



Universidad
Politécnica
de Cartagena

Campus
de Excelencia
Internacional

INTRODUCTORY PROGRAMMING IN MATLAB

Transversal Activities of Doctorate

Universidad Politécnica de Cartagena

1. General course information					
Name	Introductory Programming in MATLAB				
Level	Doctorate				
Code	*****				
University	Universidad Politécnica de Cartagena				
Language	Spanish				
ECTS	1	hours / ECTS	10	Total hours	30

2. Lecture data			
Lecturer in charge	José Luis Vicéns Moltó (Lecturer) Dolores Ojados González and Blas Zamora Parra (Support)		
Department/Service	SAIT ("Servicio de Apoyo a la Investigación Tecnológica")		
Knowledge area			
Office location	SAIT		
Telephone	968338954, 968325982	Fax	
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URL / WEB	"Aula Virtual", https://aulavirtual.upct.es/		
Office hours	9-14 h		

3. Course objectives
<p>The objective of this course consists of the acquisition of the appropriate skills for the elaboration of subroutines and scripts with the MATLAB code, so that the needs of the students for problems solving or for the development of projects concerned with of management, design or research, can be satisfied.</p> <p>As a feature of the course, it can be noted that the development of the subject is carried out through practical exercises and problems performed by students under the supervision of the teacher, acting as "tutor facilitator", and within the philosophy of the "learning by doing" approach.</p>

4. Theory programme
<p>The programming contents are initially structured according to the thematic sequence that will be explained below. However, this sequential development as well as the transversal introduction of the contents relative to numerical calculations, are adapted to the evolution of the students' learning, in an interactive way, taking into account the particular needs of the students. In fact, a specific aspect can be emphasized, depending on the</p>

evolution of the learning grade or in view of global requirements.

Programming contents

- 1.- Variables and functions. Graphics in two and three dimensions. Matrices.
- 2.- Programs. Scripts. Functions.
- 3.- Inputs and outputs. Fprintf operations.
- 4.- Relational and logical operators.
- 5.- Loops: "For" and "While".
- 6.- Control structures: "If" and "Switch".
- 7.- Strings of text.
- 8.- Nested functions. Anonymous functions.
- 9.- Symbolic mathematics.

Numeric calculation contents

- 1.- Polynomials.
- 2.- Nonlinear equations.
- 3.- Systems of linear and nonlinear equations.
- 4.- Interpolation.
- 5.- Numerical integration.
- 6.- Ordinary differential equations.

5. Practical programme

With the exception of short periods in which the student attends the instructions and suggestions of the "tutor facilitator", the course is almost practical. In this manner, the students develop MATLAB routines and scripts from the start of the course. Elements with more complexity are progressively introduced. This particular methodology implies that the homework should be performed by students (advisably) at the same computer room in which the theoretical and practical subjects are carried out. Thus, the "tutor facilitator" can offer an eventual and timely assistance in order to solve doubts, or for guiding the students towards the best solution of each practical case.

6. Hours distribution

Activity	Location	Student work	Hours
Theory programme	I+D Classroom of SAIT	Attend class	2
		Homework: study of the theory contents	2
Practice	I+D Classroom of SAIT	Attend class	12
		Homework:	12
Tutoring	I+D Classroom of SAIT, e-mail, "Aula Virtual"	Virtual	2
			30