

SYLLABUS

Mechatronics 7.5 credits

E7012E

Mekatronik

Course syllabus admitted: Autumn 2023 Sp 1 - Present

DECISION DATE
2021-02-16

Mechatronics 7.5 credits E7012E

Mekatronik

Second cycle, E7012E

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	U G#	Reglerteknik	Automation Technology

Main field of study

Engineering Physics and Electrical Engineering, Computer Science and Engineering

Entry requirements

The student should be able to program in a high-level language, analyse simple electronic circuits and furthermore be familiar with basic control theory. This corresponds to the courses D0009E Introduction to programming, E0013E Basic course in electrical engineering (alternatively E0003E Circuit Theory and E0007E Electronics) and R0004E Modeling and Control or equivalent.

Good knowledge in English equivalent to English 6.

Alternative:

Alternative to completed courses can be corresponding knowledge acquired through work with the electronics sector.

Selection

The selection is based on 30-285 credits

Course Aim

The student will after the course be able to design and program a mechatronic system including mechanics, electronic sensors, simple electronics, a control circuit (microcomputer) and electrical motors.

- After the course the student should be able to construct and analyze a mechatronic system.
- The student should be able to critical and creative deal with issues and technology solutions, plan and execute a skilled task, and work in teams with different compositions.
- The student should be able to identify the need for further knowledge and to continuously upgrade their skills.
- The student should be able to integrate knowledge, model, simulate, and anticipate a process. This is shown during the execution of the project that is a part of the examination in the course.

Contents

- Transistors, transistor circuits with inductive loads.
- Radiometry, the photodiode, amplifiers for photodiodes.
- Digital circuitry, peripheral circuits and control circuits.
- Introduction to the C programming language, program development tools.
- Electric motors and drive circuits for motors.
- Project Mobile Robot.
- OrCAD (PSpice) are used for description and simulation of designed circuits both for the laboratory work and in the project.

Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

The course consists of three parts: lectures, labs and projects. During the lectures important parts of the theory is dealt with. In the lab-exercises the students will perform assignments on basic concepts in the course and get training in using the software and equipment needed for the project. The course is largely based on PBL (problem based learning) because most of the time is devoted to work in groups of 4-6 students with an assignment to design and implement hardware and software for an autonomous mobile robot. Some parts of the robot are given and implemented at the start. At the end of the course there is held a competition between the groups.

Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided.

The examination consists of two parts:

- Report of project work 6.0HP (U G#)
- Labs 1.5HP (U G#)

Unauthorized aids during exams and assessments

If a student, by using unauthorized aids, tries to mislead during an exam or when a study performance is to be assessed, disciplinary measures may be taken. The term "unauthorized aids" refers to aids that the teacher has not previously specified as permissible aids and that may assist in solving the examination task. This means that all aids not specified as permissible are prohibited. The Swedish version has interpretative precedence in the event of a conflict.

Overlap

The course E7012E is equal to SME113

Course offered by

Department of Computer Science, Electrical and Space Engineering

Modules

Code	Description	Grade scale	Cr	Status	From period	Title
0002	Laboratory work	U G#	1.5	Mandatory	A07	
0004	Project work	U G#	6	Mandatory	S22	

Study guidance

Study guidance for the course is to be found in our learning platform Canvas before the course starts. Students applying for single subject courses get more information in the Welcome letter. You will find the learning platform via

My LTU.

Last revised

by Jonny Johansson, HUL SRT 2021-02-16

Syllabus established

by the Department of Computer Science and Electrical Engineering 2007-02-28