Università degli Studi della Basilicata
Scuola di Ingegneria

COURSE: Information Systems			
ACADEMIC YEAR: 2018/19			
TYPE OF EDUCATIONAL ACTIVITY: Basic			
TEACHER: Dr. Domenico Daniele Bloisi			
e-mail: domenico.bloisi@unibas.it		web: https://dbloisi.github.io/	
phone:		mobile (optional):	
Language: Italian			
ECTS: 6	n. of hours: 48	Campus: Potenza School of Engineering	Semester: second

EDUCATIONAL GOALS AND EXPECTED LEARNING OUTCOMES

Cyber-physical systems are expected to play a key role in the production of goods and services in the near future. A cyber-physical system is an integration of physical processes and digital computation. This course covers topics related to complex cyber-physical systems (e.g., robots) including computer vision and machine perception.

Knowledge and Understanding

This course is an introduction to the problems of computer vision and machine perception and it is designed to provide students with an exposure to recent techniques that are used to tackle image-based modeling problems. During the class, the libraries OpenCV, PCL, and Keras will be used to show practical examples.

Capability to Apply Knowledge and Comprehension

Upon completion of the course, the students are expected to be able to develop applications in Python for image processing and object recognition.

PRE-REQUIREMENTS

The following skills are necessary for this class: Linear algebra, vector calculus, and object oriented programming.

SYLLABUS

The main topics that are covered are:

- Introduction to Python language
- Image processing with Python
- 2D perception - OpenCV
- 3D perception - PCL
- Introduction to ROS
- Publisher-Subscriber pattern
- Robotic simulators
- Introduction to Deep Learning
- Keras library

TEACHING METHODS

Class lectures for a total of 48 hours. Students will be also asked to carry out home works and class work.

EVALUATION METHODS

Written examination. The exams consists of three questions about the topics covered during the course. Students can ask for a final project to obtain up to 3 bonus points.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

Slides will be available for the students on Moodle and at https://dbloisi.github.io/corsi/sistemi-informativi.html

Textbooks references:

- Jan Erik Solem "Programming Computer Vision with Python" O'Reilly Media
- Francois Chollet "Deep Learning with Python" Manning Publications Co.

INTERACTION WITH STUDENTS

During the office hours or by email. The lecturer will also use the e-learning platform to share files and to communicate information to the students (e.g., forum).

EXAMINATION SESSIONS (FORECAST)[1]

05 Feb 2019; 07 May 2019; 09 July 2019; 24 Sept 2019; 17 Dec 2019

SEMINARS BY EXTERNAL EXPERTS YES □ NO **X**

FURTHER INFORMATION

Visit https://dbloisi.github.io/corsi/sistemi-informativi.html for updates

[1] Subject to possible changes: check the web site of the Teacher or the Department/School for updates.