Complexity Theory

Course level: Master MLDM **Course code: MLDM** CCT **ECTS Credits: 4**.00

Course instructors: Richard Baron (UJM, Saint- Etienne)

Education period (Dates): 1st semester **Language of instruction:** English

Expected prior-knowledge: Basics on analysis of algorithms, complexity, maths, graph theory.

Aim and learning outcomes:

Theoretical models of computation are introduced. They are used to show that some problems are inherently difficult to solve. The methodology used to prove that a given problem is difficult is presented.

Topics to be taught (may be modified)~30h:

- Formal models of computation: Turing machines, Church-Turing thesis.
- Non-deterministic Turing Machine.
- Classes of complexity : P/NP.
- NP-completeness : definition, methodology, examples.

Teaching methods: Lectures.

Form(s) of Assessment: written exam

Literature and study materials:
Reference books:
- T. Cormen, C. Leiserson, and R. Rivest, "Introduction to Algorithms," The MIT Press, 1990.
- J. Kleinberg and E. Tardos , "Algorithm Design", Pearson International Edition, 2006.
- M. Garey, D. Johnson, "Computers and intractability : a guide to the theory of NP-Completeness", W.H. Freeman, 1979
- D.-Z. Du, K.-I. Ko, "Theory of computational complexity", Wiley-Interscience, 2000

Additional information:

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