Università degli Studi della Basilicata
Scuola di Ingegneria

COURSE: Computer Vision and Machine Perception			
ACADEMIC YEAR: 2019/20			
TYPE OF EDUCATIONAL ACTIVITY: Characteristic			
TEACHER: Dr. Domenico Daniele Bloisi			
e-mail: domenico.bloisi@unibas.it		web: http://web.unibas.it/bloisi/corsi/visione-e-percezione.html	
phone: 0971 205841		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 the development of vision modules for complex cyber-physical systems (e.g., robots).

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

The exams consists of a final project that can be realized individually or in group.

TEXTBOOKS AND ON-LINE EDUCATIONAL MATERIAL

Slides will be available for the students on Moodle and at http://web.unibas.it/bloisi/corsi/visione-e-percezione.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]

09 July 2020; 24 Sept 2020; 17 Dec 2020; 04 Feb 2021; 06 May 2021

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

FURTHER INFORMATION

Visit http://web.unibas.it/bloisi/corsi/visione-e-percezione.html for updates

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