210211 - AC AS - Architectural Acoustics. Room Acoustics

Coordinating unit: 210 - ETSAB - Barcelona School of Architecture
Teaching unit: 753 - TA - Department of Architectural Technology
Academic year: 2019
Degree: DEGREE IN ARCHITECTURE (Syllabus 2010). (Teaching unit Optional)
DEGREE IN ARCHITECTURE STUDIES (Syllabus 2014). (Teaching unit Optional)
ECTS credits: 3  Teaching languages: Catalan, Spanish

Teaching staff
Coordinator: AMAYA CABALLERO MARCOS
Others: Primer quadrimestre:
  AMAYA CABALLERO MARCOS - 140

Opening hours
Timetable: Every day, during the period of development of the subject.

Requirements
Having passed Conditioning and Services I and II.

Degree competences to which the subject contributes

Basic:
  CB1. Translation from Spanish slope
  CB2. Translation from Spanish slope
  CB3. Translation from Spanish slope
  CB4. Translation from Spanish slope
  CB5. Translation from Spanish slope

Specific:
  EAB8. Translation from Spanish slope
  ET11. Translation from Spanish slope
  ET2. Translation from Spanish slope
  EP14. Translation from Spanish slope
  EP2. Translation from Spanish slope

Transversal:
  CT1. Translation from Spanish slope
  CT2. Translation from Spanish slope
The student will be able to analyze, design and project the sound space based on its artistic, technical and scientific quality, from landscaping, urban planning and architecture to materialization in general and particularly in musical audition venues.

It will allow the student to acquire specific training in exterior and interior acoustics, from the sound landscape to the acoustics and electroacoustics of the equipment and audition venues and places of public attendance.

In particular, the student will be able to analyze the different phases of isolation to external and internal noises, impacts and vibrations, the existing acoustic theories for Auditoriums and Opera Rooms, and their specific calculation methods, with the exemplification of the designs made in these fields.

Specifically, the student will have knowledge that allows him / her to understand and realize the sound isolation to the architecture of equipment, from the planning, to the barriers and screens, the necessary acoustic conditioning treatments, and the objective and subjective parameters of room quality.

### Teaching methodology

<table>
<thead>
<tr>
<th>Presentational activities:</th>
<th>33 hours, dedicates to:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction and theoretical sessions,</td>
<td></td>
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<tr>
<td>Master class,</td>
<td></td>
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<tr>
<td>Practicals sessions/ resolution of exercises and real problems/ workshops and seminars</td>
<td></td>
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<tr>
<td>Study cases/ visits to acoustic spaces,</td>
<td></td>
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<tr>
<td>Visits to acoustic laboratory</td>
<td></td>
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<tr>
<td>Exhibition spaces/ commercial houses</td>
<td></td>
</tr>
<tr>
<td>Team work</td>
<td></td>
</tr>
<tr>
<td>Activities without presence: 42 hours, dedicates to:</td>
<td></td>
</tr>
<tr>
<td>Autonom work, development of study case</td>
<td></td>
</tr>
</tbody>
</table>

### Learning objectives of the subject

The student will be able to analyze, design and project the sound space based on its artistic, technical and scientific quality, from landscaping, urban planning and architecture to materialization in general and particularly in musical audition venues.

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### Study load

<table>
<thead>
<tr>
<th><strong>Total learning time:</strong> 75h</th>
<th>Hours large group:</th>
<th>33h</th>
<th>44.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Self study:</td>
<td>42h</td>
<td>56.00%</td>
</tr>
</tbody>
</table>
### Content

<table>
<thead>
<tr>
<th>Acoustic architecture Room acoustics</th>
<th>Learning time: 75h</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Theory classes: 33h</td>
</tr>
<tr>
<td></td>
<td>Self study: 42h</td>
</tr>
</tbody>
</table>

### Description:

**A) Acoustic architecture**
1. Reminder of basic concepts of sound communication in architecture.
2. The poetics and the sound landscape inside and outside. Acoustic architecture against noise.
3. Sound landscape, acoustic character and sound itineraries in cities and buildings.

**B) Equipment acoustics**
4. The acoustics and electroacoustics of enclosures.
5. Acoustic planning and isolation of equipment.
6. The isolation in the air sound, of impacts and vibrations.
7. Reverberation, reflection, absorption and diffusion.
8. Interior and exterior screenings.
9. Examples of equipment. Scheduled visit

**C) Salas acoustics**
10. The great hall, historical, architectural and acoustic process.
11. Wave, statistical, geometric and computer methods. Simulations
12. Subjective and objective parameters of sound quality.
13. Forms, proportions, finishing materials and textures.
15. Examples of auditorium, opera houses and special rooms. Scheduled visits

### Practices

1. Sound itinerary in the city.
2. Acoustic inspection of an equipment.

### Related activities:


### Qualification system

<table>
<thead>
<tr>
<th>System</th>
<th>Continuous evaluation</th>
<th>Final evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual work ans exercises</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Team work and exercises</td>
<td>50%</td>
<td>50%</td>
</tr>
</tbody>
</table>

**Continuous evaluation**
The continuous evaluation will be based on the work that the student will develop during the course, through the delivery of papers or the performance of written and / or oral tests, according to the criteria and calendar that are established.

**Final evaluation**
If the continuous evaluation is not positive, a second evaluation can be carried out, which will consist of a final global test in the format established according to the criteria of the responsible teacher (written or oral test and / or delivery of works).
Regulations for carrying out activities

Individual work: search work on urban acoustics, sound heritage and sound art, and / or equipment architecture. Collective work: analysis or design of an acoustic, urban or equipment space, theater, auditorium or opera room, real or fictional.

Bibliography

Basic:


Complementary:

  

Others resources:


- REAL DECRETO 1371/2007, de 19 de octubre, por el que se aprueba el documento básico «DB-HR Protección frente al ruido» del Código Técnico de la Edificación y se modifica el Real Decreto 314/2006, de 17 de marzo, por el que se aprueba el Código Técnico de la Edificación.

- EASE. Manual de utilización del programa de simulación E.A.S.E CattAcoustic, software de simulación acústica.