

Academic Year/course: 2021/22

## 30218 - Programming Theory

### Syllabus Information

**Academic Year:** 2021/22

**Subject:** 30218 - Tecnología de programación

**Faculty / School:** 110 - Escuela de Ingeniería y Arquitectura  
326 - Escuela Universitaria Politécnica de Teruel

**Degree:** 439 - Bachelor's Degree in Informatics Engineering  
443 - Bachelor's Degree in Informatics Engineering

**ECTS:** 6.0

**Year:** 2

**Semester:** Second semester

**Subject Type:** Compulsory

**Module:**

### 1. General information

### 2. Learning goals

### 3. Assessment (1st and 2nd call)

### 4. Methodology, learning tasks, syllabus and resources

#### 4.1. Methodological overview

The learning methodology will develop itself at several levels:

- Lectures where the needed subject contents are presented and discussed, and where student participation is encouraged
- Development of practical sessions, where problems of greater complexity are solved
- Practical sessions, where the students develop the theoretical concepts with the writing of longer computer programs to solve more complex problems

These steps try to encourage continuous on-going work for students.

#### 4.2. Learning tasks

**The learning process for this subject is based on the following activities:**

- Continuous students-work since the first session
- Learning of concepts and methods for analysis and design of correct and efficient programs by means of theoretical sessions
- Use of this knowledge to the resolution of algorithmic problems
- Practical sessions where technologies needed to apply these concepts to real-world problems are presented, for some programming languages.
- Course assignments, which are carried out in small groups, in order to encourage in-group work.

### 4.3. Syllabus

The program for this subject is split into two main blocks, with one very short third block at the end. First one develops more advanced Object Oriented Programming concepts, the second focuses on Functional Programming, and the short third makes a sort presentation of other Programming Paradigms.

- **Object-Oriented Programming**
  - Classes
  - Inheritance and Polymorphism
  - Generic Programming
  - Containers and Data Structures
  - Type Inference - Exceptions
  - Object-Oriented Design - Design Patterns
- **Functional Programming**
  - Introduction to Functional Programming
  - Programming Languages for FP
  - Data and Types
  - Functions and expressions
  - Recursion
  - Lists and Higher-Order functions
- **Other Programming Paradigms**
  - Logic Programming
  - Dynamic Languages

### 4.4. Course planning and calendar

The course calendar is defined by the Escuela de Ingeniería y Arquitectura calendar.

The scheduling for this subject depends on the different Campuses.

In the EINA in Campus Rio Ebro, the scheduling runs this way:

- Theoretical classes: 2 hours/week
- Problem classes: 1 hour/week
- Practical sessions: 7 sessions with 2h duration, one each other week.

In the EUP in Campus Teruel, the scheduling is the following:

- Theoretical classes: 2 hours/week
- Problem classes and practical sessions: 2 hours/week.

Students work

To achieve the learning objectives in this subject, students work is estimated around 150 hours:

- 60h of scheduled classes (lectures, assignments, practical sessions)
- 25h of programming work in groups
- 60h of personal autonomous learning time
- 5h for final tests

### 4.5. Bibliography and recommended resources

**Teruel:**

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=30218&Identificador=12959>

**Zaragoza:**

<http://psfunizar10.unizar.es/br13/egAsignaturas.php?codigo=30218&Identificador=13386>