. Analyzing the world's situation critically and systemically, while taking an interdisciplinary approach to sustainability and adhering to the principles of sustainable human development. Recognizing the social and environmental implications of a particular professional activity.

02 SCS N2. SUSTAINABILITY AND SOCIAL COMMITMENT - Level 2. Applying sustainability criteria and professional codes of conduct in the design and assessment of technological solutions.

05 TEQ N1. TEAMWORK - Level 1. Working in a team and making positive contributions once the aims and group and individual responsibilities have been defined. Reaching joint decisions on the strategy to be followed.

Teaching methodology

The course combines the following teaching (learning) methodologies:

- Autonomous learning, because students will work many self-learning materials at home.
- Cooperative learning, because students will solve many tasks in small groups.

We will make an experiment on "flipped classroom" methodology but it will depend on the group sizes

Learning objectives of the subject

Knowing the concept and conditions of unsustainability, and knowing how to apply techniques and procedures to approach sustainability



300247 - SEA - Sustainability of Aerospace Engineering

Knowing data about the current state of the world from the economic, environmental and social points of view. Having a historical idea about how we have arrived to the present situation

Awareness of complexity and the need for the systemic approach

Awareness of the engineering responsibility and especially of the aerospace engineering responsibility

Study load

Total learning time: 75h	Hours large group:	31h 30m	42.00%
	Guided activities:	1h 30m	2.00%
	Self study:	42h	56.00%

300247 - SEA - Sustainability of Aerospace Engineering

Content

CHAPTER 1 - STATE OF THE WORLD AND CAUSES OF UNSUSTAINABILITY

Learning time: 10h 14m

Theory classes: 4h 30m

Self study : 5h 44m

Description:

- 1 Some ecological data
- 2 Some economic data
- 3 Some social data
- 4 Historical causes of unsustainability
- 5 Technology as a problem
- 6 Science, technology and politics as a solution

Related activities:

Theoretical and more practical questionnaires

Specific objectives:

Knowing data about the current state of the world from the economic, environmental and social points of view.
Having a historical idea about how we have arrived to the present situation

CHAPTER 2 - SUSTAINABLE DEVELOPMENT

Learning time: 10h 12m

Theory classes: 4h 30m

Self study : 5h 42m

Description:

- 1 Some basic concepts
- 2 History of the idea
- 3 Some counterexamples
- 4 Indicators and indexes

Related activities:

Theoretical questionnaires

Specific objectives:

Knowing the concept, evolution and conditions of unsustainability and also the tools to try measuring our distance from the ideal

300247 - SEA - Sustainability of Aerospace Engineering

<p>CHAPTER 3 - SYSTEMICS AND COMPLEXITY</p>	<p>Learning time: 11h 22m Theory classes: 4h 30m Guided activities: 0h 30m Self study : 6h 22m</p>
<p>Description:</p> <ul style="list-style-type: none"> 1 Reductionism, systemic approach and complex systems 2 Linear and nonlinear behavior 3 Deterministic chaos 4 Chaotic life 5 Networks <p>Related activities: Theoretical and practical questionnaires</p> <p>Specific objectives: Awareness of complexity and the need for the systemic approach</p>	
<p>CHAPTER 4 - GLOBALIZACION</p>	<p>Learning time: 10h 14m Theory classes: 4h 30m Self study : 5h 44m</p>
<p>Description:</p> <ul style="list-style-type: none"> 1 Concept and reality 2 Who is who in globalization? 3 Human rights 4 The welfare state 5 Globalization of safety and justice 6 Globalization of health and education <p>Related activities: Theoretical questionnaires</p> <p>Specific objectives: Knowing the current globalization process and its main agents</p>	

300247 - SEA - Sustainability of Aerospace Engineering

<p>CHAPTER 5 - HUMAN VALUES</p>	<p>Learning time: 11h 22m Theory classes: 4h 30m Guided activities: 0h 30m Self study : 6h 22m</p>
<p>Description:</p> <ul style="list-style-type: none"> 0 Does engineering need human values? 1 Science and engineering 2 Reasons not to harm the others 3 Game of Cooperation and Desertion 4 Human values in engineering <p>Related activities: Theoretical and practical questionnaires</p> <p>Specific objectives: Awareness of the need for human values and their analysis from the engineering point of view</p>	
<p>CHAPTER 6 - TOOLS FOR SUSTAINABILITY</p>	<p>Learning time: 10h 14m Theory classes: 4h 30m Self study : 5h 44m</p>
<p>Description:</p> <ul style="list-style-type: none"> 1 Approach: Life Cycle Analysis <ul style="list-style-type: none"> 1.1 a 1.5 different stages 2 Environmental norms and directives <ul style="list-style-type: none"> 2.1 Environmental Impact Assessment 3 Corporate social responsibility and sustainability norms <ul style="list-style-type: none"> 3.1 Global Reporting Initiative 3.1 ISO 26000 4 Technological tools for sustainability <p>Related activities: Theoretical and more practical questionnaires</p> <p>Specific objectives: Knowing how to apply techniques and procedures to approach sustainability</p>	

300247 - SEA - Sustainability of Aerospace Engineering

<p>CHAPTER 7 - IMPACT OF AEROSPACE ENGINEERING</p>	<p>Learning time: 11h 22m Theory classes: 4h 30m Guided activities: 0h 30m Self study : 6h 22m</p>
<p>Description:</p> <ol style="list-style-type: none"> 1 Economic impact of aerospace engineering 2 Environmental impact of aerospace engineering 3 Social impact of aerospace engineering 4 Specific administrative tools 5 Involved organizations 6 Developing technologies <p>Related activities: Theoretical and more practical questionnaires</p> <p>Specific objectives: Awareness of the engineering responsibility and especially of the aerospace engineering responsibility</p>	

Qualification system

Defined at the course infoweb.

Bibliography

Basic:

Mulder, Karel. Sustainable development for engineers : a handbook and resource guide. Sheffield: Greenleaf, 2006. ISBN 1874719195.

Sustainable aviation futures. Bingley: Emerald, 2013. ISBN 9781781905951.

Janic, Milan. The Sustainability of air transportation : a quantitative analysis and assessment. Aldershot: Ashgate, 2007. ISBN 9780754649670.

Complementary:

McManners, Peter J. Fly and be damned : what now for aviation and climate change?. London: Zed Books, 2012. ISBN 9781848139749.