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: 2019
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

Requirements

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; electrotecnia; 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.

5. CE 7 AERO. Comprender el comportamiento de las estructuras ante las solicitaciones 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: 27h</th>
<th>18.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours medium group: 15h</td>
<td>10.00%</td>
<td></td>
</tr>
<tr>
<td>Guided activities: 24h</td>
<td>16.00%</td>
<td></td>
</tr>
<tr>
<td>Self study: 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.
### THE PROTECTIVE SYSTEM

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

#### 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

**Description:**
Nature of the various gravitational actions. Nature and characteristics of the different overloads of use. Basic types of wooden, reinforced concrete or prestressed, in situ or precast concrete, metal and mixed floors. Devices used to enhance the monolithic and rigid behaviour (compression layer, perimeter beams and stiffening joists). Forged one-way concrete core type. Analysis of resistant features along with the constructive aspects, specific types and uses more common. Elements of floors and conditions to be met. Elements of the floors and geometric conditions required. Moment-curvature diagram of a section of reinforced concrete. Methods based on the distribution of the plastic moments. Concept of active deflection, check of the deformability. Construction details for supports on various types of support elements. Overall reinforcement layout in floors. Detailed presentation in classroom of the practical process design and verification of a complete uniaxial floor. General types and range of use depending on the span and overload. Specific aspects of the resistant capacity. The method of virtual frames. Edge beams: importance, functions and sizing criteria. General criteria for the bidirectional floors. Punching: description of the mechanism of rupture and verification. Detailed presentation of the practical process in the classroom on the design and verification of a bidirectional floor.


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

**Specific objectives:**

<table>
<thead>
<tr>
<th>Learning time: 57h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theory classes: 16h</td>
</tr>
<tr>
<td>Practical classes: 8h</td>
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<tr>
<td>Guided activities: 16h</td>
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<tr>
<td>Self study: 17h</td>
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</tbody>
</table>
### CONSTRUCTION OF AIRPORT BUILDINGS

<table>
<thead>
<tr>
<th>Learning time: 21h</th>
</tr>
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<tbody>
<tr>
<td>Theory classes: 2h</td>
</tr>
<tr>
<td>Practical classes: 1h</td>
</tr>
<tr>
<td>Guided activities: 2h</td>
</tr>
<tr>
<td>Self study: 16h</td>
</tr>
</tbody>
</table>

### 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>Activity</th>
<th>Hours:</th>
<th>Description:</th>
<th>Specific objectives:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-term Exam</td>
<td>1h 30m</td>
<td>Mid-term exam about the first part of the course</td>
<td>Continuous evaluation of Students</td>
</tr>
<tr>
<td>Final exam</td>
<td>1h 30m</td>
<td>Exam about the second part of the course</td>
<td>Final assessment of students</td>
</tr>
<tr>
<td>Visita Técnica</td>
<td>3h</td>
<td>Technical visit related to objectives and contents of the course</td>
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**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:


