



IK2504 Wireless Access Protocols 6.0 credits

Wireless Access Protocols

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 IK2504 valid from Autumn 2008

Grading scale

P, F

Education cycle

Second cycle

Main field of study

Electrical Engineering

Specific prerequisites

120 university credits (hp) in engineering or natural sciences and documented proficiency in English corresponding to English A.

Language of instruction

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

Intended learning outcomes

The course aims at providing the students the fundamentals packet oriented wireless communication systems. After successful completion of the course the student should be able to perform performance analysis of media access protocols, in particular in packet radio systems with specific emphasis on radio layer aspects as fading, interference and power capture phenomena are treated.

Course contents

1) Wireless packet transmission: Fading channels, ARQ, HARQ, Energy efficient protocols, Link adaptation & scheduling, Throughput/Delay tradeoff. 2) Multiple access protocols: Introduction, Models & Classification 3) Conflict free access schemes, FDMA/TDMA-systems, Generalized TDMA, Dynamic conflict free access: Reservation schemes, Polling. Bluetooth. 4) ALOHA-type Protocols: Pure & slotted Aloha. Finite & infinite user populations. Delay & Stability analysis. Impact of radio channels (errors, fading, capture). Multiple access in cellular systems. 5) Carrier Sense type Protocols: Persistence, slotted/pure CSMA. CSMA/CD. Hidden terminals. IEEE 802.11 Hiperlan/2. 6) Collision Resolution Protocols: Tree & stack protocols, limited sensing. 7) Multihop radio networks: multiple access in multihop systems. STDMA, Multihop CSMA. Multihop routing schemes.

Disposition

The course is an ASP course in the GST curriculum. It is suitable as a first postgraduate (Ph.D) course for students in the telecommunication graduate school and as an advanced course in the 4th year of the M.Sc program for students considering to join the PhD program.

Examination

- ANN1 - Homework Problems, 6.0 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.

Other requirements for final grade

1. **Either**
* adequate solution of homework problems at seminar,

or

*** written exam**

2. (4 ECTS credits) Individual project report

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.