## COURSE  PLAN

**NAME OF THE DEPARTMENT: BCA/IT**

**NAME OF THE FACULTY:**      Prof. Saroj Kumari

**ACADEMIC SESSION:**      2023-24

**YEAR:**      2024

**PROGRAMME:**      BCA & B.Sc. (IT)

**SEMESTER:**      Sem-V (BCA) & Sem-IV (B.Sc. (IT)

**COURSE TYPE:**      Core

**COURSE NAME:**      Theory of Computation

**COURSE CODE:**      C 12 (BCA) & C 8(B.Sc. (IT))

**TOTAL  CREDIT:**      6

## PROGRAMME OUTCOMES (PO):

**PO1: Scientific & Computational Knowledge: -** Apply the information on scientific & computational ideas, software engineering and innovation basics.

**PO2: Problem Analysis, Design & Implementation: -** Identify, formulate and analyze real world problem. Design solution for Software, Hardware & Networking problems and implementation using Software & Network tools.

**PO3: Modern tool usage**: - Ability to select modern computing tools, skills and techniques necessary for innovative software solutions.

**PO4: Project Management:** -Comprehend Software Engineering and Technology standards and apply these to prepare own project and system as a part and pioneer in a group.

**PO5: Career Development & Entrepreneurship:** Classify opportunities, private enterprise dream and use of original thoughts to build worth and means for the betterment of the human being and the world.

**PO6: Communication:** Communicate effectively on computational & information Technology activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

**PO7: Ethics:** Ability to apply and commit professional Ethics, cyber regulations & control on software piracy in a global economic environment.

**PO8: Preparing students for future aspects**: Building and improving their creativity, social awareness, and general knowledge.

**PO9: Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological changes.

## PROGRAMME SPECIFIC OUTCOMES (PSO):

**PSO1:** An ability to apply technical comprehension in varied areas of Computer Applications and experience a conducive environment in cultivating skills for thriving career and higher studies.
**PSO2:** Understand the concept of Programing logic, Web designing logic, Signal processing, Image processing, Mobile Applications, Multimedia Media.

**PSO3:** Develop competencies in various disciplines of technologies such as Server-side Web applications, computer networking, software engineering, database concepts and programming.

## A.     COURSE OUTCOMES (COs):

**CO1:** To use & understand the basic concept of  Alphabets, Strings, language & basic operation on Language.

**CO2:** Demonstrate advance knowledge of formal Computation & its relationalship to language.

**CO3:** To Design Finite Automata's for different Regular Expressions and Languages.

**CO4:** To Construct context free grammar for various languages.

**CO5:** Recognise and comprehend formal reasoning about languages.

**CO6:** To solve various problems of applying normal form techniques, push down automata and Turing Machines.

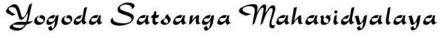**CO7:** To participate in GATE, UGC-Net and other competitive examinations.

## COURSE TEACHING AND LEARNING ACTIVITIES

### A. PEDAGOGY
   i.     **Whiteboard**         √
   ii.    **Flipped Class**      √
   iii.   **PPT**                √

### B. COURSE COMPLETION PLAN

| UNIT | NO. OF LECTURES | | TEST | QUIZ | ASSIGNMENT |
|------|--------|---------------------|------|------|------------|
|      | **THEORY** | **PRACTICAL/TUTORIAL** |      |      |            |
| 1    | 08     | 3- Tutorial         |      | √    | √          |
| 2    | 10     | 3- Tutorial         |      |      | √          |
| 3    | 09     | 3- Practical,  2- Tutorial |  √ |      | √          |
| 4    | 08     | 3- Practical,  2- Tutorial |  √ | √    | √          |
| 5    | 10     | 3- Practical,  2- Tutorial |    |      | √          |
| 6    | 10     | 3- Practical,  2- Tutorial |  √ |      | √          |
| 7    | 10     | 3- Practical,  2- Tutorial |    | √    | √          |
| 8    | 10     | 2- Practical,  2- Tutorial |  √ |      | √          |

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**B. COURSE DELIVERY PLAN:**

| UNIT | TOPIC/SUBTOPIC | LECTURE REQUIRED (Theory & Practical) | CO ADDRESSED | ASSIGNMENT/TEST/QUIZ |
|------|----------------|----------------------------------------|--------------|----------------------|
| 1 | Mathematical Preliminaries & Languages | 08 | CO1 | Assignment |
| 2 | Propositions and Predicates | 07 | CO1, CO2 | Assignment & Test |
| 3 | Theory of Automata | 09 | CO3 | Assignment & Test |
| 4 | Formal Languages | 08 | CO3 | Assignment |
| 5 | Regular Set and Regular Grammar | 07 | CO3, | Assignment |
| 6 | Context – free languages | 07 | CO4, CO5 | Assignment & Test |
| 7 | Pushdown Automata | 07 | CO5, CO6 | Assignment |
| 8 | Turing Machine and Linear bounded Automata | 07 | CO5, CO6 | Assignment & Test |

**C. COURSE OUTCOME ASSESSMENT PLAN**

**a. DIRECT ASSESSMENT**

(Please tick the appropriate column)

| COURSE OUTCOME | ASSESSMENT | | | | REMARKS |
|----------------|------|------|---------------|---------------|---------|
| | QUIZ | TEST | MID SEMESTER | END SEMESTER | |
| CO1 | | √ | √ | √ | |
| CO2 | | | √ | √ | |
| CO3 | | √ | √ | √ | |
| CO4 | | | √ | √ | |
| CO5 | | | √ | √ | |
| CO6 | | √ | √ | √ | |
| CO7 | | | | | |

**b. INDIRECT ASSESSMENT (STUDENT SURVEY)**

Rate the following aspects of course outcomes. Use the scale 1-3

| S. No | Course Outcome | 1 | 2 | 3 |
|-------|----------------|---|---|---|
| 1. | CO1 | | | √ |
| 2. | CO2 | | √ | |
| 3. | CO3 | | | √ |
| 4. | CO4 | | | √ |
| 5. | CO5 | | √ | |
| 6. | CO6 | | √ | |
| 7. | CO7 | | | |

1. Average
2. Good
3. Very Good

## D. SUGGESTED READINGS

### a. TEXT BOOKS

➢ M. Sipser - Introduction to the theory of computation, Thomson Learning, 2001.

### b. REFERENCE BOOKS

➢ K.L.P. Mishra- Theory of Computer Science, PHI Publication
➢ J. Martin - Introduction to languages and the Theory of computation, 3rd edition, McGraw Hill, 2002
➢ J. E. Hopcroft, R. Motwani and J.D. Ullman - Introduction to Automata Theory, Languages and Computation, 2nd Edition, Pearson Education, 2001.

### c. VIDEO RESOURCE

➢ https://www.youtube.com/watch?v=dCiZZiqVv9w&list=PLrjkTql3jnm_TWSXXvWX1_jX-L6f1QJSx
➢ https://www.youtube.com/watch?v=58N2N7zJGrQ&list=PLBlnK6fEyqRgp46KUv4ZY69yXmpwKOIev

### d. WEB RESOURCES

➢ https://www.geeksforgeeks.org/theory-of-computation-automata-tutorials/
➢ https://www.javatpoint.com/automata-tutorial
➢ https://www.tutorialspoint.com/automata_theory/index.htm

### e. E-RESOURCES

➢ Notes in the form of PDF share to the Students WhatsApp group.