Tárgyleírás

Tárgy neve: Formal semantics L.

Tárgyfelelős neve: Horpácsi Dániel

Tárgyfelelős tudományos fokozata: PhD

Tárgyfelelős MAB szerinti akkreditációs státusza: AT

Az oktatás célja angolul / Aim of the subject:

Knowledge

- Comprehensive and up-to-date knowledge of general mathematical and computing principles, rules, and relationships, particularly in the following areas: logic and their applications; formal models and tools in computing science.
- Comprehensive and up-to-date knowledge and understanding of the general theories, contexts, facts, and the related concepts of IT, particularly in the areas of verification, programming languages, and computing models.
- Knowledge and understanding of the mathematical concepts used in formal semantics definitions and in formal reasoning about programs and programming languages.

Abilities

- To apply their mathematical, computer science and informatics skills in a novel way to solve tasks in IT research and development.
- To formally define simple programming languages and formally reason about program behaviour.

Attitude

- To follow professional and technological developments in their IT field.
- To be committed to having quality requirements met and to analysing them with IT tools.

Az oktatás tartalma angolul / Major topics:

Introduction to concepts and methods used in giving formal definitions to programming languages by defining a small-step, a big-step operational and a denotational semantics for a simple imperative programming language. The fundamentals of fixed-point theory used in denotational semantics. Reasoning about program behaviour and program equivalence by using induction. Equivalence results in the operational and denotational semantics. Implementations of formal semantics in dedicated frameworks and in general-purpose proof assistants.

A számonkérés és értékelés rendszere angolul / Requirements and evaluation:

Exam in the lecture.

Irodalom / Literature:

- Hanne Riis Nielson, Flemming Nielson: Semantics with Applications - An Appetizer (Springer-Verlag London)
- Benjamin C. Pierce et al. Software Foundations, Volume 2: Programming Language Foundations
- Kenneth Slonneger and Barry L. Kurtz: Formal Syntax and Semantics of Programming Languages (Addison Wesley Longman)
- Glynn Winskel: The Formal Semantics of Programming Languages - An Introduction (Foundations of Computing Series, MIT Press)
- John C. Reynolds: Theories of Programming Languages (Cambridge University Press)