22CAW02 MATHEMATICAL FOUNDATION OF COMPUTER SCIENCE				
	L	**T**	**P**	**C**
	3	**0**	**0**	**3**

PREREQUISITE : NIL

Course Objective:	• To explore matrices for solving linear systems and transformations, while set theory focuses on understanding sets, their relationships, and operations. • To examine the principles of formal logic, the structure of formal languages and the design and analysis of finite state automata.

Course Outcomes The Student will be able to		**Cognitive Level**	**Weightage of COs in End Semester Examination**
CO1	Apply the knowledge of matrices with the concepts of eigen values to study their problems in data science.	Ap	20%
CO2	Examine the concepts of sets, relation and functions for designing and solving problems.	An	20%
CO3	Apply logical operations and predicate calculus to solve problems in Artificial Intelligence.	Ap	20%
CO4	Analyze the regular expressions, context-free grammars for specific languages in complier design and automata theory.	An	20%
CO5	Determine the logical concepts in engineering design using effective mathematical tool.	An	20%

UNIT I – MATRICES	**(9)**
Characteristics Equations – Properties - Eigen Values and Eigen Vectors - Cayley Hamilton Theorem.	
UNIT II - BASIC SET THEORY	**(9)**
Basic Definitions - Venn Diagrams and Set Operations - Principle of Inclusion and Exclusion - Permutations and Combinations.	
UNIT III – LOGIC	**(9)**
Propositional logic – Logical Connectives – Truth Tables – Normal Forms (Conjunctive and Disjunctive) – Predicate Logic – Universal and Existential Quantifiers – Proof Techniques – Direct and Indirect Method – Proof by Contradiction – Mathematical Induction.	
UNIT IV - FORMAL LANGUAGES	**(9)**
Languages and Grammars - Phrase Structure Grammar - Classification of Grammars - Pumping Lemma for Regular Languages.	
UNIT V - FINITE STATE AUTOMATA	**(9)**
Finite State Automata - Deterministic Finite State Automata (DFA), Non-Deterministic Finite State Automata (NFA) - Equivalence of DFA and NFA - Equivalence of NFA and Regular Languages.	
TOTAL (L:45) : 45 PERIODS	

REFERENCES:

1. Kenneth H.Rosen, "Discrete Mathematics and Its Applications", Tata McGraw Hill, Eighth Edition, 2016.
2. Hopcroft and Ullman, "Introduction to Automata Theory, Languages and Computation", Narosa Publishing House, Delhi, 2015.
3. A. Tamilarasi & A. M. Natarajan, "Discrete Mathematics and its Application", Second Edition, Khanna Publishers, 2005.
4. M. K. Venkataraman, "Engineering Mathematics", Volume II, Second Edition, National Publishing Company, 1989.

Mapping of COs with POs / PSOs

COs	POs												PSOs	
	1	2	3	4	5	6	7	8	9	10	11	12	1	2
1	3													
2		2												
3	3													2
4		2												2
5		2			2				2					2
CO	**3**	**2**			**2**				**2**					**2**