Study programmes: Master studies – Mathematics

Course name: 2RM02 – Theoretical Computer Science

Lecturers: Nebojša Ikodinović

Status: Optional

ECTS: 8

Attendance prerequisites: no prerequisite

Course aims: Acquisition of general and specific knowledge of Theoretical Computer Science.

Course outcome: Upon completion of the course, the students have advanced knowledge of Theoretical Computer Science. The students understand the following concepts: recursive functions, decidability, undecidability, computational complexity. The students know fundamental results of Theoretical Computer Science. They will be able to solve problems in the field, and to attend advanced courses in which the acquired concept and techniques should be applied.

Course content: Turing machines, recursive functions and other models of computability. Numberings, universal functions. The Recursion theorems. Church's Thesis. Decidability, undecidability, semi-decidability. Recursive and recursive enumerable sets; the Arithmetical Hierarchy. Computational complexity, complexity classes, P=?NP. Model-theoretical methods in Theoretical Computer Science; diagrams. Syntax forms: Formal specification; Testing and verification, Hoare logic. Relational databases. Fuzzy sets. Fuzzy relational databases.

Literature:

N. Cutland, *Computability: An Introduction to Recursive Function Theory,* Cambridge University Press, 1980;
H. Rogers, *Theory of Recursive Functions and Effective Computability*, MIT Press, 1987;
C. Papadimitriou, *Computational complexity*, Addison-Wesley, 1995;
Z. Ognjanović, N. Krdžavac, *Uvod u teorijsko računarstvo,* Beograd – Kragujevac 2004;
J.D.Monk, *Mathematical Logic*, Springer-Verlag, 1976;
Yu. I. Manin, *A course in mathematical logic. Graduate Texts in Math. vol. 53*, Springer-Verlag, New York, Heidelberg, Berlin, 1977.

Number of hours: 5	**Lectures: 3**	**Tutorials: 2**	**Laboratory: -**	**Research: -**

Teaching and learning methods: Lectures / Tutorials / Project

Assessment (maximal 100 points)

Course assignments	**points**	**Final exam**	**points**
Lectures	-	Written exam	20
Exercises / Tutorials	-	Oral exam	40
Colloquia	20	Written-oral exam	-
Essay / Project	20		