

**SYLLABUS**

# **Telecommunications Techniques 7.5 credits E7002R**

**Telekommunikationsteknik**

**Course syllabus admitted: Autumn 2012 Sp 1 - Present**

**DECISION DATE  
2012-03-14**

# Telecommunications Techniques 7.5 credits E7002R

## Telekommunikationsteknik

### Second cycle, E7002R

Education level	Grade scale	Subject	Subject group (SCB)
Second cycle	G U 3 4 5	Datorkommunikation	Computer Technology

## Entry requirements

Mathematics 4 (MAM224), Electric Circuit Analysis (SME096), Electronics (SME125), Electronics fk (SME126) or similar qualifications.

## Selection

The selection is based on 30-285 credits

## Examiner

Anita Enmark

## Course Aim

The aim of the course is to extend and deepen the student's knowledge of digital and analogue communication systems with an emphasis on space communications.

On completion of the course the student shall have the skills and knowledge to be able to:

1. Describe an overview of a number of forms of communication system in terms of their topology and uses, and identify the technologies and requirements of the various parts of each of the systems;
2. Perform an analysis on a communication system or part of a communication system to determine items of the performance such as the signal to noise ratio, the bit error rate, the capacity, the link utilization and the link budget;
3. Describe, analyze and make calculations and measurements on transmission media such as lines, optical fibres, waveguides and radio frequency links including antennas;
4. Describe and make calculations and measurements on a number of techniques used to translate signals in the frequency domain, to perform modulation and de-modulation and to form a number of channels through a communication system;
5. Describe some of the protocols used to operate a communication system;
6. Describe a number of methods used for forward and for backward error correction;
7. Cooperate with colleagues in undertaking practical projects and measurements and writing technical reports in English.

## Contents

The course will cover:

1. An overview of communication systems and the problems associated with converting signals into forms suitable for transmission over lines, optical fibres, waveguides and radio frequency links
2. Network topologies and methods of operation
3. Information theory, coding and capacity
4. Frequency translation and modulation theory, methods and systems
5. Noise, noise sources, noise figure, factor and temperature, system values and bit error rate
6. Antenna, various types, arrays, polar diagrams gain
7. Link budgets.

## Realization

Each course occasion's language and form is stated and appear on the course page on Luleå University of Technology's website.

The teaching on the course consists of lectures, demonstrations and practical exercises and technical report writing. The students are also required to write two papers on subjects that form part of the syllabus but are not included in lectures.

## Examination

If there is a decision on special educational support, in accordance with the Guideline Student's rights and obligations at Luleå University of Technology, an adapted or alternative form of examination can be provided. To pass the course the student must have had their practical work, technical reports and papers approved and in combination with the exam mark gained a grade 3 or above.

## Overlap

The course E7002R is equal to R7021R, RYM037

## Literature. Valid from Autumn 2011 Sp 1

Dunlop, J. & Smith, D.G. (2001) Telecommunications Engineering (3rd ed.) Cheltenham, U.K.:Nelson Thornes Ltd. ISBN: 0-7487-4044-9

## Course offered by

Department of Computer Science, Electrical and Space Engineering

## Items/credits

Number	Type	Credits	Grade
0001	Written exam	4.5	G U 3 4 5
0002	Laboratory work	3	U G#

## Last revised

by Jonny Johansson, HUL SRT 2012-03-14

## Syllabus established

The course plan was accepted by the Dept of Space Science 2007-02-28 and remains valid as from H07.