

**DEPARTMENT OF
Computer Applications**

NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

COURSE PLAN – PART I			
Name of the programme and specialization	Master of Computer Applications		
Course Title	Design and analysis of algorithm		
Course Code	CA710	No. of Credits	3
Course Code of Pre-requisite subject(s)	CA711, CA713		
Session	Jan. 2019	Section (if, applicable)	B
Name of Faculty	Dr. P.J.A. Alphonse	Department	Computer Applications
Email	alphonse@nitt.edu	Telephone No.	0431-2503742
Name of Course Coordinator(s) (if, applicable)	Dr. Mrs. B. Janet		
E-mail	Janet@nitt.edu	Telephone No.	0431-2503741
Course Type	<input type="checkbox"/> Core course <input type="checkbox"/> Elective course		

Syllabus (approved in BoS)

Algorithms as technology – Analyzing and Designing algorithms – Asymptotic notations – Recurrences – Methods to solve recurrences – Heap Sort - Quick Sort – Sorting in linear time – Radix sort – Selection in linear time.

Divide and conquer methodology – Multiplication of large integers – Strassen's matrix multiplication – Greedy method – Prim's algorithm – Kruskal's algorithm – algorithm for Huffman codes.

Dynamic Programming – Elements – Matrix-chain multiplication –Computing a binomial coefficient – Floyd-Warshall algorithm – Optimal binary search tree – Memory functions.

Backtracking – N-Queens problem – Hamiltonian circuit problem – Subset sum problem – Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem.

NP-hard and NP-complete problems – Definitions and Properties – Reducibility – Cook's Theorem (without proof) – Clique decision problem – Node cover problem – K-coloring problem.

REFERENCES:

1. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein, "Introduction to Algorithms", 3rd Edition, MIT Press, 2009.
2. Robert Sedgewick and Philippe Flajolet, "An Introduction to the Analysis of Algorithms", 2nd Edition, Addison-Wesley, 2013
3. Jon Kleinberg and Éva Tardos, "Algorithm Design", Addison-Wesley, 2005.
4. George T. Heineman, Gary Pollice and Stanley Selkow, "Algorithms in a Nutshell", O'Reilly Media, 2008.
5. Sanjoy Dasgupta, Christos Papadimitriou and Umesh Vazirani, "Algorithms", McGraw-Hill, 2006.
6. E. Horowitz, S. Sahni, and S. Rajasekaran, "Computer Algorithms", 2nd edition, Silicon Press, 2007.

COURSE OBJECTIVES

To learn about Complexity Analysis and various algorithmic design methodologies

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
1. Understanding the Asymptotic notations and Recurrences relations	PO I, II, III, IV, V
2. Solving the problems and examining the complexities	PO I, II, III, IV, V
3. Analyze the complexity of polynomial algorithms	PO I, II, III, IV, V
4. Apply various design strategies for solving problems	PO I, II, III, IV, V
5. Distinguish NP hard and NP complete problems from other problems	PO I, II, III, IV, V

COURSE PLAN – PART II**COURSE OVERVIEW**

The Design and analysis of Algorithms deals with the study of algorithms and their complexities. Examining the complexities of polynomial algorithms and applying various design strategies for solving those problems. Knowing the concepts of NP hard and NP complete problems.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1 to Week 5	Analyzing and Designing algorithms Divide and conquer methodology Greedy method	Classroom activity

2	Week 6 to Week 10	Dynamic Programming Backtracking NP-hard and NP-complete problems	Classroom activity
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COURSE ASSESSMENT METHODS (shall range from 4 to 6)

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

*mandatory; refer to guidelines on page 4

COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed)

- 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 (preferred mode of correspondence with students, compensation assessment policy to be specified)

MODE OF CORRESPONDENCE (email/ phone etc)

By Email: alphonse@nitt.edu

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 (A uniform attendance policy as specified below shall be followed)

- **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.
- Zero mark to be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.
- 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

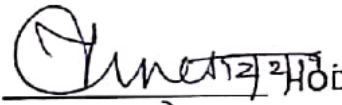
The passing minimum shall be as per the regulations. Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.

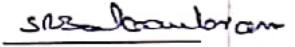
FOR APPROVAL

Course Faculty



CC-Chairperson



HOD 

(B. JANET)

Guidelines:

- a) The number of assessments for a course shall range from 4 to 6.
- b) Every course shall have a final assessment on the entire syllabus with at least 30% weightage.
- c) One compensation assessment for absentees in assessments (other than final assessment) is mandatory. Only genuine cases of absence shall be considered.
- d) The passing minimum shall be as per the regulations.

B.Tech. Admitted in				P.G.
2018	2017	2016	2015	
35% or class average/2 whichever is greater.		Peak/3 or class average/2 whichever is lower		40%

- e) Attendance policy and the policy on academic dishonesty & plagiarism by students are uniform for all the courses.
- f) Absolute grading policy shall be incorporated if the number of students per course is less than 10.
- g) Necessary care shall be taken to ensure that the course plan is reasonable and is objective.