Devi Ahilya University, Indore, India Institute of Engineering & Technology				BE III Year (Computer Engineering)					
Subject Code & Name	**Instructions Hours per Week**			**Marks**					
3CO201 **Theory of Computation**	**L**	**T**	**P**		**TH**	**CW**	**SW**	**PR**	**Total**
	4	**--**	**--**	**Max**	**100**	**50**	**-**	**-**	**150**
Duration of Theory Paper: 3 Hours				**Min**	**35**	**25**	**-**	**-**	**60**

Course Objectives: - To familiarize students about theoretical & mathematical aspects of computer science and making their problem solving thinking stronger.

Prerequisite: Discrete Structures, Applied Mathematics.

COURSE OF CONTENT

UNIT I
Introduction to Formal Languages, Grammar and Automata; Finite State Machines- DFA & NDFA; Regular Expressions; Properties of Regular Languages; Pumping Lemma.

UNIT II
Chomsky's Hierarchy; Context Free Languages & Grammars; Recognition, Translation and Parsing; Normal Forms of CFG; CKY and Earley's Algorithm.

UNIT III
Pushdown Automata; PDA and CFG; Nondeterministic PDA, Properties of CFLs; Pumping Lemmas; Turing Machines- TM as Language Acceptor, Transducer and Problem Solver.

UNIT IV
Predicate Calculus- Syntax and Wffs; Models of Interpretation and Semantics- Horn and Ground Clauses; Resolution Techniques.

UNIT V
Petri nets and its Applications; Programming Language Semantics; Verification of Programs; Formal and Type Systems; Computational Complexity. Complexity of Computing using HLL programs and Automata models; Formal Semantics of programming Languages; Verification of Programs.

BOOKS RECOMMENDED:

[1] D Mandriolli, C Ghezzi, "*Theoretical Foundation of Computer Science*, John Wiley, 1987.
[2] Zohar Manna, *Mathematical Theory of Computation*, McGraw Hill, 1977.
[3] Cohen, *Introduction to Computer Theory*, John Wiley, 1990.
[4] Moll, Arbib, Kfoury, *Introduction to Formal Language Theory*, Springer Verlog,1990.
[5] P Linz, *An Introduction to Formal languages and Automata*, 3/e, Narosa Pub. 2003.
[6] J. Martin, *Introduction to Languages and the Theory of Computation*, 3/e, Tata McGraw Hill, 2005.
[7] J.Hopcroft and J.D. Ullmam. " *Introduction to Languages*, Automata and Computation Addition Wesley, 1981.
[8] Lewis and Papadmitrou, "*Element of Theory of Computation*," Printice Hall, 1981.