

**DEPARTMENT OF COMPUTER APPLICATIONS**  
**NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI**

COURSE PLAN – PART I			
<b>Name of the programme and specialization</b>	<b>Master of Computer Applications</b>		
<b>Course Title</b>	Data Structures and Applications		
<b>Course Code</b>	<b>CA711</b>	<b>No. of Credits</b>	<b>3</b>
<b>Course Code of Pre-requisite subject(s)</b>	NIL		
<b>Session</b>	<b>July 2018</b>	<b>Section (if, applicable)</b>	<b>A and B</b>
<b>Name of Faculty</b>	<b>Dr. Michael Arock</b>	<b>Department</b>	<b>Computer Applications</b>
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<b>Name of PAC Chairman</b>	<b>Dr.G.R.Gangadharan</b>		
<b>E-mail</b>	<b>ganga@nitt.edu</b>	<b>Telephone No.</b>	<b>0431-2503737</b>
<b>Course Type</b>	<b>Core course</b>		

**Syllabus (approved in BoS)**

Linear data Structures – Arrays, Records, Linked Lists – Singly, Doubly, Circular linked lists - Stack: Definition and examples, Representing Stacks - Queues: Definition and examples, priority queue, Deque, IRD, ORD – Applications of Stack, Queue and Linked Lists- Hashing

Non-Linear data Structures - Binary Trees – Binary Tree Representations – node representation, internal and external nodes, implicit array representation - Operations on binary trees – Binary tree Traversals – Binary search trees- insertion, deletion, find. Graphs – Representation – Linked representation of Graphs – Graph Traversals.

Advanced data structures –Data structures for disjoint sets- AVL trees - Red-black trees – insertion and deletion – B-trees – Definition, insertion, deletion – Splay tree, Binomial heaps – operations.

Single-source shortest path algorithms – Bellman-Ford algorithm and Dijkstra's algorithm- Transitive closure -Topological sort – Trie Structures.

Basic sorting techniques – selection sort, bubble sort, insertion sort - Merging and merge sort – Basic Search Techniques – linear search and binary search – recursive and non-

recursive algorithms.

**REFERENCES:**

1. S. Lipschutz and G.A.V. Pai, "Data Structures", Tata McGraw-Hill, 2010.
2. M.A.Weiss, "Data Structures and Problem Solving using Java", 4<sup>th</sup> Edition, Addison Wesley, 2009.
3. D. Samanta, "Classic Data Structures", 2<sup>nd</sup> Edition, PHI, 2009.
4. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C.Stein, "Introduction to Algorithms", 3<sup>rd</sup> Edition, MIT Press, 2009.
5. P. Brass, "Advanced Data Structures", Cambridge University Press, 2008.

**COURSE OBJECTIVE(S)**

To introduce different data structures; searching and sorting techniques and their applications.

**COURSE OUTCOMES (CO)**

Course Outcomes	Aligned Programme Outcomes (PO)
1. Use linear and nonlinear data structures to solve real-time problems	PO I, II, III, IV, V
2. Apply basic searching and sorting techniques in different application domains	PO I, II, III, IV, V

**COURSE PLAN – PART II**

**COURSE OVERVIEW**

This course covers topics on introduction, linear data structures, arrays, structures, linked lists, stacks, queues, applications and hashing. It covers topics on non-linear data structures, graphs, trees, binary trees and operations on them. It includes topics on advanced data structures like B-trees, Red-Black trees, splay trees and binomial heaps and operations on them. It consists of topics on applications like single-source shortest path algorithms, transitive closure and topological sort. It deals with basic sorting techniques and basic search techniques.

**COURSE TEACHING AND LEARNING ACTIVITIES**

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1 (3 Classes)	Introduction	Chalk and Talk , Power Point Presentation
2	Week 2 (3 Classes)	Arrays and Structures	Chalk and Talk , Power Point Presentation

3	Week 3 (3 Classes)	Linked Lists	Chalk and Talk , Power Point Presentation
4	Week 4 (3 Classes)	Applications of Stacks and Queues	Chalk and Talk , Power Point Presentation
5	Week 5 (3 Classes)	Applications of Linked Lists	Chalk and Talk , Power Point Presentation
6	Week 6 (3 Classes)	Hashing	Chalk and Talk , Power Point Presentation
7	Week 7 (3 Classes)	Graphs	Chalk and Talk , Power Point Presentation
8	Week 8 (3 Classes)	Graph Traversals	Chalk and Talk , Power Point Presentation
9	Week 9 (3 Classes)	Trees	Chalk and Talk , Power Point Presentation
10	Week 10 (3 Classes)	Tree Traversals	Chalk and Talk , Power Point Presentation
11	Week 11 (3 Classes)	Tree Representations	Chalk and Talk , Power Point Presentation
12	Week 12 (3 Classes)	Operations on Binary Trees	Chalk and Talk , Power Point Presentation
13	Week 13 (3 Classes)	Disjoint Sets	Chalk and Talk , Power Point Presentation
14	Week 14 (3 Classes)	Red-Black Trees	Chalk and Talk , Power Point Presentation

#### COURSE ASSESSMENT METHODS

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Cycle Test 1	6 <sup>th</sup> Week	60 Minutes	20
2	Cycle Test 2	10 <sup>th</sup> Week	60 Minutes	20
3	Assignment	9 <sup>th</sup> week	-	10
4	Final Assessment	-	180 Minutes	50

#### COURSE EXIT SURVEY

- The students through the class representative may give their feedback at any time to the course coordinator which will be duly addressed.
- The students may give their feedback during class committee meetings.

## **COURSE POLICY**

### **MODE OF CORRESPONDENCE**

By Email: michael.rock@gmail.com

### **COMPENSATION ASSESSMENT POLICY**

Compensation assessment will be conducted for absentees in cycle test I or cycle test II only after the submission of medical or On-Duty certificates signed by competent authority.

### **ATTENDANCE POLICY**

- **At least 75% attendance in each course is mandatory.**
- **A maximum of 10% shall be allowed under On Duty (OD) category.**
- Students with **less than 65% of attendance** shall be prevented from writing the final assessment and **shall be awarded 'V' grade.**

### **ACADEMIC DISHONESTY & PLAGIARISM**

- Possessing a mobile phone, carrying bits of paper, talking to other students, copying from others during an assessment will be treated as punishable dishonesty.
- The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

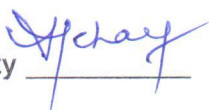
The above policy against academic dishonesty shall be applicable for all the programmes.

### **ADDITIONAL INFORMATION**


- a) The passing minimum shall be as per the regulations. Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.

### **FOR APPROVAL**

Course Faculty



CC-Chairperson



HOD

