Department: Mathematics and Computer Sciences
Division: Applied Mathematics
Level and Major: Undergraduate

Course Title: Computability Theory
Number of Credits:
Prerequisite: Foundation of Computability Theory
Lecturer:

Course Description: In this course students learn different types of machine turnings. In addition, they understand if the problems are solvable or unsolvable. Finally, they can distinguish between computability and complexity.

Course Goals and Objectives: The student is familiar with the theoretical concepts of computer science and works with its concepts.

Course Topics:

- Understanding Church-Turing thesis (Turing machines as a notion of "general-purpose computers")
- Understanding the concept of undesirability, i.e., when a problem cannot be solved using computers
- How to show undesirability using the concept of problem reduction?
- Complexity Theory
- Complexity classes: how to classify decidable problems based on their time and space requirements
- Complexity classes P and NP, and Intractability (NP-completeness)
- How to prove NP-completeness?
- Space Complexity: NL-completeness and PSAPCE-completeness

Reading Resources:

- Sipser, M. (2003). Introduction to the Theory of Computation. 3th Edition, *ACM Sigact News*, *27*(1), 27-29.
- Cooper, S. Barry. *Computability theory*. CRC Press, 2003.

Evaluation: