S.E. Semester –IV

B.E. (Computer Engineering)							**S.E. SEM: IV**		
Course Name: Mathematics IV							**Course Code:** BSC-CS401		
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**	**125**
3	1	-	4	4	25	75	-	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: Basic Mathematics									

Course Objective: The course intends to apply the concept of probability, Correlation and Regression, Laplace Transform and Fourier transform to the engineering problems and to evaluate the optimization of two and three variables.

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 concept of probability random variables, mathematical expectations and variance.	L1, L2, L3
2	Differentiate the discrete and continuous random variables.	L2, L3
3	Evaluate the Maximization and minimization of two and three variables.	L2, L3
4	Apply the concept of Correlation and Regression to the engineering problems.	L1, L2
5	Apply the Laplace Transform, Inverse Laplace Transform and its properties to solve ODE.	L1, L2, L3
6	Apply the concept of Fourier Transform and Inverse Fourier transform through properties.	L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Basic Probability** Probability spaces, conditional probability, independence; Discrete random variables, Independent random variables, sums of independent random variables; Expectation of Discrete and Continuous Random Variables, Moments, Variance of a sum, Conditional Probability	6	L1, L2, L3
2	**Basic Statistics** Measures of Central tendency, Moments, skewness and Kurtosis, Binomial, Poisson and Normal distribution and evaluation of statistical parameters for these three distributions	6	L2, L3
3	**Linear Programming problems** Types of solutions to linear programming problems, standard form of L.P.P. Simplex method, Big M method (Penalty method) to solve L.P.P, Duality, Dual simplex method and Revised simplex method to solve L.P.P.	6	L2, L3
4	**Applied Statistics** Correlation and regression – Rank correlation, Curve fitting by the method of least squares- fitting of straight lines, second degree parabolas and more general curves	8	L1, L2
5	**Transform Calculus -I** Laplace Transform, Properties of Laplace Transform, Laplace transform of periodic functions, Finding inverse Laplace transform by different methods	10	L1, L2, L3
6	**Transform Calculus -II** Convolution theorem, Solving ODEs by Laplace Transform method, Fourier Transform and Inverse Fourier transform of constant and exponential function, Properties of Fourier Transform	9	L2, L3
	Total Hours	**45**	

Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	Advanced Engineering Mathematics	Erwin kreyszig	John Wiley & Sons	Ninth Edition	2006
2	A text book of Engineering Mathematics	N.P. Bali and Manish Goyal	Laxmi Publications	Tenth Edition	2008
3	Higher Engineering Mathematics	B.S. Grewal	Khanna Publishers	Thirty Sixth Edition	2010
4	Engineering Mathematics	Veerarajan T	Tata McGraw-Hill, New Delhi	Third Edition	2008
5	Introduction to Probability Theory	P. G. Hoel, S. C. Port and C. J. Stone	Universal BookStall	Reprint	2003
6	Operations Research	S.D. Sharma	S. Chand & CO.	-	-
7	A First Course in Probability	S. Ross	Pearson Education India	Sixth Edition	2002

Online References:

S. No.	Website Name	URL	Modules Covered
1	www.statisticssolutions.com	https://www.statisticssolutions.com/continuous-probability-distribution/	M1, M2, M4
2	nptel.ac.in	https://nptel.ac.in/courses/111105123/	M5, M6
3	www.analyticsvidhya.com	https://www.analyticsvidhya.com/blog/2017/02/lintroductory-guide-on-linear-programming-explained-in-simple-english/	M3

List of Tutorials:

Sr. No	Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	Tutorial on Basic Probability (I)	1	L1, L2
2	Tutorial on Basic Probability (II)	1	L1, L2, L3
3	Tutorial on Basic Statistics (I)	1	L1, L2
4	Tutorial on Basic Statistics (II)	1	L1, L2, L3
5	Tutorial on Linear Programming problems (I)	1	L1, L2
6	Tutorial on Linear Programming problems(II)	1	L1, L2, L3
7	Tutorial on Applied Statistics(I)	1	L1, L2
8	Tutorial on Applied Statistics (II)	1	L1, L2, L3
9	Tutorial on Transform Calculus –I (I)	1	L1, L2
10	Tutorial on Transform Calculus –I (II)	1	L1, L2, L3
11	Tutorial on Transform Calculus -II (I)	1	L1, L2

12	Tutorial on Transform Calculus –II (II)	1	L1, L2, L3
13	Quiz on Basic Probability and Statistics	1	L1, L2, L3
14	Quiz on Linear Programming problems and Applied Statistics	1	L1, L2, L3
15	Quiz on Discussion on Transform Calculus	1	L1, L2, L3
	Total Hours	**15**	

S.E. Semester –IV

B.E. (Computer Engineering)							**S.E. SEM : IV**		
Course Name : Design and Analysis of Algorithm							**Course Code :**PCC- CS401		
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**	**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, Procedural Programming Languages									

Course Objective: The objective of the course is to study various techniques for effective problem solving along with different algorithm designing paradigms in computer science, to illustrate the efficient ways of problem solving for any given problem.

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

SN	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Analyze the complexities of various problems in different domains.	L1, L2, L3, L4
2	Apply and analyze the complexity of divide and conquer strategy.	L1, L2, L3, L4
3	Apply and analyze the complexity of greedy method, dynamic programming strategy, backtracking and branch and bound strategy.	L1, L2, L3, L4
4	Understand, apply and analyze different string matching algorithms	L1, L2, L3, L4
5	Compare and contrast various algorithm designing strategies to apply in real world problems.	L1, L2, L3, L4
6	Demonstrate the classes P, NP, and NP-Complete.	L1, L2

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Introduction to Algorithm Analysis** Performance analysis, space and time complexity, Order of Growth of function. Asymptotic notations, Mathematical background for algorithm analysis, Analysis of selection sort, insertion sort. Recurrences: -The substitution method -Recursion tree method -Master method. **Divide and Conquer:** Finding Minimum and maximum, Binary search, Merge sort, Quick sort.	9	L1, L2, L3, L4
2	**Greedy Method** **Greedy Method**: General method, Single source shortest path, Knapsack problem, Minimum cost spanning trees-Kruskal and prim's algorithm, Job sequencing with deadlines.	5	L1, L2, L3, L4
3	**Dynamic Programming** **Dynamic Programming**: General method, Multistage graphs, single source shortest path, all pair shortest path, 0/1 knapsack, Travelling salesman problem, Longest common subsequence.	6	L1, L2, L3, L4
4	**Backtracking and Branch & Bound** **Backtracking**: General method, 8 queen problem (N-queen problem), Sum of subsets. **Branch and Bound**: General method, 15 puzzle problem, Travelling salesman problem.	10	L1, L2, L3, L4
5	**String Matching Algorithms** The naïve string matching Algorithm, The Rabin Karp algorithm, String matching with finite automata, The knuth-Morris-Pratt algorithm, Boyer Moore algorithm.	8	L1, L2, L3, L4
6	**Introduction to Non Deterministic algorithm** Polynomial time, Polynomial time verification, classes NP, NP Completeness and polynomial time reduction.	7	L1, L2
	Total Hours	**45**	

Books and References:

	Title	Authors	Publisher	Edition	Year
1	Introduction to algorithms	T.H. Coreman, C.E. Leiserson, R.L. Rivest, and C. Stein	PHI	Third Edition	2009
2	Fundamentals of computer algorithms	Ellis Horowitz, SartajSahni, S. Rajsekaran	University Press	Second Edition	2017
3	Algorithms	SanjoyDasgupta, Christos Papadimitriou, UmeshVazirani	Tata McGraw-Hill Edition.	Featured Edition	2017

4	Design Methods and Analysis of Algorithm	S. K. Basu	PHI.	--	2005
5	Algorithm Design	John Kleinberg, Eva Tardos	Pearson	--	2005

Online Resources:

S. No.	Website Name	URL	Modules Covered
1	www.geeksforgeeks.org	https://www.geeksforgeeks.org/fundamentals-of-algorithms/#AnalysisofAlgorithms	M1-M6
2	www.tutorialspoint.com	https://www.tutorialspoint.com/design_and_analysis_of_algorithms/index.htm	M1-M3, M6
3	www.w3schools.in	https://www.w3schools.in/category/data-structures-tutorial/	M1,M4

List of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	RBT Levels
1	**Basic Experiments**	Develop a code for Quick Sort	2	L1, L2, L3
2		Develop a code for Dijkstra's algorithm using Greedy method and analyze it.	2	L1, L2, L3
3	**Design Experiments**	Develop a code Minimum spanning tree, Kruskal's algorithm using Greedy method and analyze it.	2	L1, L2, L3
4		Develop a code for all pair shortest path problem using dynamic programming and analyze it.	2	L1, L2, L3
5		Develop a code for Longest common subsequence using dynamic programming and analyze it.	2	L1, L2, L3
6		Develop a code for 8 queen's problem using backtracking approach and analyze it.	2	L1, L2, L3
7		Develop a code for 15 puzzle problem and analyze it.	4	L1, L2, L3
8		Develop a code for naïve string matching Algorithm	2	L1, L2, L3
9	**Case study:**	Various string matching algorithms and their time and space complexities.	4	L1, L2, L3
10	**Mini Project:**	1. Build a Snakes & Ladders game 2. Sudoku Solver 3. Maze generator 4. Dictionary implementation 5. Employee Record System	8	L1, L2, L3

		Super market Billing System		
		Total Hours	**30**	

List of Tutorials:

Sr. No	Topic	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	Problem solving session on substitution method	1	L1, L2, L3
2	Problem solving session on recursion tree method	1	L1, L2, L3
3	Problem solving session on master's theorem	1	L1, L2, L3
4	Problem solving session on Divide and Conquer strategy	1	L1, L2, L3
5	Problem solving session on Greedy method	1	L1, L2, L3
6	Problem solving session on Dynamic programming (TSP)	1	L1, L2, L3
7	Problem solving session on Dynamic programming (LCS)	1	L1, L2, L3
8	Problem solving session on Backtracking	1	L1, L2, L3
9	Problem solving session on Branch and Bound	1	L1, L2, L3
10	Problem solving session on Rabin Karp algorithm	1	L1, L2, L3
11	Problem solving session on String matching with finite automata	1	L1, L2, L3
12	Problem solving session on Knuth Morris Pratalgoithm	1	L1, L2, L3
13	Doubt Solving session on module 1-2	1	L1, L2, L3
14	Doubt Solving session on module 3-4	1	L1, L2, L3
15	Doubt Solving session on module 5-6	1	L1, L2, L3
	Total Hours	**15**	

S.E. Semester –IV

B.E. (Computer Engineering)							**S.E. SEM : IV**		
Course Name : Operating System							**Course Code :**PCC- CS402		
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 Organization and Architecture, Fundamentals of Data Structures									

Course Objective: The course intends to deliver the fundamental knowledge of Operating system and apply this knowledge for implementing and analyzing Process, Memory, I/O disk and File management techniques.

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	Understand the role of operating system in a computer	L1, L2
2	Make use of various Scheduling algorithms.	L1, L2, L3
3	Apply the principles of concurrency.	L1, L2, L3
4	Examine deadlock, prevention and avoidance algorithms	L1, L2, L3
5	Compare and contrast various memory management schemes	L1, L2
6	Develop a prototype file systems.	L1, L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Overview of Operating System** Operating System Objectives and Functions, The Evolution of Operating Systems, Operating System Structures, System Calls, Developments Leading to Modern Operating Systems, Virtual Machines	4	L1, L2

2	**Process Management** **Processes and Threads:**Process: Concept of a Process, Process States, Process Description, Operations on Processes, Execution of the Operating System; Threads: Processes and Threads, Concept of Multithreading, Types of Threads, Thread programming Using Pthreads; Scheduling: CPU Scheduling, Thread Scheduling.	4	L1, L2, L3
3	**Concurrency Control and Deadlock Handling** **Concurrency Control:** Principles of Concurrency, Requirements for Mutual Exclusion, Mutual Exclusion: Hardware Support, Operating System Support (Semaphores and Mutex), Programming Language Support (Monitors), Classical synchronization problems: Readers/Writers Problem, Producer and Consumer problem, Interprocess communication. **Deadlock:** Principles of Deadlock, Deadlock Modeling, Strategies to deal with deadlock: The Ostrich Algorithm, Deadlock Prevention, Deadlock Avoidance, Deadlock detection and recovery, An Integrated Deadlock Strategy, Example: Dining Philosophers Problem.	10	L1, L2,L3
4	**Memory Management** **Memory Management:** Memory Management Requirements, Memory Partitioning: Fixed Partitioning, Dynamic Partitioning, Buddy System, Relocation, Paging, Segmentation. **Virtual Memory:** What is Virtual Memory, Demand Paging, Page Replacement, Allocation, Thrashing; Allocating Kernel Memory.	10	L1, L2, L3
5	**Input / Output And File Management** I/O Management and Disk Scheduling: I/O Devices, Organization of the I/O Function, Operating System Design Issues, I/O Buffering, Disk Scheduling(FIFO, SSTF, SCAN, C-SCAN, LOOK, C-LOOK), Disk Cache. File Management: Overview, File Organization and Access, File Directories, File Sharing, Record Blocking, Secondary Storage Management.	10	L1, L2
6	**Case Study: LINUX Operating System** Overview of Linux, Architecture, Process management, Memory Management, I/O Management, BASH Shell scripting: Basic shell commands, shell as a scripting language.	7	L1, L2,L3
	Total Hours	**45**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Operating System: Internals and Design Principles	William Stallings,	Prentice Hall	Eighth Edition	2018
2	Operating System Concepts	Abraham Silberschatz, Peter Baer Galvin and Greg Gagne	WILEY	Ninth Edition	2009
3	Modern Operating System,	Andrew S. Tanenbaum& Herbert Bos	Pearson	Fourth Edition	2015

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	www.tutorialspoint.com	https://www.tutorialspoint.com/computer_fundamentals/computer_operating_system	M1-M6
2	www.geeksforgeeks.org	https://www.geeksforgeeks.org/operating-systems-need-and-functions/	M1-M6
3	nptel.ac.in	https://nptel.ac.in/courses/106106144/2	M1-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**	Explore LINUX Commands (Basic and Advanced)	2	L1, L2, L3
2		Write a program to implement any two CPU scheduling algorithms like FCFS, SJF, Round Robin etc.	2	L1, L2, L3
3	**Design Experiments**	Write a program to implement Dinning Philosopher Problem.	2	L1, L2, L3
4		Write a program to implement Banker's algorithm.	2	L1, L2, L3
5		Build a program to implement FIFO and LRU page replacement policies.	2	L1, L2, L3
6		Build a program to implement SRTF and Priority page replacement policies.	2	L1, L2, L3
7		Develop a program to implement dynamic partitioning placement algorithms i.e. Best Fit, First-Fit, Worst-Fit etc.	4	L1, L2, L3
8		Build a program to implement FCFS and SSTF disk scheduling algorithm	4	L1, L2, L3
9	**Case Study**	**Case Study** 1. Windows Operating System. 2. LINUX Operating System. 3. Multiprocessor Scheduling and Linux Scheduling.	4	L1, L2, L3

10	**Mini Project**	4. Develop a Client-Server application (use the concepts of inter-process communication, multithreading, synchronization and so). 5. Build a file system. 6. Write a shell interpreter for LINUX. Build an online compiler (with interface for inserting the code to be compiled).	6	
		Total Hours	**30**	

S.E. Semester –IV

B.E. (Computer Engineering)							**S.E. SEM : IV**		
Course Name : Computer Networks							**Course Code :**PCC-CS403		
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	-	2	5	4	25	75	25	25	
IA:In-Semester Assessment- Paper Duration – 1 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 System Basics, Programming Language (C/C++/Java)									

Course Objective: The course intends to deliver fundamental knowledge about various aspects of computer networks and apply the knowledge acquired to understand/solve problems in networking.

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

Sr. No.	Course Objectives	Cognitive levels of attainment as per Bloom's Taxonomy
1	Explain the basic concepts of digital communication.	L1, L2
2	Explain the concepts and fundamentals of computer networks and reference models.	L1, L2
3	Differentiate between types of transmission media, multiplexing techniques and switching techniques	L1, L2, L3
4	List the functionalities of Data link layer and analyze various design issues.	L1, L2, L3, L4
5	List the routing protocols of Network layer and solve subnetting and super-netting problems.	L1, L2, L3, L4
6	Illustrate how the application layer protocols utilizes transport layer protocols (TCP/UDP)	L1, L2, L3, L4

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Basics of Digital Communication** **Introduction:** Theoretical basis for communication; Maximum data rate of a channel: Transmission impairments; Attenuation distortion, Delay distortion, Noise; Data transmission modes: Serial & Parallel, Simplex, Half duplex & full duplex, Synchronous & Asynchronous transmission	5	L1, L2

2	**Introduction to Computer Networks** Definition of a Computer Network; Components of a computer network: Classification of networks, network types, Network topologies, networking devices. **Network Software &Network Standardization:** Networks Software; Protocol hierarchy, Design issues for the layers, Service Primitives: **Reference models:** Introduction and comparison of the OSI Reference Model and TCP/IP Reference Model	6	L1, L2
3	**Physical Layer** **Introduction:** Switching Techniques; Comparison of switching techniques; Multiplexing: FDM,TDM,WDM **Transmission Medium:** Guided & Unguided Transmission medium: Twisted pair, Coaxial cable, Optical fiber, Wireless transmission **DLL Design Issues** (Services, Framing, Error Control, Flow Control)	7	L1, L2, L3
4	**Data Link Layer** **Error Detection and Correction** (Hamming Code, CRC, Checksum), Elementary Data Link protocols for flow control, **Medium Access Control sub layer:** Channel Allocation problem, Types of Multiple Access Protocol, Local Area Networks -Ethernet (802.3)	8	L1, L2, L3, L4
5	**Network Layer** **Introduction and Design issues** of Network layer; Routing: Principles of Routing, Types of routing algorithms, Comparison of routing algorithms; Protocols at network layer; **Congestion**: Factors of congestion and Congestion control algorithms: Open loop congestion control, Closed loop congestion control, QoS parameters, Token & Leaky bucket algorithms	10	L1, L2, L3, L4
6	**Transport Layer & Application Layer** **The Transport Service**: Transport service primitives, Connection management (Handshake), UDP, TCP, TCP Flow control (sliding Window), TCP Congestion Control: Slow Start **Application layer:** DNS: Name Space, Resource Record and Types of Name Server. HTTP, SMTP, Telnet, FTP, DHCP	9	L1, L2, L3, L4
	Total Hours	**45**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Computer Networks	A.S. Tanenbaum,	Pearson Education	Fifth Edition	2013
2	Data Communications and Networking	B.A. Forouzan	McGraw Hill	Fifth Edition	2017
3	Computer Networking, A Top-Down Approach Featuring the Internet	James F. Kurose, Keith W. Ross,	Addison Wesley	Sixth Edition	2017

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	NPTEL	https://nptel.ac.in/courses/106105081/	M1-M5
2	Stanford University	https://lagunita.stanford.edu/courses/Engineering/Networking-SP/SelfPaced/about	M1-M6
3	www.tutorialpoint.com	https://www.tutorialspoint.com/computer_fundamentals/computer_networking	M1-M6

List of Practical/ Experiments:

Practical Number	Type of Experiment	Practical/ Experiment Topic	Hrs.	RBT Levels
1	**Basic Experiments**	Classify the types of cabling used in networking	2	L1, L2, L3
2		Survey various networking devices using Packet Tracer	2	L1, L2, L3, L4
3	**Design Experiments**	Apply CRC/ Hamming code for error detection and correction	2	L1, L2, L3
4		Explain Basic Networking Operations and troubleshooting	2	L1, L2, L3
5		Prepare a network and configure it for IP addressing, subnetting, masking.	2	L1, L2, L3
6		Demonstrate working of Static Routing Protocols	2	L1, L2, L3
7		Demonstrate working of Dynamic Routing Protocols	4	L1, L2, L3
8		Show implementation of Socket programming using TCP and Remote Login using Telnet/SSH	4	L1, L2, L3
9	**Case Studies**	**1.** Analyze Stop and wait protocol/ sliding window (selective repeat / Go back N) in NS2 **2.** Simulate congestion control (leaky bucket / token bucket) in NS2.	4	L1, L2, L3, L4
10	**Seminars/ Project**	**Mini Project:** 1. Network Desktop Manager (Java) 2. Cloud Network in packet tracer 3. IoT network in Cisco Packet Tracer	6	L1, L2, L3, L4

		4. MAC Protocols in NS2 5. A Network Based Multi-Player Eater Game Use simulator (E.g. NS2) to understand functioning of ALOHA, CSMA/CD.		
		Total Hours	**30**	

S.E. Semester –IV

B.E. (Computer Engineering)							**S.E. SEM : IV**		
Course Name : Computer Graphics							**Course Code :**PCC-CS404		
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: Knowledge of C Programming, Basic Data Structures and Mathematics									

Course Objective: The course intends to give the student a understating of drawing basic primitive techniques, 2D-3D transformation and apply the concepts for rendering 3D objects.

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

SN	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Understand the basic concepts of Computer Graphics.	L1, L2
2	Demonstrate various algorithms for scan conversion and filling of basic objects and their analysis.	L1, L2, L3
3	Apply 2D geometric transformations on graphical objects.	L1, L2, L3
4	Apply viewing and clipping transformation on graphical objects.	L1, L2, L3
5	Explore 3D solid model representation techniques and projections.	L1, L2, L3
6	Understand visible surface detection techniques, illumination models and applications of animation.	L1, L2,L3

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Introduction to Computer Graphics** Definition, applications, Raster and Random scan display, Input Device, Output Device (Cathode Ray Tube, CRTs for Color Display, The Shadow - Mask CRT, Direct View Storage Tube, Tablets, The light Pen)	4	L1, L2
2	**Basic Drawing Primitives** Coordinate system, Pixel plotting, Line Drawing algorithm: Digital Differential Analyzer, Bresenhem Line Drawing, Bresenhem and midpoint Circle Drawing algorithm, Midpoint Ellipse drawing algorithm, Aliasing , Antialiasing techniques(Pre and post filtering , super sampling , and pixel phasing) Filled area primitives: Inside-outside test, boundary and flood-fill, scan-line fill	8	L1, L2, L3
3	**2D Geometric Transformation** Homogenous coordinates, Translation, scaling, fixed point. scaling, rotation, rotation about arbitrary point, , shearing, reflection, composite transformations	6	L1, L2, L3
4	**Viewing and Clipping** Viewing transformation and Window to Viewport coordinate transformation, Line Clipping Algorithms: Cohen Sutherland, Midpoint Subdivision, Liang Barsky, Polygon Clipping Algorithms: Sutherland Hodgeman, Weiler Artherton	9	L1, L2, L3
5	**3D Transformation** 3D display methods, Wireframe model, sweep representation, Octrees, Binary space partitioning, curved lines and surfaces, cubic spline interpolation methods, Bezier, B-spline curves, Fractals, parallel and perspective projection,3D translation, scaling, rotation, Rotation about arbitrary axis	9	L1, L2, L3
6	**Hidden Surface Removal and Animation** Visible surface detection concepts, back-face detection, Z buffer method, Painters algorithm, Warnock algorithm, Illumination and Shading Models: Ambient, Specular and Diffuse reflections, Phong and Gouraud shading, Halftoning and Dithering techniques Animation: Key Frame Animation, Animation Sequence, Motion Control Methods, Morphing, Warping- Mesh Warping.	9	L1, L2,L3
	Total Hours	**45**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Computer Graphics C version,	Hearn & Baker	Pearson	Second Edition	2002
2	Computer Graphics	Samit Bhattacharya	Oxford Publication.	-	2018
3	Computer Graphics Principles and Practice in C	James D. Foley, Andries van Dam, Steven K Feiner, John F. Hughes	Pearson	Second Edition	2002
4	Computer Graphics	Rajesh K. Maurya	Wiley India Publication	-	2011
5	Computer Graphics using OpenGL	Francis S Hill, Jr. and Stephen M Kelley	Prentice Hall	3 edition	2007

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	www.tutorialspoint.com	https://www.tutorialspoint.com/computer_graphics/	M1-M6
2	www.amityhub.com	https://www.amityhub.com/computer-graphics-notes/	M1-M6
3	learnengineering.in	https://learnengineering.in/cs6504-computer-graphics/	M1-M5

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**	Develop a program for DDA and Bresenham Line Drawing algorithms	2	L1, L2, L3
2		Implement midpoint Circle/Ellipse algorithm	2	L1, L2, L3
3		Develop a program for Boundary fill and Flood fill algorithm(using 4-connected and 8-connected approaches)	2	L1, L2, L3
4		Develop a program for Basic transformation on 2D objects (Translation, Scaling, Rotation)	2	L1, L2, L3

5	**Design Experiments**	Design and develop a program for line Clipping Algorithm	2	L1, L2, L3
6		Design and Develop a program for Polygon clipping	4	L1, L2, L3
7		a)Develop a program for Bezier curve for n control points b) Design a program to draw Fractals	4	L1, L2, L3
8		Implement Basic primitives using Open GL	2	L1, L2, L3
9	**Case Studies**	**Case Study** 1. Computer Graphics in Automotive Design 2. Code sign case study in Computer Graphics 3. Computer Graphics for Office Automation.	2	L1, L2, L3
10	**Mini/Minor Projects/ Seminar**	**Mini Project** 1. Walking Robot 2. Maze Game 3. Bus Stop Simulation 4. Bull's Eye	8	L1, L2, L3,L4
		Total Hours	**30**	

S.E. Semester –IV

B.E. (Computer Engineering)							**S.E. SEM: IV**		
Course Name: Summer Internship							**Course Code:** SI-CS401		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Total Hours : Maximum 2 Weeks (60 to 80 Hours) during summer vacation (Week 21st to 25th Week)					**Theory (100)**		**Practical/Oral (25)**	**Term Work (25)**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**PR/OR**	**TW**	**25**
-	-	2	2	1	-	-	-	25	
IA: In-Semester Assessment **ESE: End Semester Examination**									
Prerequisite: Fundamental knowledge of Computer Science and Engineering									

Course Objectives:

The Course intends to get industry like exposure in the college laboratories by carrying out projects using subject studied till 4th semester. Also design innovative techniques / methods to develop the products.
To gain knowledge of marketing and publicizing products developed.

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 apply subjects knowledge in the college laboratories for carrying out projects	L1, L2,L3
2	Able to developed innovative techniques / methods to develop the products	L1, L2,L3
3	Able to do marketing and publicity of products developed	L1, L2,L3

Detailed Syllabus:

Module No.	Topics	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Program Specific Internship** Emerging technologies in domains offered by Department of Computer Engineering Applying classroom and laboratory knowledge to design, develop and deploy the products	L1, L2, L3
2	**Inter disciplinary Internship** To explore and understand issues and challenges in the other disciplines (EXTC, ELEX, MECH and CIVIL) Design , develop and deploy cost effective products using multidisciplinary approach	L1, L2, L3
3	**Industry Specific Internship** issues and challenges in industry Industry specific problems Design , develop and deploy products for startup and SMEs	L1, L2, L3
4	**Interpersonal Internship** Interpersonal skills such as leadership, marketing ,publicity and corporate ethics and communication Problem solving , presentation , negotiation skills	L1, L2, L3
5	**Social Internship** Different real life issues in the society Identify societal problems and provide engineering solutions to solve these problems	L1, L2, L3
6	**Academic Internship** Report preparation, preparation of presentations, copy table book preparation , business proposal and IPR Capture aspirations & expectations through interviews of students. Ways to connect research in technical institutes with industry. Taking inputs from self, local stakeholders and global stake holders which will help to develop process with comparative and competitive study.	L1, L2, L3

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	The Ultimate Guide to Internships: 100 Steps to Get a Great Internship and Thrive in It (Ultimate Guides)	Eric Woodard	Allworth	I	2015

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	https://www.letsintern.com/	https://www.letsintern.com/internships/summer-internships	M1-M6
2	https://codegnan.com	https://codegnan.com/blog/benefits-of-internships-and-importance	M1-M6
3	https://www.honorsociety.org	https://www.honorsociety.org/articles?category=internships	M1-M6

S.E. Semester –IV

B.E. (Computer Engineering)							**S.E. SEM : IV**		
Course Name : Value Education							**Course Code :** MC-CS401		
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**	**25**
1	-	-	1	-	-	-	-	25	
The weightage of marks for continuous evaluation of Term work/Report: Formative (40%), Timely completion of practical (40%) and Attendance / Learning Attitude (20%)									
Prerequisite: NA.									

Course Objective: The course intends to deliver fundamental knowledge of various aspects to understand the concept of Ethics in Engineering & Human values, significance of values in Self-development, ethical human value and apply values needed for peaceful society, aware value education, towards personal, national and global development.

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	Develop commitment to professional ethics, responsibilities and norms of the engineering practice.	L1, L2, L3
2	Develop a good moral character and social attitude.	L1, L2, L3
3	Determine the proper use of engineering knowledge to bring uplift in quality of life, along with peace and conflict resolution.	L1, L2, L3
4	Propagate ethics and values in society.	L1, L2, L3
5	Apply values such as care and compassion; honesty and trustworthiness;	L1, L2, L3
6	Global development through integrity; respect; responsibility and understanding tolerance and inclusion.	L1, L2, L3, L4

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Value Education - Introduction** Understanding the importance of Value Education, Need in modern Society, Benefits for students, Adding Value to Life, Self-Exploration as the Process for Value Education.	2	L1, L2,L3
2	**Values and Ethics** Definition, Concept, Classification, value based life, Present day materialistic approach, importance of value in human lives, Humility, Attitude, self-confidence, Theory, Criteria and Sources of values. Ethics, Role of Ethics, Educational Ethics, imparting ethics in educational age, integrating spiritualty with education.	3	L1, L2, L3
3	**Right Understanding** Providing the Basis for Universal Human values and Ethical Human Conduct, Basis for the Holistic Alternative Unit Universal Human Order, Professional Ethics in the Light of Right Understanding, Vision for Holistic Technologies, and Journey towards the Holistic Alternative- The Road Ahead.	3	L1, L2, L3
4	**Dealing with Habits** Introduction to Habits- Simple , Serious and Grave bad Habits, Cause of Addiction to bad habits, How some bad habit are bad though they feel good, what implies one to go on with bad habits, How to have right perception ,The Power of Good habits, importance of right association.	2	L1, L2, L3
5	**Dealing with Stress** About Stress, definition and causes, Positive stress, Negative Stress, Statistics of Stress, and Suicides the present day Stupid idea. How to deal with cries in our life, Art of Tolerance, Making Right Choice,Life Style Management.	3	L1, L2, L3
6	**Harmony at Various Levels** Understanding the Human Being as co-existence of self and body Harmony in Self, Harmony with the body, Harmony in the Family, Harmony in the Society, Harmony in Nature, Harmony in Existence.	2	L1, L2, L3, L4
	Total Hours	**15**	

Books and References:

Sr. No.	Title	Authors	Publisher	Edition	Year
1	Value Education for Young Leaders	Dr. P Hari Krishna	Vashnavi Krishna Publication	Second Edition	2015
2	Value education	Singh Y K	APHPublishingCorporation	Second Edition	2009
3	Professional Ethics	R. Subramanian	Oxford Publication	Fourth Edition	2017
4	Beyond Illusion and Doubt	A. C Bhaktivedanta Swami	BBT	Fifth Edition	2017
5	Open eye Meditation	Shubha Vilas Das	FinGer Print Belief	SecondEdition	2016
6	Life Amazing Secrete	Gaur Gopal Das	Penguin India	First Edition	2018
7	Ethics from Epic	Govinda Das	Tulsi Publication	First Edition	2015
8	Peace and Value Education	Kiruba Charles & V. Arul Selvi	Neelkamal Publications	First Edition	2016

Online References:

Sr. No.	Website Name	URL	Modules Covered
1	http://www.yourarticlelibrary.com	http://www.yourarticlelibrary.com/education/values-education/value-education-meaning-objectives-and-needs-india/86967	M1,M2
2	https://ed100.org	https://ed100.org/lessons/valueshabits	M4
3	http://www.indiancurrents.org	http://www.indiancurrents.org/article-new-education-policy-stress-on-value-education-in-schools-103.php	M5

S.E. Semester –IV

B.E. (Computer Engineering)							**S.E. SEM : IV**		
Course Name : Professional Skills - IV (Basic Technology Skills) (Introduction to Python)							**Course Code :**HSD-CSPS401		
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**	
1	-	2	3	2	-	-	50	25	**75**
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 make students learn how to design and program Python applications. The course intends to develop professional skills necessary for becoming technically skilled personnel.

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

SN	Course Outcomes	Cognitive levels of attainment as per Bloom's Taxonomy
1	Understand basic concepts in python.	L1, L2
2	Describe various decision making techniques using Python programming language	L1, L2, L3
3	Illustrate various OOP concepts in Python	L1, L2, L3
4	Comprehend contents of files, directories and text processing with python	L1, L2
5	Apply Python programming for data structure using built in functions	L1, L2, L3
6	Show GUI and communication with database using python	L1, L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs.	Cognitive levels of attainment as per Bloom's Taxonomy
1	**Introduction to Python**		L1, L2
	Data types in python, Operators in python, Input and Output, Arrays in python, String and Character in python, Importing Packages and Modules	2	
2	**Decision Making and Functions**		L1, L2, L3
	If statement, if-elif-else, while loop, for loop, break statement, Functions	3	
3	**Object Oriented Programming in Python**		L1, L2, L3
	Object Oriented Programming features in Python: Implementing Classes , Objects, methods, encapsulation, Inheritance and polymorphism	2	
4	**Advanced Python**		L1, L2
	Exception Handling, Files handling in Python, Text Processing, Regular expression in python, Reading data	2	
5	**Data Structure in Python**		L1, L2, L3
	List and Tuples, Vectors and DataFrames, Introduction to Numpy and Pandas libraries	2	
6	**Python Integration Primer**		L1, L2, L3
	Graphical User interface, Python database connectivity	4	
	Total Hours	**15**	

Books and References:

SN	Title	Authors	Publisher	Edition	Year
1	Core Python Programming	Dr. R. Nageswara Rao	Dreamtech Press, Wiley Publication	Second Edition	2018
2	Learn Python 3 The Hard Way	Zed A. Shaw	Pearson Education	First Edition	2017
3	Head First Python: A Brain-Friendly Guide	Paul Barry	Shroff/O'Reilly	Second edition	2016
4	Beginning Python: Using Python 2.6 and Python 3.1	James Payne	Wrox Publication	First Edition	2010
5	Beginning Python From Novice to Professional	Magnus Lie Hetland	Apress Publication	Second Edition	2005

Online References:

S. No.	Website Name	URL	Modules Covered
1	www.learnpython.org	https://www.learnpython.org/	M1,M2,M3
2	www.w3schools.com	https://www.w3schools.com/python/	M1-M6
3	www.tutorialspoint.com	https://www.studytonight.com/dbms/	M1-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**	Demonstrate basics of python like data types (strings, array) and Importing Packages and Modules	2	L1, L2
2.		Develop a program based on control statements	2	L1, L2
3.	**Design Experiments**	Build a program to implement encapsulation, Inheritance and polymorphism in Python.	2	L1, L2, L3
4.		Build Python program demonstrating use of text processing.(regular expression)	2	L1, L2, L3
5.		Build Python program to explore 1. Files and directories (display file, count number of lines) 2. Exception Handling	4	L1, L2, L3
6.		Build Python program to demonstrate Data Structures in Python (List, Tuples, Vectors, DataFrames)	2	L1, L2, L3
7.		Develop Python program to convert arrays into DataFrames and merge them together using Numpy and Pandas Library.	4	L1, L2, L3
8.		1.Build Python program to create GUI in python using tkinter. 2. Develop Python program to demonstrate CRUD (create, read, update and delete) operations on database (SQLite/ MySQL) using python.	4	L1, L2, L3
9.	**Case Studies**	1. Python libraries in data science 2. Python case study to analyses the eligibilityof loan.	2	L1, L2, L3
10.	**Mini Project**	1. Text processing in python 2. Desktop application using python (GUI and database) 3. SPAM mail checking system using python 4. Project based on numpy and pandas.	6	L1, L2, L3
		Total Hours	**30**	

S.E. Semester –IV

B.E. (Computer Engineering)						S.E. SEM : IV	
Course Name : Project Based Learning – II						**Course Code :**HSD-CSPBL401	
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**	**Report**	**Term Work**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**(AC)**	**(AC)**	
-	-	2	2	1	25	-	**25**

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:

SN	Course Objectives	Cognitive levels of attainment as per Bloom's Taxonomy
1	Able to modify the existing project (PBL 1) with additional functionalities.	L1,L2,L3
2	Able to evaluate the performance of existing projects by implementing it in different programming languages.	L1,L2,L3
3	Able to implement solution using multidisciplinary /Interdisciplinary approaches.	L1,L2,L3,L4

Projects Listing:

SN	Title of Project	Type of Project
1	Design and Development of Data Compression Algorithm for SMS	Core
2	Design and Development of System for Detecting Handwritten Images using CNN	Core
3	Implementing System for File Transfer through Cryptography	Application
4	Implementing System for Attendance Management Using Face Recognition	Application
5	Advanced Application for Weather Forecasting using IoT	Application/ Multidisciplinary
6	Advanced System for Security Using Biometric Authentication	Application/ Multidisciplinary
7	Advanced System for Avoiding Phishing Attack	Application
8	Design and Development of Recommender system for online shopping portal	Core
9	Implementation of Medical Prescription Reader	Application
10	Implementing System for File Transfer through Cryptography	Application
11	Design and development of web portal for Smart City Traveler	Application/ Multidisciplinary
12	Design and Development of an application for Automated Railway Concession Form System	Application

S.E. Semester –IV

B.E. (ALL BRANCHES)							**S.E. SEM : IV**		
Course Name : Activity Based Learning-IV							**Course Code:** HSD-CSABL401		
Teaching Scheme (Program Specific)					**Examination Scheme (Formative/ Summative)**				
Modes of Teaching / Learning / Weightage					**Modes of Continuous Assessment / Evaluation**				
Hours Per Week					**Theory (25)**		**Presentation**	**Report**	**Total**
Theory	**Tutorial**	**Practical**	**Contact Hours**	**Credits**	**IA**	**ESE**	**(AC)**	**(AC)**	**50**
-	-	2	2	1	-	-	25	25	
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 Objectives:

The larger objective of the course is to develop the Society Sensitive Citizens by creating awareness among students and take up the initiatives in the Activity mode for the needy.
The course intends to deliver the understanding of the concepts of critical thinking, encourage 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 help the society in the area of work.

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

SN	Course Outcome	Cognitive level attainment as per revised Bloom Taxonomy
1	Apply procedures for Creative writing, which will give them wings of imagination with self-expression in the topic. Learn on multidisciplinary subjects.	L1, L2, L3
2	Understand the importance of the *extempore* speech which will help them to think and develop presence of mind. Exposure to Group discussion will provide an opportunity to all team members to give their ideas and opinion on a certain topic. It increases one's listening skills and confidence in speaking. Team building improves.	L1, L2
3	Interpret the strengths of survey research including its effectiveness, generalizability, reliability, and versatility. Students will be able to make the awareness about various social issues.	L1, L2, L3

Detailed Syllabus:

Module No.	Topics	Hrs	Cognitive level attainment as per revised Bloom Taxonomy
1	**Creative writing (technical/non-technical**		L1, L2, L3
	I.. Introduction to creative writing. a) Orientation and Introduction to Writing skills both article form and paper writing. Information about the rules and regulations about original writing. Templates of good journals eg. (IEEE format) with emphasize on originality, plagiarism check. Topic distribution in different categories as per choice of students Select the topic of article/ paper either from choice or in consultation with teacher. Discussion forum or Use of internet is allowed for the same. **Brainstorming and prewriting** Form teams divide into 8 teams. 5 students per team. Form the skeleton of the paper with data properly designed. check the plagiarism and shaping the article/paper with the team. **II. Drafting and editing** Continuation of the article/paper shaping, taking care of plagiarism Submit the article /paper introduction in one page outlining the salient features of the topic in hard copy. Students can have the freedom of choosing mentor faculty from college if needed. Finalizing the article/ paper. **Demonstration by students** and evaluation (Presentation of papers of 4 teams with inputs from mentors/teachers) **Evaluation by faculty as per format.**	2 2	
2	**Lecturette (Extempore speech)**		L1, L2, L3
	I. Introduction Orientation and Introduction to lecturette/ extempore rules The candidate is required to deliver a short talk for 03 minutes to the group watching him. Choice of topic discussion. Technical/ Non-technical **A suitable topic** is to be chosen out of 04 topics given. 03 minutes will be given for thinking, jotting down points and organizing the speech without any help. Candidate has to introduce himself/herself in brief before starting the talk. **II. Extempore/Presentation by each student** **Evaluation by faculty as per format.**	2 2	
3	**Group Discussion**		L1, L2, L3
	I. Introduction and orientation about Group discussion and rules . GDs form an important part of the short-listing process for recruitment or admission in a company or institution. Types of GD Topics such as social, political, economic, technical etc. Topic choice to be given to students and based on that Team formation on the chosen topic Brainstorming among the students to form teams on topics selected. **.Prepare the points for group discussion.** Formation of four teams for two topics.	2	

	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. **II. Paraphrasing/summarizing.** Evaluation will be based on Creativity skills supported by listening and participating proactively by presentation of teams. Group discussion among the teams members sequentially, other teams will be audience to discussing team and vice versa. **Evaluation by faculty as per format**	2	
4	**SURVEY DESIGNING AND STUDY** **I. Introduction and Orientation** to research methodology emphasizing on survey designing. Surveys can be administered in many modes, including: online surveys, email surveys, social media surveys, paper surveys, mobile surveys, telephone surveys, and face-to-face interviewsurveys. Brainstorming and establishing the goal of the project Form teams, divide into 8 teams. 5 students per team. Select the topic of survey topic with feasible insight either from choice or in consultation with teacher. Discussion forum or Use of internet is allowed for the same. **Structuring and Designing the Questionnaire** Create the sample questionnaires(max 10) mapping with goal established Interview the peer team members for data (all students should be asked.) Field survey topics can also be collected. **II. Collection of the data** and use the tools for analyses of the survey incorporated if any. Finalizing the results Data analyses in the form of written article and graphs projection for the same. Presentation of survey results by teams (a)Demonstration by students 4 teams b) Presentation of another 4 teams Submission of projects as hard copy Evaluation by faculties	2 2	L1, L2, L3
5	**Extended Work** **I Orientation and Introduction about social responsibilities**. Team formation 5 students in each team. Visit to nearby community to provide necessary help based on the following topics **(a)Food Waste (TCET canteen) and societies.** Keep record of food waste daily in kilogram, help in designing the display of food wastage every day. Similarly extend the idea in their own society during festivals, gatherings. **(B) Health awareness** Take the record of the societies in which they reside, collect the information about vaccinations (age wise , validity of time etc) Record maintenance **(c) 3-minute Film making or case study** on the above two themes by teams and presentation. **Evaluation by faculty as per format.** **Total Hours**	4 4 6 **30**	L1, L2, L3

Books and References:

S. No.	Title	Authors	Publisher	Edition	Year
1	Creative Writing Book	Louie StowelL	Usborne Publishing Ltd	-	2016
2	Group Discussion on Current Topics	Major (retd.) P. N. Joshi	Upkar Prakashan	-	2010
3	Complete Guide to Group Discussion	PRASOON. PROF SHRIKANT	V&S Publishers	-	2011
4	Extempore speech, how to acquire and practice it	William Pittenger	Palala Press	-	2015
5	http://theconversation.com/awareness-of-food-waste-can-help-us-appreciate-holiday-meals-105798				
6	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5072240/				

Online References:

S. No.	Website Name	URL	Modules Covered
1	theconversation.com	http://theconversation.com/awareness-of-food-waste-can-help-us-appreciate-holiday-meals-105798	M1-M5
2	https://www.ncbi.nlm.nih.gov	https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5072240/	M5