Advanced vision

SCHOOL
Polytech Graduate School of Engineering

CAMPUS
Belle-Beille

LEVEL
Engineering 5th year

OPEN TO EXCHANGE STUDENTS
Yes

SEMESTER
Fall (S1)

> **Degree course:** Graduate School of Engineering - Automation and Computer Engineering
> **Teaching unit:** UE 9.2 Sciences de l'ingénieur
> **Course language:** English
> **Duration (hours):** 16
> **ECTS:** 1
> **Teacher(s):** Nicolas Delanoue

> **Assessment:**
> **Teaching methods:**

- [X] Continuous assessment
- [ ] Final exam

	hours	
[ ] Lecture course	hours	[ ] Case study
[ ] Tutorial course	hours	[ ] Project
[X] Practical work	16 hours	

COURSE DESCRİPTİON

One favors a practical approach for discovering these notions (« learn by doing ») : the class is organized around the development of a basic program allowing to manipulate and implement each concept.
More accurately, considered concepts are:

- - The pinhole model and intrinsic matrix.
- - Calibration
- - Extrinsic matrix and homogeneous coordinates
- - Marker detection, registration and automated estimate of the extrinsic matrix
- - Application to the estimate of the distance between the camera and a target
- - Application to augmented reality (superposition of a virtuel object on a video stream)
- - Extension to generic patterns : SURF descriptors and RANSAC-based pose estimation

OBJECTİVES

The purpose is to provide to students an introduction to 3D vision, based on projective geometry, registration and image processing, with underlying applications to robotics (e.g. distance measurement) and augmented reality.

PREREQUİSİTES

Computer vision and algorithmics

SELECTİVE BİBLİOGRAPHY

Multiple View Geometry », Hartley and Zissermann, 2004