Course guides
230328 - AP - Learning with Python

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).
Academic year: 2020
ECTS Credits: 2.0
Languages: Catalan

LECTURER

Coordinating lecturer: Pau Bofill
Others: Pau Bofill

PRIOR SKILLS

Students should have taken a first course on Object Oriented Programming

TEACHING METHODOLOGY

Using an engineering project as a leading thread, we will work on guided exercises at the lab.

LEARNING OBJECTIVES OF THE SUBJECT

At the end of the course, students should:
1) Be familiar with the programming framework Spyder.
2) Given a set of language constructions and primitives, students should be able to solve particular programming problems.
3) Have improved their algorithmic programming skills.
4) Be familiar with scientific programming in Python with NumPy (Matlab style).
5) Be familiar with the graphic primitives of Matplotlib (Matlab-style graphics).
6) Students will have built a guided project of medium size in Python.
7) Students will have participated in a project that shows the MVC application architecture (Model ? Vision ? Control).

STUDY LOAD

<table>
<thead>
<tr>
<th>Type</th>
<th>Hours</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Hours small group</td>
<td>20.0</td>
<td>40.00</td>
</tr>
<tr>
<td>Self study</td>
<td>30.0</td>
<td>60.00</td>
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Total learning time: 50 h
CONTENTS

Description:
Python
- The Python Interpreter (IPython). Python, a non-typed programming language.
- Data and variables. Objects and references (everything is an object in Python). Mutable and immutable data.
- Elementary sentences: multiple assignment, flow control, etc.
- Function and object calls. Passing parameters by reference.
- Data structures: strings, tuples, lists, maps, sets. Sequences.
- List comprehensions
- Modules in Python: functions and classes.
- Inheritance. In Python, everything is polymorphic.
- Exceptions

NumPy
- Arrays i matricial calculus. Some basic primitives.

Matplotlib
- Plot, scatter plot, ticks, labels, etc.

Related activities:
Guided working sessions at the lab. An example: a particular programming problem is formulated by the teacher, somehow related to the project, together with a few language constructs. Students should solve the problem with this constructs, and then compare their solution with an equivalent solution based on NumPy.

Full-or-part-time: 20h
Practical classes: 20h

GRADING SYSTEM

By attendance (students with more than two unjustified absences will be marked NP). Other than that, course marks will be determined by self-assessment, with the consensus from the teacher, based on specific tasks.