Radio Frequency Transceiver Design

Programme course

6 credits

Konstruktion av radiotransceivers

TSEK38

Valid from: 2020 Spring semester

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

Date determined
2019-09-23

Main field of study
Electrical Engineering

Course level
Second cycle

Advancement level
A1X

Course offered for
- Master's Programme in Electronics Engineering
- 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 gives students practical knowledge of the system design of radio frequency circuits for wireless communication. Students learn systematic design methods for recipients and transmitters used in wireless communication systems, such as 3G, 4G, WLAN and Bluetooth. Several aspects at the system level are presented, which requires basic knowledge of radioelectronics circuits. The aim of the course is that the student should learn the design principles of radio frequency systems for current radio standards and existing physical constraints. After the end of the course, the student is expected to:

- analyze adio system and its physical layer (PHY) given specifications from different radio standards,
- transform the system specification to performance requirements for radio circuits for different architectures,
- verify an RF front-end for the required performance using professional software tools

Course content
Basic radio system design and design trade-offs for various radio architectures. Analysis and design of receiver and transmitter systems. Radio circuits and baseband issues. Performance evaluation. Project and design work with professional tools.

Teaching and working methods
Lectures, laboratory work, seminars, and project assignment.

Examination

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

Grades are given as ”Fail” or ”Pass”.

Grades
Two grade scale, older version, U, G

Department
Institutionen för systemteknik

Director of Studies or equivalent
Mikael Olofsson

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

Books

Gu, Qizheng, (2005) *RF system design of transceivers for wireless communications* New York : Springer, c2005
ISBN: 0387241612, 0387241620, 9780387241616

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.