

## Course guide

# 230200 - PAM - Programming for Multimedia Applications

**Last modified:** 22/06/2023

**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:** 2023    **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

| Type              | Hours | Percentage |
|-------------------|-------|------------|
| Self study        | 98,0  | 65.33      |
| Hours small group | 19,5  | 13.00      |
| Hours large group | 32,5  | 21.67      |

**Total learning time:** 150 h

## CONTENTS

### Applications and multimedia web services

**Description:**

- 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

**Description:**

- 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

**Description:**

- 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

### 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

## GRADING SYSTEM

60% theory (and application), 30% laboratory, 10% Assignment on information search and 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  $= 0.5 * \text{MAX}(\text{Ep1}, \text{Ef1}) + 0.5 * \text{MAX}(\text{Ep2}, \text{Ef2})$

Evaluation of laboratory part:

Weekly deliverables at the sessions: 50%

Interviews and reports of the deliverables (or exam if not passed): 50%

## EXAMINATION RULES.

-

## BIBLIOGRAPHY

**Basic:**

- Delgado, Jaime. Col·lecció de problemes resolts. 2021.
- Delgado, Jaime. Transparències de classe. 2021.
- Delgado, Jaime. Subject slides. 2021.