Project Course CDIO

Programme course

12 credits

Projektkurs, CDIO

TNE085

Valid from: 2017 Spring semester

Determined by
Board of Studies for Electrical Engineering, Physics and Mathematics

Date determined
2017-01-25

Main field of study
Electrical Engineering

Course level
Second cycle

Advancement level
A1X

Course offered for
- Electronics Design Engineering, M Sc in Engineering

Specific information
Exchange students may apply for the course after arrival to the university but before it starts. The international officer for exchange studies must be contacted before applying.

Entry requirements
Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites
Analog electronics, digital electronics, circuit theory, micro-computers, signals and systems, mobile communications, wireless systems and networks, basic knowledge in printed circuit board manufacturing, basic programming skills. Knowledge and skills to carry out a project under a design model such as LIPS.

Intended learning outcomes
The purpose of this course is that students should work with a major project, from feasibility studies to finished prototype. The "CDIO syllabus" serves as governing policy on the learning goals.

The student selects a project within electronics design or data/telecommunication, applying previously acquired knowledge, and acquires new knowledge when necessary to conduct the project. The project work should be conducted in a professional manner, and student should develop and consolidate skills according to "CDIO Syllabus", by:

- Applying knowledge and methods from previous courses, especially analog and digital electronics, microcomputers, programming, wireless

communication systems, mobile communications and networks etc.
- Acquiring new knowledge when necessary.
- Combining knowledge from different disciplines, such as communication electronics, power electronics, microcomputers, programming, wireless communication systems and networks etc. and applying them in new contexts.
- Formulating a set of requirements for the project based on a project charter, and thereby assess the project's feasibility in terms of technology and available resources
- Presenting the project results both for the client and also for other students, who cannot be presumed to be specialists in the technical areas covered by the project.
- Demonstrating the ability to independently manage project work with the support of a project model and with limited resources in terms of personnel, equipment and time.
- Planning, implementing and monitoring a project.
- Analyzing and structuring problems, and analyzing and drawing conclusions from the results.
- Taking the initiative in finding creative solutions.
- Actively contributing to the project to run smoothly through good team work and social skills.

The results of the project should:
- Hold high technical quality and must be based on up-to-date knowledge and methods in electronic design or communication systems/networks.
- Be documented in the form of project plan and project timetable, and in the form of a technical report.
- Be presented orally and in the form of a demonstration of a prototype (design).
- Be of such good quality (in terms of documents and construction wise) that can be followed by future students.

The course aims also that students assimilate knowledge and entrepreneurial skills, with an emphasis on business planning for new activities. After the course the student should also:

- Be able describing requirements for new enterprises.
- Be able describing the information and analysis needed to evaluate a development project from a commercial perspective, and have the ability to collect and analyze relevant information for this purpose.

Course content

The projects will be closely linked to the ED- or WNE-program profiles: communications electronics, solar cells and printed electronics, wireless networks, or to companies operating in these areas. Projects can vary from year to year. Here are some examples of possible projects.

Within Power electronics (solar cell application): Automatic power control unit for recycling of the braking energy in the form of re-charging the battery in electric vehicles, Current, voltage control units in electric cars, power inverters, etc.

Within Printed electronics: Develop an organic display, design and develop control unit for an organic display by using conventional electronics, control device for smart windows, window glass is more or less transparent depending on the light intensity of outdoor / indoor ...

Within communication electronics: radio front, Developing a transmitter / receiver module according to IEEE 80215.4 standard, design, manufacturing and configuration of a Zigbee module.

Within wireless networks: Design, implementation, verification and validation of simulation models for analyzing various communication networks.

Within the smart homes: Climate Control Indoor, fire / burglary alarm with web monitoring, automated vacuum cleaning, operation of home care services via mobile phone (light, heat, garage door ...).

Teaching and working methods

The course consists of a few introductory lectures, the rest is self-study. Each project team, composed of 5-8 students (depending on the total number of students in the course, will be assigned a mentor who supports the group in its work. There is also a limited access to technical experts.

For each project there is a client, with whom the project team negotiates the terms, conditions and specifications.

Before the project work begins the team should prepare a project timetable. Projects must be conducted according to the LIPS model. Requirements, specifications, milestones and timetable and other project documents should follow the templates that are included in LIPS.

The course runs over the entire autumn semester.

Examination

UPG1	Assignments on entrepreneurship, report	3 credits	U, G
PRA1	Project	9 credits	U, G

The project work will be examined against the learning goals mentioned in the CDIO Syllabus. Especially the following aspects of the project will be examined.

- The quality of all supplied documents (according to the LIPS project model).
- The quality of the oral presentation and the subsequent (public) demonstration.
- The quality of the technical approach / design. To pass the project, all the above parts are to be approved. In addition, a report on entrepreneurship to be accepted and approved.

Grades

Two-grade scale, U, G

Department

Institutionen för teknik och naturvetenskap

Director of Studies or equivalent

Adriana Serban

Examiner

Ole Pedersen

Course website and other links

http://www2.itn.liu.se/utbildning/kurs/

Education components

Preliminary scheduled hours: 34 h
Recommended self-study hours: 286 h

Course literature

Additional literature

Compendia

Other

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.