Course Syllabi

1. TICS-00069 THEORY OF COMPUTATION
2. 96 credits hours.
3. Bibliography
   - Introducción a la teoría de autómatas, lenguajes y computación, HOPCROFT, John; MOTWANI, Rajeev; ULLMAN, Jeffrey D., 2002
   - Introduction to the Theory of Computation, Sipser, M., 2013
   - A Practical Guide to the Theory of Computation. What Can Be Computed?, MacCormick J., 2018
   - Teoría de autómatas, lenguajes y computación, John E. Hopcroft Rajeev Motwani Jeffrey D. Ullma, 2003
4. Specific Course Information
   a. In this course we study theoretical - mathematical models that are the basis of the design of the current computing machines. In addition, the analysis of abstract machines allows to define the limits of the ability to compute and classify problems according to various characteristics. It is studied on logics and formal languages and, its relationship with software programs.
   b. Prerequisites:
      - MAES-00126 DISCRETE MATHEMATICS
5. Learning Objectives of the Course
   a. To know the Theory of Computing to understand the capabilities and limitations of computers when solving problems.
      - to know the theory of automata and to use it for the design of automata machines
      - to know and use formal languages
      - to know the fundamental concepts of the theories of computability and complexity
   b. Learning Outcomes
      - Before the intercycle examination, the student knows the concept of a computational model
      - At the end of the course, the student identifies the type of machine
      - Before the intercycle exam, the student knows, designs and employs finite automatons
      - At the end of the course, the student knows and uses formal languages and grammars
      - At the end of the course, the student knows and uses formal languages and grammars
      - At the end of the course, the student, knows and employs non-deterministic and stacked finite automatons.
      - At the end of the course, the student knows and applies theorems related to automaton design
      - At the end of the course the student knows and applies the concepts related to a turing machine
      - At the end of the course, the student identifies the type of machine
      - Before the intercycle exam, the student knows, designs and employs finite automatons
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- At the end of the course the student knows and applies the concepts related to a turing machine
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- At the end of the course, the student identifies the type of machine
- At the end of the course, the student knows the concept of algorithm and computation
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6. Course Topics

- Introduction
- Languages and grammars
- Finites deterministic automate
- Non-deterministic and battery automates
- The turing machine
- Basic concepts on complexity and decibility