Radio Frequency Transceiver Design

Programme course

6 credits

Konstruktion av radiotransceivers

TSEK38

Valid from: 2018 Spring semester

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

Date determined

Main field of study

Electrical Engineering

Course level

Second cycle

Advancement level

A1X

Course offered for

- Electronics Engineering, Master's Programme
- Computer Science and Engineering, M Sc in Engineering
- Information Technology, M Sc in Engineering
- Applied Physics and Electrical Engineering - International, M Sc in Engineering
- Applied Physics and Electrical Engineering, M Sc in Engineering

Prerequisites

Background in RF electronics, integrated circuits and communication theory.

Intended learning outcomes

The course should give students a practical knowledge on RF transceiver system design for wireless communications. The course provides systematic design methods of receivers and transmitters used in communication systems, like GSM, WLAN or Bluetooth. System-level perspective will be presented, assumed RF circuits be well understood. The particular objective of the course is that the student will learn design principles of RF systems in terms of the contemporary radio standards and the existing physical limitations on the other hand. After the course the student should be able to:

- analyze an RF system in its physical layer given specifications defined by standard
- transform the system specification into the requirements for the RF front-end blocks for various architectures
- design an RF front-end for the required performance using professional software tools

Course content

Fundamentals of RF system design. Basic design considerations in different radio architectures. Receiver system analysis and design. Transmitter system analysis and design. RF front-end and baseband isues. Performance evaluation. Case studies. Design work with professional tools.

Teaching and working methods

Lectures, laboratory work, seminars, and project assignment.

Examination

PRA1	Project Work	U, G	4 credits
LAB1	Laboratory work	U, G	2 credits

Grades are given as ”Fail” or ”Pass”.

Grades

Two grade scale, older version, U, G

Department

Institutionen för systemteknik

Director of Studies or equivalent

Tomas Svensson

Examiner

Ted Johansson

Course website and other links

http://www.ek.isy.liu.se/courses/tsek38

Education components

Preliminary scheduled hours: 52 h
Recommended self-study hours: 108 h

Course literature

Qizheng Gu, "RF System Design of Transceivers for Wireless Communications", 2005
Springer, ISBN 0-387-24161-2

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.