VARDHAMAN COLLEGE OF ENGINEERING, HYDERABAD

Autonomous Institute, Affiliated to JNTUH

III B.TECH I SEMESTER

COURSE STRUCTURE

A5602– FORMAL LANGUAGES AND AUTOMATA THEORY

(PROFESSIONAL ELECTIVE-I)

3. Course Syllabus

FINITE AUTOMATA (FA) -Introduction, model and behavior, Deterministic Finite Automata (DFA) - Formal definition, simpler notations (state transition diagram, transition table), language of a DFA. Nondeterministic Finite Automata (NFA)-definition of NFA, language of an NFA, Equivalence of Deterministic and Nondeterministic Finite Automata, Applications of Finite Automata, Finite Automata with Epsilon Transitions, Eliminating epsilon transitions, Minimization of Deterministic Finite Automata, Finite automata with output (Moore and Mealy machines)

REGULAR EXPRESSIONS (RE) -Introduction, algebraic laws for Regular Expressions, Finite Automata and Regular Expressions-from DFA's to Regular Expressions, converting Regular Expressions to Automata, applications of Regular Expressions. Proving languages to be non-regular -Pumping lemma, applications. Closure properties of regular languages,

CONTEXT FREE GRAMMARS (CFG) -Formal definition, sentential forms, leftmost and rightmost derivations, the language of a CFG. Derivation tree or parse tree, Ambiguous Grammar. SIMPLIFICATION OF CFG -Removing useless symbols, Null (epsilon) -productions and unit productions. Normal forms –CNF, GNF. Proving that some languages are not context free -Pumping lemma for CFLs, applications. Closure properties of CFLs.

PUSHDOWN AUTOMATA (PDA) -Definition of the Pushdown Automata, the languages of PDA (acceptance by final state and empty stack), Equivalence of PDA's and CFG's-CFG to Pushdown Automata, Pushdown Automata to CFG. Deterministic PDA.

TURING MACHINES (TM) -Formal definition and behavior, languages of a TM, TM as accepters, computable functions, Types of TMs. RECURSIVE AND RECURSIVELY ENUMERABLE LANGUAGES (REL) -Properties of recursive and recursively enumerable languages, universal Turing machine, the Halting problem, undecidable problems about TMs. COMPUTABILITY THEORY - Context sensitive language and linear bounded automata (LBA), Chomsky hierarchy, post's correspondence problem (PCP).