



INTRODUCTION TO AUTOMATA, LANGUAGES AND COMPUTATION

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TYPE OF COURSE : Rerun | Core | UG/PG
COURSE DURATION : 12 weeks (18 Jan'21 - 09 Apr'21)
EXAM DATE : 25 April 2021

INTENDED AUDIENCE : Computer Science

COURSE OUTLINE :

Automata, Languages and Computation have been an important part of the curriculum in computer science department 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 :

Dr. 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 Computing, 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 01** : Finite automata and regular languages
- Week 02** : Regular expressions
- Week 03** : Equivalence of DFA and NFA
- Week 04** : Minimization of finite automata
- Week 05** : Pumping lemma and its application
- Week 06** : Context-free grammars and context-free languages
- Week 07** : Chomsky normal form, closure properties
- Week 08** : Push down automata
- Week 09** : Computability
- Week 10** : Turing machines and variants
- Week 11** : Time complexity of Turing machines
- Week 12** : P and NP, NP- completeness