System Design

Programme course

12 credits

Systemkonstruktion CDIO

TSTE17

Valid from: 2017 Spring semester

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

Date determined
2017-01-25

Offered for the last time
Autumn semester 2024

Main field of study
Electrical Engineering

Course level
Second cycle

Advancement level
A1F

Course offered for
- Computer Science and Engineering, M Sc in Engineering
- Applied Physics and Electrical Engineering, M Sc in Engineering
- Electronics Engineering, Master's programme
- Information Technology, M Sc in Engineering
- Applied Physics and Electrical Engineering - International, M Sc in Engineering

Specific information
The Entrepreneurship part overlap with other CDIO courses and cannot be included more than once in a degree.

Exchange students may apply for the course after arrival to LiTH 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
Design of digital systems or similar, Linear systems, Signals and systems

Intended learning outcomes

The course aim at both developing the students skill in solving complex design problems using a well structured design process that assures that the design goal is reached as well as provide advanced knowledge in both the electronics and application domain. After successfully completing the course, the student can:

- Solve complex design problems using a well structured design process
- Learn to use fast prototyping tools for DSP systems
- Apply knowledge from previous courses, search for supplementary knowledge, and find create solutions
- Manage advanced project work in an industrially professional way
- Communicate technical project results orally and in writing

A purpose for the course is also for the students to acquire knowledge and abilities within the general area of entrepreneurship, with particular focus on business planning for new ventures. After the course, students should be able to:

- account for models that describe what it takes for a new venture to have a stable basis for further development and to asess the level of development of ventures using such models; and
- account for the information and analyses needed to evaluate a development project from a business point of view and have the ability to collect and analyse relevant information for the purpose.

Course content

The course will cover all essential steps in the design and implementation of a multi-carrier based communication system. Basic theory for the multicarrier system and current standards for radio LAN is provided as needed. A top-down design-flow will be used, starting from the system specification, partitioning, algorithms, mapping to a software/hardware resource structure, and ending with a working implementation in FPGA (Field-Programmable Gate Array). The design process is centered on building a sequence of models with increasing level of detail. The modeling, realization, verification of functionality, and implementation of the communication system is based on using high-level tools.

Teaching and working methods

The course consist of a series of lectures, exercises and laboratory work and a large design project. A typical project group consists of 6 to 8 students. The project will be managed according to the LIPS project management model. The project task is selected from a set of suitable communication standards, and the requirements are then negotiated and the project and time plans defined in a number of iterations.
The course runs over the entire autumn semester.

Examination

UPG1	Entrepreneurship assignments	3 credits	U, G
UPG2	Assignments	1 credits	U, G
LAB1	One laboratory course	1 credits	U, G
PRA1	Project work	7 credits	U, G

The project work will be evaluated against the achievement of course objectives. Three sections, each of which is assessed pass /fail are parts of the assessment. These topics are written documentation, oral presentation and LIPS documentation. LIPS document shall at least include project plan, schedule and reflection document, in accordance with LIPS. To pass the entire project work requires approval of all parts and that the objectives of the course are met.Grades are given as 'Fail' or 'Pass'.

Grades

Two-grade scale, U, G

Department

Institutionen för systemteknik

Director of Studies or equivalent

Tomas Svensson

Examiner

Kent Palmkvist

Course website and other links

http://www.isy.liu.se/en/edu/kurs/TSTE17/

Education components

Preliminary scheduled hours: 42 h
Recommended self-study hours: 278 h

Course literature

Additional literature

Books

Heiskala J., Terry J., (2002) *OFDM Wireless LANs: A Theoretical and Practical Guide* SAMS publishing
Svensson T., Krysander C, (2011) *Projektmodellen LIPS* Studentlitteratur

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.