



# Faculté des sciences appliquées

**FSA****MECA2845** **Projet en mécatronique**

[30h+45h exercices] 6 credits

**Teacher(s):** Paul Fisette (coord.), Ernest Matagne, Benoît Raucent  
**Language:** french  
**Level:** 2nd cycle course

**Aims**

- Introduce students, via practice, to develop mechatronic engineering projects
- Foster creativity and solution seeking
- Promote a synthetic spirit and combining material learned by solving a real problem
- Allow students to construct a mechatronic prototype : a mobile robot

**Main themes**

- Analysis and description of a given technological problem
- Submission of a pilot project and performance evaluation
- Mechanical and electromechanical component dimensioning
- Taking technical and safety norms into consideration
- Presentation and defense of a complete and realistic technological solution
- Drawings of the manufacturing plans and design of an autonomous

**Content and teaching methods**

Students must take charge all the aspects of a proposed design problem. They particularly see to proposing innovative and technically correct solutions. The project will be advanced as far as possible including scale models, a final prototype and manufacturing plans for mechanical parts.

The project starts in September and ends during the month of May. It is done in groups and involves the following steps :

- Problem analysis and writing the specification conditions
- Seeking original solutions
- Quantification of the performances of each of the variants
- Solution selection (i.e. choosing the best variant)
- Presentation of the pilot project
- Mechanical and electromechanical component dimensioning
- Short economic study
- Drawings of the manufacturing plans of parts to be built in the workshop
- Private defense of the project and public of robot performance

## Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

### Prerequisite :

The project combines elements from the courses of mechanical design, electronics, computer science (real-time computing) , sensors and actuator control

### References :

- RC. Juvinall and KM Marshek, Fundamentals of Machine Component Design, Wiley and Sons
- Technical documentation and Manufacturers' catalogues

### Organisation :

- Unlike the mechanical design project (MECA 2840), the subject of this course (MECA2845) is imposed by the teachers.
- Groups : students work in groups of at least four. Before the pilot project, the group works together. Then, each one can specialize on a particular aspect.
- Schedule : Two to Four hours of consultation are foreseen each week all year.
- Accompaniment : besides the professors of the courses involved, each group has a tutor who will follow it all year. For that matter, the students are accompanied and aided by technical personnel of divisions PRM, LEI and DICE to construct the final robot.
- Locale : students have the mechatronic room at their disposal (Bâtiment Maxwell) equipped with mechanical tools and electronic and computing equipment. The guarantee for this equipment for the academic year involves a deposit to be determined (amount and time limit) will be set by the project coordinator at the beginning of the year.

### Grading criteria :

- Principally based on presentations and technical reports done during the year and the robot built. Grading of course MECA 2845 involves three aspects : quality of the pilot project (including the design of a scale models before the final prototype)
- Mechanical design of the prototype (including the choice of materials, components, their dimensioning and manufacturing and assembly plans)
- Combining the disciplines involved (mechanics, actuator control, electronics, sensors, real-time computing)

N.B.: the other non MECA disciplines involved will be graded separately, in the context of an associated course

## Other credits in programs

<b>ELME22/M</b>	Deuxième année du programme conduisant au grade d'ingénieur civil électro-mécanicien (mécatronique)	(6 credits)	Mandatory
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