



NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF COMPUTER APPLICATIONS

| COURSE PLAN – PART I | | | |
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| Name of the programme and specialization | Master of Computer Applications | | |
| Course Title | Design and Analysis of Algorithm | | |
| Course Code | CA 710 | No. of Credits | 3 |
| Course Code of Pre-requisite subject(s) | CA 711 , CA 713 | | |
| Session | January 2019 | Section (if, applicable) | A |
| Name of Faculty | Dr.Michael Arock | Department | Computer Applications |
| Official Email | michael@nitt.edu | Telephone No. | 0431-2503736 |
| Name of Course Coordinator(s) (if, applicable) | Dr.(Mrs)B.Janet | | |
| Official E-mail | | Telephone No. | |
| Course Type (please tick appropriately) | <input checked="" type="checkbox"/> Core 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 | | | |
| COURSE OBJECTIVES | | | |
| To Learn about Complexity analysis and various algorithmic design methodologies. | | | |
| MAPPING OF COs with POs | | | |
| Course Outcomes | Programme Outcomes (PO) (Enter Numbers only) | | |



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| Analyze the complexity of polynomial algorithms. | I,II,III,IV,V |
| Apply various design strategies for solving problems | I,II,III,IV,V |
| Distinguish NP hard and NP complete problems from other problems | 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 | | | (Add more rows) |
| S.No. | Week/Contact Hours | Topic | Mode of Delivery |
| 1 | Week 1 | Algorithms as technology – Analyzing and Designing algorithms – Asymptotic notations – Recurrences | Chalk and Talk |
| 2 | Week 2 | Recurrences – Methods to solve recurrences | Chalk and Talk |
| 3 | Week 3 | Heap Sort - Quick Sort – Sorting in linear time – Radix sort – Selection in linear time. | Chalk and Talk |
| 4 | Week 4 | Divide and conquer methodology – Multiplication of large integers – Strassen's matrix multiplication – | Chalk and Talk |
| 5 | Week 5 | Greedy method – Prim's algorithm – Kruskal's algorithm – algorithm for Huffman codes. | Chalk and Talk |
| 6 | Week 6 | Dynamic Programming – Elements – Matrix-chain multiplication – Computing a binomial coefficient – | Chalk and Talk |
| 7 | Week 7 | Floyd-Warshall algorithm – Optimal binary search tree – Memory functions. | Chalk and Talk |



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| 8 | Week 8 | Backtracking – N-Queens problem – Hamiltonian circuit problem – Subset sum problem – | Chalk and Talk |
| 9 | Week 9 | Branch and bound – Assignment problem – Knapsack problem – Traveling salesman problem. | Chalk and Talk |
| 10 | Week 10 | NP-hard and NP-complete problems – Definitions and Properties – Reducibility – Cook’s Theorem (without proof) | Chalk and Talk ,ppt |
| 11 | Week 11 | Clique decision problem – Node cover problem – K-coloring problem | Chalk and Talk |

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

| S.No. | Mode of Assessment | Week/Date | Duration | % Weightage |
|-------|--------------------------|-----------------|----------|-------------|
| 1 | Cycle Test 1 | 4th Week | 1 Hr | 20 |
| 2 | Cycle Test 2 | 8th Week | 1Hr | 20 |
| 3 | Assignment | 7th to 8th Week | | 10 |
| CPA | Compensation Assessment* | 9th Week | 2 Hrs | 40 |
| 4 | Final Assessment * | | 3 Hrs | 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 chairman which will be duly addressed.
- ✓ The students may also give their feedback during class committee meeting.
- ✓ Course Outcome Survey’ form will be distributed on the last working day to all the
- ✓ Students and the feedback on various rubrics will be analyzed.
- ✓ The COs will be computed after arriving at the final marks.

COURSE POLICY (including compensation assessment to be specified)

Mode Of Correspondence(email/phone)

Compensation assessment Policy :

One compensation assessment will be conducted for the students those who have missed CT1 or CT2 for genuine reason before the final assessment

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



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- 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, IF ANY

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

FOR APPROVAL

Course Faculty 

CC- Chairperson 

HOD 