

RF System Design

Programme course

12 credits

RF Systemutveckling

TNE062

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

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

RF Electronics, Analog/digital System Design (can be taken in parallel)

Intended learning outcomes

The course aims at giving students the knowledge and readiness to design electronic systems, particularly wireless communication systems. After the course, the student will be able to do the following.

- Analyze different wireless communication systems
- Exemplify different receiver and transmitter architectures
- Calculate basic radio specifications in terms of, gain, noise, signal-to-noise ratio, power
- Describe analog and digital modulation techniques and modulation schemes
- Understand and describe mathematically the relationship between baseband signals and bandpass signals
- Understand and exemplify different synchronization methods circuits and describe their block schema and design criteria
- Design RF circuits and systems using an advanced design tool.
- Measure RF circuits and systems with a spectrum analyzer.

Course content

Period 1 (lectures + lab): Introduction to communication electronics, general signal transmission theory, communication network, overview receiver/transmitter architectures, noise i RF-systems, modulation techniques, analog and digital modulation, baseband and bandpass signals, introduction to antenna theory, RF-circuits, design of RF-circuits and systems.

Period 2 (project work): Communication circuit or system design. System or circuit design in communication electronics. Under the project work, there is the possibility to manufacture the designed RF-circuits as RF-modules and then, to evaluate their performance.

Teaching and working methods

Lectures, lab and project work.

The course runs over the entire spring semester.

Examination

PRA1 Project resulting in a written report and PowerPoint presentation	5 credits	U, G
LAB2 Compulsory written report	2 credits	U, G
TEN1 Written examination by the end of period 1	5 credits	U, 3, 4, 5

Grades

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

Other information

Supplementary courses: Microwave Engineering, Antenna Theory and Techniques

Department

Institutionen för teknik och naturvetenskap

Director of Studies or equivalent

Adriana Serban

Examiner

Adriana Serban

Course website and other links

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

Education components

Preliminary scheduled hours: 70 h

Recommended self-study hours: 250 h

Course literature

Microwave and RF Design of Wireless Systems, David M. Pozar

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://stydokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.