

## Projects

### Innovation by mechatronics and robotics Course

#### IDENTIFICATION

CODE : PC-S4-P2i6-TF  
ECTS : 10.0

#### HOURS

Lectures : 28.0 h  
Seminars : 16.0 h  
Laboratory : 21.0 h  
Project : 98.5 h  
Teacher-student  
contact : 163.5 h  
Personal work : 90.0 h  
Total : 253.5 h

#### ASSESSMENT METHOD

Servoing: 1 individual evaluation, 3 sessions over 5 sessions.  
Perception / Action: 1 group assessment, TP report on 4h.  
Programming & Communication: 1 assessment in situation by binomial, 1 written individual assessment, 1 individual evaluation QCM machine  
Design: 1 individual evaluation, CAD rendering, for the duration of the sessions.  
Project : 1 individual evaluation throughout the duration of the sessions, 1 individual evaluation by the pairs, 1 group assessment during the Sciences Fair.  
Documentary research: 1 individual assessment in writing  
Humanities: 1 individual assessment in writing, having to write outside the niches., 1 written group assessment, article to be made.

#### TEACHING AIDS

Online courses : <https://moodle.insa-lyon.fr/course/view.php?id=2570>

#### TEACHING LANGUAGE

French

#### CONTACT

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#### AIMS

The students will design a prototype using mechatronics and robotics. The project theme is common to all groups and is chosen each year, it addresses the whole field of possibilities of robotics. The chosen theme should: enable a realization at the level of what students can do, allow to find a multitude of solutions, question the role of robotics in society, link the P2I to the real world with a shared project with " clients, "finding a place in the daily life of a young humanist student.

The creations are made from a functional specification. Each group composed of a dozen students will start the project with a search for solutions with ideation sessions (brainstorming, TRIZ, 6 hats, mental map). The selected solutions are the subject of a mechanical design study with 3D modeling, mechanical simulation, multiphysical modeling, Lego model, validation experiments ...

The prototypes are made by the students in 3 workshops according to the needs: machining, metal construction, additive manufacturing.

The electronics of the prototypes are 80% commercial cards: arduino, power cards, axis servo, video recognition ... Some cards are designed and manufactured by students for specific needs: Lego / electronic interfaces, sound controls...

The control of the prototypes is done in several layers: a real-time layer on a microcontroller and a remote layer for the HMI on PC (Java) or tablet / tel (Android).

Wired communications use serial or I2C protocols, wireless communications use WIFI in UDP or TCP.

#### CONTENT

Project 78h  
Servoing 16h  
Programming & Communication 26h  
Sensors /Actuators 12h  
Energy 2h  
Humanities 30h  
Documentary Research 4h

#### PRE-REQUISITE

S1, S2 and S3 Mechanical design  
S3 Manufacturing  
S3 Mechatronics

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