IK1330 Wireless Systems 7.5 credits

Trådlösa system

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

Establishment

Course syllabus for IK1330 valid from Spring 2016

Grading scale

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

Education cycle

First cycle

Main field of study

Electrical Engineering, Technology

Specific prerequisites

Completed upper secondary education including documented proficiency in Swedish corresponding to Swedish B and English corresponding to English A. For students who received/will receive their final school grades after 31 December 2009, there is an additional entry requirement for mathematics as follows: documented proficiency in mathematics corresponding to Mathematics A. And the specific requirements of mathematics, physics and chemistry corresponding to Mathematics D, Physics B and Chemistry A.

30 HEC in mathematics

7,5 HEC in communication systems

Language of instruction

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

Intended learning outcomes

This course provides an overview of wireless systems. It describes the basic design of radio links and radio networks, and describes the system architecture and function of different existing standards for wireless systems.

To pass, the student should be able to:

- Give an overview how a fading radio channel affects the link performance of wireless communication systems
- Dimensioning a radio link in terms of range and channel capacity based on given conditions
- Explain how multiple access methods works
- Estimate the capacity of a radio network and descibe the relation between system capacity, deployment strategy, cost and available spectrum
- Describe structure and actors of a telecom market
- Give an overview of the system architecture of the various existing wireless communication systems
- Explain, in a wide sense, the environmental and sustainability challange of the ICT-industry. (Electromagnetic radioation, energy, limited natural resources, environmentally harmful effects).

For the highest grade, the student should be able to:

- Explain wavepropagation 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 modeland how the make money
- Given an overview of various existing systems for wireless communications and compare the capacity, performance and environmental aspects of them
- Be able to judge the economic and social advantages of providing affordable telecommunication in relation to its environmental effects.

Fullfiling parts of the learning outcomes of the highest grade results in grades D to B.

Course contents

Channel capacity, transmission, multplexing,

Antennas, wave propagation, spectrum fading,

Digital Modulation, Spread spectrum FHSS, DSSS,

Multiple accesss FDMA, TDMA, CDMA, OFDMA,

Error detection and error correction, Wireless networks using standards for cellular mobile broadband systems, wireless LAN, sensornetworks and PAN,

Environmental, social, market and economic effects of wireless systems.

Course literature

Wireless Communications & Networks, Beard, Cory and William Stallings Upplaga: 1:a, Förlag: Pearson: 2015 or similar book.

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.