

230696 - MLAB - Matlab: Fundamentals And/Or Applications

Coordinating unit: 230 - ETSETB - Barcelona School of Telecommunications Engineering
Teaching unit: 739 - TSC - Department of Signal Theory and Communications
Academic year: 2019
Degree: MASTER'S DEGREE IN ADVANCED TELECOMMUNICATION TECHNOLOGIES (Syllabus 2019).
(Teaching unit Optional)
MASTER'S DEGREE IN TELECOMMUNICATIONS ENGINEERING (Syllabus 2013). (Teaching unit
Optional)
MASTER'S DEGREE IN ELECTRONIC ENGINEERING (Syllabus 2013). (Teaching unit Optional)
ECTS credits: 5 Teaching languages: English

Teaching staff

Coordinator: Lazaro Villa, Jose Antonio
Others: Rosa María Fernandez

Opening hours

Timetable: Tuesday 15h-16h, Friday 15h-16h

Prior skills

Linear Algebra, Signal Processing

Requirements

No requisit

Teaching methodology

Lecture notes and collection of exercises are available in pdf in the virtual campus. We use a forum for questions and answers in the virtual campus. Solutions of the proposed exercises are also available. In the first part of the course the student solves a set of proposed exercises for training. In the second part of the course the student develops and presents a final work.

Learning objectives of the subject

Part I. Fundamentals.

The objectives are:

1. Present MATLAB and SIMULINK.
2. To get the basic knowledge necessary to work with both packages with complete autonomy.

Part II. Applications.

The objectives are:

1. To get more insight into MATLAB and SIMULINK, while presenting and developing more advanced applications,...
2. Each student will work in a subject of their own interest.



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Study load

Total learning time: 125h	Hours large group:	26h	20.80%
	Hours small group:	13h	10.40%
	Self study:	86h	68.80%

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Content

<p>(ENG) Unit 1. Matlab Fundamentals</p>	<p>Learning time: 11h 40m Guided activities: 3h 20m Self study : 8h 20m</p>
<p>Description: Matlab fundamentals</p> <p>Related activities: Exercises 1</p> <p>Specific objectives: Introduction to the software</p>	
<p>(ENG) Unit 2. Matlab Graphics</p>	<p>Learning time: 11h 40m Guided activities: 3h 20m Self study : 8h 20m</p>
<p>Description: Using Matlab Graphics</p> <p>Related activities: Exercises 2</p>	
<p>(ENG) Unit 3. M-file Programming</p>	<p>Learning time: 11h 40m Guided activities: 3h 20m Self study : 8h 20m</p>
<p>Description: M-file programming</p> <p>Related activities: Exercises 3</p> <p>Specific objectives: Learn how to produce scripts and functions</p>	

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<p>(ENG) Unit 4. Graphics User Interface</p>	<p>Learning time: 11h 40m Guided activities: 3h 20m Self study : 8h 20m</p>
<p>Description: Using GUIs</p> <p>Related activities: Exercises 4</p> <p>Specific objectives: Generate GUIs with Matlab</p>	
<p>(ENG) Unit 5. Simulink</p>	<p>Learning time: 11h 40m Guided activities: 3h 20m Self study : 8h 20m</p>
<p>Description: Introducing Simulink and Stateflow</p> <p>Related activities: Exercises 5</p> <p>Specific objectives: To simulate systems with Simulink</p>	
<p>(ENG) Unit 6. Hand-on projects with ARDUINO, RASPBERRY PI, FPGAs</p>	<p>Learning time: 10h Practical classes: 4h Laboratory classes: 6h</p>
<p>Description: Laboratory projects based on SIMULINK and/or MATLAB with ARDUINO, RASPBERRY and FPGAs</p> <p>Related activities: Practices in the Laboratory of the Subject using ARDUINO, RASPBERRY and/or FPGAs</p> <p>Specific objectives: Learn the basics of programming with SIMULINK / MATLAB and Hardware-in-the-loop</p>	

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(ENG) Unit 7. Advanced projects with ARDUINO, RASPBERRY PI, FPGAs	Learning time: 14h Laboratory classes: 6h Self study : 8h
Description: Development of your own laboratory projects based on SIMULINK and/or MATLAB with ARDUINO, RASPBERRY and FPGAs	

Planning of activities

Guided Laboratory Practices on examples of projects based on SIMULINK and/or MATLAB with ARDUINO, RASPBERRY and FPGAs	Hours: 10h Practical classes: 4h Laboratory classes: 6h
Description: Laboratory projects based on SIMULINK and/or MATLAB with ARDUINO, RASPBERRY and FPGAs Support materials: ARDUINO, RASPBERRY and FPGAs Descriptions of the assignments due and their relation to the assessment: Practice Report Specific objectives: Learn the basics of Hardware programming with SIMULINK and / or MATLAB	

Develop of a Final Work	Hours: 14h Laboratory classes: 6h Self study: 8h
Description: Development of your own laboratory projects based on SIMULINK and/or MATLAB with ARDUINO, RASPBERRY and FPGAs Descriptions of the assignments due and their relation to the assessment: Final Work Report Video of performance	

Qualification system

Exercises: 30%
Final work: 70%

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Regulations for carrying out activities

Final work consists of

(1) A document containing:

(1.1) A brief theoretical introduction about the chosen subject (this can be any related to your thesis, your job, or other interests), and

(1.2) two solved exercises about the chosen subject as well as their solution steps and MATLAB code.

(2) The set of MATLAB files (*.m, *.mdl,...) that solve the two proposed exercises.

(Several final works from previous courses will be available in the virtual campus in order to show the required extension and difficulty)

Bibliography

Basic:

Mathworks. Matlab toolboxes. Mathworks,

Dormido, S. I, II, III Congreso de usuarios de MATLAB. Madrid: UNED, 1995.