



Indra Ganesan

COLLEGE OF ENGINEERING

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai
Accredited by NAAC with 'B+' Grade, 2(f) & 12B Status Institution by UGC

IG Valley, Madurai Main Road, Manikandam, Tiruchirappalli - 620012

NAAC DOCUMENTS

QUALITY INDICATOR FRAME WORK

CRITERION – 1

CURRICULAR ASPECTS

SUBMITTED BY

IQAC

INTERNAL QUALITY ASSURANCE CELL

INDRA GANESAN COLLEGE OF ENGINEERING





Criteria 1	Curricular Aspects	100
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1.1 Curricular Planning and Implementation (20)

1.1.1 The Institution ensures effective curriculum planning and delivery through a well-planned and documented process including Academic calendar and conduct of continuous internal Assessment

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**INDRA GANESAN COLLEGE OF
ENGINEERING**

IG Valley, Manikandam, Tiruchirappalli, Tamil Nadu – 620 012, India.
(Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai-25)

DEPARTMENT OF INFORMATION TECHNOLOGY

PREFACE OF THE COURSE FILE

Batch : 2019-2023

Academic Year : 2019-2020/ODD

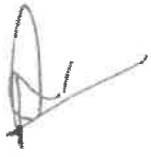
Program : INFORMATION TECHNOLOGY

Year & Semester : 2nd Year / III Semester

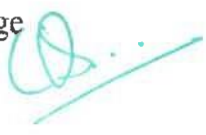
Course Code : CS8391

Name of the Course : Data Structures

Faculty in-charge : Mr. A. Vivek Ignatius, AP / IT


Signature of the Faculty in-charge


HoD / IT


Dr. G. Balakrishnan, M.E., Ph.D.,
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NSAC Accredited, 2 (F) A12 (B) Status Institution by UGC



Department of INFORMATION TECHNOLOGY

Work Load Allocation - ODD Semester
2019 - 2020

S.NO.	Staff Name	Course Code	Course Name	Semester	Lecture Week	Total
1	Mrs. K. Uthra Devi, ASP/ IT	CS8494	Software Engineering	V	4	4
2	Mrs. S. Jenila, AP/ IT	IT8501	Web Technology	V	4	8
		IT8511	Web Technology lab	V	4	
3	Mr. A. Vivek Ignatius, AP / IT	CS6703	Grid And Cloud Computing	VII	4	16
		IT6713	Grid And Cloud Computing	VII	4	
		CS8391	Data Structures	III	4	
4	Mrs. V. Nancy, AP/ IT	CS8391	Data Structures Laboratory	III	4	8
		CS 8591	Computer Networks	V	4	
		CS8581	Networks Lab	V	4	
5	Mrs. M. Karthiga, AP/ IT	CS8392	Object Oriented Programming	III	4	8
		CS8383	Object Oriented Programming lab	III	4	


PRINCIPAL




HOD/IT

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DEPARTMENT OF INFORMATION TECHNOLOGY

Lecture Schedule

Degree/Program: B. TECH/ IT

Duration: 2017

AIM:

Course code & Name :CS8391 & DS

Semester: III Faculty: Mr. A. Vivek Ignatius

To expose the students to principle of operation and performance of electrical machines.

OBJECTIVES:

- To apply the concepts of ADT's
- To learn linear data structures – lists, stacks, and queues
- To apply sorting, searching and hashing algorithms
- To apply Tree and Graph structure

COURSE OUTCOMES:

After the course, the student should be able to:

- Define linear and non-linear data structures
- Implement abstract data types for linear data structures.
- Implement linear and non-linear data structure operations.
- Apply the different linear/non-linear data structure operations for solving a given problem.
- Apply appropriate graph algorithm graph applications.

Critically analyze the various sorting algorithms.

CO	Course Outcomes	POs	PSOs
C302.1	To Implement linear and Non-Linear Data Structure	1,2,3,4,5,6,7,8,9,10,11,12	1,2
C302.2	To Understand the Different Operations Of Search Trees	1,2,3,4,5,6,7,8,9,10,11,12	1,2
C302.3	To Implement Graph Traversal Algorithms	1,2,3,4,5,6,7,8,9,10,11,12	1,2
C302.4	To Get Familiarized To Sorting and Searching Algorithms	1,2,3,4,5,6,7,8,9,10,11,12	1,2
C302.5	To Implementation Of Stack and Queue ADT's	1,2,3,4,5,6,7,8,9,10,11,12	1,2


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S.No	Date	TopicstobeCovered	Book
UNIT-I LINEAR DATA STRUCTURES-LIST			Target periods:06
1	1.7.19	ADT-ADT list	T1/BB
2	4.7.19	Array Based & Linked list Implementation	R2/BB
3	5.7.19	Singly, Circularly Doubly	T1/BB
4	8.7.19	Application Of List	T3/BB
5	11.7.19	Polynomial Manipulation	R3/BB
6	12.7.19	All Operation	T2/BB
UNIT-II LINEAR DATA STRUCTURES-STACK&QUEUE			Target periods :06
7	18.7.19	Stack ADT-Operations Applications	T1/BB
8	19.7.19	Evaluation Of Arithmetic Expressions	T1/BB
9	22.7.19	Conversion Of Infix to Postfix	R2,T1/BB
10	25.7.19	Queue ADT Operations	
11	26.7.19	Circular Queue Priority	T1/BB
12	29.7.19	De Queue Applications Of Queue	R2,T1/BB
UNIT-III NON-LINEAR DATA STRUCTURES - TREES			Target Periods:05
13	8.8.19	Tree ADT Traversal Binary Tree	R3/BB
14	9.8.19	Expression Binary Search Tree Application	T1/BB
15	12.8.19	Threaded AVL Tree	T1/BB
16	16.8.19	B-Tree and B+ Tree	R1/BB
17	19.8.19	Heap & Application	T1/BB
UNIT-IV NON-LINEAR DATA STRUCTURES - GRAPH			TargetPeriods:06
18	5.9.19	Graph - Introduction & Definition	T1/BB
19	6.9.19	Representation & Types Of Graph	T1/BB T1/BB
20	6.9.19	BFS ,DFS	R1/BB
21	7.9.19	TopologicalBI Connectivity	T2/BB
22	9.9.19	Cut Vertex, Euler Circuit	R1/BB
23	10.9.19	Applications of Graph	T3/BB
UNIT-V SEARCHING SORTING AND HASHING TECHNIQUES			Target Periods:05
24	19.9.19	Searching	
25	20.9.19	Sorting & Hashing	
26	23.9.19	Hash Techniques Separate Chaining	
28	27.9.19	Open Addressing Rehashing Extendible Hashing	

Book Reference- Text Books

Sl.A. Title of the Book Author Publisher Year

1. Data Structures and Algorithm Analysis in C Mark Allen Weis Pearson Education,2005
2. Introduction to Data Structures in C Kamthane, Pearson Education,200



Signature of the Faculty in-charge



HoD/ IT


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Register Number:



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Internal Assessment Exam - I			Date/Session	13.07.2019	Marks	50
Course code	CS8391	Course Title	Data Structures			
Regulation	2017	Duration	90 minutes	Academic Year	2020-2021	
Year	II	Semester	III	Department	IT	

COURSE OUTCOMES

CO1:	Define linear and non-linear data structures.
CO2:	Implement abstract data types for linear data structures.
CO3:	Implement linear and non-linear data structure operations.
CO4:	Apply the different linear/non-linear data structure operations for solving a given problem.
CO5:	Apply appropriate graph algorithms for graph applications.
CO6:	Critically analyze the various sorting algorithms.

Q.No.	Question	CO	BTS
PART A (Answer all the Questions 10 x 2 = 20 Marks)			
1	Define Data Structure?	CO1	K1
2	List out the disadvantages of Arrays?	CO1	K2
3	List out the advantages of using a linked list?	CO1	K2
4	Differentiate: Arrays and Linked Lists.	CO1	K1
5	Define: linked List?	CO1	K1
6	List out the applications of a linked list. ?	CO1	K1
7	List the various types of queues. ?	CO1	K3
8	List the applications of stacks. ?	CO2	K2
9	List out the basic operations that can be performed on a stack?	CO2	K5
10	Define Non- linear Data Structure?	CO2	K2
PART B (Answer all the Questions 2 x 10 = 20 Marks)			
11a	Explain Array based implementation of elements. ?	CO1	K6
OR			
11b	Elaborate the various operations on Singly Linked List.?	CO1	K6
12a	Describe the various operations on Circularly Linked List. – Creation?	CO2	K2
OR			
12b	Explain the Various Operations of stack using array?	CO2	K2
PART C (Answer all the Questions 1 x 10 = 10 Marks)			
13a	Explain Polynomial manipulation in detail?	CO1	K2
OR			
13b	Outline: how to convert Infix to Postfix expression with an example?	CO1	K2

Course Faculty
(Name /Sign / Date)

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HoD
(Name /Sign / Date)

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DEPARTMENT OF INFORMATION TECHNOLOGY

Assignment Question Paper

Assignment-01		Date of Issue:		Marks	10
Course code	CS8391	Course Title	Data Structures		
Year	II	Semester/Section	III/A	Date of Submission:	

Q.No	Questions	CO
1	Elaborate the various operations on Singly Linked List.	C203.2
2	Explain Polynomial manipulation in detail.	C203.2



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DEPARTMENT OF INFORMATION TECHNOLOGY

Faculty Time Table

Mrs. A. Vivek Ignatius, AP/IT								
DayOrder	1	2	3	4	5	6	7	8
I		DS						

II								
III		DS						
IV	DS							
V		DS		DS				
S.Code	Title			Year/Branch			Hours	
CS8391	DataStructures			II/IT				
TOTAL - 5 hours								



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DEPARTMENT OF INFORMATION TECHNOLOGY

CBS-PROOF

ACADEMIC YEAR: 2019-2020 (ODD)

REGULATION:2021

Name of the Faculty:Mr. A. Vivek Ignatius ,AP/IT

SEM: 03

PROGRAM: IT

TOPIC: Sparce Matrix



Consider the simple matrix on the left in Figure 1.1. Many of its entries are zero (and so are omitted). This is an example of a sparse matrix. The problem we are interested in is that of solving linear systems of equations $Ax=b$, where the square sparse matrix A and the vector b are given and the solution vector x is required. Such systems arise in a huge range of practical applications, including in areas as diverse as quantum chemistry, computer graphics, computational fluid dynamics, power networks, machine learning, and optimization. The list is endless and constantly growing, together with


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Systems to be solved, the sparsity of A must be exploited and operations with the Zero entries avoided. To achieve this, sophisticated algorithms are required. The majority of algorithms fall in to two main categories : direct methods and interactive methods. Direct method strans form Ausinga finite sequence of elementary. Transformations into a product of simpler sparse matrices in such away that solving Linear systems of equations with these factor matrices is comparatively easy and inexpensive



Faculty in-Charge



HOD/IT



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DEPARTMENT OF INFORMATION TECHNOLOGY

Identification of Curricular Gap & Content Beyond Syllabus (CBS)

Name of the Faculty : Mr. A. Vivek Ignatius AP/IT Course Code & Name: CS8391 & DS

Technology Degree & Program: B.TECH /IT Semester: III

Year: 2019 -2020/ODD

I. Mapping of Course Outcomes with POs & PSOs. (before CBS)

Table.1 Mapping of COs, C, PSOs with POs -before CBS.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C302.1	3	2	3	-	2	2	2	-	-	3	-	2	2	2
C302.2	3	-	3	2	-	2	2	-	2	-	-	2	2	2
C302.3	3	-	3	-	-	2	2	-	-	-	2	2	2	2
C302.4	3	2	3	2	2	2	-	-	2	-	-	2	2	2
C302.5	-	-	-	-	-	2	2	-	-	3	2	2	2	2
C302	3	2	3	2	2	2	2	-	2	3	2	2	2	2

II. Identification of content beyond syllabus.

Table.2 Identification of content beyond syllabus

Detail of Content Beyond Syllabus (CBS) added	POs strengthened/ vacant filled	CO/Unit
Sparse Matrix	PO9 (Vacant filled)	C302.3 & C302.5/ III & V

III. Mapping of Course Outcomes with POs & PSOs. (After CBS)

Table.3 Mapping of COs, C, PSOs with POs -after CBS.

Course	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
C302.1	3	2	3	-	2	2	2	-	-	3	-	2	2	2
C302.2	3	-	3	2	-	2	2	-	2	-	-	2	2	2
C302.3	3	-	3	-	-	2	2	-	*2	-	2	2	2	2
C302.4	3	2	3	2	2	2	-	-	2	-	-	2	2	2
C302.5	-	-	-	-	-	2	2	-	*2	3	2	2	2	2
C302	3	2	3	2	2	2	2	-	4	3	2	2	2	2

Signature of the Faculty

HoD/IT

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DEPARTMENT OF INFORMATION TECHNOLOGY

Assignment Question Paper

Assignment-01			Date of Issue:	20.7.19	Marks	10
Coursecode	CS8391	Course Title	Data Structures			
Year	II	Semester	III	Date of Submission:	20.7.19	

Q.No	Questions	CO
1	Explain detail about strongly Connected Component and Illustrate with an Example	C302.3
2	Explain Brief about B+ Tree and Discuss the application of Heap	C302.3

Mark Allocation

Rubrics	Marks Allocated	Marks obtained
Content Quality	6	5
Presentation Quality	2	2
Timely submission	2	1
Total marks	10	8



Name and Signature of the Faculty In-charge



HoD/IT



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DEPARTMENT OF INFORMATION TECHNOLOGY

Tutorial Question Paper

Tutorial-01			Date of Issue:	13.10.2019	Marks	10
Course code	CS8391	Course Title	DATA STRUCTURES			
Year	II	Semester	III	Date of Submission:	13.10.2019	

Q.No	Questions	CO
1	Implementation Of Heaps Using Priority Queues	C302.1
2	Hashing – Any Two Collision Techniques	C302.1



Name and Signature of the Faculty In charge



HoD/IT



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DEPARTMENT OF INFORMATION TECHNOLOGY

Academic Year 2019-2020 (odd Semester)

Class: II Year / III Sem

CLASS CO-ORDINATOR:

Mrs. V. Nancy, AP/IT

Day	TEST	1	BREAK	2	3	4	LUNCH	5	6	BREAK	7	8
	9.15-10.00	10.00 - 10.45		11.00-11.45	11.45 - 12.30	12.30-1.15		2.00-2.45	2.45-3.25		3.35-4.15	4.15 -5.0
MON	DM	OOP	BREAK	DM	DS	DPSD	LUNCH	MENTOR	BD	BREAK	SPORTS	
TUE	OOP	DPSD		ADC	OOP	DS		DS LAB	DS LAB			
WED	DS	DS		ADC	DPSD	DM		OOP LAB	OOP LAB			
THUR	DPSD	OOP		ADC	SEMINAR	OOP		DPSD LAB	LIBRARY		SEMINAR NPTEL	
FRI	ADC	DS		ADC	DM	COUNSELLING		DPSD LAB	T&P			

NOTE: Attendance will be marked from 9.15am to 9.25am

SUBJECT CODE	COURSE NAME	ERP ID	CREDITS/HOURS	STAFF IN CHARGE
MA8351	Discrete Mathematics		3/4	Mr. Kannan, AP/ Maths
CS8351	Digital Principles and System Design		3/4	Mrs. Saranya, AP/ECE
CS8391	Data Structures		3/4	Mr. Vivek Ignatius A, AP/IT
CS8392	Object Oriented Programming		3/5	Mrs. Uthra Devi K, AP/IT
EC8394	Analog and Digital Communication		3/4	Mrs. Bharath, AP/EEE
CS8381	Data Structures Laboratory		4/4	Mr. Vivek Ignatius A, AP/IT
CS8383	Object Oriented Programming Laboratory		4/4	Mrs. Uthra Devi K, AP/IT
CS8382	Digital Systems Laboratory		2/2	Mrs. Saranya AP/ECE
HS8381	Interpersonal Skills/Listening & Speaking		2/2	

V. Nancy
Time-Table Incharge

leap
HOD

(Signature)

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DEPARTMENT OF INFORMATION TECHNOLOGY

Academic Year 2019-2020(Odd Semester)

Class: II Year / III Sem

CLASS CO-ORDINATOR:

Mr. A. Vivek Ignatius,
AP/IT

Day	TEST	1	BREAK	2	3	4	LUNCH	5	6	BREAK	7	8
	9.15-10.00	10.00 - 10.45		14.00-11.45	11.45 - 12.30	12.30- 1.15		2.00-2.45	2.45-3.25		3.35-4.15	4.15 - 5.00
MON					DS							
TUE						DS		DS LAB			DS LAB	
WED	DS	DS				DM						
THUR												
FRI		DS										

V. Nay

ABLE CO-ORDINATOR

leup
HOD

[Signature]
PRINCIPAL

[Signature]

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IOAC Academic Audit Form

ACADEMIC YEAR: 2019-2020

Name of Department : IT Year / Sem : II / III No. of Students Registered : 28

Details of Examination : IA Test -1 / IA Test -2 / IA Test -3 / Model Test

S.No.	Course Code	List of Reg.No Verified	Course Log Book Verified (Y/N)	Course File Verified (Y/N)	No of students Attended	No of Absentees	No of Failures	Pass %	Remarks
1.	MA8351	811218205015	Y	Y	27	1	2	92%	-
2.	CS8351	811218205018	Y	Y	27	1	0	100%	-
3.	CS8391	811218205003	Y	Y	27	1	1	96%	-
4.	CS8392	811218205001	Y	Y	27	1	2	92%	-
5.	EC8394	811218205301	Y	Y	27	1	1	96%	-

Verified by

External Member Name and Signature:

Dr. A. Anandhan & [Signature]

Internal Member Name and Signature:

A.P. Devan & [Signature]

Overall Remarks:

[Signature]
HoD/ IT

[Signature]
IOAC Co-ordinator

[Signature]
Principal

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DEPARTMENT OF INFORMATION TECHNOLOGY

Internal Assessment Test Answer Book

Name	Gopi. U	Year/Semester/Section	11 / 11
Batch No.	2019 - 2020	Date/Session	7.8.19/AN
Department	IT		
Course code	CS8391	Course Title	Data Structures
Internal Assessment Test	<input checked="" type="checkbox"/> IAT1	<input type="checkbox"/> IAT2	<input type="checkbox"/> IAT3
			<input type="checkbox"/> Model
Name and Signature of the Invigilator with date			

Instruction to the Student: Put tick mark to the question at tended in the column against question.							
Part A			Part B/Part C				Total Marks
Q. No.	✓	Marks	Q.NO.	✓	a	b	
					Marks	Marks	
1	✓	2	11	✓	10		10
2	✓	2	12	✓	10		10
3	✓	1	13			✓ 12	12
4		-	14				
5	✓	2	15				
6	✓	1	16				
7	✓	1	Total				30
8	✓	0	Grand Total			Name and Signature	
9	✓	2	45			Of the Examiner with date	
10	✓	2					
Total		13					

To be filled by the examiner							
Course Outcomes	1	2	3	4	5	6	Total
Marks allotted	30	20					50
Marks Obtained	30	15					45

IQAC Audit-Remarks	Name and Signature of the IQAC member
---------------------------	---------------------------------------

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DEPARTMENT OF INFORMATION TECHNOLOGY

ROOT CAUSE ANALYSIS

Name of the Faculty : Mr. A. Vivek Ignatius Course code & Name : CSS391 & Data structures
Degree & Program : B. Tech (IT) Semester & Section : III sem
IA Test : V / II / III / Model University Exam/

Month & Year : Nov / DEC 2019

Target : 95 % Achieved : 94 %

S.NO	ROLL NO	NAME OF THE STUDENT	CAUSES FOR FAILURE	CORRECTIVE ACTION TAKEN	PREVENTIVE ACTION TAKEN	FOLLOWUP STATUS	REMARKS OF THE HOD
1.	811218205010	Kayalvizhi - B	Fever	Retest	Special Coaching	Y	-

Signature of the Faculty

Signature of the HOD/ IT

Dr. G. Balakrishnan, M.E., Ph.D.,
Principal

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Manikandam, Trichy-620 012.