

SYLLABUS
LOGIC IN COMPUTER SCIENCE
2012

Basic data

Subject code: INGK401E	Classes/week: 2+2
Subject title: Logic in Computer Science	ECTS Credit points: 5
Semester: . . . 1	Prerequisites: none
Type: Lecture/seminar	

Topics

Propositional logic – syntax, semantics. The language of first-order-logic, terms, formulas. Free variables and bounded variables, bounded variables renaming, quantifier-free formula. Term substitution. Interpretations, truth assignments. Satisfiability, logically valid formulas and contradictions. Logical equivalences. Conjunctive and disjunctive normal forms, prenex normal forms. Logical consequences. Gentzen sequents, Gentzen calculus, soundness, completeness.

Seminars (practical part)

The signature prove that you successfully pass all of the 3 requirements of the seminar.

1. ATTENDANCE. You have to participate on the seminars, that is why we use an attendance register on the seminars.
2. WEEKLY TEST. You have to get at least 36 points from the weekly test. For this purpose, we organize short tests in the first 10-15 minutes in 10 seminar. Each test contains questions about definitions for 6 points.

It is permitted to write a test in the beginning of the examination period for additional 18 point (if it is necessary). This test contains questions for 24 points, but your first 6 point can not increase your result.

3. PRACTICAL TEST. You have to pass the practical test in the last week of the seminar period. The test contains practical exercises. The successful test must be at least 60%.

It is permitted to repeat the test (if it is necessary) in the beginning of the examination period. In this case, the repeat test must be at least 60%.

The test results can follow in the NEPTUN system.

Lectures (theoretical part)

To successfully pass all of the requirements of the lecture, you have to take the exam. Before you can take the exam, you have to get the signature from the seminar part. The **minimum requirements** on the exam are the following:

1. definitions and theorems (without proving), and
2. conjunctive and disjunctive normal forms and prenex form (all in practice also), and
3. at least one of the following exercises (in zero and first order logic as well):
 - syntactical and semantical properties (in practice also), or
 - conclusion checking, or
 - deductions in Gentzen style sequent calculus.

Compulsory/Recommended Readings

- Mendelson, E.: *Introduction to Mathematical Logic*, Chapman & Hall, 1997.
- Gabbay, D. M., Abramsky, S., Maibaum, T. S. E.: *Handbook of Logic in Computer Science*, Oxford University Press, 2000.