Switching Theory and Logical Design

Programme course

8 credits

Digitalteknik

TSIU05

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
First cycle

Advancement level
G1X

Course offered for
- Computer Engineering, B Sc in Engineering
- Engineering Electronics, B Sc in Engineering

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.

Intended learning outcomes
To bring knowledge of methods for structural design of digital systems, to develop an operational skill and understanding of how digital systems and common basic electrical components work. After the course the student shall be able to:

- have knowledge of common components
- define and discuss the terms tension, current and resistance
- describe basic electrical circuits
- perform basic troubleshooting of electrical circuits
- perform measurements with meters and oscilloscopes
- produce a specification of a digital system at the binary level.
- Combinatorial networks shall be represented by truth tables and sequential networks by state graphs with structural methods analyze and design digital circuits.
- The methods aim at guaranteeing correct designs as well as minimal networks implement a digital network in PLDs (Programmable Logic Devices).

Course content
Ohm's law, voltage and current dividers, Kirchoff's laws, wave forms, top-top-, average- and mean values, resistors, capacitors, tone generator, multimeters, oscilloscopes.
Number systems and codes, boolean algebra and logic gates, simplification, Karnaugh maps, combinatorial logic, synchronous sequential logic, state graphs, Mealy and Moore networks, reduction of state tables.

Teaching and working methods
Lectures, lessons, laborations and seminars.

Examination

UPG1	Assignments	2 credits	U, G
LAB1	Laboratory work	2 credits	U, G
TEN1	Written examination	4 credits	U, 3, 4, 5

Grades
Four-grade scale, LiU, U, 3, 4, 5

Other information
Supplementary courses: System Design

Department
Institutionen för systemteknik

Director of Studies or equivalent
Tomas Svensson

Examiner
Michael Josefsson

Course website and other links
http://www.isy.liu.se/edu/kurs/TSIU05/

Education components
Preliminary scheduled hours: 74 h
Recommended self-study hours: 139 h

Course literature

Additional literature

Books

Hemert, Lars-Hugo, *Digitala kretsar* 3
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.