

**Department of Computer Science and Engineering
National Institute of Technology Calicut**

Tentative Course Details : Monsoon 2012
CS3001 Theory of Computation

Course:

Code : CS3001
Title : Theory of Computation
Lecture Hours : Tue: 11.15 am - 12.15 pm, Wed: 08.00 am - 09.00 am, Thu: 02.00 pm - 3.00 pm,
Fri: 09.00 am - 10.00 am
Room : A Batch : ELHC 402, B Batch : ELHC 403

Instructors:

Name	: Lijiya A	Saleena N
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Course Objective:

To introduce the students to models of computation, formal languages, computability theory and complexity theory.

References:

- M. Sipser, *Introduction to the Theory of Computation*, Thomson, 2001.
- C. H. Papadimitriou., *Computational Complexity*, Addison Wesley, 1994.
- Jerome Keisler H. Joel Robbin, *Mathematical Logic and Computability*, McGraw-Hill International Editions, 2000.
- C. H. Papadimitriou, H. Lewis, *Elements of Theory of Computation*, Prentice Hall, 1981.
- J. E. Hopcroft R. Motwani and J. D. Ullman, *Introduction to Automata Theory, Languages and Computation*, Addison Wesley, 3/e, 2006.
- J. C. Martin, *Introduction to Languages and the Theory of Computation*, Mc Graw Hill, 2002.
- M. R. Garey and D. S. Johnson. *Computers & Intractability*, W. H. Freeman & Co., San Francisco, 1979.
- S. M. Srivastava, *A Course on Mathematical Logic*, Springer, 2008.

Grading: Exams and Assignments:

Mid-Term Exam I : 15%
Mid-Term Exam II : 15%
Assignments : 20%
Final Exam : 50%

Course Schedule:

	Evaluation	Topic
Week 01		Basic Concepts of Languages, Automata and Grammar.
Week 02		Regular Languages, Regular Expression, Finite Automata, Equivalence
Week 03		Myhill Nerode Theorem and DFA State Minimization
Week 04		Pumping Lemma and Proof for Existence of Non-Regular Languages
Week 05		Context Free Languages
Week 06	Midterm Exam I	
Week 07		Context Free Languages, CFL-PDA Equivalence
Week 08		Pumping Lemma: Proof for Existence of Non-Context Free Languages CYK Algorithm, Deterministic CFLs
Week 09		Turing Machines: Recursive & Recursively Enumerable Languages
Week 10		Universality of Turing Machine, Church Thesis, Chomsky Hierarchy
Week 11		Undecidability, Reducibility
Week 12		Recursive & Recursively Enumerable Sets, Rice Theorems
Week 13	Midterm Exam II	
Week 14		Recursion Theorem, Turing Reducibility, Hierarchy Theorems
Week 15		Complexity: P, NP, NP Completeness
Week 16		PSPACE and Log Space
Week 17		Logic: Propositional Logic, Compactness, Decidability, Resolution

Grading: Policies:

- Grading will be relative.
- Even though the grading will be relative here is a tentative grade distribution:
90-100: S; 80-89: A; 70-79: B; 60-69: C; 50-59: D; 40-49: E; <40: F.
- All issues regarding valuation of exams must be resolved within one week after the marks are announced.

Standard of Conduct:

Each student is expected to adhere to high standards of ethical conduct, especially those related to cheating and plagiarism. Any submitted work MUST BE an individual effort. Any academic dishonesty will result in zero marks in the corresponding exam or evaluation and will be reported to the department council for record keeping and for permission to assign F grade in the course. The department policy on academic integrity can be found at: <http://cse.nitc.ac.in/sites/default/files/Academic-Integrity.pdf>