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 Autumn 2010

Grading scale

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

Education cycle

Second cycle

Main field of study

Electrical Engineering

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.

Language of instruction

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

Intended learning outcomes

Upon comletion of the course, the student should be able to:

- apply the most important techniques for analyzing the capacity and Quality-of-Service of wireless networks
- use and modify simulation tools for performance evaluation of Wireless Systems (e.g. RUNE-TDMA and RUNE-CDMA)
- read the current litterature at both conference and journal levels.

Course contents

- Fundamentals of wireless area communication systems: Structure and functional blocks. Performance measures: coverage, quality, capacity, Traffic models. Quality of Service (QoS) classes and negociation. Introduction to the Radio Resource Management (RRM)-problem.
- Link performance in interference limited systems: Multiple Access Communication Systems. Orthogonal, non-orthogonal signalling.
- Cellular system concepts: Cochannel interference, spectrum reuse, simple capacity analysis. blocking, combined outage/blocking analysis. Advanced cell structures: Sectorization, Hierarchical systems (macro/micro/pico-cells) adaptive antennas, SDMA.
- Simulation tools for cellular network analysis.
- Handover and Mobility Management.
- Dynamic Resource Allocation.
- Transmitter Power Control: Optimal power control C/I balancing, Removal/Admission strategies, Multirate power control.
- Frequency Hopping Systems: Random Resource Allocation.
- DS-CDMA systems: Capacity calculations, Power control, Soft-Handoff, Dynamic Cell Management.
- Wireless broadband access systems: IP access, packet bases systems, Ex: HSPA, LTE.
- Mesh networks, sensor networks, ALOHA, Multihop.
- Some fundamentals of wireless infrastructure economics.

Course literature

Radio Resource Management for Wireless Networks, Jens Zander and Seong-Lyun Kim

Upplaga: Förlag: Artech House, Inc År: 2001

Examination

- LAB1 - Laboratory Work, - credits, grading scale: P, F
- TEN1 - Examination, 7.5 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.

A number of homework problems are handed out during the course.

Results from the homework problems will score points on the first written exam. All problems solved in a satisfactory manner will alone (just barely) render the student the grade passed (E) in the written exam. The student may still take the written exam to get a higher grade.

Other requirements for final grade

Grade scale for the course:

A/B/C/D/E/Fx/F

LAB1 - Laboratory Work, 0.0 HEC, grade scale: P, F

TEN1 - Examination, 7,5 HEC, grade scale: A, B, C, D, E, FX, F

a) Passed written exam.

b) Passed Lab course.

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.