



TCET
DEPARTMENT OF INFORMATION TECHNOLOGY (IT)
Credit Based Grading Scheme(Revised - 2012) - University of Mumbai
CBGS-2012(R)



TCET/FRM/IP-02/09

**Semester Plan
(Theory)**

Revision: A

Semester: III

Course: IT

Subject: ITC- 303: Data Structure and Algorithm

Class: SE IT - A

Sr	Prerequisite/ Bridge course:	Duration (Week /Hrs)	Modes of Learning	Recommended Sources
1	C Programming concept: Selection statement, Iterative statement, 1-D and 2-D numeric and non numeric array, function structure, pointer, pointer to structure, Fundamental Algorithms: Design and Analysis	6 hours	Self Learning/ Revision	Textbooks: 1. C and Data structures, Dreamtech Press. 2. Programming in C, Pradip dey, Oxford Publication

Class Room Teaching

Sr. No	Module No.	Lesson No	Topics Planned (Technology to be used)	Teaching Aids Required	Planned /Completion Date	Resource Book Reference	Remarks
1	Module 1	L1.1	SOP-Theory, Introduction to Data structures, Need of Data structures	Power point presentation, Chalk & Board	10/7/2017	1.7.1	
2	Module 1	L1.2	Types of Data structures : Linear and non linear data structures Arrays	Chalk & Board, Animation	10/7/2017	1.7.2	
			SOP- OBE	Presentation	11/7/2017	-	
3	Module 1	L1.3	Stack and queues, Linked list and Tree,	Chalk & Board, Animation	11/7/2017	1.7.3	
4	Module 1	L1.4	Graph, Recursion, ADT (Abstract Data type). Introduction to Analysis, Algorithms	Chalk & Board, Animation	14/7/2017	1.7.4	
5	Module 1	L1.5	Time and Space complexities	Chalk & Board, Animation	14/07/2017	1.7.5	
6	Module 1	L1.6	Asymptotic notations	Chalk & Board, Animation	17/07/2017	1.7.5	
7	Module 2	L2.1	Order of growth functions, Asymptotic notations	Chalk & Board, Animation	18/07/17	1.7.5	
8	Module 2	L2.2	Introduction to Stack	Power point presentation, Chalk & Board	18/07/17	2.7	
9	Module 2	L2.3	Stack as ADT, Operations on stack,	Chalk & Board, Animation	19/07/17	2.8	
10	Module 2	L2.4	Application of stack	Chalk & Board, Animation	20/7/2017	2.9	
11	Module 2	L2.5	Reversing string	Chalk & Board, Animation	21/7/2017	2.9	
12	Module 2	L-3.1	Polish notations	Chalk & Board, Animation	24/07/2017	2.9	
13	Module 2	L-3.2	Polish notations	Power point presentation, Chalk & Board	25/07/2017	2.9	
14	Module 3	L-3.3	Introduction to Queue Queue as ADT	Chalk & Board, Animation	26/07/2017	3.7	

15	Module 3	L-3.4	Operations on Queue	Chalk & Board, Animation	27/07/2017	3.8	
16	Module 3	L-4.1	Linear representation of queue,	Chalk & Board, Animation	31/07/2017	3.9	
17	Module 3	L-4.2	Circular Queue	Chalk & Board, Animation	1/8/2017	3..10	
18	Module 3	L-4.3	Priority Queue	Power point presentation, Chalk & Board	2/8/2017	3.11	
19	Module 3	L-4.4	De-queue, Application of Queues	Chalk & Board, Animation	3/8/2017	3.12 and 3.13	
20	Module 4	L-4.5	Introduction to Linked List	Chalk & Board, Animation	5/8/2017	4.8.1	Extra Lecture
21	Module 4	L-4.6	Basic concept of Linked List	Chalk & Board, Animation	5/8/2017	4.8.1	Extra Lecture
22	Module 4	L-5.1	Memory allocation & de allocation of Linked list	Chalk & Board, Animation	07/8//2017	4.8.2 and 4.8.3	
23	Module 4	L-5.2	Singly Linked list	Power point presentation, Chalk & Board	8/8/2017	4.8.3	
24	Module 4	L-5.3	Doubly Linked list	Chalk & Board, Animation	9/8/2017	4.8.4	
25	Module 4	L-5.4	Circular linked list, Operations on linked list	Chalk & Board, Animation	10/8/2017	4.8.5	
26	Module 4	L-6.1	Linked representation of stack	Chalk & Board, Animation	14/8/2017	4.8.6	
27	Module 4	L-6.2	Linked representation of Queue,	Chalk & Board, Animation	16/08/2017	4.8.6	
28	Module 4	L-7.1	Application of linked list.	Power point presentation, Chalk & Board	24/08/2017	4.8.7	
29	Module 5	L-8.1	Introduction to Sorting: Bubble Sort	Chalk & Board, Animation	30/08/2017	5.8.1	
30	Module 5	L-8.2	Selection Sort	Chalk & Board, Animation	31/08/2017	5.8.2	
31	Module 5	L-9.1	Insertion Sort,	Chalk & Board, Animation	4/9/2017	5.8.3	
32	Module 5	L-9.2	Merge Sort	Chalk & Board, Animation	5/9/2017	5.8.4	
33	Module 5	L-9.3	Quick Sort	Chalk & Board, Animation	6/9/2017	5.8.5	
35	Module 5	L-9.4	Shell Sort	Chalk & Board, Animation	7/9/2017	5.8.8	
36	Module 5	L-10.1	Radix sort	Chalk & Board, Animation	11/9/2017	5.8.6	
37	Module 5	L-10.2	Analysis of Sorting Techniques. Comparison of sorting Techniques	Chalk & Board, Animation	12/9/2017	5.9	
38	Module 5	L-10.3	Introduction to Searching: Linear search, Binary search	Chalk & Board, Animation	13/09/2017	5.14	
39	Module 5	L-10.4	Hashing Techniques, Different Hash functions	Chalk & Board, Animation	14/09/2017	5.15	

40	Module 5	L-11.1	Collision& Collision resolution techniques, Analysis of searching Techniques	Power point presentation, Chalk & Board	18/09/2017	5.15	
41	Module 6	L-11.2	Introduction to Trees, Definitions& Tree terminologies	Chalk & Board, Animation	19/09/2017	6.6	
42	Module 6	L-11.3	Binary tree representation, Operations on binary tree	Chalk & Board, Animation	20/9/2017	6.6.1	
43	Module 6	L-11.4	Traversal of binary trees	Chalk & Board, Animation	21/09/2017	6.6.1	
44	Module 6	L-12.1	Binary search tree, Threaded Binary tree,	Chalk & Board, Animation	25/9/2017	6.6.2 6.6.8	
45	Module 6	L-12.2	Expression tree, Application of Trees	Chalk & Board, Animation	26/09/2017	6.6.8	
46	Module 6	L-13.1	Introduction to Graph, Introduction Graph Terminologies, Graph Representation	Power point presentation, Chalk & Board	3/10/2017	6..10	
47	Module 6	L-13.2	Type of graphs, Graph traversal:Depth first search(DFS)&	Chalk & Board, Animation	4/10/2017	6.10 and 6.10.2.1	
48	Module 6	L-13.3	Breadth First search(BFS)	Chalk & Board, Animation	5/10/2017	6.10.2.1	
49	Module 6	L-14.1	Minimum Spanning Tree	Chalk & Board, Animation	12/10/2017	6.10.3	
50	Module 6	L-14.2	Prim’s & Kruskal’s Shortest Path Algorithm	Chalk & Board, Animation	13/10/2017	6.10.3.1	Extra Lecture
51	Module 6	L-15.1	Algorithm. Applications of graph	Chalk & Board, Animation	16/10/2017	6.10.3.2	
52		L-15.2	Revision / Practice Session for DSA Code	Chalk & Board	16/10/2017		Extra Lecture
Remark:		Syllabus Coverage:		Practice Session:	Content Beyond Syllabus: Application of Linked List to organize the data on harddisk and Use of tree in File System		
Course:							
No. of (lectures planned)/(lecture taken): 52							

Advance Course	Conduction Mode	Duration	Sources
Data Structure using Python	Online NPTEL videos with Hands on Training in Laboratory	20 Hrs	Web sources: 1. NPTEL- https://onlinecourses.nptel.ac.in 2. www.tutorialpoint.com 1. Instructor's study material Textbook reference: 1. Core Python Programming, Dreamtech Publication

Text Books:

1. Data structures using C by Tenenbaum, Langsam, Augenstein , Pearson.
2. Data Structures using C, ReemaThareja, Oxford.
3. C and Data structures, Prof. P.S.Deshpande, Prof. O.G.Kakde, Dreamtech Press.
4. Introduction to Data Structure and its Applications Jean-Paul Tremblay, P. G. Sorenson

Reference Books:

1. Data Structures Using C & C++, Rajesh K. Shukla, Wiley- India.
2. Data Structures and Algorithm Analysis in C ,Mark A.Weiss ,Pearson
3. ALGORITHMS Design and Analysis, Bhasin, OXFORD.
4. Computer Algorithms by Ellis Horowitz and Sartaj Sahni, Universities Press

Digital Reference:

- 3.1 www.nptel.ac.in
- 3.2 www.tutorialpoint.com

Name & Signature of Faculty

Signature of HOD

Signature of Principal /Dean (Academics)

Date:

Date:

Date:

Note:

1. Plan date and completion date should be in compliance
2. Courses are required to be taught with emphasis on resource book, course file, text books, reference books, digital references etc.
3. Planning is to be done for 15 weeks where 1st week will be AOP, 2nd -13th for effective teaching and 14th -15th week for effective university examination oriented teaching, mock practice session and semester consolidation.
4. According to university syllabus where lecture of 4 hrs/per week is mentioned minimum 55 hrs and in case of 3 lectures per week minimum 45 lectures are to be engaged are required to be engaged during the semester and therefore accordingly semester planning for delivery of theory lectures shall be planned.
5. In order to improve score in NBA, faculty members are also required to focus course teaching beyond university prescribed syllabus and measuring the outcomes w.r.t learning course and programme objectives.
6. Text books and reference books are available in syllabus. Here only additional references w.r.t. non –digital/ digital sources can be written (if applicable)
7. Technology to be used in class room during lecture shall be written below the topic planned within the bracket.