INTRODUCTION TO AUTOMATA, LANGUAGES AND COMPUTATION

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INTENDED AUDIENCE : Computer Science
INDUSTRY SUPPORT : Software

COURSE OUTLINE :

Automata, Languages and Computation have been an important part of the curriculum in computer science depart-ment for several decades. The automata theory is the study of abstract machines and their application in solving computational problems. Automata is a major part of this course, and is explained elaborately throughout in easily comprehensible ways. Besides providing students with a detailed introduction to the theories related to computer science, this course also fully covers mathematical preliminaries which are essential to computation.

ABOUT INSTRUCTOR :

Prof. Sourav Mukhopadhyay is an Associate Professor at Indian Institute of Technology Kharagpur. He has completed his B.Sc (Honours in Mathematics) in 1997 from University of Calcutta, India. He has done M.Stat (in statistics) and M.Tech (in computer science) from Indian Statistical Institute, India, in 1999 and 2001 respectively. He worked with Cryptology Research Group at Indian Statistical Institute as a PhD student and received his Ph.D. degree in Computer Science from there in 2007. He was a Research Assistant at the Computer Science department of School of Comput-ing, National University of Singapore (NUS). He visited InriaRocquencourt, project CODES, France and worked as a post-doctoral research fellows at the School of Computer Engineering, Nanyang Technological University (NTU), Singapore. He was a post-doctoral research fellows and a part time Lecturer with School of Electronic Engineering, Dublin City University (DCU), Ireland.

COURSE PLAN :

Week 1 : Finite automata and regular languages
Week 2 : Regular expressions
Week 3 : Equivalence of DFA and NFA
Week 4 : Minimization of finite automata
Week 5 : Pumping lemma and its application
Week 6 : Context-free grammars and context-free languages Chomsky normal form, closure properties
Week 7 : Chomsky normal form, closure properties
Week 8 : Push down automata
Week 9 : Computability
Week 10 : Turing machines and variants
Week 11 : Time complexity of Turing machines
Week 12 : P and NP, NP- completeness