COURSE DETAIL

COMPUTABILITY AND COMPLEXITY
Country Denmark
Host Institution University of Copenhagen
Program(s) University of Copenhagen
UCEAP Course Level Upper Division
UCEAP Subject Area(s) Computer Science
UCEAP Course Number 157
UCEAP Course Suffix
UCEAP Official Title COMPUTABILITY AND COMPLEXITY
UCEAP Transcript Title COMPUTABILITY
UCEAP Quarter Units 6.00
UCEAP Semester Units 4.00

Course Description
In computing, there is continual tension between time usage and space usage, and what can be computed and what cannot be computed at all. The purpose of this course is to explore these issues. Topics covered include: regular languages; context-free language; Turing machines; decidability; reducibility; complexity; complexity classes (P, NP, PSPACE, EXPSPACE, L, and NL); intractability. Also covered in this course are: computational models such as finite automata, pushdown automata, and Turing machines, the languages recognized by some of these models, and techniques for showing their limitations, such as the pumping lemmas for regular and for context-free languages; the power and limits of algorithmic solvability, with focus on the computationally unsolvable Halting problem; the reducibility method for proving that additional problems are computationally unsolvable; how to analyze algorithms and their time and space complexity and how to classify problems according to the amount of time and space required to solve them; known computational problems that are solvable in principle but not in practice, i.e., intractable problems. Students obtain the following skills; reading and writing specifications of languages using computational models and grammars; classifying given languages according to type (regular, context-free, etc.) and algorithmic problems according to complexity (time and space); showing the equivalence between certain machine models; presenting the relevant constructions and proofs in writing, using precise terminology and an appropriate level of technical detail. Prerequisites: Basic algorithms and discrete mathematics course(s).

Language(s) of Instruction
English

Host Institution Course Number
NDAA09007U

Host Institution Course Title
COMPUTABILITY AND COMPLEXITY (COCO)

Host Institution Course Details

Host Institution Campus

Science
Host Institution Faculty
Host Institution Degree
Host Institution Department Computer Science
Course Last Reviewed

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