Course guide
230200 - PAM - Programming for Multimedia Applications

Unit in charge: Barcelona School of Telecommunications Engineering
Teaching unit: 701 - DAC - Department of Computer Architecture.
Degree: BACHELOR’S DEGREE IN TELECOMMUNICATIONS TECHNOLOGIES AND SERVICES ENGINEERING (Syllabus 2015). (Optional subject).
BACHELOR’S DEGREE IN DATA SCIENCE AND ENGINEERING (Syllabus 2017). (Optional subject).

Academic year: 2022  ECTS Credits: 6.0  Languages: English

LECTURER
Coordinating lecturer: Consultar aquí / See here:
https://telecos.upc.edu/ca/estudis/curs-actual/professorat-responsables-coordinadors/responsables-assignatura
Others: Consultar aquí / See here:
https://telecos.upc.edu/ca/estudis/curs-actual/professorat-responsables-coordinadors/professorat-assignat-idioma

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

REQUIREMENTS
NETWORK APPLICATIONS AND SERVICES - Prerequisite

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>Type</th>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours small group</td>
<td>19.5</td>
<td>13.00</td>
</tr>
<tr>
<td>Hours large group</td>
<td>32.5</td>
<td>21.67</td>
</tr>
<tr>
<td>Self study</td>
<td>98.0</td>
<td>65.33</td>
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</tbody>
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**Total learning time:** 150 h

CONTENTS

**Applications and multimedia web services**

- The application layer.
- Client/Server and Symmetric models.
- E-mail: Protocols and formats.
- HTTP: Web and other applications.
- XML (eXtensible Markup Language): Syntax, Schema, Use, Associated technologies (parsers, transformations, ...).

**Full-or-part-time:** 8h
- Theory classes: 7h
- Laboratory classes: 1h

**Development of HTTP-based applications and services**

- Web applications development techniques. JSPs, Servlets.
- Distributed applications.
- Web services: SOAP, WSDL, REST.
- Programming tools.

**Full-or-part-time:** 16h
- Theory classes: 5h
- Laboratory classes: 11h

**Representation and management of audiovisual content**

- The standardization process.
- The market for software for audiovisual content.
- Multimedia information architecture and life cycle.
- Representation standards: Monomedia (Characters, Audio, Images, Video), Multimedia containers, Metadata.

**Full-or-part-time:** 7h
- Theory classes: 5h
- Laboratory classes: 2h
**Transmission of audiovisual content**

**Description:**
- Audiovisual content in HTML5.
- Streaming: Real time, HTTP-based, DASH.

**Full-or-part-time:** 6h
Theory classes: 4h
Laboratory classes: 2h

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**Multimedia applications security**

**Description:**
- Security threads and mechanisms.
- Private key (symmetric) and public key (asymmetric).
- Public key and digital signature algorithms.
- Public key infrastructure for secure services.
- Security in application level protocols.
- Security with XML.
- Security protocols for the web: SAML, OAuth.
- Privacy in Internet applications.
- Intellectual rights for multimedia content.

**Full-or-part-time:** 12h
Theory classes: 8h 30m
Laboratory classes: 3h 30m

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**GRADING SYSTEM**

60% theory (and application), 30% laboratory, 10% Assignment associated to the 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 5 (Ep2)
A final optional exam with two parts: topics 1 to 3 (Ef1) and topics 4 to 5 (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%

**EXAMINATION RULES.**

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**BIBLIOGRAPHY**

**Basic:**