300239 - EA-MP7 - Airport Buildings

Coordinating unit: 300 - EETAC - Castelldefels School of Telecommunications and Aerospace Engineering
Teaching unit: 751 - DECA - Department of Civil and Environmental Engineering
Academic year: 2018
Degree: BACHELOR'S DEGREE IN AIRPORT ENGINEERING (Syllabus 2010). (Teaching unit Compulsory)
BACHELOR'S DEGREE IN AEROSPACE SYSTEMS ENGINEERING (Syllabus 2015). (Teaching unit Optional)
BACHELOR'S DEGREE IN AEROSPACE SYSTEMS ENGINEERING/BACHELOR'S DEGREE IN TELECOMMUNICATIONS SYSTEMS ENGINEERING (Syllabus 2015). (Teaching unit Optional)
BACHELOR'S DEGREE IN AEROSPACE SYSTEMS ENGINEERING/BACHELOR'S DEGREE IN NETWORK ENGINEERING (Syllabus 2015). (Teaching unit Optional)
ECTS credits: 6
Teaching languages: Catalan, Spanish

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

Opening hours
Timetable: To make inquiries to the teachers, the students will be taken care of in leaving the class and, if it is not possible, they will arrange an appointment with the teacher through the email, in a schedule that is suitable for both.

Prior skills
Knowledge of statics, structures and resistance of materials. Materials technology.

Requirements
Continuum and Structural Mechanics.

Degree competences to which the subject contributes
Specific:
1. CE 19 AERO. Conocimiento aplicado de: la ciencia y tecnología de los materiales; mecánica y termodinámica; mecánica de fluidos; aerodinámica y mecánica del vuelo; sistemas de navegación y circulación aérea; tecnología aeroespacial; teoría de estructuras; transporte aéreo; economía y producción; proyectos; impacto ambiental. (CIN/308/2009, BOE 18.2.2009)
2. CE 21 AEROP. Conocimiento adecuado y aplicado a la Ingeniería de: La normativa específica de edificación; los procedimientos de control y ejecución de obras; el funcionamiento y la gestión del aeropuerto y el transporte aéreo. (CIN/308/2009, BOE 18.2.2009)
3. CE 22 AEROP. Conocimiento adecuado y aplicado a la Ingeniería de: Los métodos de cálculo y de desarrollo de las diferentes soluciones de edificación y pavimentación de aeropuertos; el cálculo de los sistemas específicos de los aeropuertos y sus infraestructuras; la evaluación de las actuaciones técnicas y económicas de las aeronaves; el manejo de las técnicas experimentales, equipamiento e instrumentos de medida propios de la disciplina; las técnicas de inspección, de control de calidad y de detección de fallos; los planes de seguridad y control en aeropuertos. (CIN/308/2009, BOE 18.2.2009)
4. CE 23 AEROP. Conocimiento aplicado de: edificación; electricidad; electrotécnia; electrónica; mecánica del vuelo;
300239 - EA-MP7 - Airport Buildings

Knowledge of the design, calculation, construction and maintenance of airport construction works regarding the structure and foundation structures, finishes and facilities.

hidráulica; instalaciones aeroportuarias; ciencia y tecnología de los materiales; teoría de estructuras; mantenimiento y explotación de aeropuertos; transporte aéreo, cartografía, topografía, geotecnia y meteorología. (CIN/308/2009, BOE 18.2.2009)

5. CE 7 AERO. Comprender el comportamiento de las estructuras ante las solicitudes en condiciones de servicio y situaciones límite. (CIN/308/2009, BOE 18.2.2009)

Teaching methodology

The course consists of five hours a week of classes in the classroom. These hours are devoted to (1) the presentation of theoretical issues, where the teacher explains the concepts and materials for the course. This aspect represents 65% of the time devoted to classes. (2) the description and discussion of practical exercises (20% of the time), and (3) exercises and tests assessed (15% of the time). The course includes also a technical visit related to the subject matter of the course. In addition, the student must perform a number of exercises related to various topics of the course, as part of the guided activities to do outside the classroom. These exercises are evaluated. Support material is supplied in the form of detailed syllabus provided by the virtual campus ATENEA: contents, schedule of evaluation activities, guided learning and literature.

Learning objectives of the subject

Knowledge of the design, calculation, construction and maintenance of airport construction works regarding the structure and foundation structures, finishes and facilities.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group:</th>
<th>27h</th>
<th>18.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group:</td>
<td>15h</td>
<td>10.00%</td>
<td></td>
</tr>
<tr>
<td>Guided activities:</td>
<td>24h</td>
<td>16.00%</td>
<td></td>
</tr>
<tr>
<td>Self study:</td>
<td>84h</td>
<td>56.00%</td>
<td></td>
</tr>
</tbody>
</table>
Content

THE BUILDING AND ITS SUBSYSTEMS

Learning time: 24h
- Theory classes: 3h
- Practical classes: 2h
- Guided activities: 2h
- Self study: 17h

Description:

Related activities:
Individual (mandatory) assignment 1

Specific objectives:
Knowledge of features, elements and systems that constitute a building of the airport. Analysis of the problems arising from the interaction between the various subsystems (enclosures, installations and structures) and the main arrangements that allow optimize the overlap in the building. Knowledge of basic aspects of the life cycle of the building.
PHYSICS OF THE BUILDING

Description:

Related activities:
Individual (mandatory) assignment 2

Specific objectives:
Knowledge of the characteristics and parameters of the interior environment of the buildings. Analysis of the thermal conditions and the operation of the thermal insulation of the building. Presentation of the materials and the thermally insulating elements. Analysis of the higrotermic behavior of the building and the possible production of water vapor condensations. Practical implementation of concepts and the theoretical formulation regarding the verification of thermal conditions and condensation of water vapor. Knowledge of the effects of fires in buildings and the levels and solutions that are applicable for protection. Knowledge of the resistant behavior of various structural materials in front of the fire. Planning of the basic techniques of analysis of the buildings in front of the fire. Consideration of the evacuation conditions and the requirements that are derived for the design of the building. Demonstration of the practical application of the concepts and methods related to the verification of the fire resistance of the structure of the buildings. Knowledge of the acoustic behavior of the buildings and the solutions for the improvement of the levels of insulation and comfort. Consideration of the problem from the physical point of view. Compliance with current regulations and familiarization with improvement solutions.
# 300239 - EA-MP7 - Airport Buildings

## THE PROTECTIVE SYSTEM

<table>
<thead>
<tr>
<th>Learning time: 24h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes: 3h</td>
</tr>
<tr>
<td>Practical classes: 2h</td>
</tr>
<tr>
<td>Guided activities: 2h</td>
</tr>
<tr>
<td>Self study : 17h</td>
</tr>
</tbody>
</table>

### Description:

### Related activities:
Classes with presentation and analysis of real cases

### Specific objectives:
Understanding the problems resulting from the contact between the structural and protective layers. Presentation of the problems of conventional solutions and offer optimal solutions. Presentation of the main types of solutions for façades, roofs and partitions, with their advantages and disadvantages.
## Structural Elements

<table>
<thead>
<tr>
<th>Description:</th>
<th>Learning time: 57h</th>
</tr>
</thead>
</table>
Practical classes: 8h  
Guided activities: 16h  
Self study: 17h |

**Related activities:** 
Individual (mandatory) assignments 3-4

**Specific objectives:**
Evaluation of actions susceptible to acting on floors. Knowledge of the different types of floors and devices used to guarantee their proper monolithism and the appropriate link to the vertical structure of the building. Knowledge of the types of one-way reinforced or prestressed concrete floors. Familiarization with the criteria and the process of calculation in service and in ultimate conditions. Knowledge of the constructive details. Practical demonstration of the design and resistant verification process of a one-way floor. Knowledge of the types of bi-directional reinforced concrete floors. Presentation of the criteria and the verification process in service and in the ultimate conditions. Knowledge of the constructive details. Analysis of the resistance to punching on pillars and presentation of specific reinforcement details. Practical demonstration of the design and resistant verification process of a bidirectional floor. Knowledge of the advantages of post-tensioning in the formation of building slabs. Presentation of specific constructive and technological aspects. Knowledge of the main characteristics and applications of composite steel sheet and collaborative concrete floors. Knowledge of the specific constructive elements and types of the surface foundations of the buildings. Practical demonstration relative to the design and resistant verification of a building foundation. Detailed presentation in the classroom of the practical application of the criteria and methods related to the design and verification of resistant structural elements of the deep foundation of a building. Practical demonstration related to the design and safety verification of a deep foundation of the building.

**CONSTRUCTION OF AIRPORT BUILDINGS**

**Learning time:** 21h
- Theory classes: 2h
- Practical classes: 1h
- Guided activities: 2h
- Self study: 16h

**Description:**

**Related activities:**
Technical visit to the Iberia hangar at the Airport of Barcelona - El Prat

**Specific objectives:**
Knowledge of structural systems applied to airport buildings.
Knowledge of procedures used in construction of airport buildings: technology of placement of concrete formwork systems, quality control, etc.
### Planning of activities

<table>
<thead>
<tr>
<th>Mid-term Exam</th>
<th>Hours: 1h 30m</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Guided activities: 1h 30m</td>
</tr>
<tr>
<td>Mid-term exam about the first part of the course</td>
<td></td>
</tr>
<tr>
<td><strong>Specific objectives:</strong></td>
<td></td>
</tr>
<tr>
<td>Continuous evaluation of Students</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Final exam</th>
<th>Hours: 1h 30m</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Guided activities: 1h 30m</td>
</tr>
<tr>
<td>Exam about the second part of the course</td>
<td></td>
</tr>
<tr>
<td><strong>Specific objectives:</strong></td>
<td></td>
</tr>
<tr>
<td>Final assessment of students</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Visita Técnica</th>
<th>Hours: 3h</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Guided activities: 3h</td>
</tr>
<tr>
<td>Technical visit related to objectives and contents of the course</td>
<td></td>
</tr>
</tbody>
</table>

### Qualification system

Apply the evaluation criteria defined in Infoweb of the course.

### Regulations for carrying out activities

Exams and exercises are to be submitted individually, unless expressly indicated otherwise.
Bibliography

Basic:


