S.E. Semester –III

B.E. (Computer Engineering)							**S.E. SEM: III**		
Course Name: Mathematics III (Applied)							**Course Code:**PCC-CS301		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week					**Theory (100)**		**Practical/Oral (25)**	**Term Work (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**PR/OR**	**TW**	
3	1	-	4	4	25	75	-	25	**125**
IA: In-Semester Assessment - Paper Duration – 1.5Hours **ESE: End Semester Examination - Paper Duration - 3 Hours** **The weightage of marks for continuous evaluation of Term work/Report:** Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)									
Prerequisite: Basic Mathematics									

Course Objective: The objective of the course is to understand the notion of mathematical thinking, proof and logic to solve the problems and apply the knowledge of sets, relations, functions, graphs, lattices and coding theory in programming applications.

Course Outcomes:Upon completion of the course students will be able to:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Apply the notion of mathematical thinking, mathematical proofs for problem solving.	L1, L2, L3
2	Make use of logic and reasoning for problem solving.	L1, L2, L3
3	Apply arithmetic modulo to design security problems.	L1, L2, L3
4	Make use offunctions and graphs in programming applications.	L1, L2, L3
5	Make use of basic mathematical objects such as functions and relations.	L1, L2, L3
6	Apply discrete structures into other computing problems	L1, L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Introduction to Set Theory and Proofing Techniques** Definition of Sets, Venn Diagrams, Complements, Cartesian products, Power sets, Counting principle, Cardinality and Countability (Countable and Uncountable sets) Laws of set theory, Fundamental Product, Partitions of sets.The Principle of Inclusion and Exclusion,Pigeonhole Principle, Mathematical Induction.	6	L1, L2, L3
2	**Logic** Propositions and logical operations, Truth tables Equivalence, Implications, Laws of logic, Normal Forms, Predicates and Quantifiers	6	L1, L2, L3
3	**Modular Arithmetic** Modulo, Congruence, Primes and the Sieve of Eratosthenes, Testing for primes, Prime Number Theorem, Euler's theorem, Fermat's little theorems, Chinese remainder theorem.	6	L1, L2, L3
4	**Graph Theory** Definitions of graphs, digraphs, Multigraphs, Paths and cycles(Hamiltonian and Eulerian), Subgraphs, Isomorphism, Special kinds of graphs: trees, bipartite graphs, planer graphs.	8	L1, L2, L3
5	**Relation and Functions** Relation: Definition, types of relation, composition of relations, pictorial representation of relation (Digraphs), properties of relation, partial ordering relation. Operations on relations, Closures, Warshall's algorithm. Hasse diagram and Lattice. Function: Definition and types of function, composition of functions.Recursive and recursively defined functions.Generating Functions.	10	L1, L2, L3
6	**Algebraic Structures** Algebraic structures with one binary operation: Semigroup, Monoid and Group, Abeliangroup,Cyclic groups, Normal subgroups. Homomorphism, Isomorphism and Automorphism. Coding theory: Coding of binary information and error detection, Decoding and error correction	9	L1, L2, L3
	TotalHours	**45**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Elements of Discrete Mathematics	C. L. Liu and D. P. Mohapatra	McGraw Hill	SecondEdition	2010
2	Discrete Mathematical Structures with Applications to Computer Science	J. P. Trembley, R. Manohar	McGraw Hill	Fifth Edition	2011
3	Discrete Mathematics	Seymour Lipschutz, Marc Lars Lipson,"	McGraw Hill	Fifth Edition	2010

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	nptel.ac.in	https://nptel.ac.in/courses/111106086/2	M1- M5
2	www.geeksforgeeks.org	https://www.geeksforgeeks.org/groups-discrete-mathematics/	M6
3	www.tutorialspoint.com	https://www.tutorialspoint.com/graph_theory/	M4

List of Tutorials:

Sr. No.	Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	Tutorial on Introduction to Set Theory andProofing Techniques (I)	1	L1, L2
2	Tutorial on Introduction to Set Theory andProofing Techniques (II)	1	L1, L2, L3
3	Tutorial on Logic	1	L1, L2, L3
4	Tutorial on Modular Arithmetic (I)	1	L1, L2
5	Tutorial on Modular Arithmetic (II)	1	L1, L2, L3
6	Tutorial on Graph Theory (I)	1	L1, L2
7	Tutorial on Graph Theory (II)	1	L1, L2, L3
8	Tutorial on Relation and Functions (I)	1	L1, L2
9	Tutorial on Relation and Functions (II)	1	L1, L2, L3
10	Tutorial on Algebraic Structures (I)	1	L1, L2
11	Tutorial on Algebraic Structures (II)	1	L1, L2, L3
12	Quiz on Set Theory and Logics	1	L1, L2, L3
13	Quiz on Graph Theory	1	L1, L2, L3
14	Group discussion on Relations and function using think, pair and share technique	1	L1, L2, L3
15	Quiz on Algebraic Structures	1	L1, L2, L3
	Total Hours	**15**	

S.E. Semester –III

B.E. (Computer Engineering)							S.E. SEM : III		
Course Name : Data Structures							**Course Code :**PCC- CS302		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week					**Theory (100)**		**Practical/Oral (25)**	**Term Work (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**PR/OR**	**TW**	
3	-	2	5	4	25	75	25	25	**150**
IA: In-Semester Assessment - Paper Duration – 1.5 Hours **ESE: End Semester Examination - Paper Duration - 3 Hours** **The weightage of marks for continuous evaluation of Term work/Report:** Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)									
Prerequisite: Computer Basics, Procedural Programming Languages									

Course Objective: The course intends to deliver the fundamentals of data structures by providing a platform to learn, compare and apply them in real world scenario.

Course Outcomes: Upon completion of the course students will be able to:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Compare linear and non-linear data structures.	L1, L2
2	Apply operations like insertion, deletion, searching and traversing on stack and queue data structure.	L1, L2, L3
3	Apply operations like insertion, deletion, searching and traversing on linked list data structure.	L1, L2, L3
4	Apply operations like insertion, deletion, searching and traversing on tree data structure.	L1, L2, L3
5	Apply operations like insertion, deletion, searching and traversing on graph data structure.	L1, L2, L3
6	Analyze appropriate sorting and searching technique for given problem.	L1, L2, L3, L4

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Introduction to Data Structure** Introduction, Types of data Structures, Abstract data type, Operations on data structures.	3	L1, L2
2	**Stacks and Queues** **Stack**: ADT of stack, operations on stack, array implementation of stack, applications of stack. **Queue:** ADT of queue, operations on queue, array implementation of queue, Types of queues: circular queue, priority queue, double ended queue, applications of queue.	7	L1, L2, L3
3	**Linked lists** **Linked list**: ADT of Linked lists, operations on linked list, Types of linked lists: Single linked list, Double Linked list, Implementation of linked list, stack implementation using linked list, queue implementation using linked list, Applications of linked list.	8	L1, L2, L3
4	**Introduction to Non Linear Data Structure** **Trees:** Terminologies, Binary tree and its types, Binary tree operations and implementation, Tree traversing techniques, Expression tree, AVL tree, Multiway search tree, Application of tree.	13	L1, L2, L3
5	**Graphs** **Graph:** Terminologies, Graph representation: Matrix and Adjacency list, Graph traversing techniques: BFS, DFS, Applications of graph.	6	L1, L2, L3
6	**Searching and Sorting** **Searching:**Linear search, binary search **Sorting:** Insertion sort, Merge sort, Quick sort **Hashing:** Hash functions, Hash table, Hashing technique, Collision resolution technique	8	L1, L2, L3, L4
	TotalHours	**45**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Data Structures using C	ReemaThareja	Oxford	Second Edition	2014
2	Data Structures: A Pseudocode Approach with C	Richard F. Gilberg&Behrouz A., Forouzan	CENGAGE Learning	Second Edition	2011
3	Data Structures Using C	Aaron M Tenenbaum, YedidyahLangsam, Moshe J Augenstein	Pearson	Second Edition	2006
4	Data Structures with C	SeymoreLipschutz	Tata McGraw-Hill	India Special Edition	2011

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	www.geeksforgeeks.org	https://www.geeksforgeeks.org/stack-data-structure/	M1-M6
2	www.studytonight.com	https://www.studytonight.com/data-structures/introduction-to-data-structures	M1-M3, M6
3	www.w3schools.in	https://www.w3schools.in/category/data-structures-tutorial/	M1-M4, M6

List of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Basic Experiments**	Build a Program for stack using an array (Menu driven program)	2	L1, L2, L3
2		Build a Program for Queue using an array. (Menu driven program)	2	L1, L2, L3
3	**Design Experiments**	Develop a code for circular queue. (Menu driven)	2	L1, L2, L3
4		Develop a code for Single Linked List. (Menu driven program)	2	L1, L2, L3
5		Develop a code for Doubly linked list. (Menu driven program)	2	L1, L2, L3
6		Develop a code for Binary Search Tree (Menu driven program)	2	L1, L2, L3
7		Develop a code for BFS. (Menu driven program)	2	L1, L2, L3
8		Develop a code for DFS. (Menu driven program)	2	L1, L2, L3
9		Develop a code for Binary search technique.	2	L1, L2, L3
10		Develop a code for Quick Sort.	2	L1, L2, L3
11	**Advanced Experiments**	Develop a code for circularly linked doubly linked list.	2	L1, L2, L3
12		Develop a code for Hashing technique with collision resolution.	2	L1, L2, L3
13	**Mini/Minor Projects/ Seminar/ Case Studies**	**Case study:** 1. Red-Black tree 2. Binomial heap **Mini Project:** 1. Build a Snakes & Ladders game 2. Sudoku Solver 3. Maze generator 4. Dictionary implementation 5. Employee Record System 6. Super market Billing System	6	L1, L2, L3, L4
		TotalHours	**30**	

S.E. Semester –III

B.E. (Computer Engineering)							**S.E. SEM : III**		
Course Name : Database Management System							Course Code : PCC- CS303		
Teaching Scheme (Program Specific)					**Examination scheme**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week					**Theory (100)**		**Practical/Oral (25)**	**Term Work (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**PR/OR**	**TW**	**150**
3	1	2	6	5	25	75	25	25	
IA: In-Semester Assessment - Paper Duration – 1.5 Hours **ESE: End Semester Examination - Paper Duration - 3 Hours** **The weightage of marks for continuous evaluation of Term work/Report:** Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)									
Prerequisite: Computer Basics									

Course Objective: The course intends to deliver the fundamental knowledge of database management system and apply this knowledge for implementing and analyzing real world problems.

Course Outcomes: Upon completion of the course students will be able to:

SN	Course Objectives	Cognitive levels of attainment as per Bloom's Taxonomy
1	Demonstrate the fundamental elements of relational database Management Systems	L1, L2
2	Outline ER and EER diagram for the real life problem and convert it to Relational Database.	L1, L2,L3
3	Solve and build basic SQL Queries on given Data.	L1, L2, L3
4	Solve and build Advanced SQL Queries on given Data.	L1, L2, L3
5	Develop a relational database using concept of functional dependencies.	L1, L2, L3
6	Interpret the concepts of transaction, concurrency and recovery	L1, L2

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Introduction to Database Concepts** Basic Concepts of Data, Database and DBMS, Applications of Databases, Advantages of Databases over File Processing System, 3 Level Architecture of Database System, Data Abstraction and Data Independence, Database Languages, Database Users, Database Administrator and its functions, Overall System Structure.	3	L1, L2
2	**Entity Relationship Model(ER), Relational Model and Extended ER Model**	6	

	The Entity-Relationship (ER) Model: Entity with its types, Attributes with its types, Relationships with its Types. Real life Examples of ER Diagram. **Relational Model**: Structure of Relational Databases, Keys with its Types **Extended ER Model (EER):** Concept ofSpecialization**,** Generalization and Aggregation, Mapping of ER and EER to Relational Model.		L1, L2,L3
3	**Introduction to Structured Query Language (SQL)**	9	L1, L2, L3
	Overview of SQL, Data Definition Language Commands, Data Manipulation Language Commands, Data Control Language Commands, Transaction Control Language Commands, Constraints, Set and String Operations, Aggregate Functions, Group by and Having Clause.		
4	**Advanced SQL with Integrity, Security and Authorization**	11	L1, L2, L3
	Nested Sub queries, Referential Integrity in SQL, Joins, Views, Assertion, Trigger, Database Security and Authorization, Granting of Privileges, Revoking of Authorization in SQL **Relational Algebra:** Fundamental Operations in Relational Algebra		
5	**Relational Database Design**	8	L1, L2, L3
	Pitfalls in Relational Database Design, Concept of Normalization, Functional Dependencies, 1 NF, 2 NF, 3 NF, BCNF, 4 NF		
6	**Transaction, Recovery and Concurrency Control**	8	L1, L2
	Transaction Management: Transaction Concept, Transaction States, ACID Properties of Transaction, Serial and Concurrent Executions, Conflict and View Serializability. **Concurrency Control:** Lock Based Protocols, Deadlock Handling **Recovery:** Failure Classification, Log based recovery, Checkpoint, Shadow Paging.		
	TotalHours	**45**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Database System Concepts	Korth, Slberchatz,Sudarshan	McGraw Hill	Seventh Edition	2019
2	Fundamentals of Database Systems	Elmasri and Navathe	Pearson education	Seventh Edition	2016
3	Database Management Systems	Raghu Ramkrishnan and Johannes Gehrke	McGraw Hill	Third Edition	2014

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	www.guru99.com	https://www.guru99.com/dbms-tutorial.html	M1,M2,M6
2	www.javatpoint.com	https://www.javatpoint.com/dbms-tutorial	M1-M6
3	www.studytonight.com	https://www.studytonight.com/dbms/	M1 to M3,M5
4	www.w3schools.in	https://www.w3schools.in/dbms/ https://www.w3schools.com/sql/default.asp	M1,M2,M5,M6 M3,M4
5	www.geeksforgeeks.org	https://www.geeksforgeeks.org/dbms/	M1- M6
6	www.tutorialcup.com	https://www.tutorialcup.com/dbms	M1, M2, M5,M6

List of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Basic Experiments**	Identify any real life Database Management System. Identify Entity, Relationship and Attributes with its types for Identified Real life Example	2	L1, L2
2	**Design Experiments**	Develop an Entity-Relationship (ER) diagram for the problem definition Identified and convert it into Relational Database.	2	L1, L2, L3
3		Apply DDL Commands to Specified System	2	L1, L2, L3
4		Apply Basic DML Commands to Specified System	2	L1, L2, L3
5		Apply Constraints for the Specified system.	2	L1, L2, L3
6		Apply Set and String Operations to Specified System	2	L1, L2, L3
7		Apply Aggregate Functions and Create Views for Specified System	2	L1, L2, L3
8		Build Nested Queries on Specified System.	2	L1, L2, L3
9		Apply Referential Integrity on Specified System.	2	L1, L2, L3
10		Develop of Normalized Database for any Real World Example by applying concept of Normalization	2	L1, L2, L3
11	**Advanced Experiments**	Apply Triggers in SQL for Specified System	2	L1, L2, L3
12		Apply Joins in SQL for Specified System	2	L1, L2, L3
13	**Mini/Minor Projects/ Seminar/ Case Studies**	1. Student Management System 2. Library Management System 3. Airline Reservation System 4. Hospital Management System 5. Hotel Management System 6. Billing System	6	L1, L2, L3
		Total Hours	**30**	

List of Tutorials:

Tutorial Number	Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	Solve and Build SQL Queries on DDL Commands.	1	L1, L2, L3
2	Solve and Build SQL Queries on DML Commands	1	L1, L2, L3
3	Solve and Build SQL Queries on Constraints in SQL	1	L1, L2, L3
4	Solve and Build SQL Queries on Aggregate Functions.	1	L1, L2, L3
5	Solve and Build SQL Queries on Set Functions.	1	L1, L2, L3
6	Solve and Build SQL Queries on String Operations	1	L1, L2, L3
7	Solve and Build SQL Queries on Group by and Having Clause	1	L1, L2, L3
8	Outline ER Diagram for given real life problem and convert it into relational Database.	1	L1, L2, L3
9	Solve and Build SQL Nested Queries	1	L1, L2, L3
10	Solve and Build SQL Queries on Referential Integrity	1	L1, L2, L3
11	Solve and Build SQL Queries on Joins	1	L1, L2, L3
12	Solve Build SQL Queries on Real Time Management Systems.	1	L1, L2, L3
13	Develop Database design by applying concept of Normalization to Student Management System	1	L1, L2, L3
14	Develop Database design by applying concept of Normalization to Hospital Management System	1	L1, L2, L3
15	Develop Database design by applying concept of Normalization to Airlines Reservation System	1	L1, L2, L3
	Total Hours	**15**	

S.E. Semester –III

B.E. (Computer Engineering)							S.E. SEM : III		
Course Name :Digital Logic Design & Analysis							Course Code :ESC301		
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week					Theory (100)		Practical/Oral (25)	Term Work (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	IA	ESE	PR/OR	TW	
3	-	2	5	4	25	75	25	25	150
IA: In-Semester Assessment - Paper Duration – 1.5 Hours ESE: End Semester Examination - Paper Duration - 3 Hours **The weightage of marks for continuous evaluation of Term work/Report:** Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)									
Prerequisite: Engineering Mathematics									

Course Objective: The course intends to provide the basic knowledge of digital logic levels and apply knowledge to understand digital electronics circuits.

Course Outcomes: Upon completion of the course students will be able to:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Build different number systems forms	L1, L2, L3
2	Solve Boolean expressions	L1, L2, L3
3	Explain the basics of TTL and CMOS logic families	L1, L2
4	Illustrate the design of Combinational circuits	L1, L2,L3
5	Illustrate the design of Sequential circuits	L1, L2,L3
6	Understand the concepts in designing of counters and registers	L1, L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Number Systems and codes** **Introduction to number system and conversions:** Binary, Octal, Decimal and Hexadecimal number Systems, Binary arithmetic: addition, subtraction (1"s and 2"s complement), multiplication and division. Octal and Hexadecimal arithmetic: Addition and Subtraction (7"s and 8"s complement method for octal) and (15"s and 16"s complement method for Hexadecimal). **Codes:** Gray Code, BCD Code, Excess-3 code, ASCII Code. **Error Detection and Correction:** Hamming codes.	8	L1, L2, L3
2	**Boolean Algebra & Logic Gates** Theorems and Properties of Boolean Algebra, Boolean functions, Boolean function reduction using Boolean laws, Canonical forms, Standard SOP and POS form. **Basic Digital gates:** NOT , AND , OR , NAND , NOR , EXOR , EXNOR, positive and negative logic, K-map method 2 variable, 3 variable, 4 variable, Don't care condition, Quine-McClusky Method, NAND,NOR Realization.	7	L1, L2, L3
3	**Digital Logic Families** Introduction: Terminologies like Propagation Delay, Power Consumption, Fan in and Fan out, current and voltage parameters, noise margin, with respect to TTL and CMOS Logic and their comparison	3	L1, L2
4	**Analysis and Design of Combinational Logic** Introduction, Half and Full Adder, Half subtractor Full Subtractor, one digit BCD Adder, Multiplexer, Multiplexer tree, Demultiplexer, Demultiplexer tree, Encoders Priority encoder, Decoders, One bit, Two bit, 4-bit Magnitude Comparator, ALU IC 74181.	9	L1, L2, L3
5	**Latches and Flip Flops** Introduction: SR latch, Concepts of Flip Flops: SR, D, J-K, T, Truth Tables and Excitation Tables of all types, Race around condition, Master Slave J-K Flip Flops, Timing Diagram, Flip-flop conversion, State machines, state diagrams, State table, concept of Moore and Mealy machine	9	L1, L2, L3
6	**Counters and Shift registers** Counters: Design of Asynchronous and Synchronous Counters, Modulus of the Counters, UP- DOWN counter. Shift Registers: SISO, SIPO, PIPO, PISO Bidirectional Shift Register, Universal Shift Register, Ring and twisted ring/Johnson Counter, sequence generator.	9	L1, L2, L3
	TotalHours	**45**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Modern Digital Electronics	R. P. Jain	McGraw Hill	Fourth Edition	2010
2	Digital Logic and computer Design	M. Morris Mano	Pearson	Sixth Edition	2017
3	Digital Principles and Applications	Donald p Leach, Albert Paul Malvino	McGraw Hill	Seventh Edition	2011

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	www.crectirupati.com	http://www.crectirupati.com/sites/default/files/lecture_notes/DLD%20lecture%20notes.pdf	M11-M2, M4-M6
2	www.engrcs.com	https://www.engrcs.com/courses/engr250/engr250lecture.pdf	M1-M6
3	www.uptusuccess.com	https://uptusuccess.com/digital-logic-design-rec301/	M1-M3

List of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Basic Experiments**	Utilize logic gates to realize Boolean expressions	2	L1, L2, L3
2		Make use ofuniversal gates to implement Basic gates	2	L1, L2, L3
3		Build parity generator and detector.	2	L1, L2, L3
4	**Design Experiments**	Build basic gates using Xilinx.	2	L1, L2, L3
5		Build binary to gray code and gray code to binary converter	2	L1, L2, L3
6		Construct arithmetic circuits i) Half adder ii) Full adder iii) Half subtractor iv) Full subtractor.	2	L1, L2, L3
7		Construct 4:1 multiplexer using Xlinx.	2	L1, L2, L3
8		Develop full adder using multiplexer IC	2	L1, L2, L3
9		Develop 4 bit binary adder using IC 7483	2	L1, L2, L3
10		Develop full adder using multiplexer IC	2	L1, L2, L3
11		Constructionof 2-bit magnitude comparator.	2	L1, L2, L3
12		Make use of NAND and NOR gates to Verify state tables of R-S flip-flop, J - K flip-flop, T Flip-Flop, D Flip-Flop	2	L1, L2, L3

13	**Mini/Minor Projects/ Seminar/ Case Studies**	1. Water Level Indicator 2. Rain Alarm Circuit 3. RFID based Attendance System 4. PC Based Digital IC Tester 5. K-map using 5 Variables 6. Very High Speed Integrated Circuit Hardware Description Language	6	L1, L2, L3
		TotalHours	**30**	

S.E. Semester –III

B.E.(Computer Engineering)							**S.E. SEM : III**		
Course Name : Computer Organization & Architecture							**Course Code :**ESC302		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week					**Theory (100)**		**Practical/Oral (25)**	**Term Work (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**PR/OR**	**TW**	
3	-	2	5	4	25	75	25	25	**150**
IA: In-Semester Assessment - Paper Duration – 1.5 Hours **ESE: End Semester Examination - Paper Duration - 3 Hours** **The weightage of marks for continuous evaluation of Term work/Report:** Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)									
Prerequisite: Basic Mathematics									

Course Objective: This course intends to deliver basics of modern computer organization and architectures, covering the interaction between computer hardware and software at various levels and to analyze performance issues in processor and memory design of a digital computer.

Course Outcomes:Upon completion of the course students will be able to:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Explain basic structure and working of computer.	L1, L2
2	Applyvarious computer arithmetic operations.	L1, L2, L3
3	Explain the working of control unit.	L1, L2
4	Understandvarious types of memory of digital computer.	L1, L2, L3
5	Compare between different types I/O modes of transfer.	L1, L2
6	Understand basic concepts of pipelining.	L1, L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Introduction of Computer Organization and Architecture** Basic organization of computer and block level description of the functional units. Introduction to computer organization & Architecture, Evolution of Computers, Von Neumann model, Instruction cycle, Addressing Modes, Instruction Format, Introduction toSystem buses, Multi-bus organization.	5	L1, L2
2	**Data Representation and Arithmetic Algorithm** Signed number representation, fixed point computation algorithms, Booth multiplication, Division - non-restoring and restoring techniques, floating point arithmetic algorithms. IEEE 754 floating point number representation.	7	L1, L2, L3
3	**Control Unit Design** Control Unit: Soft wired (Micro-programmed) and Hardwired control unit design methods, Address sequencing, Microprogram Sequencer, Micro operation, Micro instruction Format, Control Memory, Concepts of nano programming, Introduction to RISC and CISC architectures and design issues.	6	L1, L2
4	**Memory Organization** Classifications of primary and secondary memories, Types of RAM and ROM, Memory hierarchy and characteristics. Memory Access Methods. Cache memory: concept, architecture, mapping, Cache coherency, Interleaved and Associative memory, Memory management unit, Magnetic Hard disks.	9	L1, L2
5	**I/O Organization** Input/ Output systems, Types of data transfer techniques: Programmed I/O, Interrupt driven ,Direct Memory Access and DMA controller, Types of Interrupts, Bus Arbitration, Interface circuits - Parallel and serial port. Features of PCI and PCI Express bus.	9	L1, L2
6	**Pipelining & Parallel Processing** Introduction to pipelining, Performance measures of pipelining, Synchronous and Asynchronous pipelining, Instruction level pipelining (ILP), Pipelining hazards, Handling of Branch instructions. Multiprocessor (loosely & tightly coupled) and Multicomputer(UNA,NUMA,COMA).	9	L1, L2
	Total Hours	**45**	

Books and References:

	Title	Authors	Publisher	Edition	Year
1	Computer organization	V. Carl, G. Zvonko and S. G. Zaky	McGraw Hill	Sixth Edition	2011
2	Computer Architecture and organization	Morris Mano	McGraw Hill	Third Edition	2010
3	Computer Organizations and Architecture	John P. Hayes	McGraw-Hill	Fifth Edition	2017

Online Resources:

S. No.	Website Name	URL	Modules Covered
1	www.nptel.ac.in	https://nptel.ac.in/courses/106102062/	M1-M6
2	www.edx.org	https://www.edx.org/course/computation-structures-2-computer-architecture	M1-M6
3	www.coursera.org	https://www.coursera.org/learn/comparch	M1-M6

List of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	RBT Levels
1	Basic Experiments	Demonstrate Computer Anatomy- Memory, Ports, Motherboard and add-on cards.	2	L1, L2
2		Develop a program to calculate 1's compliment and 2's compliment of a Binary number.	2	L1, L2, L3
3		Develop a program to calculate Binary and octal addition and multiplication	2	L1, L2, L3
4	Design Experiments	Construct of Register and Counter	2	L1, L2, L3
5		Develop a program to convert in IEEE 754 format	2	L1, L2, L3
6		Develop a program to perform Booth's Multiplication on binary numbers	2	L1, L2, L3
7		Develop a C/Java program for Non-restoring Division	2	L1, L2, L3
8		Develop a C/Java program for Restoring Division	2	L1, L2, L3
9		Experiment with mapping techniques of Direct Mapped Cache memory.	2	L1, L2, L3

10		Experiment with mapping techniques of Cache memory, Associative Mapped cache, Set Associative Mapped cache	2	L1, L2, L3
11		Build a program to compare the performance measures of pipelined and non-pipelined systems.	2	L1, L2, L3
12		Build a C/Java program for Interrupt Handling	2	L1, L2, L3
13	**Mini/Minor Projects/ Seminar/ Case Studies**	1. Case Study: A Recent Intel Processor 2. Parallel Architectures 3. Bus Arbitration 4. Direct Memory Access 5. Cache Mapping 6. Nano Programming	6	L1, L2, L3
		TotalHours	**30**	

S.E. Semester –III

B.E. (Computer Engineering)							S.E. SEM: III		
Course Name: Seminar / Workshop							Course Code: SI301		
Teaching Scheme (Program Specific)					Examination Scheme (Formative/ Summative)				
Modes of Teaching / Learning / Weightage					Modes of Continuous Assessment / Evaluation				
Hours Per Week					Theory (100)		Practical/Oral (25)	Term Work (25)	Total
Theory	Tutorial	Practical	Contact Hours	Credits	IA	ESE	PR/OR	TW	
-	-	2	2	1	-	-	-	25	25
IA: In-Semester Assessment ESE: End Semester Examination									
Prerequisite: Mathematical Foundation, Computing Methods									

Course Objective: To familiarize students with emerging technologies used in industry. Also, to expose the students with developments in the various Program Specific Research (PSR) domains offered by the department.

Course Outcomes: Upon completion of the course students will be able to:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	To comprehend the different emerging technologies used in the industry	L1, L2
2	To apply different emerging technologies for solving the problems in the domains.	L1, L2,L3

Detailed Syllabus:

Module No.	Topics	Hrs	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Computing and System Design domain** • Seminar on Emerging Technologies used in the industry • Hands-on Workshop on Industry special skills • Industry Connect / Alumni Connect Seminar	5	L1, L2, L3
2	**Communication Networking and Web Engineering domain** • Seminar on Emerging Technologies used in the industry • Hands-on Workshop on Industry special skills • Industry Connect / Alumni Connect Seminar	5	L1, L2, L3
	Multimedia System Design and Development domain		L1, L2, L3

3	• Seminar on Emerging Technologies used in the industry • Hands-on Workshop on Industry special skills • Industry Connect / Alumni Connect Seminar	5	
4	**Software Development and Information Management System domain** • Seminar on Emerging Technologies used in the industry • Hands-on Workshop on Industry special skills • Industry Connect / Alumni Connect Seminar	5	L1, L2, L3
5	**Intelligent System Design and Development** • Seminar on Emerging Technologies used in the industry • Hands-on Workshop on Industry special skills • Industry Connect / Alumni Connect Seminar	5	L1, L2, L3
6	**Case study on the Emerging Tools and techniques under Program Specific Research domains**	5	L1, L2, L3
	Total Hours	**30**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Emerging Technologies in Computer Science: Introducing The New IT & The Internet of Things	Andrew Moss	Amazon	I	2019
2	Emerging Technologies in Computing	Miraz, M.H., Excell, P., Ware, A., Soomro, S., Ali, M.	Springer	I	2018

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	Advanced Topics in Computer Science	http://m.el-dosuky.com/course.php?c=advanced-topics-in-computer-science	M1-M6
2	https://interestingengineering.com	https://interestingengineering.com/5-technology-trends-to-watch-in-2019	M1-M6

S.E. Semester –III

B.E. (Computer Engineering)							S.E. SEM : III		
Course Name : Environmental Studies							**Course Code :**MC301		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week					**Theory (100)**		**Practical/Oral (25)**	**Term Work (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**PR/OR**	**TW**	
1	-	-	1	-	-	-	-	25	**25**

IA: In-Semester Assessment - Paper Duration – 1.5 Hours

ESE: End Semester Examination - Paper Duration - 3 Hours

The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)

Prerequisite: Biology, chemistry, geography, geology, physics.

Course Objective:

The course intends to deliver the fundamental concepts of Environmental Sciences. It will also help in understanding & analyzing the major challenges and current issues in Environment and evaluate possible solutions.

Course Outcome: **Upon completion of the course students will be able to:**

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Relate the concept of Environmental Sciences and provide solutions to the major challenges and current issues in Environment.	L1, L2
2	Relate the fundamentals and importance of Natural Resources and understand the importance of Biodiversity and its Conservation.	L1, L2
3	Interpretand Analyze various types of Environmental Pollution and their effects on plants and animals	L1, L2, L3, L4
4	Relate and Apply various laws available in the country to protect the Environment.	L1, L2, L3
5	Interpret and Analyze address social issues for sustainable development.	L1, L2, L3, L4
6	Relate and Analyze the importance of Environmental Monitoring.	L1, L2, L3, L4

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Concepts of Environmental Sciences** Environment, Levels of organizations in environment, Structure and functions in an ecosystem; Biosphere, its Origin and distribution on land in water and in air.	2	L1, L2
2	**Natural Resources, Biodiversity and its conservation** Renewable and Non-renewable Resources, Forests, water, minerals, Food and land (with example of one case study); Energy, Growing energy needs, energy sources (conventional and alternative), Biodiversity at global, national and local levels; India as a mega-diversity nation; and strategies for conservation of Biodiversity.	3	L1, L2
3	**Environmental Pollution** Types of pollution- Air, water (including urban, rural, marine), soil, noise, thermal, nuclear; Pollution prevention; Management of pollution- Rural/Urban/Industrial waste management [with case study of any one type, e.g., power (thermal/nuclear), fertilizer, tannin, leather, chemical, sugar], Solid/Liquid waste management, disaster management.	3	L1, L2, L3, L4
4	**Environmental Biotechnology** Biotechnology for environmental protection- Biological indicators, bio-sensors; Remedial measures- Bio-remediation, photo remediation, bio-pesticides, bio-fertilizers; Bio-reactors- Design and application	2	L1, L2, L3
5	**Social Issues and Environment** Problems relating to urban environment- Population pressure, water scarcity, industrialization; remedial measures; Climate change- Reasons, effects (global warming, ozone layer depletion, acid rain) with one case study; Legal issues- Environmental legislation (Acts and issues involved), Environmental ethics	3	L1, L2, L3, L4
6	**Environmental Monitoring** Monitoring- Identification of environmental problem, tools for monitoring (remote sensing, GIS); Sampling strategies- Air, water, soil sampling techniques	2	L1, L2, L3, L4
	TotalHours	**15**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Textbook of Environmental Studies for Undergraduate Courses	ErachBharucha	University's Press	Second Edition	2013
2	Fundamentals of Environmental Studies	MahuaBasu& Xavier Savarimuthu SJ	Cambridge Publication	First Edition	2016
3	Environmental Studies	Benny Joseph	Tata McGraw – Hill Publishing Company Limited	First Edition	2015
4	Environmental Studies	R.J.Ranjit Daniels, JagadishKrishnaswamy	Wiley India Private Ltd., New Delhi.	First Edition	2013
5	Introduction to Environmental Engineering and Science	Gilbert M.Masters	Pearson- Education	Third Edition	2008

Online References:

Sr. No.	Website Name	URL	Modules Covered
1.	www.conserve-energy-future.com	https://www.conserve-energy-future.com/what-is-environmental-science-and-its-components.php	M1
2.	www.vikaspedia.in/InDG	http://vikaspedia.in/energy/environment/biodiversity-1/conservation-of-biodiversity	M2
3.	www.encyclopedia.com	https://www.encyclopedia.com/earth-and-environment/ecology-and-environmentalism/environmental-studies/environmental-toxicology	M3
4.	www.environmentalscience.org	https://www.environmentalscience.org/career/environmental-biotechnology	M4
5.	www.forestresearch.gov.uk	https://www.forestresearch.gov.uk/tools-and-resources/urban-regeneration-and-greenspace-partnership/greenspace-in-practice/practical-considerations-and-challenges-to-greenspace/social-and-environmental-justice/	M5
6.	www.unece.org/info/ece-homepage.html	https://www.unece.org/environmental-policy/environmental-monitoring-and-assessment/areas-of-work/environmental-monitoring.html	M6

List of Practical/ Experiments: NA

S.E. Semester –III

B.E. (Computer Engineering)							S.E. SEM : III		
Course Name : Professional Skills-III(Basic Technology Skills) (Object Oriented Programming using Java)							**Course Code :**HSD-CSPS301		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week					**Theory (100)**		**Presentation (25)**	**Report (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**(AC)**	**(AC)**	**75**
1	-	2	3	2	-	-	50	25	

IA: In-Semester Assessment - Paper Duration – 1.5 Hours
ESE: End Semester Examination - Paper Duration - 3 Hours
AC: Activity
The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)

Prerequisite: Computer Basics, Procedural Programming Languages

Course Objective: The course intends to deliverthe OOP concepts using Java and to help students design and implement real world applications.

Course Outcomes:Upon completion of the course students will be able to:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Apply fundamental programming constructs.	L1, L2, L3
2	Experiment with concept of class, objects, strings, arrays and vectors.	L1, L2, L3
3	Experiment with concept of inheritance and interfaces.	L1, L2, L3
4	Experiment with concept of exception handling.	L1, L2, L3
5	Experiment with notion of multithreading and packages.	L1, L2, L3
6	Develop GUI based application	L1, L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Object Oriented Concepts** Basics of object oriented programming , OOP Concepts: Object, Class, Encapsulation, Abstraction, Inheritance, Polymorphism	2	L1, L2, L3
2	**Introduction to Java** Basics of Java programming, Data types, Variables, Operators, Looping ,Strings, Arrays in java ,Input / Output in java , objects and classes in java, , Constructor and its types, Visibility modifiers, this reference	3	L1, L2, L3

3	**Inheritance and Polymorphism** Inheritance in java, Super and sub class, Polymorphism, Dynamic binding, Abstract class, Interface in java	2	L1, L2, L3
4	**Exception Handling** Exception and Error, Use of try, catch, throw, throws and finally, Built in Exception, Custom exception, Throwable Class	2	L1, L2, L3
5	**Multithreading in java** Thread life cycle and methods, Thread class, Runnable interface, Thread synchronization.Package in java	2	L1, L2, L3
6	**Event and GUI programming** Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, TextFields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing.. Database Connectivity	4	L1, L2, L3
	TotalHours	**15**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Programming with Java(Fifth Edition)	E Balagurusamy	McGraw Hill	Sixth Edition	2019
2	Java Programming, D. S. Malik	D. S. Malik	Cengage Learning	First Edition	2009
3	Programming in Java	Sachin Malhotra &Saurabh Chaudhary	Oxford University Press	Second Edition	2018
4	The Complete Reference, Java 2	Herbert Schild	McGraw Hill.	Fourth Edition	2011
5	Head First Java: A Brain-Friendly Guide	Kathy Sierra and Bert	O'Reilly Media	Second Edition	2005

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	www.javatpoint.com	https://www.javatpoint.com/java-oops-concepts	M1,M2,M3
2	www.w3schools.com	https://www.w3schools.com/java/	M1-M6
3	www.programiz.com	https://www.programiz.com/java-programming	M1-M6

List of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	RBT Levels
1	**Basic Experiments**	Apply installation steps to set the environment variables and run a simple java program.	2	L1, L2

2		Experiment with various ways to accept data through keyboard for 1D and 2D array	2	L1, L2
3	**Design Experiments**	Experiment with class creation including members and methods, accepting and displaying details for single object.	2	L1, L2, L3
4		Experiment withconstructor and constructor overloading	2	L1, L2, L3
5		Experiment with String and StringBuffer	2	L1, L2, L3
6		Experiment withsingle and multilevel inheritance (Use super keyword).	2	L1, L2, L3
7		Experiment withdemonstration of try, catch, throw, throws and finally	2	L1, L2, L3
8		Experiment withcreating user defined package	2	L1, L2, L3
9		Experiment with implementing multithreading using Thread class and Runnable interface	2	L1, L2, L3
10		Experiment withApplet to demonstrate Graphics, Font and Color class	2	L1, L2, L3
11		Experiment withcreation of GUI application with event handling using AWT controls	2	L1, L2, L3
12		Make use of database connectivity to develop java application.	2	L1, L2, L3
13	**Mini/Minor Projects/ Seminar/ Case Studies**	Mini Project based on content of the syllabus. (Group of 2-3 students) 1. Gaming System 2. Hotel Reservation System 3. Airline Reservation System 4. Hospital Management System 5. Online chat application 6. E-commerce website	6	L1, L2, L3
		TotalHours	**30**	

S.E. Semester –III

B.E. (Computer Engineering)						S.E. SEM : III	
Course Name : Project Based Learning – I						**Course Code :**HSD-CSABL301	
Teaching scheme (Holistic Student Development - HSD) Industry Specific/Interdisciplinary					**Examination Scheme (Formative/ Summative)**		
Modes of Teaching / Learning / Weightage					**Assessment/Evaluation Scheme**		
Hours Per Week					**Presentation (25)**	**Report (25)**	**Term Work**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**(AC)**	**(AC)**	
-	-	2	2	1	25	-	**25**
IA: In-Semester Assessment - Paper Duration – 1.5 Hours **ESE: End Semester Examination - Paper Duration - 3 Hours** **AC: Activity** **The weightage of marks for continuous evaluation of Term work/Report:** Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)							
Prerequisite: Computer Fundamentals and Knowledge of Programming Languages							

Course Objective: The Course intends to aid students identify real world problems and apply computing fundamental and technical skill to find solutions to them.

Course Outcomes:Upon completion of the course students will be able to:

Sr. No.	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Interpret the basic real time problems.	L1, L2
2	Apply appropriate technologies and programming constructs to solve problems.	L1, L2, L3
3	Inspect the results obtained for documentation and presentation.	L1, L2, L3, L4

Projects Listing:

Sr. No.	Title of Project	Type of Project
1	Implementing system for text encryption and decryption	Application
2	Implementing Hospital Management System	Application
3	Implementing Employee Management System	Application
4	Implementation of Payroll System	Application
5	Implementing system for Bus Booking	Application
6	Implementation of Currency Converter System	Application
7	Design and Development of Game	Core
8	Design and Development of system for scheduling of events	Core
9	Design and development of IQ Test System	Core
10	Develop an app for Invoice	Core

S.E. Semester –III

B.E.(ALL BRANCHES)							S.E. SEM : III		
Course Name : Activity Based Learning-III							**Course Code:** HSD-CSABL301		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week					**Theory (25)**		**Presentation (25)**	**Report (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**(AC)**	**(AC)**	**50**
-	-	2	2	1	-	-	25	25	

IA: In-Semester Assessment - Paper Duration – 1.5 Hours
ESE: End Semester Examination - Paper Duration - 3 Hours
AC: Activity
The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance/Learning Attitude (20%)

Prerequisite: Basics of Computer Programming, General knowledge, Social awareness

Course Objective: The larger objective of the course is to develop the Socially Sensitive Citizens by creating awareness among students through Activity mode.
The course intends to deliver the understanding of the concepts by encouraging the students to look beyond their textual knowledge, establish the relationship between theory and the applications of the learned concepts. It also intends to address the social issues and create awareness.

Course Outcomes:Upon completion of the course students will be able to:

Sr. No.	Course Outcome	Cognitive levels of attainment as per Bloom's Taxonomy
1	Construct his views independently and demonstrate various debate styles.	L1, L2, L3
2	Identify the various benefits of quiz competitions.	L1, L2, L3
3	Utilize the society awareness in various social issues	L1, L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Extempore/Debate** **I. Introduction to debate**, Definition and types of Debate Brainstorming session among students on various topics floated for debate. Topics can be Academic or Parliamentary, Financial, International affairs, technology trends, Technical or philosophical. Extempore speech by each student for /against topic for 1 minute. **II. Debate competition**. Formation of four teams for two topics. Two teams (For and against) for topic I will debate first and the other two team will be audience and for topic II vice-versa. **Evaluation by faculty as per format.**	4	L1, L2, L3
2	**General Knowledge (Technical and Current Affairs)** **I. Introduction to Quiz**, Definition, Types of quiz, Rules of quiz, quiz rounds. Quiz competition on Technical topic with 50 MCQ. **II**. Puzzle/**Quiz competition on current affairs** with 50 MCQ. **Evaluation by faculty as per format.**	4	L1, L2, L3
3	**Personality Development** **I. Word association (Test Sentence Building) (2 Hrs.)** Students are shown 60 English words one after other and a short sentence using the words shown are to be written. Each word will appear for 15 seconds and sentence is to be written within this period only. At least 45 words are to be attempted to get good marks **II. Thematic Apperception Test (Short Story Writing)(2 Hrs.)** 12 Slides will be projected, and stories are to be written in 03 Minutes. Discussions on Stories written by students **Evaluation by faculty as per format.**	4	L1, L2, L3
4	**Extended Work** **Introduction to Street play-T**ypes of Street play, Writing and demonstration of street Play on social Issues Water conservation Waste Management Plastic Ban etc. **Evaluation by faculty as per format**	6	L1, L2, L3
5	**Awareness creationon social issues** Students will develop material like placard, posters etc. for creating awareness on issue like • Education on social Issues like social media, youth related issues etc. • Education on health issues • Education on issues related to senior citizen etc. **The education/ awareness** needs to be conducted in campus through presentation(placards, posters etc.). **Evaluation by faculty as per format** **Data collection and Analysis:** survey's needs to be developed and conducted, data analysis and results interpretation	6	L1, L2, L3

	Evaluation by faculty as per format		
6	**Extempore/Debate** **I. Introduction to debate**, Definition and types of Debate Brainstorming session among students on various topics floated for debate. Topics can be Academic or Parliamentary, Financial, International affairs, technology trends, Technical or philosophical. Extempore speech by each student for /against topic for 1 minute. **II. Debate competition**. Formation of four teams for two topics. Two teams (For and against) for topic I will debate first and the other two team will be audience and for topic II vice-versa. **Evaluation by faculty as per format.**	6	L1, L2, L3
	TotalHours	**30**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Competitive Debate	Richard Earl	Alpha	-	2008
2	Times Quiz bookby Times Mind Games	OLovBjortomt	Times Books	-	2016
3	Cracking the codingInterview	GayleLaakmann	Createspace	-	2011

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	www.cleverism.com	https://www.cleverism.com/18-best-idea-generation-techniques/	M1
2	www.thebetterindia.com	https://www.thebetterindia.com/111/teaching-street-children-a-thing-or-two/	M6