



MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

COURSE PLAN

Department	Computer Science and Engineering		
Course Name	Data Structures and Applications	Course Code	CSE2152
Semester	III	Curriculum	2018
Name of the faculty	SHIVAPRAS AD G	Academic year	2022-23
No. of Contact Hours/Week	L T P C: 3 1 0 4		

COURSE OUTCOMES (CO'S)

At the end of this course, the student should be able to:		No. of Hours	Marks
CO1	Associate real world representation of information using structures and recursions.	10	20
CO2	Solve real world problems using concepts like queues and stacks.	9	20
CO3	Understand and solve real world problems using linked list concepts.	12	25
CO4	Analyze Non-Linear Data Structures such as Trees.	11	23
CO5	Choose the appropriate data structure for solving real world problems.	06	12
Total hours/ Marks		48	100

In semester & End semester plan and schedule (AY: 2022-23)

Component	Type	Max. Marks	Syllabus: Topics covered during	Schedule	Blooms taxonomy levels
MISAC 1	In semester Exam 1	15	Aug 16 – Sep 17, 2022	Sep 24-30, 2022	2 to 6
MISAC 2	Surprise Assignment	5	Aug 16 – Sep 23, 2022	Oct 3-8, 2022	4
MISAC 3	Quiz	5	Sep 5 – Oct 1, 2022	Oct 10-14, 2022	2 to 6
FISAC 1	Quiz	5	Oct 3 – Oct 22, 2022	Oct 26-29, 2022	2 to 6
MISAC 4	In semester Exam 2	15	Oct 03 - Nov 05, 2022	Nov 09-15, 2022	2 to 6
FISAC 2	Take Home Assignment	5	Topics covered after MISAC 4	Nov 21-26, 2022	4
END Semester examination		50	L1 – L48	Dec 8- 22, 2022	2 to 6

MISAC – Mandatory In semester Assessment Components

FISAC – Flexible In semester Assessment components

LESSON PLAN

Lecture No.	Topic	CO's addressed
L0	Introductory class(Introduction between teacher & students. Overview of the subject).	-
L1	Pointers, Accessing variables through pointers, pointer declaration and definition initialization of pointer variables	CO1
L2	Pointers for inter function communication, pointers to pointers	CO1
L3	Arrays and pointers, pointer arithmetic and arrays	CO1
L4(T1)	Tutorial-1: Passing an array to a function, memory allocation functions, array of pointers	CO1
L5	The type definition, enumerated types	CO1
L6	Structures: structure type declaration, initialization, accessing, operations	CO1
L7	Complex structures, Arrays of structures	CO1
L8(T2)	Tutorial-2: Introduction	CO1
L9	Recursive algorithm	CO1
L10	Examples using system stack	CO1
L11	Stacks	CO2
L12(T3)	Tutorial-3: Evaluation of Expression	CO2
L13	Application : infix, postfix and prefix expressions	CO2
L14	Multiple stacks & queues	CO2
L15(T4)	Tutorial-4: Stacks using Dynamic Arrays	CO2
L16	Applications of stacks	CO5
L17	Queues	CO2
L18	Circular Queues	CO2
L19	Circular Queues using Dynamic Arrays	CO2
L20(T5)	Tutorial-5: Priority queues & their representations, Input/Output restricted queues	CO2
L21	Singly linked list and Chains	CO3
L22	Representing Chains in C	CO3
L23	Linked Stacks	CO3
L24(T6)	Tutorial-6: Linked Queues	CO3

L25	Polynomials	CO3
L26	Circular list representation of polynomials	CO3
L27	Additional list Operations	CO3
L28(T7)	Tutorial-7: Operations for circularly linked lists	CO3
L29	Sparse matrices - representation	CO3
L30	Sparse matrices - input	CO3
L31	Sparse matrix output, erasing	CO3
L32(T8)	Tutorial -8: Doubly linked lists	CO3
L33	Applications using linked lists	CO5
L34	Applications using linked lists	CO5
L35	Terminology, representation of trees	CO4
L36(T9)	Tutorial-9: Binary trees, properties	CO4
L37	binary tree representation	CO4
L38	binary tree traversal	CO4
L39	binary tree traversal	CO4
L40(T10)	Tutorial-10: Traversal without a stack	CO4
L41	additional binary tree operations	CO5
L42	threaded binary trees - inorder traversal , Insertion	CO4
L43	Binary Search Trees	CO5
L44(T11)	Binary search trees	CO5
L45	Optimal Binary Search Trees	CO4
L46	Red-Black Trees	CO4
L47	m-way Search trees	CO4
L48(T12)	Tutorial-12: B-trees	CO4

References:

References	
1	Behrouz A. Forouzan, Richard F. Gilberg “A Structured Programming Approach Using C”, 3rd Edition, Cengage Learning India Pvt. Ltd, India, 2007.
2	Ellis Horowitz, Sartaj Sahni , Susan Anderson and Freed, “ Fundamentals of Data Structures in C”, 2nd Edition, Universities Press, India, Reprint 2011.
3	Richard F. Gilberg, Behrouz A. Forouzan, “Data structures, A Pseudocode Approach with C”, 2nd Edition, Cengage Learning India Pvt. Ltd, India , 2009
4	Tenenbaum Aaron M., Langsam Yedidiah, Augenstein Moshe J., “Data structures using C”, 1st Edition, Pearson Prentice Hall of India Ltd., 2007.
5	Debasis Samanta, “Classic Data Structures”, 2nd Edition, PHI Learning Pvt. Ltd., India, 2010

Submitted by: SHIVAPRASAD G
Name of the faculty

(Signature of the faculty)

Date: 29/07/2022

Approved by:
(Signature of HOD)

Date: 29/07/2022

FACULTY MEMBERS TEACHING THE COURSE (IF MULTIPLE SECTIONS EXIST):

FACULTY NAME	SECTION	FACULTY NAME	SECTION
Mr. Shivaprasad G.	A	Dr. Radhika kamath	C
Mr. Ahamad Shafeeq	B	Dr. Venkatesh B	D

COURSE PLAN – ADDITIONAL DETAILS

At the end of this course, the student should be able to:		No. of contact Hours	Marks	Program outcomes (POs)	Learning outcomes (LOs)	Program Specific outcomes (PSOs)	Blooms Taxonomy (BT)
CO1	Associate real world representation of information using structures and recursions.	10	20	1,2,3,8	1	1,2,4	2,3,4
CO2	Solve real world problems using concepts like queues and stacks.	10	22	1,2,3,8	1	1,2,4	2,3,4
CO3	Understand and solve real world problems using linked list concepts.	12	24	1,2,3,8	1	1,2,4	2,3,4,6
CO4	Analyze Non-Linear Data Structures such as Trees.	10	22	1,2,3,8	2	1,2,4	2,3,4
CO5	Choose the appropriate data structure for solving real world problems.	06	12	1,2,3,8	2	1,2,4	3,4,6
Total hours/ Marks		48	100				

Mapping of course outcomes (COs) with Program outcomes (POs) and Program Specific outcomes (PSOs)

Course outcomes (COs)		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CO1	Associate real world representation of information using structures and recursions	2	2	1	-	-	-	-	1	-	-	-	-	3	1	-	1
CO2	Solve real world problems using concepts like queues and stacks	2	2	1	-	-	-	-	1	-	-	-	-	3	1	-	1
CO3	Understand and solve real world problems using linked list concepts	2	2	1	-	-	-	-	1	-	-	-	-	3	1	-	1
CO4	Analyze Non-Linear Data Structures such as Trees	2	2	1	-	-	-	-	1	-	-	-	-	3	1	-	1
CO5	Choose the appropriate data structure for solving real world problems	2	2	1	-	-	-	-	1	-	-	-	-	3	1	-	1
Average Program Articulation Level		2	2	1	-	-	-	-	1	-	-	-	-	3	1	-	1

Mapping of course learning outcomes (CLOs) with AHEP Learning outcomes (AHEP LOs)

Course Learning Outcomes (CLOs)		C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18
CSE 2152.1	Associate real world representation of information using structures and recursions	✓																	
CSE 2152.2	Solve real world problems using concepts like queues and stacks	✓																	
CSE 2152.3	Understand and solve real world problems using linked list concepts	✓																	
CSE 2152.4	Analyze Non-Linear Data Structures such as Trees		✓																
CSE 2152.5	Choose the appropriate data structure for solving real world problems		✓																

Abbreviations

1. CO – Course outcome
2. PO – Program outcome
3. PSO – Program Specific outcome
4. LO – Learning outcome
5. CLO – Course Learning outcome
6. BT – Blooms Taxonomy
7. AHEP – The Accreditation of Higher Education Programmes