STUDY SUBJECT PROGRAMME

Subject code	Subject group	Credits	Subject certified	Subject certification valid until	Reg. No.
INF5003		6	2012-06-01	2014-06-01	

Course type (compulsory or optional)	**Compulsory**
Course level (study cycle)	**Master**
Semester the course is delivered	**1**
Study form (face-to-face or distant)	**Face-to-Face**

Title in Lithuanian

FORMALŪS METODAI MODELIAVIME

Title

FORMAL METHODS IN MODELLING

Subject annotation

The course aims to study the theories and techniques used in modelling of information and text based retrieval. It discusses classical and modern techniques of knowledge modelling and their application for information retrieval. Students start from the basic notions and concepts, and finish with the newest challenges in the field.

Necessary background knowledge for the study of the subject

Basic linguistics and mathematics (sets theory, logics, algebra, statistics) knowledge.

Study outcomes

Havingcompletedthiscourse, studentsshouldhavethefollowing competences:

1. Definition and specifics of concurrent software/systems.
2. Theory and application of
   - Process algebras, strong and weak equivalence and bisimulation.
   - LTL (Linear Temporal Logic) and CTL (Computation Tree Logic) temporal logics.
   - Timed automata.
3. Practical systems modelling and analysis skills
   - LTSA tool;
   - SPIN tool;
   - Uppaal tool.
4. Choice of proper modelling tool based on the specific of systems and requirements.

Subject contents

Formal methods. Concurrent systems. Dynamical systems. Process algebras. Weak and strong bisimulation. LTSA tool. Linear temporal logic (LTL) and computation tree logic (CTL). Model checking. Promela and SPIN. Timed automata. Zones and regions. DBM (difference bound matrix). Uppaal tool.

Study hours

Lectures - 45 hours,
Laboratory classes - 15 hours,
Consultations - 4 hours,
Independent- 96 hours.

Evaluation of study results

Midterm exam - 17%, laboratory classes - 33%, final exam - 50% of the final grade.

Literature

1. J. Magee and J. Kramer (2006). Concurrency: state models & Java programs. John Wiley & Sons, Inc.
2. R. Milner (1989). Communication and concurrency. Prentice-Hall, Inc.
3. E. Clarke, O. Grumber, and D. Peled (2001). Model Checking. The MIT Press.
4. J.-P. Katoen (1999). Concepts, Algorithms and Tools for Model Checking. Universität Erlangen-Nürnberg.

G. Holzmann (2006). The Spin Model Checker: Primer and Reference Manual. Addison-Wesley.

Programme prepared by

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