

## Programming

Academic Year: ( 2020 / 2021 )

Review date: 08-07-2020

Department assigned to the subject: Computer Science and Engineering Department

Coordinating teacher: ZARRAONANDIA AYO, TELMO AGUSTIN

Type: Basic Core ECTS Credits : 6.0

Year : 1 Semester : 1

Branch of knowledge: Engineering and Architecture

## OBJECTIVES

The objective of this course is to introduce basic programming techniques.

The programming language used during the course is MATLAB. The techniques covered in the course are generic, and students will be able to make use of them for programming in other languages.

During the course students will acquire knowledge on:

- Fundamentals of the imperative programming
- Fundamentals of structured programming
- Language data types
- Matlab computing language syntax
- Program testing and debugging

Related to specific skills, students will be able to:

- Analyze and understand MATLAB programs
- Localize and fix syntax and functional errors
- Design and develop simple algorithms based on given prerequisites
- Develop simple Matlab programs from functional descriptions
- Design, develop and execute program test plans

## DESCRIPTION OF CONTENTS: PROGRAMME

## 1. Introduction

- Computer architecture
- Programming languages
- Program compilation and execution

## 2. Programming fundamentals

- Programming paradigms
- Program elements: data and algorithms
- Basic programming tools: algorithms, flow diagrams and pseudocode

## 3. Programming using MATLAB

- Matlab language characteristics
- Working with matrices
- Expressions
- Operators

## 4. Flow Control Statements

- Decision-Making Statements
- Looping Statements

## 5. Scripts and Funcions

- Functions
- Scripts

## 6. Data Structures

- Characters and Text
- Multidimensional Arrays
- Cell Arrays
- Structures

## 7. Input / Output Files

- Import / Export data
- ASCII and Binary Files

## 8. Advanced Techniques

- Debug, testing and error control
- Recursivity

## LEARNING ACTIVITIES AND METHODOLOGY

The teaching methodology includes:

**Lectures.** Teachers will present the theoretic concepts. It is expected that students participate actively in the lectures. Basic documentation (lecture notes, bibliography, and complementary documentation) will be accessible to students through the web-based learning platform. Students have to read and study the basic documentation (student work).

**Laboratory.** Students will learn to develop basic programs using the Matlab programming environment. Before attending the session, students will prepare the program solution as much as possible (student work).

**Problem solving.** Students, guided by teachers, will solve a set of representative problems during problem sessions in order to apply the theoretic concepts. Before attending the session, students will prepare the problem solutions as much as possible (student work). This allows the session is focused on concepts or specific problems that are more difficult for the student. Students will be asking to present their solutions in public.

**Forum.** Students may ask doubts and make comments or suggestions to teachers and other students of their group regarding lectures, laboratory assignments and problem solving, using the web platform. Besides, students may consult forum and participate actively by answering other students' questions or complementing other students' comments.

## ASSESSMENT SYSTEM

<b>% end-of-term-examination:</b>	40
<b>% of continuous assessment (assigments, laboratory, practicals...):</b>	60

Assessment will consider:

1. Laboratory assessment (mandatory) 50%

3. Final exam (mandatory) 45% - 50%

4. Participation and Personal Work (optional) 5%

Application of theoretical-practical knowledge to simple problems during the exercise classes will be assessed: personal work and active participation during the class and the problem-solving on blackboard

## BASIC BIBLIOGRAPHY

- MathWorks Getting Started with MATLAB, MATLAB.

## ADDITIONAL BIBLIOGRAPHY

- García de Sola, Juan Francisco Informática Básica, Alhambra Longman.

- Ureña López, L. Alfonso Fundamentos de informática, RA-MA, 1997

#### BASIC ELECTRONIC RESOURCES

- Mathworks . MATLAB R2018a Documentation: <https://es.mathworks.com/help/matlab/getting-started-with-matlab.html>