The course presents the basic principles and development of the TV systems. It offers a broad view of the analog and digital audiovisual communication systems as well as of the services and functionalities that these systems offer.

### Prior skills

Basic knowledge of Analog and Digital Signals and Systems, Signal Processing and Communications.

### Requirements

Signals and Systems, Communications

### Teaching methodology

This course is taught through lectures (3h/week) and laboratory sessions (2h every 2 weeks), with a continuous evaluation control by mid course consisting in a series of short questions.

The special assignment is a cooperative learning experience. In previous editions of this course, this has been either reviewing and adding new entries to the Wikipedia (in Catalan, Spanish or English) or preparing a debate of the kind "59 seconds" on topics related to the subject.

### Learning objectives of the subject

The course presents the basic principles and development of the TV systems. It offers a broad view of the analog and digital audiovisual communication systems as well as of the services and functionalities that these systems offer.

### Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 39h</th>
<th>26.00%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Hours small group: 13h</td>
<td>8.67%</td>
</tr>
<tr>
<td></td>
<td>Self study: 98h</td>
<td>65.33%</td>
</tr>
</tbody>
</table>
230201 - TV - Television Systems

Content

1. Introduction (3h)

Degree competences to which the content contributes:

Description:
1.1 Television engineering: elements of a visual communication system
1.2 Human Visual System: color sensitivity, gamma, spatial/temporal resolution

Related activities:
Lab session 0

Specific objectives:

2. TV Signal (9h)

Degree competences to which the content contributes:

Description:
2.1 Signal values: light and color, colorimetric representations (YCbCr), quantization
2.2 Signal domain: how to convert video to 1D? Scanning (sampling), progressive/interlaced
2.3 Standardization: SDTV/HDTV (ITU-R BT.601/BT.709), composite, component, SDI
2.4 Timing and synchronization: raster formats (4:2:2, 4:1:1, 4:2:0)
2.5 TV audio: analog stereo/dual, digital AES/EBU audio channels

Related activities:
Lab session 1

Specific objectives:

3. Coding (6h)

Degree competences to which the content contributes:

Description:
3.1 Compression principles. Early strategies in TV: interlacing, color differences, chroma interleaving, NTSC, PAL, SECAM
3.2 Audiovisual coding: spatial-temporal compression, audio coding
3.3 MPEG2, SMPTE 421M (VC-1), H.264/AVC (HDTV)

Related activities:
Lab session 2

Specific objectives:

4. Multiplex and Signaling (6h)

Degree competences to which the content contributes:
5. Modulation and Transmission (6h)

Degree competences to which the content contributes:

Description:
5.1 Analog modulation for color TV signals
5.2 Digital modulation for TV signals
5.3 Broadcasting standards: DVB, ATSC, ANSI/SMPTE
5.4 Datacasting

Related activities:
Lab session 4

Specific objectives:

6. Other environments: perspective (6h)

Degree competences to which the content contributes:

Description:
6.1 Digital platforms and Interactive TV
6.2 Set Top Box: the system key element
6.3 Middleware: API Multimedia Home Platform
6.4 Studio production environment

Related activities:
Lab session 5

Specific objectives:

7. Image Acquisition and Reproduction Systems (3h)

Degree competences to which the content contributes:

Description:
7.1 Cameras and CCDs
7.2 Displays: CRTs, flat screens and projection systems
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Specific objectives:

LABORATORI SESSIONS

Degree competences to which the content contributes:

Description:
0. Introduction to the TV lab (LABMU)
1. TV Signal (YCbCr+scanning)
2. Coding: program stream
3. Multiplex: transport stream
4. Modulation and transmission
5. Interactive TV (MHP)
LAB5. API MHP: development of an interactive application

Qualification system

- Mid term control: 15%
- Special assignment: 15%
- Laboratory: 30%
- Final exam: 40%

Regulations for carrying out activities
Bibliography

Basic:


Complementary:


Others resources:

Lecture notes available from the Digital Campus