



# IK1330 Wireless Systems 7.5 credits

Trådlösa system

This is a translation of the Swedish, legally binding, course syllabus.

## Establishment

The official course syllabus is valid from the autumn semester 2022 in accordance with head of school decision: J-2022-0646. Decision date: 14/03/2022

## Grading scale

A, B, C, D, E, FX, F

## Education cycle

First cycle

## Main field of study

Electrical Engineering, Technology

## Specific prerequisites

- Knowledge in algebra and geometry, 7.5 higher education credits, equivalent completed course IX1303.
- Knowledge in mathematical analysis, 7.5 higher education credits, equivalent completed course IX1304.
- Knowledge in network and communication, 7.5 higher education credits, equivalent completed course IK1203.

Active participation in a course offering where the final examination is not yet reported in LADOK is considered equivalent to completion of the course. Registering for a course is

counted as active participation. The term 'final examination' encompasses both the regular examination and the first re-examination.

## Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

## Intended learning outcomes

To pass, the student should be able to:

- describe, at a general level, how fading (variation of the field strength of a radio signal) in a radio channel influences link-performance in wireless communication systems.
- dimensioning a radio link in terms of range and channel capacity based on given conditions
- estimate the capacity of a radio network and describe the relation between system capacity, deployment strategy, cost and available spectrum
- describe structure and actors on a telecom market
- explain how multiple access-methods works
- describe at a general level system architecture for different existing systems for wireless communication
- explain, in a wide sense, the environmental and sustainability challenge of the ICT-industry. (Electromagnetic radiation, energy, limited natural resources, environmentally harmful effects)

For higher grades, the student should furthermore be able to:

- explain wave propagation mechanisms and make judgments based on how these mechanisms affect the wave propagation
- Solve a general design problem for the radio links and radio networks by using simple formulas
- In a telecom market, be able to explain, the main actors business model and how they make money
- explain, at a general level, the functionality of different existing systems for wireless communication and compare their capacity, performance and environmental aspects
- Be able to judge the economic and social advantages of providing affordable telecommunication in relation to its environmental effects.

## Course contents

Channel capacity, transmission, multiplexing,

Antennas, wave propagation, spectrum, fading,

Digital modulation, spread spectrum FHSS, DSSS,

Multiple access methods FDMA, TDMA, CDMA, OFDMA,

Error detection and error correcting codes,

Wireless networks using standards for cellular mobile broadband systems, wireless LAN, sensor networks and PAN,

Environmental aspects, social, market and economic factors concerning wireless systems.

## Examination

- SEM1 - Seminars, 1.5 credits, grading scale: P, F
- INL1 - Problem Assignments, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- LABA - Laborative Work, 1.5 credits, grading scale: P, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

## Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.