320115 - GDSA - Audiovisual Signal Management and Distribution

Coordinating unit: 205 - ESEIAAT - Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 739 - TSC - Department of Signal Theory and Communications
Academic year: 2018
Degree: BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Teaching unit Compulsory)
ECTS credits: 6
Teaching languages: Catalan

Teaching staff
Coordinator: XAVIER GIRÓ I NIETO

Opening hours
Timetable: Upon request. Send an e-mail with your availability during the next week.

Prior skills
Students will be expected to have passed the various subjects related to programming, databases, and analogue and digital communications. Programming in Python.

Degree competences to which the subject contributes

Specific:
4. AUD: Ability to build, exploit and manage telecommunication services and applications, understood as capture systems, analogue and digital manipulation, coding, transport, representation, processing, storage, reproduction, management and presentation of audiovisual services and multimedia information.
5. AUD: Ability to analyse, specify, build and maintain systems, equipment and headers, as well as television, audio and video installations, in both fixed and mobile environments.
6. AUD: Ability to create, encode, manage, promote and distribute multimedia content, on the basis of the criteria of usability and accessibility of audiovisual services and interactive broadcasts.

Transversal:
1. EFFICIENT ORAL AND WRITTEN COMMUNICATION - Level 3. Communicating clearly and efficiently in oral and written presentations. Adapting to audiences and communication aims by using suitable strategies and means.
2. 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.
3. EFFECTIVE USE OF INFORMATION RESOURCES - Level 3. Planning and using the information necessary for an academic assignment (a final thesis, for example) based on a critical appraisal of the information resources used.
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Teaching methodology

- In-class lectures.
- In-class lab exercises.
- Independent learning and programming.
- Preparation and completion of group activities subject to assessment.

The learning methodology for this subject varies over the course of the year, with the first part focusing on theory and the second part covering practical aspects and the implementation of the various concepts.

The theoretical content is presented in the first seven weeks of the year, with four hours of lectures per week. During the lectures, the lecturer reviews content that the students are expected to have studied beforehand outside of class. The lecturer also assigns problems to be solved outside of class; the answers are presented and discussed in the next class session.

During the eight weeks that make up the second half of the subject, students attend two hours of lectures and two hours of laboratory sessions per week. In the laboratory sessions, students will rotate between six different work stations. The lecture sessions in the second half of the year will be practical in nature, featuring three different types of activities:

a) Team projects involving the storage, retrieval and distribution of audiovisual content over a telecommunications network.

b) Individual projects that explore some of the themes of the subject in greater depth. These projects are published online and in a public repository.

c) Two examination sessions, one at the beginning of the period and the other at the end.

Students must study independently in order to assimilate the concepts and solve the assigned exercises either manually or with the help of a computer. As part of the practical projects, students must submit regular progress reports on the assigned tasks.

Learning objectives of the subject

In this subject, students will learn to recognise the various systems used to manage and distribute audiovisual content over telecommunications networks. They will learn to design and use a database of multimedia files using efficient indexing criteria, and to choose the most appropriate audiovisual distribution networks and standards for each service. They will also learn to define audiovisual consumption systems that are appropriate for the end user's electronic device and level of knowledge. They will build on the specific and transversal competencies associated with coursework, as described below.

Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td>Hours large group:</td>
</tr>
<tr>
<td>45h</td>
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<tr>
<td>30.00%</td>
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<tr>
<td>Hours medium group:</td>
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<td>0h</td>
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<td>0.00%</td>
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<tr>
<td>Hours small group:</td>
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<tr>
<td>15h</td>
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<tr>
<td>10.00%</td>
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<tr>
<td>Guided activities:</td>
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<tr>
<td>0h</td>
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<td>0.00%</td>
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<tr>
<td>Self study:</td>
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<tr>
<td>90h</td>
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<td>60.00%</td>
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### Content

#### TOPIC 1: DISTRIBUTION

<table>
<thead>
<tr>
<th>Learning time: 58h</th>
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<tbody>
<tr>
<td>Theory classes: 22h</td>
</tr>
<tr>
<td>Laboratory classes: 9h</td>
</tr>
<tr>
<td>Self study : 27h</td>
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</tbody>
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**Description:**
- Local environments: analogue and digital video.
- IP networks: real-time downloading and playback.

**Related activities:**
- Study of the waveform and spectrum of an analogue video signal.
- Analysis of the MPEG-2 transport stream test.
- DVB-T COFDM modulation and demodulation.
- Analysis of a complete digital terrestrial television reception system.

**Specific objectives:**
- Explain the relationship between the video-signal design parameters and the limitations of the human visual system.
- Identify and explain the temporal and spectral shape of both baseband and modulated video signals.
- Be familiar with the various bands of the radio spectrum and their uses.
- Describe the service information and signalling tables used in digital radio broadcasting.
- Design digital television transmission systems in accordance with the DVB family of standards for terrestrial, satellite, cable and mobile networks.
- Select and configure content-distribution services over IP networks.
## TOPIC 2: CONSUMPTION

**Learning time:** 47h  
Theory classes: 14h  
Laboratory classes: 5h  
Self study: 28h

### Description:
- Search and navigation interfaces.  
- Proxy software and interactive services.  
- Profile- and level-based scalability.  
- Customisation and smart content.  
- Recommendations and social networks.

### Related activities:
- The application development cycle.

### Specific objectives:
- Select a video coding standard on the basis of the final application.  
- Implement an interactive application for a television service.  
- Design an interface for the retrieval and playback of multimedia content.  
- Use recommendations to generate playlists.

## TOPIC 3: RETRIEVAL

**Learning time:** 49h  
Theory classes: 10h  
Laboratory classes: 4h  
Self study: 35h

### Description:
- Metadata  
- Rights management.  
- Manual and automatic indexing.

### Specific objectives:
- Identify the systems that make up a multimedia database and its interconnections.  
- Design data structures suitable for audiovisual content.  
- Understand the domain of application of the MPEG-7 and MPEG-21 standards.  
- Automatically generate metadata.  
- Apply efficient indexing strategies.
Qualification system

- The 3 best grades among 4 exams on Course Lectures and Readings: 30%
- Project: 30%
- Exam on the project: 20%
- Laboratory: 20%

For those students who meet the requirements and submit to the reevaluation examination, the grade of the reevaluation exam will replace the grades of all the on-site written evaluation acts (tests, midterm and final exams) and the grades obtained during the course for lab practices, works, projects and presentations will be kept.

If the final grade after reevaluation is lower than 5.0, it will replace the initial one only if it is higher. If the final grade after reevaluation is greater or equal to 5.0, the final grade of the subject will be pass 5.0.

Bibliography

Basic:


Complementary:


Others resources: