Teaching guide

IDENTIFICATION DETAILS

Degree: Expert in Robotics

Faculty/School: Senior Polytechnic School

Course: 

<table>
<thead>
<tr>
<th>Type: Compulsory Internal</th>
<th>ECTS credits: 3</th>
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<td>Year:</td>
<td>Code: 56211</td>
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<tr>
<td>1</td>
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<tr>
<td>Teaching period:</td>
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<tr>
<td>Second semester</td>
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<td>Teaching type:</td>
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<tr>
<td>Classroom-based</td>
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<tr>
<td>Language:</td>
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<tr>
<td>English</td>
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<tr>
<td>Total number of student</td>
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<tr>
<td>study hours:</td>
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Teaching staff | E-mail
Alberto Garcés Jiménez | alberto.garces@ufv.es

SUBJECT DESCRIPTION

Esta asignatura corresponde al título propio de Experto en Robótica. Abarca el aprendizaje sobre los componentes fundamentales de un robot. El robot está diseñado para un uso sin base de conocimientos en programación, apto para la introducción a los componentes de un robot y para las primeras semanas lectivas de 1º de grado, donde los conocimientos sobre fundamentos de programación, impartidos en la asignatura de Algoritmos, no se habrán madurado lo suficiente. Esta asignatura se divide en parte teórica y parte práctica, en la parte teórica se impartirán nociones básicas sobre diseño de programas con diagramas de flujo y dispositivos como los distintos tipos de sensores y actuadores. La parte práctica se basara en programar sobre el tipo de robot mencionado.

GOAL

The objective of this Course is to learn the challenges that programming robots faces and acquire the capacity to generate basic algorithms that control a physical robot.
The specific aims of the subject are:

To understand the challenges that programming robots addresses
To generate useful code autonomously and load it into a real robot
To be able to assess the efficiency of the delivered code based on the results on the real robot
To learn the specifications of a robotic arm
To know possible applications of a robotic arm
To be able to solve new problems with the topics learned

PRIOR KNOWLEDGE

B2 level of English is required
Good predisposition to Mathematics, Physics, Electronics and Computing
Personal interest in Robotics

COURSE SYLLABUS

1 Impact of Robotics
   1.1 Current requirements
   1.2 Trends: Spatial, IoT, A.I., Cybersecurity
   1.3 Robotics Expert
2 Programming Framework
   2.1 Basics
   2.3 Components
   2.3 Robot Libraries
   2.4 Framework/IDE?
3 Programming Challenges
   3.1 Loop
   3.2 Control strategies
   3.3 Robotic integration
4 Robotic arm case: DK, IK

EDUCATION ACTIVITIES

The Professor will explain the different topics, raising discussions, explaining the problems, giving guidelines about the evaluation progress, so that attending with proactivity is essential for success.
The Professor explains the assignments and answer the questions of the students.
The Student complements the classroom activities working on his own.
Students collaborate with the whole group to generate an effective work environment and with the assigned team when the activity is in groups.
The platform Aula Virtual provides an efficient way of communications and notifications between the professor and every student, hosting the material, indications for the assignments and a repository for uploading the work assigned and online exercises.

DISTRIBUTION OF WORK TIME

<table>
<thead>
<tr>
<th>CLASSROOM-BASED ACTIVITY</th>
<th>INDEPENDENT STUDY/OUT-OF-CLASSROOM ACTIVITY</th>
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<tbody>
<tr>
<td>30 hours</td>
<td>45 hours</td>
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<tr>
<td>Lectures 10h</td>
<td>Personal study 30h</td>
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<td>Supervised Assignment 14h</td>
<td>Teamwork 15h</td>
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<td>Public presentations 2h</td>
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SKILLS

- To be able to identify when a new Robot problem can be solved by programming
- To understand the challenges of Robot Programming
- To be able to program the Robotic Arm in the Lab

LEARNING RESULTS

- To know what type of problems programming face
- To know the proposed robot architecture: hardware and components
- To know the functionality of the programming framework
- To be able to implement a basic behavior on the Lab robot
- To be able to translate a purpose into programming code
- To be able to assess the efficiency of the code based on the real results
- To be able to implement basic algorithms of the addressed topics
- To know how to present the work making use of the sections of a scientific article

LEARNING APPRAISAL SYSTEM

Evidences (Grade weight):
1. Assignments (50%)
   1.1. Assignment 1
   1.2. Assignment 2
   1.3. Assignment 3
2. Individual Test (40%)
3. Proactivity and Attendance (10%)

Conditions for each one of the Evidences 1.1, 1.2, 1.3 and 2:
- require grade 5 out of 10 or above.
- can be retaken in resit.
- not dispensable.

Those students who are officially dispensed from the obligation of attending the classes, will be graded like the rest of students with evidences 1.1, 1.2, 1.3 and 2. Evidence 3 will be graded, whenever the dispensed student requests at least 2 tutoring sessions with the professor to evaluate the progress of the student. The tutorials must be requested with enough anticipation to the exam and separated at least 4 weeks.

The student will be graded in any of the two calls of the enrollment (standard and resit), if submits the work for the 50% or more the value of the evidences. Otherwise the student will not be graded and the call will not increment the tries.

Any type of fraud or plagiarism on the part of the student in an evaluable activity, will be sanctioned as it is included in the UFV Coexistence Regulations. For these purposes, any attempt to defraud the evaluation system, such as copying exercises, exams, practices, works or any other type of delivery, either from another partner or from unauthorized materials or devices, will be considered “plagiarism”. order to make the teacher believe that they are their own.

BIBLIOGRAPHY AND OTHER RESOURCES
Basic