GUJARAT TECHNOLOGICAL UNIVERSITY

B. E. SEMESTER: VI

Computer Engineering /Computer Science & Engineering

Subject Name: **Theory of Computation**
Subject Code: **160704**

Teaching Scheme				Evaluation Scheme		
Theory	**Tutorial**	**Practical**	**Total**	**University Exam (Theory) (E)**	**Mid Sem Exam (Theory) (M)**	**Practical (I)**
3	0	0	3	70	30	50

Sr. No	Course Content	Total Hrs.
1.	**Review Of Mathematical Terms And Theory:** Basic Mathematical Notations And Set Theory, Logic Functions And Relations, Language Definitions, Mathematical Inductions And Recursive Definitions	04
2.	**Finite Automata:** Deterministic And Non Deterministic Finite Automata, $\wedge$-Transitions, Conversion From NFA To DFA, Kleene's Theorem, Regular And Non Regular Languages	12
3.	**CFG (Context Free Grammar):** Introduction To CFG, CFG And Known Languages, Unions Concatenations And *'S Notations And CFL, Derivations Of Trees And Ambiguity, Unambiguous CFG And Algebric Expressions, Normal Forms And Siplified Forms	09
4.	**Pushdown Automata, CFL and NFL:** Introduction To PDA, Definition, DPDA, PDA Corresponding To CFG, CFG Corresponding To PDA, Introduction To CFL, Intersections And Complements Of CFL, Decisions Problems And CFL	09
5.	**Turing Machines, Recursive Language:** Model Of Computation And Church Turning Thesis, Definition Of Turing Machine, Tm And Language Acceptors, Variations Of Tm, Non Deterministic Tm, Universal Tm, Enumerable And Language, Recursive And Non Recursive Enumerable	05
6.	**Computation Functions, Measuring, Classifications And Complexity:** Primitive Recursive Functions, Halting Problem, Recursive Predicates And Some Bounded Operations, Unbounded Minimizations And μ-Recursive Functions, Godel Numbering, Computable Functions And μ-Recursive, Numerical Functions	05

7.	**Tractable And Intractable Problems:** Growth Rate And Functions, Time And Speed Complexity, Complexity Classes, Tractable And Possibly Intractable Problems, P And Np Completeness, Reduction Of Time, Cook's Theorem, Np-Complete Problems	04

Text Book:

1. Introduction To Languages And Theory Of Computation By John C. Martin, Third Edition,TMH.

Reference Books:

1. Automata Theory, Languages and Computation, Hopcroft, Motwani, Ullman, Pearson Education
2. Theory of automata, Langusges and computation, Kumar, McGraHill
3. The Theory of Computation, Moret, Pearson Education
4. Introduction to Computer Theory, Cohen, Wiley-India