Global Learning Semesters
Course Syllabus
Course: COMP-305 Theory of Computation
Department: Computer Science
Host Institution: University of Nicosia, Nicosia, Cyprus

Course Summary		
Course Code	**Course Title**	**Recommended Credit Hours**
COMP-305	Theory of Computation	3
Semester Offered	**Contact Hours**	**Prerequisites**
Please contact us	42-45	MATH-201, COMP-301
Department	**Level of Course**	**Language of Instruction**
Computer Science	Upper Division	English

Course Description

This course introduces the student to the basic theory of formal methods of computation, based on automata, Turing machines, grammars and languages. It provides the student with the basic knowledge on computability theory, P and NP complexity classes, and the NP-completeness problem. It also prepares students for advanced courses in algorithm design, parallel computing and artificial intelligence and makes them capable of using advanced techniques for solving problems which arise on complexity and designing of algorithms.

Prerequisites

MATH-201, COMP-301

Topic Areas

1. Automata and Languages

a. Finite automata, nondeterminsm, regular expressions, no regular languages.
b. Context-free languages, pushdown automata, non-context -free languages.

2. Computability Theory

a. Turing machines, variants of Turing machines and Church's thesis.
b. Decidability, reducibility and unsolvable decision problems.
c. The recursion theorem and decidability of logical theories.

3. Complexity Theory

a. The P and NP complexity classes.
b. NP-completeness, the Cook-Levin theorem and applications.

Readings and Resources

Required Textbook

- Harry Lewis, Christos Papadimitriou, “Elements of the theory of Computation”, Prentice Hall, 2nd edition 1997, ISBN: 0132624788.

Recommended Reading

- Christos Papadimitriou, “Computational Complexity”, Addisson Wesley Pub.Company, 1st Edition, 1993, ISBN: 0201530821.
- Michael Sipser, “Introduction to the theory of Computation”, Brooks Cole, 1st edition, 1996, ISBN: 053494728.
- John Hopcroft, Jeffrey Ullman, “Introduction to Automata Theory, Languages and Computation”, Addison-Wesley, 1973.