230200 - PAM - Programming for Multimedia Applications

**Coordinating unit:** 230 - ETSETB - Barcelona School of Telecommunications Engineering  
**Teaching unit:** 701 - AC - Department of Computer Architecture  
**Academic year:** 2017  
**Degree:** BACHELOR'S DEGREE IN AUDIOVISUAL SYSTEMS ENGINEERING (Syllabus 2009). (Teaching unit Optional)  
BACHELOR'S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Teaching unit Optional)  
BACHELOR'S DEGREE IN TELECOMMUNICATIONS SCIENCE AND TECHNOLOGY (Syllabus 2010). (Teaching unit Optional)  
BACHELOR'S DEGREE IN NETWORK ENGINEERING (Syllabus 2010). (Teaching unit Optional)  
**ECTS credits:** 6  
**Teaching languages:** Catalan, Spanish, English

### Teaching staff

**Coordinator:** JAIME M. DELGADO MERCE  
**Others:** JAIME M. DELGADO MERCE  
SILVIA LLORENTE VIEJO

### Prior skills

Basic knowledge of programming, telecommunication networks, and coding and compression of audiovisual content.

### Requirements

Second year.

### Degree competences to which the subject contributes

**Transversal:**  
1. 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.

### Teaching methodology

Theory + application lessons: Development of concepts from examples and exercises.  
Laboratory lessons: Development of laboratory work from a case to be solved with programming resources. Integration of the different assignments.

### Learning objectives of the subject

Provide the necessary tools to develop software applications to distribute, manage and protect audiovisual content, and multimedia content in general, especially on web sites and Internet, using public specifications and products of highly generalized use.
### Study load

<table>
<thead>
<tr>
<th>Total learning time: 150h</th>
<th>Hours large group: 32h 30m</th>
<th>21.67%</th>
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<tbody>
<tr>
<td></td>
<td>Hours small group: 19h 30m</td>
<td>13.00%</td>
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<tr>
<td></td>
<td>Self study: 98h</td>
<td>65.33%</td>
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## Content

<table>
<thead>
<tr>
<th>Application and multimedia web services</th>
<th>Learning time: 7h</th>
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<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Theory classes: 6h</td>
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<tr>
<td>- The application layer.</td>
<td>Laboratory classes: 1h</td>
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<tr>
<td>- Client/Server and Symmetric models.</td>
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<tr>
<td>- E-mail: Protocols and formats.</td>
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<tr>
<td>- HTTP: Web and other applications.</td>
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<tr>
<td>- XML (eXtensible Markup Language): Syntax, Schema, Use, Associated technologies (parsers, transformations, ...).</td>
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<thead>
<tr>
<th>Development of HTTP-based applications and services</th>
<th>Learning time: 14h</th>
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<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Theory classes: 5h</td>
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<tr>
<td>- Web applications development techniques. JSPs, Servlets.</td>
<td>Laboratory classes: 9h</td>
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<tr>
<td>- Web services: SOAP, WSDL, REST.</td>
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<td>- Other technologies.</td>
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<td>- Application servers.</td>
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<table>
<thead>
<tr>
<th>Representation and management of audiovisual content</th>
<th>Learning time: 6h</th>
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</thead>
<tbody>
<tr>
<td><strong>Description:</strong></td>
<td>Theory classes: 5h</td>
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<tr>
<td>- The standardization process.</td>
<td>Laboratory classes: 1h</td>
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<td>- The market for software for audiovisual content.</td>
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<tr>
<td>- Multimedia information architecture and life cycle.</td>
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<tr>
<td>- Representation standards: Monomedia (Characters, Audio, Images, Video), Multimedia containers, Metadata.</td>
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### Multimedia applications security

**Learning time:** 14h  
- Theory classes: 11h 30m  
- Laboratory classes: 2h 30m

**Description:**
- Private key (symmetric) and public key (asymmetric).
- Public key and digital signature algorithms.
- Public key infrastructure for secure services.
- Security with XML.
- Digital identity, Privacy and Data protection.
- Multimedia content intellectual rights.

### Transmission of audiovisual content

**Learning time:** 5h  
- Theory classes: 3h  
- Laboratory classes: 2h

**Description:**
- Audiovisual content in HTML5.
- Operation and delivery of content: Content Delivery Networks (CDN).
- Streaming: Real time, HTTP-based, DASH.

### Mobile devices programming

**Learning time:** 6h  
- Theory classes: 2h  
- Laboratory classes: 4h

**Description:**
- Specific features for mobile devices of the applications. The Android case.
- Mobile interfaces.
- Integration with web applications.
- Examples of applications.

### Qualification system

- 60% theory (and application), 36% laboratory, 4% Generic competence.
- Evaluation of generic competence: Work on information sources analysis.
- Evaluation of theory and application part:
  - A first partial exam of topics 1 to 3 (Ep1)
  - A second partial exam of topics 4 to 6 (Ep2)
  - A final optional exam with two parts: topics 1 to 3 (Ef1) and topics 4 to 6 (Ef2)
  - Theory mark = 0.5 * MAX (Ep1, Ef1) + 0.5 * MAX (Ep2, Ef2)
- Evaluation of laboratory part:
  - Weekly deliverables at the sessions: 50%
  - Interviews and reports of the deliverables (or exam if not passed): 50%
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Regulations for carrying out activities

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Bibliography

Basic:

Delgado, Jaime. Transparències de classe. 2015.