**Advanced Theory Of Computation And Computability**

Syllabus

In-depth study of concepts related to computability - Chomsky hierarchy - Turing machines – Computability - Decidability - Nondeterministic automats, recursive function theory - Theory of complexity and complexity classification.

Course Plan

PART I : Guided Lectures delivered by Me (5 weeks): State of the art.

1. Introduction to Challenges in Theoretical Computer Science
2. Reviewing basics of TOC: Automata+Computability +Complexity
3. Chomsky hierarchy
4. Recognizability Vs Decidability
5. Complexity

PART II : Students prepare presentations on two topic (5 weeks) from the following :

1. The L-machines ( James Ladyman (theory) + Neal G. Anderson (implementation): What does it mean to say that a physical system implements a computation?

2. Kolmogorov complexity and Solomonoff’s theory of inductive inference applied to Turing Machines. (Soler-Tuscano et al., 2014)

3.Infinite time TMs of Hale.

4. Quantum computers and eras ability (Neal Anderson)

PART III: student selects a computational challenge and contributes to it (Expected publication within 4 weeks.

Evaluation:

Paper 40%

Seminars 30%

End of semester written exam 30%