Faculty of Applied Sciences

INGI2123   Calculability and complexity

[30h+15h exercises] 4 credits

This course is taught in the 2nd semester

Teacher(s):   Yves Deville (coord.), Pierre Dupont, Baudouin Le Charlier
Language: French
Level: Second cycle

Aims

- To understand, recognize and identify the limits of computing science
- To understand the foundations, the similarities and differences of the main computability models
- To identify, recognize and understand non computable and untractable problems

Main themes

- Computability : problems and algorithms, computable and non computable functions, reductions, undecidable classes of problems (Rice), fix point theorem, Church-Turing thesis
- Main computability models : Turing machines, recursive functions, lambda calculus, automates
- Complexity theory : complexity classes, NP-completeness, Cook's theorem, how to solve NP-complete problems

Content and teaching methods

see "Main themes"

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

- Prerequisites
This course presupposes the knowledge of material covered in the following course
(1) LINF2121 : Algorithmique et structures de données
- References
(1) Sipser M. Introduction to the Theory of Computation. PWS Publishing Company, 1997
(2) P. Wolper. Introduction à la calculabilité. (2nd edition) InterEditions, 2001.
For more information:
http://www.ucl.ac.be/etudes/cours/ingi2123.htm

Programmes in which this activity is taught

INFO2   Ingénieur civil informaticien
LINF2   Licence en informatique

Other credits in programs

INFO21	Première année du programme conduisant au grade d'ingénieur civil informaticien	(4 credits)	Mandatory
LINF21/GN	Première licence en informatique (informatique générale)	(4 credits)	Mandatory
LINF21/GS	Première licence en informatique (informatique de gestion)	(4 credits)	
MAP22	Deuxième année du programme conduisant au grade d'ingénieur civil en mathématiques appliquées	(4 credits)	
MAP23	Troisième année du programme conduisant au grade d'ingénieur civil en mathématiques appliquées	(4 credits)	
MATH22/G	Deuxième licence en sciences mathématiques	(4 credits)	