

Theory of computation BEG274CO

Year: III

Semester: II

<u>Teaching Schedule</u>			Examination Scheme				
Hours/Week							
Theory	Tutorial	Practical	Internal		Final		Total
3	1	-	Theory	Practical	Theory	Practical	100
			20	-	80	-	

Course objectives

To provide the knowledge of automata, and to apply the concept of Context free language, and complexity theory

- 1. Finite automata and regular expression 7 hours**
 - 1.1 Review of set theory
 - 1.2 Finite state system
 - 1.3 Non-deterministic finite automata
 - 1.4 NFA to DFA Conversion
 - 1.5 Regular expressions
 - 1.6 Arden's Theorem

- 2. Properties of regular sets 4 hours**
 - 1.1 The pumping lemma for regular sets
 - 1.2 Closure properties of regular sets
 - 1.3 Decision algorithms for regular sets

- 3. Context-free grammars 6 hours**
 - 3.1 Derivative trees
 - 3.2 Simplification of context-free grammars.
 - 3.3 Normal forms

- 4. Pushdown automata 4 hours**
 - 4.1 Introduction
 - 4.2 Pushdown automata and context-free grammars.

- 5. Properties of context-free languages (CFL) 6 hours**
 - 5.1 The pumping lemma for CFL's
 - 5.2 Closure properties of CFL's
 - 5.3 Decision algorithms for CFL's

- 6. Turing Machines: 5 hours**
 - 6.1 Computable languages and functions.

- 6.2 Church's hypothesis
- 7. Undecidability** **5 hours**
- 7.1 Properties of recursive and recursively languages.
- 7.2 Universal Turing machines and undecidable problem.
- 7.3 Recursive function theory.
- 8. Computational complexity theory** **4 hours**
- 9. Intractable problems** **4 hours**
- 9.1 Computable languages and functions
- 9.2 NP-complete problems

References

1. R. McNaughton, "*Elementary Computability, Formal Languages and Automata*", Prentice Hall of India.
2. H.R. Lewis, and C.H. Papadimitriou, "*Element of the theory of Computation*", Eastern Economy Edition, Prentice Hall of India.
3. E. Engeler, "*Introduction to the Theory of Computation*", Academic Press.

Marks Distribution

Chapter	Hrs	Marks
1	7	12
2	4	8
3	6	10
4	4	8
5	6	10
6	5	8
7	5	8
8	4	8
9	4	8
Total		80