K S INSTITUTE OF TECHNOLOGY, BENGALURU
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

NAME OF THE STAFF : **RAGHAVENDRACHAR.S**
SUBJECT CODE/NAME : **18CS32/ DATA STRUCTURES AND APPLICATIONS**

SEMESTER/SEC/YEAR : **III / A / II**

ACADEMIC YEAR : **2021-2022 [Odd Semester]**

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
MODULE 1:Introduction						
1	Data Structures, Classifications (Primitive & Non Primitive), Data structure Operations.	L+D	BB	1	1	19-10-2021
2	Review of Arrays, Structures, Self-Referential Structures, and Unions.	L+ D	BB	2	3	21-10-2021 22-10-2021
3	Pointers and Dynamic Memory Allocation Functions	L+ D	BB	2	5	23-10-2021 26-10-2021
4	Representation of Linear Arrays in Memory	L+D	BB	1	6	27-10-2021
5	Dynamically allocated arrays	L+D	BB	1	7	28-10-2021
6	Array Operations: Traversing, inserting, deleting, searching, and sorting.	L+D	BB	2	9	29-10-2021 30-10-2021
7	Multidimensional Arrays	L+D	LCD	2	11	02-11-2021 04-11-2021
8	Polynomials	L+D	BB	2	13	09-11-2021 10-11-2021
9	Sparse Matrices	L+D	BB	2	15	11-11-2021 12-11-2021
10	Strings: Basic Terminology, Storing	L+D	BB	1	16	16-11-2021
11	Operations and Pattern Matching algorithms. Programming Examples.	L+D	BB	2	18	17-11-2021 18-11-2021
MODULE 2:Stacks And Queues						
12	Stacks: Definition, Stack Operations and Array	L+ D	BB	2	20	19-11-2021

	Representation of Stacks					23-11-2021
13	Stacks using Dynamic Arrays	L+D	BB	1	21	24-11-2021
14	Stack Applications: Polish notation, Infix to postfix conversion, evaluation of postfix expression	L+D	BB	2	23	25-11-2021 26-11-2021
15	Recursion - Factorial, GCD, Fibonacci Sequence, Tower of Hanoi, Ackerman's function	PS	BB	1	24	27-11-2021
16	Queues: Definition, Array Representation and Queue Operations	L+D	LCD	2	26	30-11-2021 01-12-2021
	First Test					02-11-2021
17	Circular Queues	L+D	BB	1	27	07-12-2021
18	Circular queues using Dynamic arrays	L+D	BB	1	28	08-12-2021
19	Dequeues, Priority Queues	L+D, LW	BB	2	30	09-12-2021 10-12-2021
20	Mazing Problem. Multiple Stacks and Queues. Programming Examples.	L+D, LW	BB	2	32	14-12-2021 15-12-2021
MODULE 3: Linked Lists						
21	Definition, Representation of linked lists in Memory	L+D	BB+LCD	1	33	16-12-2021
22	Memory allocation; Garbage Collection.	L+D	LCD	1	34	17-12-2021
23	Linked list operations: Traversing, Searching, Insertion, and Deletion	L+D	BB	2	36	18-12-2021 21-12-2021
24	Doubly Linked lists	L+D	BB	2	38	22-12-2021 23-12-2021
25	Circular linked lists	L+D	BB	2	40	24-12-2021 28-12-2021
26	Header linked lists	L+D	BB	1	41	29-12-2021
27	Linked Stacks and Queues Applications of Linked lists	L+D	LCD	1	42	30-12-2021
MODULE 4: Trees						
	Second Test					03-01-2022
28	Terminology, Binary Trees, Properties of Binary trees	L+D	BB	2	44	31-12-2021 06-01-2022
29	Array and linked Representation of Binary Trees	L+D	LCD	1	45	07-01-2022
30	Binary Tree Traversals - Inorder, postorder, preorder	L+D, PS	BB	2	47	08-01-2022 11-01-2022
31	Additional Binary tree operations	L+D	BB	2	49	12-01-2022
32	Threaded binary trees	L+D	BB	1	50	13-01-2022
33	Binary Search Trees – Definition, Insertion, Deletion, Traversal, Searching	L+D	BB	1	51	18-01-2022

34	Application of Trees-Evaluation of Expression, Programming Examples	L+D, PS	BB	1	52	19-01-2022
MODULE 5: Graphs						
35	Definitions, Terminologies,	L+D	BB	1	53	20-01-2022
36	Matrix and Adjacency List	L+D	BB	1	54	21-01-2022
37	Representation Of Graphs	L+D	BB	1	55	22-01-2022
38	Elementary Graph operations	L+D, PS	BB	2	56	25-01-2022 27-01-2022
39	Traversal methods	L+D	BB	1	57	28-01-2022
40	Breadth First Search	L+D	BB	1	58	01-02-2022
41	Depth First Search	L+D	BB	1	59	02-02-2022
42	Sorting and Searching	L+D	LCD	1	60	03-02-2022
43	Insertion Sort	L+D	BB	1	61	04-02-2022
44	Radix sort and Address Calculation Sort	L+D	BB	1	62	05-02-2022
45	Hashing: Hash Table organizations	L+D	BB	1	63	08-02-2022
46	Hashing Functions, Static and Dynamic Hashing	L+D	BB	1	64	09-02-2022
47	Files and Their Organization	L+D	BB	2	66	10-02-2022 10-02-2022
48	**Third Test**					14-02-2022

Signature of Course in charge **Signature of H.O.D**

KS INSTITUTE OF TECHNOLOGY BANGALORE

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

NAME OF THE STAFF : Mr. SANJOY DAS

SUBJECT CODE/NAME : 18CS33/ ANALOG AND DIGITAL ELECTRONICS

SEMESTER/YEAR : III A/ II

ACADEMIC YEAR : 2021-2022

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
MODULE 1						
1	Photodiodes	L+D	BB	1	1	19/10/2021
2	Light Emitting Diodes and Optocouplers	L+ D	BB	1	2	21/10/2021
3	Fixed bias ,Collector to base Bias, voltage divider bias	L+ D	BB	1	3	22/10/2021
4	Integrated Circuit(IC) Multivibrator	L+D	BB	1	4	23/10/2021
5	Peak Detector Circuit and Schmitt Trigger	L+D	BB	1	5	23/10/2021
6	Comparator and Active Filters	L+D	BB	1	6	26/10/2021
7	Non-Linear Amplifiers and Relaxation Oscillator	L+D	BB	1	7	27/10/2021
8	Current-To-Voltage and Voltage-To-Current Converter	L+D	BB	1	8	28/10/2021
9	Power Supply Parameters and voltage regulator	L+D	BB	1	9	30/10/2021
10	D to A and A to D converter	L+D	BB	1	10	02/11/2021
MODULE 2						
11	Basic Logic gates, Positive and Negative Logic	L+ D	BB	1	11	04/11/2021
12	Sum-of-Products Method	L+D	BB	1	12	09/11/2021
13	Truth Table to Karnaugh Map, Pairs Quads and Octets	L+D	BB	1	13	10/11/2021
14	Karnaugh Simplifications and Don't-care Conditions	L+D	BB	1	14	10/11/2021

15	Product-of-sums Method	L+D	BB	1	15	16/11/2021
16	Product-of Sums simplifications	L+D	BB	1	16	17/11/2021
17	Quine-McClusky Method	L+D	BB	1	17	17/11/2021
18	Simplification by Quine-McClusky Method	L+D	BB	1	18	18/11/2021
19	Petricks method	L+D	BB	1	19	23/11/2021
20	Simplification using map-entered variables	L+D	BB	1	20	24/11/2021
MODULE 3						
21	Review of Combinational circuit design	L+D	BB	1	21	24/11/2021
22	Gate delays and Timing diagrams	L+D	BB	1	22	25/11/2021
23	Hazards in combinational Logic	L+D	BB	1	23	27/11/2021
24	Simulation and testing of logic circuits	L+D	BB	1	24	30/11/2021
25	Multiplexers	L+D	BB	1	25	01/12/2021
26	1-of-16 Decoder and BCD to Decimal Decoders	L+D	BB	1	26	01/12/2021
27	Seven Segment Decoders and Encoders	L+D	BB	1	27	02/12/2021
28	Exclusive-OR Gates, Parity Generators and Checkers	L+D	BB	1	28	03/12/2021
29	Programmable Logic Arrays	L+D	BB	1	29	07/12/2021
30	Programmable Array Logic.	L+D	BB	1	30	08/12/2021
MODULE 4						
31	Set Reset Latch, Gated Latches	L+D	BB	1	31	08/12/2021
32	D flip-flop and SR flip-flop	L+D	BB	1	32	14/12/2021
33	JK flip-flop and JK Master-slave flip-flop	L+D	BB	1	33	14/12/2021
34	Switch Contact Bounce Circuits and Various Flip-Flops	L+D	BB	1	34	15/12/2021
35	VHDL Module	L+D	BB	1	35	21/12/2021
36	VHDL description of combinational circuits	L+D	BB	1	36	22/12/2021
37	VHDL Modules for multiplexer	L+D	BB	1	37	22/12/2021
38	VHDL Implementation of D-Flip-Flops	L+D	BB	1	38	23/12/2021
39	VHDL Implementation of JK-Flip-Flops	L+D	BB	1	39	28/12/2021
40	Asynchronous Counters and Decoding Gates	L+D	BB	1	40	29/12/2021
MODULE 5						

41	Shift registers	L+D	BB	1	41	29/12/2021
42	Serial In - Serial Out, Serial In -Parallel out Registers	L+D	BB	1	42	30/12/2021
43	Parallel In - Serial Out, Parallel In - Parallel Out Registers	L+D	BB	1	43	04/01/2022
44	Parallel Adder with accumulator	L+D	BB	1	44	04/01/2022
45	Design of Binary counters	L+D	BB	1	45	05/01/2022
46	Counter Design as a Synthesis problem	L+D	BB	1	46	05/01/2022
47	A Digital Clock	L+D	BB	1	47	06/01/2022
48	Synchronous Counters and Changing the Counter Modulus	L+D	BB	1	48	11/01/2022
49	Sequential parity checker	L+D	BB	1	49	12/01/2022
50	State tables and graphs	L+D	BB	1	50	13/01/2022
51	Revision	L+D	BB	1	51	17/01/2022
52	Revision	L+D	BB	1	52	18/01/2022

KS INSTITUTE OF TECHNOLOGY BANGALORE

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

NAME OF THE STAFF : VIJAYALAXMI MEKALI

SUBJECT CODE/NAME : 18CO34 / Computer Organization

SEMESTER/YEAR : III / 'B'

ACADEMIC YEAR : 2020-2021

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
MODULE 1: Basic Structure of Computers						
1	Introduction to CO	L+D	PPT using MS TEAMS	1	**1**	**1-9-2020**
2	Basic Operational Concepts	L+D	PPT using MS TEAMS	1	2	**2-9-2020**
3	Bus Structures, Performance – Processor Clock,	L+D	PPT using MS TEAMS	1	3	**3-9-2020**
4	Basic Performance Equation, Clock Rate	L+ D	PPT using MS TEAMS	1	4	**7-9-2020**
5	Performance Measurement	L+ D	PPT using MS TEAMS	1	5	**8-9-2020**
6	Machine Instructions and Programs: Memory Location and Addresses	L+ D	PPT using MS TEAMS	1	6	**9-9-2020**
7	Memory Operations, Instructions and Instruction Sequencing,	L+D	PPT using MS TEAMS	1	7	**10-9-2020**
8	Addressing Modes, Assembly Language	L+D	PPT using MS TEAMS	1	8	**14-9-2020**
9	Basic Input and Output Operations	L+D	PPT using MS TEAMS	1	9	**15-9-2020**

10	Stacks and Queues, Subroutines	L+D	PPT using MS TEAMS	1	10	16-9-2020
11	Additional Instructions, Encoding of Machine Instructions		PPT using MS TEAMS	1	11	21-9-2020
12	Pedagogy activity		PPT using MS TEAMS	1	12	22-9-2020
	MODULE 2: Input/Output Organization					
13	Introduction to Input/Output Organization	L+ D	PPT using MS TEAMS	1	13	23-9-2020
14	Accessing Input Devices	L+D	PPT using MS TEAMS	1	14	24-9-2020
	IA-1 29/9/2020					
15	Accessing Output Devices	L+D	PPT using MS TEAMS	1	15	1-10-2020
16	Interrupts – Interrupt Hardware	L+D	PPT using MS TEAMS	1	16	5-10-2020
17	Direct Memory Access	L+D	PPT using MS TEAMS	1	17	6-10-2020
18	Buses	L+D	PPT using MS TEAMS	1	18	7-10-2020
19	Interface Circuits	L+D	PPT using MS TEAMS	1	19	8-10-2020
20	Standard I/O Interfaces – PCI Bus	L+D	PPT using MS TEAMS	1	20	12-10-2020
21	SCSI Bus	L+I	PPT using MS TEAMS	1	21	13-10-2020
22	USB.	L+D	PPT using MS TEAMS	1	22	14-10-2020
23	Pedagogy activity		PPT using MS TEAMS	1	23	15-10-2020
24	Pedagogy activity		PPT using MS TEAMS	1	24	19-10-2020
	MODULE 3: Memory System					
25	Introduction to Memory System	L+D	PPT using MS TEAMS	1	25	20-10-2020
26	Basic Concepts	L+D	PPT using	1	26	21-10-2020

			MS TEAMS			
27	Semiconductor RAM Memories: Internal organization of Memory chips	L+D	PPT using MS TEAMS	1	27	**22-10-2020**
28	Static Memories, Asynchronous DRAMs and Synchronous DRAMs	L+D	PPT using MS TEAMS	1	28	**24-10-2020**
29	Structure of Larger memories, memory system considerations	L+D	PPT using MS TEAMS	1	29	**27-10-2020**
30	Read Only Memories	L+D	PPT using MS TEAMS	1	30	**28-10-2020**
31	Speed, Size, and Cost, Cache Memories – Mapping Functions	L+D	PPT using MS TEAMS	1	31	**29-10-2020**
32	Replacement Algorithms, Performance Consideration	L+D,PS(Tx)	PPT using MS TEAMS	1	31	**2-11-2020**
33	Interleaving, Hit rate and Miss penalty	L+D,PS(Tx)	PPT using MS TEAMS	1	32	**3-11-2020**
34	Pedagogy activity	L+D,PS(Tx)	PPT using MS TEAMS	1	33	**4-11-2020**
MODULE 4:**Arithmetic**						
35	Introduction to Arithmetic, Numbers, Arithmetic Operations and Characters,Addition and Subtraction of Signed Numbers	L+I	PPT using MS TEAMS	1	34	**5-11-2020**
36	Design of Fast Adders	L+D	PPT using MS TEAMS	1	35	**7-11-2020**
IA-210/10/2020						
37	Multiplication of Positive Numbers,	L+D	PPT using MS TEAMS	1	36	**12-11-2020**
38	Signed Operand Multiplication	L+D,PS(Tx)	PPT using MS TEAMS	2	37	**17-11-2020**
39	Fast Multiplication	L+D,PS(Tx)	PPT using MS TEAMS	1	38	**18-11-2020**
40	Integer Division.	L+D,PS(Tx)	PPT using MS TEAMS	2	39	**19-11-2020**
41	Pedagogy activity	L+D,PS(Tx)	PPT using MS TEAMS	1	40	**23-11-2020**
42	Pedagogy activity	L+D,PS(Tx)	PPT using MS TEAMS	1	41	**24-11-2020**

MODULE 5:**Basic Processing Unit**						
43	Introduction toBasic Processing Unit	L+D,PS(Tx)	PPT using MS TEAMS	1	42	**25-11-2020**
44	Some Fundamental Concepts	L+D,PS(Tx)	PPT using MS TEAMS	1	43	**26-11-2020**
45	Execution of a Complete Instruction	L+D,PS(Tx)	PPT using MS TEAMS	1	44	**30-11-2020**
46	Multiple Bus Organization	L+D	PPT using MS TEAMS	1	45	**1-12-2020**
47	Hard-wired Control – A Complete Processor	L+D	PPT using MS TEAMS	1	46	**2-12-2020**
48	Micro programmed Control.	L+D	PPT using MS TEAMS	1	47	**5-12-2020**
49	Micro instructions	L+D	PPT using MS TEAMS	1	48	**7-12-2020**
50	Micro program sequencing	L+D	PPT using MS TEAMS	1	49	**8-12-2020**
51	Micro instructions with next address field	L+D	PPT using MS TEAMS	1	50	**9-12-2020**
52	Pipelining: Basic concepts of pipelining	L+D	PPT using MS TEAMS	1	51	**10-12-2020**
IA-315/11/2020						
59	Revision	L+D	PPT using MS TEAMS	1	60	**1-2-2021**
60	Revision	L+D	PPT using MS TEAMS	1	60	**2-2-2021**

Text Books

1. Carl Hamacher, ZvonkoVranesic, SafwatZaky, Computer Organization, 5th Edition, Tata McGraw Hill, 2002.

Reference Books

2. William Stallings: Computer Organization & Architecture, 9th edition, Pearson, 2015

Web Material:

http://nptel.vtu.ac.in/econtent/courses/CSE/06CS46/index.php

Details of Teaching Aids:

PPts usingZoom Platform

Signature of Course in-charge **Signature of Module Coordinator** **Signature of HOD-CSE**

Head of the Department
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K.S. Institute of Technology
Bengaluru -560 109

K S INSTITUTE OF TECHNOLOGY BENGALURU
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

NAME OF THE STAFF : VIJAYALAXMI MEKALI
SUBJECT CODE/NAME : 18CS42/ DESIGN AND ANALYSIS OF ALGORITHMS
SEMESTER/YEAR/SEC : IV /II/B
ACADEMIC YEAR : 2020-2021

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
	MODULE 1					
1	What is an Algorithm?, Algorithm Specification	L+D	PPT using MS TEAMS	1	1	19-4-2021
2	Analysis Framework	L+ D	PPT using MS TEAMS	1	2	21-4-2021
3	Performance Analysis: Space complexity,	L+ D	PPT using MS TEAMS	1	3	21-4-2021
4	Time complexity	L+D	PPT using MS TEAMS	1	4	23-4-2021
5	**Asymptotic Notations:** Big-Oh notation (O), with Examples	L+D	PPT using MS TEAMS	1	5	24-4-2021
6	Omega notation (Ω), Theta notation (Q), and Little-oh notation (o)	L+D	PPT using MS TEAMS	1	6	24-4-2021
7	Mathematical analysis of Non-Recursive and	L+D	PPT using MS TEAMS	1	7	26-4-2021
8	Mathematical analysis of recursive Algorithms	L+I	PPT using MS TEAMS	1	8	28-4-2021
9	**Important Problem Types:** Sorting, Searching, String processing, Graph Problems, Combinatorial Problems.	L+D	PPT using MS TEAMS	1	9	28-4-2021
10	**Fundamental Data Structures:** Stacks, Queues, Graphs, Trees, Sets and Dictionaries.	L+D	PPT using MS TEAMS	1	10	30-4-2021

11	Guiding Principles	PS(Tx)	PPT using MS TEAMS	1	11	3-5-2021
	MODULE 2					
12	**Divide and Conquer:** General method	L+ D	PPT using MS TEAMS	1	12	5-5-2021
13	Binary search	L+D	PPT using MS TEAMS	1	13	5-5-2021
14	Recurrence equation for divide and conquer	LW	PPT using MS TEAMS	1	14	7-5-2021
15	Recurrence equation for divide and conquer	L+D	PPT using MS TEAMS	1	15	8-5-2021
16	Merge sort	L+D	PPT using MS TEAMS	1	16	10-5-2021
17	Merge sort	L+D	PPT using MS TEAMS	1	17	
18	Quick sort	L+D	PPT using MS TEAMS	1	18	12-5-2021
19	Quick sort	L+ D	PPT using MS TEAMS	1	19	17-5-2021
20	Strassen's matrix multiplication	L+ D	PPT using MS TEAMS	1	20	19-5-2021
21	Advantages and Disadvantages of divide and Conquer.	L+ D	PPT using MS TEAMS	1	21	19-5-2021
22	**Decrease and Conquer Approach:** Topological Sort.	L+ D	PPT using MS TEAMS	1	22	21-5-2021
	I Test					**24/5/2021**
	MODULE 3					
23	**Greedy Method:** General method	L+D	PPT using MS TEAMS	1	23	28-5-2021
24	Coin Change Problem	L+D	PPT using MS TEAMS	1	24	31-5-2021
25	Knapsack Problem	L+D	PPT using MS TEAMS	1	25	21-5-2021
26	Job sequencing with deadlines	L+D+I	PPT using MS TEAMS	1	26	2-6-2021
27	Minimum cost spanning trees: Prim's	L+D+I	PPT using MS	1	27	2-6-2021

	Algorithm		TE,A,M5			
28	**Minimum cost spanning trees: Kruskal's** Algorithm	L1,(5) L=5+1	PPT using MS TE,A,M5	1	28	4-6-2021
29	**Single source shortest paths:** Dijkstra's Algorithm	L=5	PPT using MS TE,A,M5	1	29	5-6-2021
30	Optimal Tree problem: Huffman Trees and Codes	L=5	PPT using MS TE,A,M5	1	30	5-6-2021
31	**Transform and Conquer Approach: Heaps**	L=5	PPT using MS TE,A,M5	1	31	7-6-2021
32	Heap Sort	L=5	PPT using MS TE,A,M5	1	32	9-6-2021
	SESSIONAL # 2					
33	**Dynamic Programming:** General method with Examples	L=6	PPT using MS TE,A,M5	1	33	9-6-2021
34	Multistage Graphs	L=6	PPT using MS TE,A,M5	1	34	11-6-2021
35	Multistage Graphs	L=5+1,(2)	PPT using MS TE,A,M5	1	35	12-6-2021
36	**Transitive Closure:** Warshall's Algorithm.	L=5	PPT using MS TE,A,M5	1	36	14-6-2021
37	**All Pairs Shortest Paths:** Floyd's Algorithm	L=5	PPT using MS TE,A,M5	1	37	14-6-2021
38	Optimal Binary Search Trees	L=5	PPT using MS TE,A,M5	1	38	14-6-2021
39	**Knapsack problem**	L=5	PPT using MS TE,A,M5	1	39	15-6-2021
40	**Knapsack problem**	L=5	PPT using MS TE,A,M5	1	40	21-6-2021
41	Bellman Ford Algorithm	L=5+1	PPT using MS TE,A,M5	1	41	21-6-2021
42	Travelling Sales Person problem	L=5+1	PPT using MS	1	42	23-6-2021

			TEAMS			
43	Travelling Sales Person problem	L+ D	PPT using MS TEAMS	1	43	25-6-2021
II Test						**28-5-2021**
MODULE 5						
44	**Backtracking**: General method Programme and **Bound**: Assignment Problem,	L+D	PPT using MS TEAMS	1	44	2-7-2021
45	N-Queens problem	L+D	PPT using MS TEAMS	1	45	5-7-2021
46	N-Queens problem	L+LFCR	PPT using MS TEAMS	1	46	7-7-2021
47	Sum of subsets problem	L+ D	PPT using MS TEAMS	1	47	7-7-2021
48	Graph coloring	L+D	PPT using MS TEAMS	1	48	9-7-2021
49	Hamiltonian cycles	L+D	PPT using MS TEAMS	1	49	12-7-2021
50	Travelling Sales Person problem	L+ D	PPT using MS TEAMS	1	50	14-7-2021
51	0/1 Knapsack problem	L+D	PPT using MS TEAMS	1	51	14-7-2021
52	LC Programme and Bound solution	L+D	PPT using MS TEAMS	1	52	16-7-2021
53	FIFO Programme and Bound solution	L+ D	PPT using MS TEAMS	1	53	19-7-2021
54	non- deterministic algorithms	L+ D	PPT using MS TEAMS	1	54	23-7-2021
54	P, NP, NP-Complete, and NP-Hard classes		PPT using MS TEAMS	1	55	
III Test						**29-7-2021**
55	Revision	L+D	PPT using MS TEAMS	2	57	26-7-2021 and 27/7/2021 (2)

Textbooks:

1. Introduction to the Design and Analysis of Algorithms, Anany Levitin:, 2rd Edition, 2009. Pearson.
2. Computer Algorithms/C++, Ellis Horowitz, Satraj Sahni and Rajasekaran, 2nd Edition, 2014, Universities Press

Reference Books:

1. Introduction to Algorithms, Thomas H. Cormen, Charles E. Leiserson, Ronal L. Rivest, Clifford Stein, 3rd Edition, PHI.
2. Design and Analysis of Algorithms , S. Sridhar, Oxford (Higher Education).

Web Material:

https://nptel.ac.in/courses/106/106/106106131/

Details of Teaching Aids:

1. PPTs using Zoom Platform

Signature of Course in-charge **Signature of Module Coordinator** **Signature of HOD-CSE**

Head of the Department
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Bengaluru -560 109

KS INSTITUTE OF TECHNOLOGY BANGALORE

DEPARTMENT OF COMPUTER SCIENCE &ENGINEERING

NAME OF THE STAFF : Mr. Roopesh Kumar B N

SUBJECT CODE/NAME : 18CS44/ MICROCONTROLLER & EMBEDDED SYSTEMS

SEMESTER/YEAR/SEC : IV / II/ B

ACADEMIC YEAR : 2020-2021

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
MODULE 1						
1	Microprocessors versus Microcontrollers	L+I	LCD	1	1	19/04/2021
2	ARM Embedded Systems	L+I	LCD	1	2	20/04/2021
3	The RISC design philosophy	L+I	LCD	1	3	22/04/2021
4	The ARM Design Philosophy	L+I	LCD	1	4	23/04/2021
5	Embedded System Hardware	L+I	LCD	1	5	26/04/2021
6	Embedded System Software, Pipeline	L+I	LCD	1	6	27/04/2021
7	ARM Processor Fundamentals: Registers, Current Program Status Register	L+I	LCD	1	7	29/04/2021
8	Exceptions	L+I	LCD	1	8	30/04/2021
9	Interrupts, and the Vector Table	L+I	LCD	1	9	03/05/2021
10	Core Extensions	L+I	LCD	1	10	04/05/2021
MODULE 2						
11	**Introduction to the ARM Instruction Set :** Data Processing Instructions	L+I	LCD	1	11	06/05/2021
12	Programme Instructions, Software Interrupt Instructions	L+I	LCD	1	12	07/05/2021
13	Program Status Register Instructions ,Coprocessor Instructions	L+I	LCD	1	13	08/05/2021

14	Coprocessor Instructions, Loading Constants	L+I	LCD	1	14	10/05/2021
15	**ARM programming using Assembly language:** Writing Assembly code	L+I	LCD	1	15	11/05/2021
16	Profiling and cycle counting	L+I	LCD	1	16	17/05/2021
17	Instruction scheduling	L+I	LCD	1	17	18/05/2021
18	Register Allocation	L+I	LCD	1	18	20/05/2021
19	Conditional Execution	L+I	LCD	1	19	21/05/2021
20	Looping Constructs	L+I	LCD	1	20	22/05/2021
MODULE 3						
21	**Embedded System Components:** Embedded Vs General computing system	L+I	LCD	1	21	27/05/2021
22	History of embedded systems	L+I	LCD	1	22	28/05/2021
23	Classification of Embedded systems	L+I	LCD	1	23	31/05/2021
24	Major applications areas of embedded systems	L+I	LCD	1	24	01/06/2021
25	Purpose of embedded systems	L+I	LCD	1	25	03/06/2021
26	Core of an Embedded System including all types of processor/controller	L+I	LCD	1	26	04/06/2021
27	Core of an Embedded System including all types of processor/controller	L+I	LCD	1	27	07/06/2021
28	Core of an Embedded System including all types of processor/controller	L+I	LCD	1	28	08/06/2021
29	Embedded firmware	L+I	LCD	1	29	10/06/2021
30	Other system components	L+I	LCD	1	30	11/06/2021
MODULE 4						
31	**Embedded System Design Concepts:** Characteristics and Quality Attributes of Embedded Systems	L+I	LCD	1	31	14/06/2021
32	Operational quality attributes	L+I	LCD	1	32	15/06/2021
33	non-operational quality attributes	L+I	LCD	1	33	17/06/2021
34	Embedded Systems-Application specific	L+I	LCD	1	34	18/06/2021
35	Embedded Systems- Domain specific	L+I	LCD	1	35	19/06/2021
36	Hardware Software Co-Design and Program Modelling	L+I	LCD	1	36	21/06/2021
37	Hardware Software Co-Design and Program Modelling	L+I	LCD	1	37	22/06/2021
38	Hardware Software Co-Design and Program Modelling	L+I	LCD	1	38	24/06/2021
39	Hardware Software Co-Design and Program Modelling	L+I	LCD	1	39	25/06/2021
40	Embedded firmware design and development	L+I	LCD	1	40	01/07/2021

MODULE 5						
41	**RTOS and IDE for Embedded System Design:**	L+I	LCD	1	41	02/07/2021
42	Operating System basics, Types of operating systems	L+I	LCD	1	42	03/07/2021
43	Task, process and threads	L+I	LCD	1	43	05/07/2021
44	Thread preemption, Multiprocessing and Multitasking	L+I	LCD	1	44	06/07/2021
45	Task Communication	L+I	LCD	1	45	08/07/2021
46	Task synchronization issues	L+I	LCD	1	46	09/07/2021
47	Concept of Binary and counting semaphores	L+I	LCD	1	47	12/07/2021
48	How to choose an RTOS	L+I	LCD	1	48	13/07/2021
49	Integration and testing of Embedded hardware and firmware	L+I	LCD	1	59	15/07/2021
50	Embedded system Development Environment	L+I	LCD	1	50	16/07/2021
51	Embedded system Development Environment	L+I	LCD	1	51	17/07/2021
52	Profiling and cycle counting	L+I	LCD	1	52	22/07/2021
53	Instruction scheduling	L+I	LCD	1	53	23/07/2021
54	Register Allocation	L+I	LCD	1	54	26/07/2021
55	Conditional Execution	L+I	LCD	1	55	27/07/2021
56	Looping Constructs	L+I	LCD	1	56	29/07/2021
I INTERNALS						25/05/2021
II INTERNALS						29/06/2021
III INTERNALS						05/08/2021

Signature of HOD

K S INSTITUTE OF TECHNOLOGY, BENGALURU
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

NAME OF THE STAFF : Mr. RAGHAVENDRACHAR.S
SUBJECT CODE/NAME : 18CS45/ OBJECT ORIENTED CONCEPTS
SEMESTER/SEC/YEAR : IV / A / II
ACADEMIC YEAR : 2020-2021 [EVEN SEMESTER]

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
MODULE 1: Introduction to Object Oriented Concepts:						
1	A Review of structures	L+D	Microsoft Teams	1	1	19-04-2021
2	Procedure–Oriented Programming system	L+D	Microsoft Teams	1	2	20-04-2021
3	Object Oriented Programming System	L+D	Microsoft Teams	1	3	21-04-2021
4	Comparison of Object Oriented Language with C	L+D	Microsoft Teams	1	4	22-04-2021
5	Console I/O, variables and reference variables	L+D	Microsoft Teams	1	5	24-04-2021
6	Function Prototyping	L+D	Microsoft Teams	1	6	26-04-2021
7	Function Overloading	L+D	Microsoft Teams	1	7	27-04-2021
8	**Class and Objects :** Introduction	L+D	Microsoft Teams	1	8	28-04-2021
9	member functions and data	L+D	Microsoft Teams	1	9	29-04-2021

10	objects and functions	L+D	Microsoft Teams	1	10	03-05-2021
11	Programming Examples	L+D	Microsoft Teams	1	11	04-05-2021
12	Programming Examples	L+D	Microsoft Teams	1	12	05-05-2021
13	Programming Examples	L+D	Microsoft Teams	1	13	06-05-2021
14	Programming Examples	L+D	Microsoft Teams	1	14	08-05-2021
MODULE 2: Class and Objects (contd):						
15	Objects and arrays	L+D	Microsoft Teams	1	15	10-05-2021
16	Namespaces	L+D	Microsoft Teams	1	16	11-05-2021
17	Nested classes, Constructors, Destructors	L+D	Microsoft Teams	1	17	12-05-2021
18	**Introduction to Java**	L+D	Microsoft Teams	1	18	17-05-2021
19	Java‟s magic: the Byte code; Java Development Kit (JDK)	L+D	Microsoft Teams	1	19	18-05-2021
20	the Java Buzzwords	L+D	Microsoft Teams	1	20	19-05-2021
21	Object-oriented programming	L+D	Microsoft Teams	1	21	20-05-2021
22	Simple Java programs. Data types, variables	L+D	Microsoft Teams	1	22	22-05-2021
23	**First Test**					26-05-2021
24	arrays, Operators	L+D	Microsoft Teams	1	23	27-05-2021
25	Control Statements	L+D	Microsoft	1	24	31-10-2020

			Teams			
26	Programming Examples	L+D	Microsoft Teams	1	25	01-06-2021
27	Programming Examples	L+D	Microsoft Teams	1	26	02-06-2021
28	Programming Examples	L+D	Microsoft Teams	1	27	03-06-2021
MODULE 3: Classes, Inheritance, Exception Handling						
29	Classes: Classes fundamentals	L+D	Microsoft Teams	1	28	05-06-2021
30	Declaring objects	L+D	Microsoft Teams	1	29	07-06-2021
31	Constructors	L+D	Microsoft Teams	1	30	08-06-2021
32	this keyword, garbage collection	L+D	Microsoft Teams	1	31	09-06-2021
33	**Inheritance:** inheritance basics	L+D	Microsoft Teams	1	32	10-06-2021
34	using super	L+D	Microsoft Teams	1	33	14-06-2021
35	creating multi level hierarchy	L+D	Microsoft Teams	1	34	15-06-2021
36	method overriding	L+D	Microsoft Teams	1	35	16-06-2021
37	**Exception handling:** Exception handling in Java	L+D	Microsoft Teams	1	36	17-06-2021
38	Programming Examples	L+D	Microsoft Teams	1	37	19-06-2021
MODULE 4: Packages and Interfaces						
39	Packages, Access Protection, Importing Packages	L+D	Microsoft Teams	1	38	21-06-2021

40	Packages, Access Protection, Importing Packages	L+D	Microsoft Teams	1	39	22-06-2021
41	Interfaces	L+D	Microsoft Teams	1	40	23-06-2021
42	**Multi Threaded Programming:** What are threads?	L+D	Microsoft Teams	1	41	24-06-2021
43	**Second Test**					30-06-2021
44	How to make the classes threadable	L+D	Microsoft Teams	1	42	01-07-2021
45	Extending threads , Implementing runnable	L+D	Microsoft Teams	1	43	03-07-2021
46	Synchronization	L+D	Microsoft Teams	1	44	05-07-2021
47	Changing state of the thread	L+D	Microsoft Teams	1	45	06-07-2021
48	Bounded buffer problems	L+D	Microsoft Teams	1	46	07-07-2021
49	Producer consumer problems.	L+D	Microsoft Teams	1	47	08-07-2021
MODULE 5: Event Handling						
50	Two event handling mechanisms	L+D	Microsoft Teams	1	48	12-07-2021
51	The delegation event model	L+D	Microsoft Teams	1	49	13-07-2021
52	Event classes	L+D	Microsoft Teams	1	50	14-07-2021
53	Sources of events; Event listener interfaces	L+D	Microsoft Teams	1	51	15-07-2021

54	Using the delegation event model	L+D	Microsoft Teams	1	52	17-07-2021
55	Adapter classes; Inner classes	L+D	Microsoft Teams	1	53	19-07-2021
56	**Swings:** Swings: The origins of Swing; Two key Swing features	L+D	Microsoft Teams	1	54	20-07-2021
57	Components and Containers	L+D	Microsoft Teams	1	55	22-07-2021
58	The Swing Packages; A simple Swing Application	L+D	Microsoft Teams	1	56	26-07-2021
59	Create a Swing Applet; Jlabel and ImageIcon	L+D	Microsoft Teams	1	57	27-07-2021
60	JTextField;The Swing Buttons JTabbedpane; JScrollPane; JList; JComboBox; JTable	L+D	Microsoft Teams	1	58	28-07-2021
61	**Third Test**					31-07-2021
62	Programming Examples	L+D	Microsoft Teams	1	59	07-08-2021

Text Books

1. Sourav Sahay, Object Oriented Programming with C++ , 2nd Ed, Oxford University Press,2006
2. Herbert Schildt, Java The Complete Reference, 7th Edition, Tata McGraw Hill, 2007.

Reference Books (specify minimum two foreign authors text books)

1. Mahesh Bhave and Sunil Patekar, "Programming with Java", First Edition, Pearson Education,2008, ISBN:9788131720806
2. Herbert Schildt, The Complete Reference C++, 4th Edition, Tata McGraw Hill, 2003.
3. Stanley B.Lippmann, Josee Lajore, C++ Primer, 4th Edition, Pearson Education, 2005.
4. Rajkumar Buyya,S Thamarasi selvi, xingchen chu, Object oriented Programming with java, Tata McGraw Hill education private limited.

5. Richard A Johnson, Introduction to Java Programming and OOAD, CENGAGE Learning.
6. E Balagurusamy, Programming with Java A primer, Tata McGraw Hill companies.

Useful Websites

1. https://www.topcoder.com/
2. https://www.coderbyte.com/
3. https://www.codechef.com/#
4. https://www.codewars.com/

Signature of Course in charge **Signature of Module Coordinator** **Signature of H.O.D**

K S INSTITUTE OF TECHNOLOGY, BENGALURU
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

NAME OF THE STAFF : Mr. RAGHAVENDRACHAR.S
SUBJECT CODE/NAME : 18CS45/ OBJECT ORIENTED CONCEPTS
SEMESTER/SEC/YEAR : IV / A / II
ACADEMIC YEAR : 2020-2021 [EVEN SEMESTER]

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
MODULE 1: Introduction to Object Oriented Concepts:						
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2	Procedure–Oriented Programming system	L+D	Microsoft Teams	1	2	20-04-2021
3	Object Oriented Programming System	L+D	Microsoft Teams	1	3	21-04-2021
4	Comparison of Object Oriented Language with C	L+D	Microsoft Teams	1	4	22-04-2021
5	Console I/O, variables and reference variables	L+D	Microsoft Teams	1	5	24-04-2021
6	Function Prototyping	L+D	Microsoft Teams	1	6	26-04-2021
7	Function Overloading	L+D	Microsoft Teams	1	7	27-04-2021
8	**Class and Objects :** Introduction	L+D	Microsoft Teams	1	8	28-04-2021
9	member functions and data	L+D	Microsoft Teams	1	9	29-04-2021

10	objects and functions	L+D	Microsoft Teams	1	10	03-05-2021
11	Programming Examples	L+D	Microsoft Teams	1	11	04-05-2021
12	Programming Examples	L+D	Microsoft Teams	1	12	05-05-2021
13	Programming Examples	L+D	Microsoft Teams	1	13	06-05-2021
14	Programming Examples	L+D	Microsoft Teams	1	14	08-05-2021
MODULE 2: Class and Objects (contd):						
15	Objects and arrays	L+D	Microsoft Teams	1	15	10-05-2021
16	Namespaces	L+D	Microsoft Teams	1	16	11-05-2021
17	Nested classes, Constructors, Destructors	L+D	Microsoft Teams	1	17	12-05-2021
18	**Introduction to Java**	L+D	Microsoft Teams	1	18	17-05-2021
19	Java‟s magic: the Byte code; Java Development Kit (JDK)	L+D	Microsoft Teams	1	19	18-05-2021
20	the Java Buzzwords	L+D	Microsoft Teams	1	20	19-05-2021
21	Object-oriented programming	L+D	Microsoft Teams	1	21	20-05-2021
22	Simple Java programs. Data types, variables	L+D	Microsoft Teams	1	22	22-05-2021
23	**First Test**					26-05-2021
24	arrays, Operators	L+D	Microsoft Teams	1	23	27-05-2021
25	Control Statements	L+D	Microsoft	1	24	31-10-2020

			Teams			
26	Programming Examples	L+D	Microsoft Teams	1	25	01-06-2021
27	Programming Examples	L+D	Microsoft Teams	1	26	02-06-2021
28	Programming Examples	L+D	Microsoft Teams	1	27	03-06-2021
MODULE 3: Classes, Inheritance, Exception Handling						
29	Classes: Classes fundamentals	L+D	Microsoft Teams	1	28	05-06-2021
30	Declaring objects	L+D	Microsoft Teams	1	29	07-06-2021
31	Constructors	L+D	Microsoft Teams	1	30	08-06-2021
32	this keyword, garbage collection	L+D	Microsoft Teams	1	31	09-06-2021
33	**Inheritance:** inheritance basics	L+D	Microsoft Teams	1	32	10-06-2021
34	using super	L+D	Microsoft Teams	1	33	14-06-2021
35	creating multi level hierarchy	L+D	Microsoft Teams	1	34	15-06-2021
36	method overriding	L+D	Microsoft Teams	1	35	16-06-2021
37	**Exception handling:** Exception handling in Java	L+D	Microsoft Teams	1	36	17-06-2021
38	Programming Examples	L+D	Microsoft Teams	1	37	19-06-2021
MODULE 4: Packages and Interfaces						
39	Packages, Access Protection, Importing Packages	L+D	Microsoft Teams	1	38	21-06-2021

40	Packages, Access Protection, Importing Packages	L+D	Microsoft Teams	1	39	22-06-2021
41	Interfaces	L+D	Microsoft Teams	1	40	23-06-2021
42	**Multi Threaded Programming:** What are threads?	L+D	Microsoft Teams	1	41	24-06-2021
43	**Second Test**					30-06-2021
44	How to make the classes threadable	L+D	Microsoft Teams	1	42	01-07-2021
45	Extending threads , Implementing runnable	L+D	Microsoft Teams	1	43	03-07-2021
46	Synchronization	L+D	Microsoft Teams	1	44	05-07-2021
47	Changing state of the thread	L+D	Microsoft Teams	1	45	06-07-2021
48	Bounded buffer problems	L+D	Microsoft Teams	1	46	07-07-2021
49	Producer consumer problems.	L+D	Microsoft Teams	1	47	08-07-2021
MODULE 5: Event Handling						
50	Two event handling mechanisms	L+D	Microsoft Teams	1	48	12-07-2021
51	The delegation event model	L+D	Microsoft Teams	1	49	13-07-2021
52	Event classes	L+D	Microsoft Teams	1	50	14-07-2021
53	Sources of events; Event listener interfaces	L+D	Microsoft Teams	1	51	15-07-2021

54	Using the delegation event model	L+D	Microsoft Teams	1	52	17-07-2021
55	Adapter classes; Inner classes	L+D	Microsoft Teams	1	53	19-07-2021
56	**Swings:** Swings: The origins of Swing; Two key Swing features	L+D	Microsoft Teams	1	54	20-07-2021
57	Components and Containers	L+D	Microsoft Teams	1	55	22-07-2021
58	The Swing Packages; A simple Swing Application	L+D	Microsoft Teams	1	56	26-07-2021
59	Create a Swing Applet; Jlabel and ImageIcon	L+D	Microsoft Teams	1	57	27-07-2021
60	JTextField;The Swing Buttons JTabbedpane; JScrollPane; JList; JComboBox; JTable	L+D	Microsoft Teams	1	58	28-07-2021
61	**Third Test**					31-07-2021
62	Programming Examples	L+D	Microsoft Teams	1	59	07-08-2021

Text Books

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2. Herbert Schildt, The Complete Reference C++, 4th Edition, Tata McGraw Hill, 2003.
3. Stanley B.Lippmann, Josee Lajore, C++ Primer, 4th Edition, Pearson Education, 2005.
4. Rajkumar Buyya,S Thamarasi selvi, xingchen chu, Object oriented Programming with java, Tata McGraw Hill education private limited.

5. Richard A Johnson, Introduction to Java Programming and OOAD, CENGAGE Learning.
6. E Balagurusamy, Programming with Java A primer, Tata McGraw Hill companies.

Useful Websites

1. https://www.topcoder.com/
2. https://www.coderbyte.com/
3. https://www.codechef.com/#
4. https://www.codewars.com/

Signature of Course in charge **Signature of Module Coordinator** **Signature of H.O.D**

KS INSTITUTE OF TECHNOLOGY BANGALORE

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

NAME OF THE STAFF : Dr. VANEETA M

\SUBJECT CODE/NAME : 18CS56 UNIX PROGRAMMING

SEMESTER/YEAR : V 'A' Section

ACADEMIC YEAR : 2020-2021

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
	MODULE 1					
1	**Introduction**. Unix Components/Architecture. Features of Unix	L+D	Zoom App	1	1	2-9-2020
2	The UNIX Environment and UNIX Structure	L+D	Zoom App		2	3-9-2020
3	POSIX and single Unix specification. The login prompt. General features of Unix commands/ command structure.	L+ D	Zoom App	1	3	4-9-2020
4	General features of Unix commands/ command structure.	L+D	Zoom App	1	4	7-9-2020
5	Command arguments and options. Understanding of some basic commands such as echo, printf, ls, who, date, passwd, cal.	L+ D	Zoom App, Cygwin POSIX Compatible platform	1	5	9-9-2020
6	Combining commands. Meaning of Internal and external commands.	L+D	Zoom App, Cygwin POSIX Compatible platform	1	6	10-9-2020
7	The type command: knowing the type of a command and locating it. The root Login, Becoming Super user: su command	L+D	Zoom App, Cygwin POSIX Compatible platform	1	7	11-9-2020
8	**Unix Files**: Naming files, Basic file types/categories, Organization of files.	L+D	Zoom App, Cygwin POSIX Compatible platform	1	8	14-9-2020
9	Hidden files, Standard directories. Parent Child relationship. Home directory and HOME variable	L+D	Zoom App, Cygwin POSIX Compatible platform	1	9	16-9-2020
10	The PATH variable, Manipulating the PATH, Realtive and absolute path names. Directory commands – pwd,cd	L+D	Zoom App, Cygwin POSIX Compatible platform	1	10	18-9-2020

11	mkdir,rmdir,the (.) dotand double dots(..) notations to represent, File related commands –cat,mv.rm,cp and od commands	L+D	Zoom App, Cygwin POSIX Compatible platform	1	11	21-9-2020
12	Pedagogy activity – I		Zoom App	1	12	23-9-2020
	MODULE 2					
13	A file attributes and permissions: The ls Command with options, changing file permissions: the relative and absolute permissions changing methods.	L+D	Zoom App, Cygwin POSIX Compatible platform	1	13	24-9-2020
14	Recursively changing file permissions, Directory permissions	L+D	Zoom App, Cygwin POSIX Compatible platform	1	14	25-9-2020
15	**Internal Assessment Test I**			**1**	**15**	**28-9-2020**
16	**The Shells interpretive cycle**: Wild cards. Removing the special meaning of wild cards.	L+D	Zoom App, Cygwin POSIX Compatible platform	1	16	1-10-2020
17	Three standard files and redirection	L+D	Zoom App, Cygwin POSIX Compatible platform	1	17	5-10-2020
18	**Connecting Commands** pipe. Basic and extended regular expressions The grep, egrep. Typical ex. Involving diff. regular expressions	L+ D	Zoom App, Cygwin POSIX Compatible platform	1	18	7-10-2020
19	**Shell Programming** : Ordinary and environment variables	L+D	Zoom App, Cygwin POSIX Compatible platform	1	19	8-10-2020
20	The .profile. Read and readonly commands. Command line arguments.	L+D	Zoom App, Cygwin POSIX Compatible platform	1	20	9-10-2020
21	exit and exit status of command. Logical operators for conditional execution. The test command & short cuts	L+D	Zoom App, Cygwin POSIX Compatible platform	1	21	12-10-2020
22	The if, while, for and case control statements	L+D	Zoom App, Cygwin POSIX Compatible platform	1	22	14-10-2020
23	The set and shift commands	L+D	Zoom App, Cygwin POSIX Compatible platform	1	23	15-10-2020
24	Handling positional parameters. The HERE (<<) document and trap command,	L+D	Zoom App, Cygwin POSIX Compatible platform	1	24	16-10-2020
25	Simple shell program examples	L+D	Zoom App, Cygwin POSIX Compatible platform	1	25	19-10-2020
26	Simple shell program examples	L+D	Zoom App, Cygwin POSIX Compatible platform	1	26	21-10-2020
27	Pedagogy Activity - II		Zoom App	1	27	22-10-2020
	MODULE 3					
28	UNIX File APIs: General File APIs	L+D	Zoom App	1	28	23-10-2020
29	File and Record locking, Directory File APIs	L+D	Zoom App	1	29	24-10-2020
30	Device File APIs	L+D	Zoom App	1	30	28-10-2020

31	FIFO File APIs, Symbolic Link APIs	L+D	Zoom App	1	31	29-10-2020
32	**UNIX PROCESSES and Process Control : The Environment of a UNIX Process:** Introduction, main function, Process termination	L+D	Zoom App	1	32	2-11-2020
33	Command-line arguments	L+D	Zoom App	1	33	4-11-2020
34	Environment List, Memory layout of a C program, Shared Libraries, Memory Allocation	L+D	Zoom App	1	34	5-11-2020
35	Environmental Variables, setjmp, longjmp Functions,	L+D	Zoom App	1	35	6-11-2020
36	getrlimit, setrlimit functions	L+D		1	36	9-11-2020
37	Unix Kernel Support for Processes **Process Control: Introduction**	L+D	Zoom App	1	37	11-11-2020
38	Process identifier, fork, vfork	L+D	Zoom App	1	38	12-11-2020
39	wait,waitpid,wait3	L+D	Zoom App	1	39	13-11-2020
40	wait4 Functions	L+D	Zoom App	1	40	20-11-2020
41	**Internal Assessment Test II**				41	18-11-2020
42	Race Conditions, exec Functions	L+D	Zoom App	1	42	21-11-2020
	MODULE 4					
43	Changing User IDs and Group IDs, Interpreter Files, system Function, Process Accounting,	L+D	Zoom App	1	43	23-11-2020
44	User Identification, Process Times, I/O Redirection.	L+D	Zoom App	1	44	25-11-2020
45	Overview of IPC Methods	L+D	Zoom App	1	45	26-11-2020
46	Pipes, popen, pclose Functions,	L+D	Zoom App	1	46	27-11-2020
47	Coprocesses, FIFOs,	L+D	Zoom App	1	47	30-11-2020
48	System V IPC, Message Queues	L+D	Zoom App	1	48	2-12-2020
49	Semaphores.	L+D	Zoom App	1	49	4-12-2020
50	Shared Memory	L+D	Zoom App	1	50	7-12-2020
51	Client-Server Properties	L+D	Zoom App	1	51	9-12-2020
52	Stream Pipes, Passing File Descriptors	L+D	Zoom App	1	52	10-12-2020
53	An Open Server-Version 1	L+D	Zoom App	1	53	11-12-2020
54	Client-Server Connection Functions.	L+D	Zoom App	1	54	14-12-2020
	MODULE 5					
55	Signals: The UNIX Kernel Support for Signals	L+D	Zoom App	1	55	16-12-2020
56	signal, Signal Mask, sigaction	L+D	Zoom App	1	56	17-12-2020
57	The SIGCHLD Signal and the waitpid Function	L+D	Zoom App	1	57	18-12-2020
58	The sigsetjmp and siglongjmp Functions	L+D	Zoom App	1	58	19-12-2020
59	The sigsetjmp and siglongjmp Functions	L+D	Zoom App		59	21-12-2020
60	Kill, Alarm	L+D	Zoom App	1	60	23-12-2020
61	Interval Timers	L+D	Zoom App		61	24-12-2020
62	POSIX.lb Timers.	L+D	Zoom App	1	62	28-12-2020

63	Daemon Processes: Introduction,	L+D	Zoom App	1	63	30-12-2020
64	Daemon Characteristics	L+D	Zoom App	1	64	31-12-2020
65	Coding Rules	L+D	Zoom App	1	65	1-1-2021
66	Error Logging	L+D	Zoom App	1	66	2-1-2021
67	Client-Server Model.	L+D	Zoom App	1	67	15-1-2021
68	**Internal Assessment Test III**			1	68	11-1-2021

Course incharge

Text Books: -

1. Sumitabha Das., Unix Concepts and Applications., 4thEdition., Tata McGraw Hill (Chapter 1,2,3,4,5,6,8,13,14)
2. W. Richard Stevens: Advanced Programming in the UNIX Environment, 2nd Edition, Pearson Education, 2005 (Chapter 3,7,8,10,13,15)
3. Unix System Programming Using C++ - Terrence Chan, PHI, 1999. (Chapter 7,8,9,10)

Reference Books:

1. M.G. Venkatesh Murthy: UNIX & Shell Programming, Pearson Education.
2. Richard Blum , Christine Bresnahan : Linux Command Line and Shell Scripting Bible, 2ndEdition, Wiley,2014learning

Web Materials

https://nptel.ac.in/content/storage2/courses/106108101/pdf/PPTs/Mod_13.pdf
http://www.ee.surrey.ac.uk/Teaching/Unix/unixintro.html
https://link.springer.com/book/10.1007/978-3-319-92429-8

Details of Teaching Aids:
Power point Presentation using Zoom Platform

Course In charge **Module Coordinator** **HOD**

KS INSTITUTE OF TECHNOLOGY, BANGALORE

#14, Raghuvanahalli, Kanakapura Main Road, Bengaluru-5600109

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

NAME OF THE FACULTY: Deepa .S.R

SUBJECT CODE/NAME : 18CS61/ System Software and Compilers

SEMESTER/YEAR : VI A / III

ACADEMIC YEAR : 2020-2021

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
MODULE 1: System Software, Assemblers, Macroprocessor						
1	Introduction to System Software, Machine Architecture of SIC	L+D	Microsoft Teams	3	3	19/4/21, 20/4/21, 21/4/21
2	Machine Architecture of SIC/XE	L+ D	Microsoft Teams	3	6	23/4/21, 24/4/21, 26/4/21
3	**Assemblers:** Basic assembler functions	L+D	Microsoft Teams	1	7	27/4/21
4	Machine dependent assembler features,	L+D,PS	Microsoft Teams	1	8	28/4/21
5	Machine independent assembler features	L+D	Microsoft Teams	1	9	30/4/21
6	Assembler design options.	L+D	Microsoft Teams	1	10	3/5/21

7	Basic Loader Functions	L+D	Microsoft Teams	1	11	4/5/21
8	Pedagogy activity	L+D	Microsoft Teams	1	12	5/5/21
	MODULE 2:Introduction, lexical analysis					
9	**Introduction:** Language Processors, The structure of a compiler	L+ D	Microsoft Teams	1	13	7/5/21
10	The evaluation of programming languages, The science of building compiler,	L+D,PS	Microsoft Teams	2	15	8/5/21, 10/5/21
11	Applications of compiler technology, Programming language basics	L+D	Microsoft Teams	2	17	11/5/21, 12/5/21
12	**Lexical Analysis:** The role of lexical analyzer, Input buffering		Microsoft Teams	2	19	17/5/21, 18/5/21
13	Specifications of token	L+D	Microsoft Teams	2	21	19/5/21, 21/5/21
14	recognition of tokens	L+D	Microsoft Teams	2	23	22/5/21, 28/5/21
	1st Internal Assessment					24/5/21
15	Pedagogy activity	L+D	Microsoft Teams	1	24	31/5/21
	MODULE 3 : Syntax Analysis					
16	**Syntax Analysis:** Introduction, Role Of Parsers, Context Free Grammars	L+D	Microsoft Teams	1	25	1/6/21
17	Writing a grammar	L+D	Microsoft Teams	1	26	2/6/21
18	Top Down Parsers	L+D	Microsoft Teams	4	30	4/6/21, 5/6/21, 7/6/21, 8/6/21
19	Bottom-Up Parsers	L+D	Microsoft Teams	4	34	9/6/21, 11/6/21,

						14/6/21, 15/6/21
	MODULE 4: Lex and Yacc					
20	The Simplest Lex Program, Grammars, Parser-Lexer Communication	L+D	Microsoft Teams	1	35	16/6/21
21	A YACC Parser, The Rules Section, Running LEX and YACC	L+D	Microsoft Teams	3	38	18/6/21, 19/6/21, 21/6/21
22	LEX and Hand- Written Lexers	L+D	Microsoft Teams	1	39	22/6/21
23	Using LEX - Regular Expression, Examples of Regular Expressions, A Word Counting Program,	L+D	Microsoft Teams	2	41	23/6/21, 25/6/21
	2nd Internal Assessment					28/6/21
24	Using YACC – Grammars, Recursive Rules, Shift/Reduce Parsing	L+D	Microsoft Teams	1	42	2/7/21
25	What YACC Cannot Parse, A YACC Parser - The Definition Section, The Rules Section	L+D	Microsoft Teams	1	43	5/7/21
26	The LEXER, Compiling and Running a Simple Parse	L+D	Microsoft Teams	2	45	6/7/21
27	Arithmetic Expressions and Ambiguity.	L+D	Microsoft Teams	1	46	7/7/21
	MODULE 5					
28	Syntax Directed Translation	L+D	Microsoft Teams	4	50	9/7/21, 12/7/21, 13/7/21, 14/7/21
29	Intermediate code generation	L+D	Microsoft Teams	4	54	16/7/21, 18/7/21, 19/7/21, 20/7/21
30	Code generation	L+D	Microsoft Teams	2	56	22/7/21, 27/7/21

31	Revision	L+D	Microsoft Teams	1	57	28/7/21
	3rd Internal Assessment					29/7/21
32	Revision	L+D	Microsoft Teams	1	58	6/7/21
33	Revision	L+D	Microsoft Teams	1	59	7/7/21

Text Books:

1. System Software by Leland. L. Beck, D Manjula, 3rd edition, 2012
2. Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman , Compilers-Principles, Techniques and Tools, Pearson, 2nd edition, 2007
3. Doug Brown, John Levine, Tony Mason, lex & yacc, O'Reilly Media, October 2012.

Reference Books:

1. Systems programming – Srimanta Pal , Oxford university press, 2016
2. System programming and Compiler Design, K C Louden, Cengage Learning
3. System software and operating system by D. M. Dhamdhere TMG
4. Compiler Design, K Muneeswaran, Oxford University Press 2013.

WEB MATERIALS:

W1: https://nptel.ac.in/courses/106105190/
W2: http://nptel.vtu.ac.in/econtent/courses/CSE/06CS51/index.php
W3: https://www.tutorialspoint.com/computer_fundamentals/system_software.asp
W4: https://www.geeksforgeeks.org/compiler-design-tutorials/

Details for the teaching Aids

Microsoft Teams

Signature of Course In charge **Signature of Module Coordinator** **Signature of HOD**

KS INSTITUTE OF TECHNOLOGY, BANGALORE

#14, Raghuvanahalli, Kanakapura Main Road, Bengaluru-5600109

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

NAME OF THE FACULTY: Deepa .S.R

SUBJECT CODE/NAME : 18CS61/ System Software and Compilers

SEMESTER/YEAR :VI B / III

ACADEMIC YEAR : 2020-2021

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
MODULE 1: System Software, Assemblers, Macroprocessor						
1	Introduction to System Software, Machine Architecture of SIC	L+D	PPT using Microsoft Teams	3	3	19/4/21, 21/4/21 22/4/21
2	Machine Architecture of SIC/XE	L+ D	PPT using Microsoft Teams	3	6	23/4/21, 24/4/21, 26/4/21
3	**Assemblers:** Basic assembler functions	L+D	PPT using Microsoft Teams	1	7	28/4/21
4	Machine dependent assembler features,	L+D,PS	PPT using Microsoft Teams	1	8	29/4/21

5	Machine independent assembler features	L+D	PPT using Microsoft Teams	1	9	30/4/21
6	Assembler design options.	L+D	PPT using Microsoft Teams	1	10	3/5/21
7	Basic Loader Functions	L+D	PPT using Microsoft Teams	1	11	5/5/21
8	Pedagogy activity	L+D	PPT using Microsoft Teams	1	12	6/5/21
	MODULE 2:Introduction, lexical analysis					
9	**Introduction:** Language Processors, The structure of a compiler	L+ D	PPT using Microsoft Teams	1	13	7/5/21
10	The evaluation of programming languages, The science of building compiler,	L+D,PS	PPT using Microsoft Teams	2	15	8/5/21, 10/5/21
11	Applications of compiler technology, Programming language basics	L+D	PPT using Microsoft Teams	2	17	12/5/21, 17/5/21
12	**Lexical Analysis:** The role of lexical analyzer, Input buffering		PPT using Microsoft Teams	2	19	19/5/21, 20/5/21
13	Specifications of token	L+D	PPT using Microsoft Teams	2	21	21/5/21, 27/5/21
14	1st Internal Assessment		Microsoft Teams	1	22	24/5/21
15	recognition of tokens	L+D	PPT using Microsoft Teams	2	24	28/5/21, 31/5/21
16	Pedagogy activity	L+D	PPT using Microsoft Teams	1	25	31/5/21
	MODULE 3 : Syntax Analysis					
17	**Syntax Analysis:** Introduction, Role Of Parsers, Context Free Grammars	L+D	PPT using Microsoft Teams	1	26	2/6/21
18	Writing a grammar	L+D	PPT using Microsoft Teams	1	27	3/6/21
19	Top Down Parsers	L+D	PPT using Microsoft Teams	4	31	4/6/21, 7/6/21, 9/6/21,

						10/6/21
20	Bottom-Up Parsers	L+D	PPT using Microsoft Teams	4	35	11/6/21, 14/6/21, 16/6/21 17/6/21
MODULE 4:Lex and Yacc						
21	The Simplest Lex Program, Grammars, Parser-Lexer Communication	L+D	PPT using Microsoft Teams	1	36	18/6/21
22	A YACC Parser, The Rules Section, Running LEX and YACC	L+D	PPT using Microsoft Teams	3	39	19/6/21, 21/6/21 23/6/21
23	LEX and Hand- Written Lexers	L+D	PPT using Microsoft Teams	1	40	24/6/21
24	Using LEX - Regular Expression, Examples of Regular Expressions, A Word Counting Program,	L+D	PPT using Microsoft Teams	2	42	25/6/21 1/7/21
25	2nd Internal Assessment		Microsoft Teams	1	43	28/6/21
26	Using YACC – Grammars, Recursive Rules, Shift/Reduce Parsing	L+D	PPT using Microsoft Teams	1	44	2/7/21
27	What YACC Cannot Parse, A YACC Parser - The Definition Section, The Rules Section	L+D	PPT using Microsoft Teams	1	45	3/7/21
28	The LEXER, Compiling and Running a Simple Parse	L+D	PPT using Microsoft Teams	2	47	5/7/21
29	Arithmetic Expressions and Ambiguity.	L+D	PPT using Microsoft Teams	1	48	7/7/21
MODULE 5						
30	Syntax Directed Translation	L+D	PPT using Microsoft Teams	4	52	8/7/21, 9/7/21, 12/7/21, 14/7/21
31	Intermediate code generation	L+D	PPT using Microsoft Teams	4	56	15/7/21, 16/7/21, 17/7/21,

						19/7/21
32	Code generation	L+D	PPT using Microsoft Teams	2	58	22/7/21, 23/7/21
33	Revision	L+D	PPT using Microsoft Teams	1	59	26/7/21
34	3rd Internal Assessment		Microsoft Teams	1	60	28/7/21
35	Revision	L+D	PPT using Microsoft Teams	1	62	6/7/21
36	Revision	L+D	PPT using Microsoft Teams	1	63	7/7/21

Text Books:

1. System Software by Leland. L. Beck, D Manjula, 3rd edition, 2012

2. Alfred V Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman , Compilers-Principles, Techniques and Tools, Pearson, 2nd edition, 2007

3. Doug Brown, John Levine, Tony Mason, lex & yacc, O'Reilly Media, October 2012.

Reference Books:

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2. System programming and Compiler Design, K C Louden, Cengage Learning

3. System software and operating system by D. M. Dhamdhere TMG

4. Compiler Design, K Muneeswaran, Oxford University Press 2013.

WEB MATERIALS:

W1: https://nptel.ac.in/courses/106105190/

W2: http://nptel.vtu.ac.in/econtent/courses/CSE/06CS51/index.php

W3: https://www.tutorialspoint.com/computer_fundamentals/system_software.asp

W4: https://www.geeksforgeeks.org/compiler-design-tutorials/

Details for the teaching Aids

PPT using Microsoft Teams

deepa

Signature of Course In charge

deepa

Signature of Module Coordinator

Signature of HOD

KS INSTITUTE OF TECHNOLOGY BANGALORE

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

NAME OF THE STAFF : Sougandhika Narayan

SUBJECT CODE/NAME : 18CS62 / Computer Graphics and Visualization

SEMESTER/YEAR : VI / 'B'

ACADEMIC YEAR : 2020-2021

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
MODULE 1:Computer Graphics and OpenGL						
1	Overview: Computer Graphics:	L+D	PPT using MS-Teams	1	1	19-04-2021
2	Basics of computer graphics	L+D	PPT using MS-Teams	1	2	20-04-2021
3	Application of Computer Graphics	L+D	PPT using MS-Teams	1	3	22-04-2021
4	Video Display Devices: Random Scan and Raster Scan displays	L+ D	PPT using MS-Teams	1	4	23-04-2021
5	graphics software. OpenGL: Introduction to OpenGL	L+ D	PPT using MS-Teams	1	5	26-04-2021
6	coordinate reference frames, specifying two-dimensional world coordinate reference frames in OpenGL	L+ D	PPT using MS-Teams	1	6	03-05-2021
7	OpenGL point functions, OpenGL line functions, point attributes, line attributes	L+D	PPT using MS-Teams	1	7	04-05-2021
8	curve attributes, OpenGL point attribute functions	L+D	PPT using MS-Teams	1	8	05-05-2021
9	Line drawing algorithms-DDA	L+D	PPT using MS-Teams	1	9	06-05-2021

10	Line drawing algorithms- Bresenham's	L+D	PPT using MS-Teams	1	10	07-05-2021
11	circle generation algorithms (Bresenham's)	L+D	PPT using MS-Teams	1	11	08-05-2021
12	Problems related to DDA andBresenham's	L+D	PPT using MS-Teams	1	12	10-05-2021
	MODULE 2:Fill area Primitives, 2D Geometric Transformations and 2D viewing					
13	Fill area Primitives: Polygon fill-areas	L+ D	PPT using MS-Teams	1	13	11-05-2021
14	Fill area Primitives: Polygon fill-areas	L+D	PPT using MS-Teams	1	14	17-05-2021
15	general scan line polygon fill algorithm	L+D	MS-Teams		15	18-05-2021
16	OpenGL fill-area attribute functions	L+D	PPT using MS-Teams	1	16	19-05-2021
17	2DGeometric Transformations: Basic 2D Geometric Transformations	L+D	PPT using MS-Teams	1	17	20-05-2021
18	matrix representations	L+D	PPT using MS-Teams	1	18	21-05-2021
19	homogeneous coordinates and Inverse transformations	L+D	PPT using MS-Teams	1	19	22-05-2021
20	TEST-1	MS-Teams		1	20	24-05-2021
21	2DComposite transformations, other 2D transformations	L+D	PPT using MS-Teams	1	21	27-05-2021
22	raster methods for geometric transformations, OpenGL raster transformations	L+D	PPT using MS-Teams	1	22	28-05-2021
23	OpenGL geometric transformations function, 2D viewing: 2D viewing pipeline	L+D	PPT using MS-Teams	1	23	31-05-2021
24	OpenGL 2D viewing functions	L+D	PPT using MS-Teams	1	24	01-06-2021
	MODULE 3:Clipping,3D Geometric Transformations, Color and Illumination Models					
25	Clipping	L+D	PPT using MS-Teams	1	25	04-06-2021
26	clipping window	L+D	PPT using MS-Teams	1	26	07-06-2021
27	normalization and viewport transformations	L+D	PPT using MS-Teams	1	27	08-06-2021

28	clipping algorithms- 2D point clipping	L+D	PPT using MS-Teams	1	28	10-06-2021
29	2D line clipping algorithms: cohen-sutherland line clipping	L+D	PPT using MS-Teams	1	29	11-06-2021
30	polygon fill area clipping - Sutherland-Hodgeman polygon clipping algorithm	L+D	PPT using MS-Teams	1	30	11-06-2021
31	3DGeometric Transformations - 3D translation, rotation, scaling	L+D	PPT using MS-Teams	1	31	14-06-2021
32	composite 3D transformations, other 3D transformations, affine transformations	L+D	PPT using MS-Teams	1	32	15-06-2021
33	OpenGL geometric transformations functions. Color Models: Properties of light, color models, RGB and CMY color models	L+D	PPT using MS-Teams	1	33	17-06-2021
34	Illumination Models: Light sources, basic illumination models-Ambient light, diffuse reflection	L+D	PPT using MS-Teams	1	34	18-06-2021
35	2nd Internal Assessment	MS-Teams			35	18-06-2021
36	specular and phong model	L+D	PPT using MS-Teams	1		21-06-2021
37	Corresponding openGL functions	L+D	PPT using MS-Teams	1		22-06-2021
MODULE 4:3D Viewing and Visible Surface Detection						
38	3DViewing:3D viewing concepts, 3D viewing pipeline and 3D viewing coordinate parameters	L+D	PPT using MS-Teams	2	38	24-06-2021
39	TEST-2	L+D	MS-Teams	1	39	28-06-2021
40	Transformation from world to viewing coordinates, Projection transformation, orthogonal projections and perspective projections	L+D	PPT using MS-Teams	2	40	02-07-2021
41	Pedagogy - QUIZ		PPT using MS-Teams	1	41	03-07-2021
42	The viewport transformation and 3D screen coordinates, OpenGL 3D viewing functions	L+D	PPT using MS-Teams	1	42	05-07-2021
43	Visible Surface Detection Methods: Classification of visible surface Detection algorithms	L+D	PPT using MS-Teams	1	43	15-07-2021
44	depth buffer method	L+D	PPT using MS-Teams	1	44	16-07-2021
45	OpenGL visibility detection functions	L+D	PPT using	1	45	19-07-2021

			MS-Teams			
MODULE 5:Input& interaction, Curves and Computer Animation						
46	Input and Interaction: Input devices	L+D	PPT using MS-Teams	1	46	20-07-2021
47	clients and servers, Display Lists	L+D	PPT using MS-Teams	1	47	23-07-2021
48	Display Lists and Modeling	L+D	PPT using MS-Teams	1	48	26-07-2021
49	Programming Event Driven Input	L+D	PPT using MS-Teams	1	49	27-07-2021
50	Menus Picking, Building Interactive Models, Animating Interactive programs	L+D	PPT using MS-Teams	1	50	29-07-2021
51	TEST-3	L+D	MS-Teams	1	51	05-08-2021
52	Design of Interactive programs	L+D	PPT using MS-Teams	1	52	06-08-2021
53	Logic operations.Curved surfaces	L+D	PPT using MS-Teams	1	53	07-08-2021
54	quadric surfaces, OpenGL Quadric-Surface and Cubic-Surface Functions	L+D	PPT using MS-Teams	1	54	08-08-2021
55	Bezier Spline Curves,	L+D	PPT using MS-Teams	1	55	10-08-2021
56	Bezier surfaces, OpenGL curve functions	L+D	PPT using MS-Teams	1	56	11-08-2021
57	Corresponding openGL functions.	L+D	MS-Teams		57	12-08-2021
58	3rd Internal Assessment	L+D	PPT using MS-Teams	1	58	13-08-2021
59	Revision	L+D	PPT using MS-Teams	1	59	14-08-2021
60	Revision	L+D	PPT using MS-Teams	1	60	14-08-2021

Text Books

1.Carl Hamacher, ZvonkoVranesic, SafwatZaky, Computer Organization, 5th Edition, Tata McGraw Hill, 2002.

Reference Books

1. Donald Hearn & Pauline Baker: Computer Graphics with OpenGL Version,3rd / 4th Edition, Pearson Education,2011
2. Edward Angel: Interactive Computer Graphics- A Top Down approach with OpenGL, 5th edition. Pearson Education, 2008

Web Material:

https://nptel.ac.in/courses/106/106/106106090/

Details of Teaching Aids:

PPTs usingMS-Teams

Signature of Course in-charge **Signature of Module Coordinator** **Signature of HOD-CSE**

K S INSTITUTE OF TECHNOLOGY, BENGALURU
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

NAME OF THE STAFF : Mr. RAGHAVENDRACHAR.S
SUBJECT CODE/NAME : 17CS73/ MACHINE LEARNING
SEMESTER/SEC/YEAR : VII / A / IV
ACADEMIC YEAR : 2020-2021 [ODD SEMESTER]

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
MODULE 1: Introduction, Concept Learning						
1	Introduction: Well posed learning problems,	L+D	Microsoft Teams	1	1	02-09-2020
2	Designing a Learning system,	L+D	Microsoft Teams	1	2	04-09-2020
3	Perspective, Issues in Machine Learning.	L+D	Microsoft Teams	1	3	05-09-2020
4	Concept Learning: Concept learning task,	L+D	Microsoft Teams	1	4	07-09-2020
5	Concept learning as search,	L+D	Microsoft Teams	1	5	09-09-2020
6	Find-S algorithm,	L+D	Microsoft Teams	1	6	11-09-2020
7	Example on Find-S algorithm	L+D	Microsoft Teams	1	7	12-09-2020
8	Version space,	L+D	Microsoft Teams	1	8	14-09-2020
9	Candidate Elimination algorithm and its examples	L+D	Microsoft Teams	1	9	16-09-2020
10	Inductive Bias	L+D	Microsoft Teams	1	10	18-09-2020

MODULE 2: Decision Tree Learning						
11	Decision tree representation	L+D	Microsoft Teams	1	11	19-09-2020
12	Appropriate problems for decision tree learning	L+D	Microsoft Teams	1	12	21-09-2020
13	Basic decision tree learning algorithm	L+D	Microsoft Teams	1	13	23-09-2020
14	Example on ID3 algorithm	L+D	Microsoft Teams	1	14	25-09-2020
15	Example on ID3 algorithm	L+D	Microsoft Teams	1	15	26-09-2020
16	**First Test**					29-09-2020
17	hypothesis space search in decision tree learning	L+D	Microsoft Teams	1	16	03-10-2020
18	hypothesis space search in decision tree learning	L+D	Microsoft Teams	1	17	05-10-2020
19	Inductive bias in decision tree learning	L+D	Microsoft Teams	1	18	07-10-2020
20	Issues in decision tree learning.	L+D	Microsoft Teams	1	19	09-10-2020
21	**Revision**	L+D	Microsoft Teams	1	20	10-10-2020
MODULE 3: Artificial Neural Networks						
22	Introduction	L+D	Microsoft Teams	1	21	12-10-2020
23	Neural Network representation	L+D	Microsoft Teams	1	22	14-10-2020
24	Neural Network representation	L+D	Microsoft Teams	1	23	16-10-2020
25	Appropriate problems	L+D	Microsoft Teams	1	24	19-10-2020
26	Appropriate problems	L+D	Microsoft	1	25	21-10-2020

			Teams			
27	Perceptron	L+D	Microsoft Teams	1	26	23-10-2020
28	Perceptron	L+D	Microsoft Teams	1	27	24-10-2020
29	Back propagation algorithm	L+D	Microsoft Teams	1	28	28-10-2020
30	Back propagation algorithm	L+D	Microsoft Teams	1	29	02-11-2020
31	Revision	L+D	Microsoft Teams	1	30	04-11-2020
MODULE 4: Bayesian Learning						
32	Introduction,	L+D	Microsoft Teams	1	31	06-11-2020
33	Bayes theorem	L+D	Microsoft Teams	1	32	07-11-2020
34	**Second Test**					10-11-2020
35	Bayes theorem	L+D	Microsoft Teams	1	33	13-11-2020
36	Concept Learning	L+D	Microsoft Teams	1	34	18-11-2020
37	ML and LS error hypothesis	L+D	Microsoft Teams	1	35	20-11-2020
38	ML for predicting probabilities	L+D	Microsoft Teams	1	36	21-11-2020
39	MDL principle	L+D	Microsoft Teams	1	37	23-11-2020
40	Naive Bayes classifier	L+D	Microsoft Teams	1	38	25-11-2020
41	Bayesian belief networks	L+D	Microsoft Teams	1	39	27-11-2020
42	EM algorithm	L+D	Microsoft Teams	1	40	30-11-2020

MODULE 5: Evaluating Hypothesis, Instance Based Learning, Reinforcement Learning						
43	Motivation	L+D	Microsoft Teams	1	41	02-12-2020
44	Estimating hypothesis accuracy	L+D	Microsoft Teams	1	42	04-12-2020
45	Basics of sampling theorem	L+D	Microsoft Teams	1	43	04-12-2020
46	General approach for deriving confidence intervals	L+D	Microsoft Teams	1	44	04-12-2020
47	Difference in error of two hypotheses	L+D	Microsoft Teams	1	45	05-12-2020
48	Comparing learning algorithms.	L+D	Microsoft Teams	1	46	05-12-2020
49	Instance Based Learning: Introduction	L+D	Microsoft Teams	1	47	05-12-2020
50	k-nearest neighbor learning	L+D	Microsoft Teams	1	48	07-12-2020
51	Learning Task,	L+D	Microsoft Teams	1	52	07-12-2020
52	Q Learning	L+D	Microsoft Teams	1	53	07-12-2020
53	**Third Test**					15-12-2020

Text Books

1. Tom M. Mitchell, **Machine Learning,** India Edition 2013, McGraw Hill Education.

Reference Books (specify minimum two foreign authors text books)

1. Trevor Hastie, Robert Tibshirani, Jerome Friedman, **The Elements of Statistical Learning**, 2nd edition, Springer series in statistics.
2. Ethem Alpaydin, **Introduction to machine learning**, second edition, MIT press.

Useful Websites

1. https://nptel.ac.in/courses/106105152/
2. https://www.coursera.org/learn/machine-learning
3. https://www.slideshare.net/ColleenFarrelly/machine-learning-by-analogy-59094152

Signature of Course in charge **Signature of Module Coordinator** **Signature of H.O.D**

KS INSTITUTE OF TECHNOLOGY BANGALORE

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

NAME OF THE STAFF : SOUGANDHIKA NARAYAN

SUBJECT CODE/NAME : 17CS743/ INFORMATION AND NETWORK SECURITY

SEMESTER/YEAR : IV / VII 'A'

ACADEMIC YEAR : 2020-2021

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
MODULE 1:Introduction						
1	Introduction	L+D	PPT using MS-Teams	1	1	2/9/2020
2	How to Speak Crypto, Classic Crypto	L+D	PPT using MS-Teams	1	2	3/9/2020
3	Simple Substitution Cipher	L+ D	PPT using MS-Teams	1	3	4/9/2020
4	Cryptanalysis of a Simple Substitution	L+ D	PPT using MS-Teams	1	4	5/9/2020
5	Definition of Secure, Double Transposition Cipher	L+D	PPT using MS-Teams	1	5	7/9/2020
6	One-time Pad, Project VENONA	L+D	PPT using MS-Teams	1	6	9/9/2020
7	Codebook Cipher.	L+D	PPT using MS-Teams	1	7	10/9/2020
8	Ciphers of the Election of 1876. Modern Crypto History	L+D	PPT using MS-Teams	1	8	11/9/2020
9	Taxonomy of Cryptography	L+D	PPT using MS-Teams	1	9	12/9/2020

10	Taxonomy of Cryptanalysis.	L+D	PPT using MS-Teams	1	10	14/9/2020
MODULE 2:What is a Hash Function?						
11	What is a Hash Function?	L+ D	PPT using MS-Teams	1	11	16/9/2020
12	The Birthday Problem	L+D	PPT using MS-Teams	1	12	18/9/2020
13	Non-cryptographic Hashes, Tiger Hash	L+D	PPT using MS-Teams	1	13	19/9/2020
14	HMAC	L+D	PPT using MS-Teams	2	15	21/9/2020 22/9/2020
15	Uses of Hash Functions	L+D	PPT using MS-Teams	1	16	23/9/2020
16	Online Bids. Spam Reduction	L+D	PPT using MS-Teams	1	17	24/9/2020
17	Other Crypto-Related Topics	L+D	PPT using MS-Teams	1	18	25/9/2020
18	Secret Sharing. Key Escrow	L+D	PPT using MS-Teams	1	19	26/9/2020
19	**IA TEST-1**					28/9/2020
20	Random Numbers, Texas Hold 'em Poker	L+D	PPT using MS-Teams	1	20	1/10/2020
21	Generating Random Bits	L+D	PPT using MS-Teams	1	21	3/10/2020
21	Information Hiding.	L+D	PPT using MS-Teams	1	22	5/10/2020
MODULE 3:Random number generation						
22	Random number generation	L+D	PPT using MS-Teams	1	23	7/10/2020
23	Providing freshness	L+D	PPT using MS-Teams	1	24	8/10/2020
24	Fundamentals of entity authentication	L+D	PPT using MS-Teams	2	25	9/10/2020 10/10/2020
25	Passwords Dynamic password schemes	L+D	PPT using MS-Teams	1	27	12/10/2020

26	Zero-knowledge mechanisms	L+D	PPT using MS-Teams	1	28	13/10/2020
27	Further reading Cryptographic Protocols	L+D	PPT using MS-Teams	1	29	14/10/2020
28	Protocol basics from objectives to a protocol	L+D	PPT using MS-Teams	2	31	15/10/2020 16/10/2020
29	Analysing a simple protocol	L+D	PPT using MS-Teams	1	32	19/10/2020
30	Authentication and key establishment protocols	L+D	PPT using MS-Teams	1	33	21/10/2020
	MODULE 4:Key management					
31	Key management	L+D	PPT using MS-Teams	2	35	22/10/2020, 23/10/2020
32	fundamentals Key lengthsand lifetimes	L+D	PPT using MS-Teams	1	36	24/10/2020
33	Key generation	L+D	PPT using MS-Teams	2	38	28/10/2020 29/10/2020
34	Key establishment	L+D	PPT using MS-Teams	1	39	2/11/2020
35	Key storage	L+D	PPT using MS-Teams	1	40	4/11/2020
36	Key usage	L+D	PPT using MS-Teams	1	41	5/11/2020
37	Governing key management	L+D	PPT using MS-Teams	1	42	6/11/2020
38	Governing key management	L+D	PPT using MS-Teams	1	43	7/11/2020
39	**IA TEST-2**					10/11/2020
40	Certification of public keys	L+D	PPT using MS-Teams	1	44	12/11/2020
41	The certificate lifecycle Public-key management models	L+D	PPT using MS-Teams	1	45	13/11/2020
42	Alternative approaches	L+D	PPT using MS-Teams	1	46	18/11/2020

MODULE 5: Cryptographic Applications						
42	Cryptography on the Internet	L+D	PPT using MS-Teams	1	47	19/11/2020
43	Cryptography for wireless local area networks	L+D	PPT using MS-Teams	1	48	20/11/2020
44	Cryptography for mobile telecommunications	L+D	PPT using MS-Teams	1	49	21/11/2020
45	Cryptography for secure payment card transactions	L+D	PPT using MS-Teams	1	50	23/11/2020
46	Cryptography for video broadcasting	L+D	PPT using MS-Teams	1	51	24/11/2020
47	Cryptography for identity cards	L+D	PPT using MS-Teams	1	52	25/11/2020
48	Cryptography for home users	L+D	PPT using MS-Teams	1	53	26/11/2020
49	Revision	L+D	PPT using MS-Teams	1	54	27/11/2020
50	Revision	L+D	PPT using MS-Teams	1	55	30/11/2020
51	Revision	L+D	PPT using MS-Teams	1	56	2/12/2020
52	Revision	L+D	PPT using MS-Teams	1	56	4/12/2020
53	**IA TEST-2**					14/12/2020

Signature of Course in-charge **Signature of Module Coordinator** **Signature of HOD-CSE**

KS INSTITUTE OF TECHNOLOGY BANGALORE

DEPARTMENT OF COMPUTER SCIENCE &ENGINEERING

NAME OF THE STAFF : Mr. Roopesh Kumar B N

SUBJECT CODE/NAME : 17CS754/ STORAGE AREA NETWORKS

SEMESTER/YEAR/SEC :VII/ IV/ A

ACADEMIC YEAR : 2020-2021

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
MODULE 1: Storage System						
1	Introduction to Information Storage	L+I	LCD	1	1	01/09/2020
2	Data Center Infrastructure	L+I	LCD	1	2	02/09/2020
3	Virtualization and Cloud Computing	L+I	LCD	1	3	04/09/2020
4	RAID Implementation Methods	L+I	LCD	1	4	05/09/2020
5	RAID Impact on Disk Performance	L+I	LCD	1	5	08/09/2020
6	Intelligent Storage Systems	L+I	LCD	1	6	09/09/2020
7	Components of Intelligent Storage System	L+I	LCD	1	7	11/09/2020
8	Storage Provisioning	L+I	LCD	1	8	12/09/2020
9	RAID Techniques	L+I	LCD	1	9	15/09/2020
10	RAID Techniques	L+I	LCD	1	10	16/09/2020
MODULE 2: Storage Networking Technologies						
11	Components of FC SAN	L+I	LCD	1	11	16/09/2020
12	Zoning	L+I	LCD	1	12	18/09/2020
13	FC SAN Topologies	L+I	LCD	1	13	19/09/2020
14	IP SAN and FCoE	L+I	LCD	1	14	22/09/2020

15	Network Attached Storage	L+I	LCD	1	15	23/09/2020
16	NAS File-Sharing Protocols	L+I	LCD	1	16	25/09/2020
17	File-Level Virtualization	L+I	LCD	1	17	03/10/2020
18	Object-Based Storage and Unified Storage	L+I	LCD	1	18	03/10/2020
19	Object-Based Storage Devices	L+I	LCD	1	19	06/10/2020
20	Content-Addressed Storage	L+I	LCD	1	20	07/10/2020
FIRST INTERNALS						
MODULE 3: Backup, Archive and Replication						
21	Introduction to Business Continuity	L+I	LCD	1	21	09/10/2020
22	BC Terminology	L+I	LCD	1	22	10/10/2020
23	BC Planning Lifecycle	L+I	LCD	1	23	13/10/2020
24	Backup Topologies	L+I	LCD	1	24	14/10/2020
25	Local Replication	L+I	LCD	1	25	16/10/2020
26	Remote Replication	L+I	LCD	1	26	20/10/2020
27	Three-Site Replication	L+I	LCD	1	27	21/10/2020
28	Remote Replication Technologies	L+I	LCD	1	28	23/10/2020
29	Migration in a Virtualized Environment	L+I	LCD	1	29	27/10/2020
30	Migration in a Virtualized Environment	L+I	LCD	1	30	28/10/2020
MODULE 4: Cloud Computing and Virtualization						
31	Cloud Enabling Technologies	L+I	LCD	1	31	03/11/2020
32	Characteristics of Cloud Computing	L+I	LCD	1	32	04/11/2020
33	Cloud Service Models	L+I	LCD	1	33	06/11/2020
34	Cloud Computing Infrastructure	L+I	LCD	1	34	07/11/2020
35	Black Box Virtualization	L+I	LCD	1	35	13/11/2020
SECOND INTERNALS						
36	Policy-Based Storage Management	L+I	LCD	1	36	17/11/2020
37	Storage Automation	L+I	LCD	1	37	18/11/2020
38	Application-Aware Storage Virtualization	L+I	LCD	1	38	20/11/2020
39	Virtualization-Aware Applications.	L+I	LCD	1	39	21/11/2020
40	High Availability	L+I	LCD	1	40	24/11/2020
MODULE 5: Securing and Managing Storage Infrastructure						
41	Information Security Framework	L+I	LCD	1	41	25/11/2020
42	Risk Triad	L+I	LCD	1	42	27/11/2020

43	Storage Security Domains	L+I	LCD	1	43	01/12/2020
44	Security Implementations	L+I	LCD	1	44	04/12/2020
45	Securing Storage Infrastructure in Virtualized and Cloud Environments.	L+I	LCD	1	45	05/12/2020
46	Monitoring the Storage Infrastructure	L+I	LCD	1	46	05/12/2020
47	Storage Infrastructure Management activities	L+I	LCD	1	47	05/12/2020
48	Storage Infrastructure Management Challenges	L+I	LCD	1	48	08/12/2020
49	Information Lifecycle management	L+I	LCD	1	59	08/12/2020
50	Storage Tiering	L+I	LCD	1	50	08/12/2020
I INTERNALS						30/09/2020
II INTERNALS						11/11/2020
III INTERNALS						16/12/2020

Signature of HOD

K S INSTITUTE OF TECHNOLOGY BENGALURU
DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

NAME OF THE STAFF : **BEENA K**
SUBJECT CODE/NAME : **17CS81/ INTERNET OF THINGS TECHNOLOGY**
SEMESTER/SEC/YEAR : **VIII / B/ IV**
ACADEMIC YEAR : **2020-2021**

Sl. No.	Topic to be covered	Mode of Delivery	Teaching Aid	No. of Periods	Cumulative No. of Periods	Proposed Date
MODULE 1						
1	What is IoT, Genesis of IoT, IoT and Digitization	L+D	Microsoft Teams	2	2	20/4/21
2	IoT Impact	L+ D	Microsoft Teams	1	3	21/4/21
3	Convergence of IT and IoT	L+ D	Microsoft Teams	1	4	21/4/21
4	IoT Impact	L+D	Microsoft Teams	1	5	24/4/21
5	IoT Challenges	L+D	Microsoft Teams	1	6	24/4/21
6	IoT Network Architecture and Design	L+D	Microsoft Teams	1	7	27/4/21
7	Drivers Behind New Network Architectures	L+D	Microsoft Teams	1	8	27/4/21
8	Comparing IoT Architectures	L+D	Microsoft Teams	1	9	28/4/21
9	A Simplified IoT Architecture, The Core IoT Func-tional Stack	L+D	Microsoft Teams	1	10	28/4/21
10	IoT Data Management and Compute Stack	L+D	Microsoft Teams	1	11	4/5/21

MODULE 2						
11	Smart Objects: The "Things" in IoT	L+D	Microsoft Teams	1	12	4/5/21
12	Sensors	L+ D	Microsoft Teams	1	13	5/5/21
13	Actuators	L+ D	Microsoft Teams	1	14	5/5/21
14	Smart Objects	L+D	Microsoft Teams	1	15	11/5/21
15	Sensors Networks	L+D	Microsoft Teams	1	16	11/5/21
16	Connecting Smart Objects	L+D	Microsoft Teams	1	17	12/5/21
17	Communication Criteria	L+D	Microsoft Teams	1	18	12/5/21
18	IoT Access Technologies	L+D	Microsoft Teams	1	19	18/5/21
MODULE 3						
19	IP as the IoT Network Layer	L+D	Microsoft Teams	1	20	18/5/21
20	The Business Case for IP	L+D	Microsoft Teams	1	21	19/5/21
21	The need for Optimization	L+D	Microsoft Teams	1	22	19/5/21
22	Optimizing IP for IoT	L+D	Microsoft Teams	1	23	22/5/21
23	Profiles and Compliances	L+D	Microsoft Teams	1	24	22/5/21
24	IA TEST 1	-	-	1	25	24/5/21
25	Application Protocols for IoT	L+D	Microsoft Teams	1	26	1/6/21
26	The Transport Layer	L+D	Microsoft Teams	2	28	1/6/21,2/6/21

27	IoT Application Transport Methods	L+D	Microsoft Teams	2	30	2/6/21,8/6/21
MODULE 4						
28	Data and Analytics for IoT, An Introduction to DataAnalytics for IoT	L+D	Microsoft Teams	1	31	8/6/21
29	Machine Learning	L+D	Microsoft Teams	1	32	9/6/21
30	Big Data Analytics Tools and Technology	L+D	Microsoft Teams	1	33	9/6/21
31	Edge Streaming Analytics	L+D	Microsoft Teams	1	34	15/6/21
32	Network Analytics	L+D	Microsoft Teams	1	35	15/6/21
33	Securing IoT	L+D	Microsoft Teams	1	36	16/6/21
34	A Brief History of OT Security, Common Chal-lenges in OT Security	L+D	Microsoft Teams	1	37	16/6/21
35	How IT and OT Security Practices and SystemsVary, Formal Risk Analysis Structures: OCTAVE andFAIR	L+D	Microsoft Teams	1	38	22/6/21
36	The Phased Application of Security in an Opera-tional Environment	L+D	Microsoft Teams	1	39	22/6/21
MODULE 5						
37	IoT Physical Devices and Endpoints - ArduinoUNO: Introduction to Arduino	L+D	Microsoft Teams	1	40	23/6/21
38	Arduino UNO, Installing the Software	L+D	Microsoft Teams	1	41	23/6/21
39	IA TEST 2	-	-	1	42	28/6/21
40	Fundamentals of Arduino Programming.	L+D	Microsoft Teams	1	43	6/7/21

28	Data and Analytics for IoT, An Introduction to DataAnalytics for IoT	L+D	Microsoft Teams	1	31	8/6/21
29	Machine Learning	L+D	Microsoft Teams	1	32	9/6/21
30	Big Data Analytics Tools and Technology	L+D	Microsoft Teams	1	33	9/6/21
31	Edge Streaming Analytics	L+D	Microsoft Teams	1	34	15/6/21
32	Network Analytics	L+D	Microsoft Teams	1	35	15/6/21
33	Securing IoT	L+D	Microsoft Teams	1	36	16/6/21
34	A Brief History of OT Security, Common Chal-lenges in OT Security	L+D	Microsoft Teams	1	37	16/6/21
35	How IT and OT Security Practices and SystemsVary, Formal Risk Analysis Structures: OCTAVE andFAIR	L+D	Microsoft Teams	1	38	22/6/21
36	The Phased Application of Security in an Opera-tional Environment	L+D	Microsoft Teams	1	39	22/6/21
MODULE 5						
37	IoT Physical Devices and Endpoints - ArduinoUNO: Introduction to Arduino	L+D	Microsoft Teams	1	40	23/6/21
38	Arduino UNO, Installing the Software	L+D	Microsoft Teams	1	41	23/6/21
39	IA TEST 2	-	-	1	42	28/6/21
40	Fundamentals of Arduino Programming.	L+D	Microsoft Teams	1	43	6/7/21

41	IoT Physical Devices and Endpoints - RaspberryPi: Introduction to RaspberryPi, About the RaspberryPiBoard: Hardware Layout	L+D	Microsoft Teams	1	44	6/7/21
42	Operating Systems on RaspberryPi	L+D	Microsoft Teams	1	45	7/72/1
43	Configuring RaspberryPi, Programming Raspber-ryPi with Python	L+D	Microsoft Teams	1	46	7/7/21
44	Wireless Temperature Monitoring System Using Pi	L+D	Microsoft Teams	1	47	13/7/21
45	DS18B20 Temperature Sensor, Connecting Raspber-ry Pi via SSH	L+D	Microsoft Teams	1	48	13/7/21
46	Accessing Temperature from DS18B20 sensors,Remote access to RaspberryPi	L+D	Microsoft Teams	2	50	14/7/21
47	Smart and Connecting Cities, AnIoT Strategy for Smarter Cities, Smart City IoT Architecture, SmartCity Security, Smart City Use-Case Examples	L+D	Microsoft Teams	2	52	17/7/21
48	IA TEST 3	-	-	1	53	19/7/21

Text Books

1. David Hanes, Gonzalo Salgueiro, Patrick Grossetete, Robert Barton, Jerome Henry,"IoT Fundamentals: Networking Technologies, Protocols, and Use Cases for the Internet of Things", 1stEdition, Pearson Education (Cisco Press Indian Reprint). (ISBN: 978-9386873743)
2. Srinivasa K G, "Internet of Things",CENGAGE Leaning India, 2017

Reference Books

1. Vijay Madisetti and ArshdeepBahga, "Internet of Things (A Hands-on-Approach)", 1stEdition, VPT, 2014. (ISBN: 978-8173719547)
2. Raj Kamal, "Internet of Things: Architecture and Design Principles", 1st Edition, McGraw Hill Education, 2017. (ISBN: 978-9352605224)

Useful Websites

www.ibm.com/in-en/internet-of-things

www.cisco.com/c/en_in/solutions/internet-of-things/overview.html

Details of Teaching Aids:

PPts using Microsoft Teams

Signature of Faculty **Signature of Module Coordinator** **Signature of HOD**