IK2510 Wireless Networks 7.5 credits

Radionät

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

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

Establishment
Course syllabus for IK2510 valid from Spring 2019

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

Education cycle
Second cycle

Main field of study
Electrical Engineering

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

Intended learning outcomes
Upon the completion of the course, the student should be able to:
• apply the most important techniques for analyzing the capacity, design, resource management, and performance of Wireless Networks

• use and modify simulation tools for performance evaluation of Wireless Systems (e.g. RUNE-TDMA and RUNE-CDMA)

• read the current literature at both conference and journal levels.

Course contents

This course provides a comprehensive and systematic introduction to the theory and practice of mobile data networks. Covering basic design principles as well as analytical tools for network performance evaluation, and with a focus on system-level resource management, you will learn how state-of-the-art network design can enable you flexibly and efficiently to manage and trade-off various resources such as spectrum, energy, and infrastructure investments. Topics covered range from traditional elements such as medium access, cell deployment, capacity, handover, and interference management, to more recent cutting-edge topics such as heterogeneous networks, energy and cost-efficient network design, and a detailed introduction to LTE (4G).

Fundamentals of wireless area communication systems: Structure and functional blocks.

Performance measures: coverage, quality, capacity, Traffic models. Quality of Service (QoS) classes and negotiation.


Scheduling: Issues in Wireless Scheduling, Wireless Scheduling and Capacity Region, Round Robin Scheduling, Max Throughput Scheduling, Proportional Fair Scheduling, Max-Min Scheduling, Max Utility Scheduling, Scheduling in OFDMA Systems.


**LTE**: Physical Layer for Downlink, Physical Layer for Uplink, Interference Management in LTE.

**Wireless Infrastructure Economics**: Communication Infrastructures, Wireless access economics, Spectrum cost and regulation, Affordable wideband wireless access.

### Specific prerequisites
IK2507 Wireless Communication Systems 7,5 hp
IK2508 Wireless Transmission Techniques 7,5 hp
or equivalent courses.

Documented proficiency in english B or equivalent.

### Course literature

### Examination
- **LABA** - Laboratory work, 1.0 credits, grading scale: P, F
- **TENA** - Examination, 6.5 credits, grading scale: A, B, C, D, E, FX, 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.

### 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.