CMP 224.3 Theory of Computation (3 – 1 – 0)

	Theory	Practical	Total
Sessional	50	-	50
Final	50	-	50
Total	80	-	100

Course Objectives:

To provide the knowledge of automata, context free language, and complexity theory.
Course Contents :

1. **Finite Automate and Regular Expression** **(5hrs)**

   Finite state system, Non-deterministic finite automata, Regular expression.

2. **Properties of Regular Sets** **(4hrs)**

   The pumping lemma for regular sets, Closure properties of regular sets, Decision algorithms for regular sets.

3. **Context-free Grammars** **(8hrs)**

   Derivate trees, Simplification of context-free grammars, Normal forms.

4. **Pushdown Automata** **(4hrs)**

   Pushdown automata and context-free grammars.

5. **Properties of Context –free Languages (CFL)** **(6hrs)**

   The pumping lemma for CFL's, Closure properties of CFL's, Decision algorithms for CFL's.

6. **Turing Machines** **(5hrs)**

   Computable languages and functions, Church's hypothesis.

7. **Undecidability** **(5hrs)**

   Properties of recursive and recursively languages, Universal turing machines and undecidable problem, Recursive function theory

8. **Computational Complexity Theory** **(4hrs)**

9. **Intractable Problems** **(4hrs)**

Reference Book:

1. R. Mc Naughton, *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.