

# Radio Electronics

Programme course

6 credits

Radioelektronik

TSEK02

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 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
- Communication Systems, Master's programme

## 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

Basic knowledge in circuit theory, electronics, and mathematic.

## Intended learning outcomes

The course gives the student basic knowledge in radio electronics. The system perspective is addressed both in the context of traditional radio and today's wireless communication systems. The objectives of the course is that the student will learn operation principles of radio systems and their fundamental limitations. After the course the students should be able to:

- explain the principles of radio transmission and reception

- explain the existing physical and technical limitations of a radio system
- analyze the functionality of radio transmitters and receivers
- calculate basic radio specifications in terms of power, gain, noise and frequency for basic modulation schemes
- explain differences between traditional radio and today's digital radio systems

## Course content

Overview of a traditional radio and today's communication systems. Basic modeling of an RF communication channel. Modulation, detection, and multiple access schemes. Overview of transceiver architectures and operation principles of RF blocks. Limitations due to power, frequency, noise and nonlinear distortions.

## Teaching and working methods

Lectures, tutorials, laboratory work.

## Examination

TEN1	Written Examination	U, 3, 4, 5	4 credits
LAB1	Laboratory Work	U, G	2 credits

## Grades

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

## Other information

Supplementary courses: Radio Frequency Integrated Circuits (TSEK03), Radio Frequency Transceiver Design (TSEK38), VLSI Design Project, CDIO (TSEK06)

## Department

Institutionen för systemteknik

## Director of Studies or equivalent

Tomas Svensson

## Examiner

Ted Johansson

## Course website and other links

<http://www.isy.liu.se/en/edu/kurs/TSEK02/>

## Education components

Preliminary scheduled hours: 44 h

Recommended self-study hours: 116 h

## Course literature

### **Additional literature**

#### **Books**

B. Razavi, (2012) *RF Microelectronics 2*

ISBN: 978-0-13-283941-9

Pearson Education

# 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](http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva).