NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	II Year B.Tech. (CSE) Section A		
Course Title	Introduction to Algorithms		
Course Code	CSPC29	**No. of Credits**	3
Course Code of Pre-requisite subject(s)	CSPC21, CSLR21		
Session	JAN 2019	**Section (if, applicable)**	-
Name of Faculty	Dr. R. Mohan	**Department**	CSE
Email	rmohan@nitt.edu	**Telephone No.**	0431-2503210
Name of Course Coordinator(s) (if, applicable)			
E-mail		**Telephone No.**	
Course Type	✓ Core course	☐ Elective course	

Syllabus (approved in Senate)

Unit – I
Algorithms - Examples - Tournament method - Evaluating polynomial functions - pre-processing of coefficients - solving recurrence equations.

Unit – II
Divide and Conquer method - Strassen's matrix multiplication - Greedy method - Knapsack problem - Job sequencing with deadlines - Minimum spanning trees.

Unit – III
Dynamic Programming - Multistage graphs - All pair's shortest paths - Optimal binary search trees - Travelling salesman problem - Fast Fourier transform.

Unit – IV
Randomized Algorithms and Amortized Analysis - Las Vegas and Monte Carlo types - Randomized quick sort and its analysis - Min-Cut algorithm.

Unit – V
NP-Hard and NP-complete problems - Basic concepts - Reducibility - Cook's theorem (without proof) - Turing machines - NP-Hard graph problems.

Text Books
1. T. Cormen, C. Lieserson, R. Rivest, and C. Stein, "Introductions to Algorithms", Prentice-Hall/India, 3rd edition, 2009

COURSE OBJECTIVES

- ➤ To understand the importance of algorithm and its complexity
- ➤ To analyze the complexity of an algorithm in terms of time and space complexity
- ➤ To design and implement various programming paradigms and its complexity

MAPPING OF COs with POs

Course Outcomes	Aligned Programme Outcomes (PO)
1. Ability to analyze the time and space complexity, given an algorithm	1, 2, 4
2. Ability to apply the techniques of algorithm in solving real world problems	1, 2
3. Ability to develop systematically an algorithm for solving a problem	1, 2

COURSE PLAN – PART II

COURSE OVERVIEW

The Introduction to Algorithms course deals with the study of different algorithms applied in many real world problems. In UNIT - 1, examples of algorithms, complexity notations and recurrence equations are discussed. In UNIT-II, divide and conquer methods and greedy methods are given. Then the concept of dynamic programming is discussed in UNIT-III. Different randomized algorithms are discussed in UNIT-IV. In the last unit, basic concepts of NP-hard and NP-complete problems are discussed with examples.

COURSE TEACHING AND LEARNING ACTIVITIES

S.No.	Week	Topic	Mode of Delivery
1.	1	Algorithms - Examples - Tournament method - Evaluating polynomial functions	Chalk and Talk
2.	2	Pre-processing of coefficients – recurrence equations-solving recurrence equations	Chalk and Talk
3.	3	Introduction to Divide and Conquer method – examples of Divide and Conquer	Chalk and Talk
4.	4	Examples of Divide and Conquer- Strassen's matrix multiplication	Chalk and Talk
5.	5	Introduction to Greedy method - Knapsack problem	Chalk and Talk
6.	6	Job sequencing with deadlines - Minimum spanning trees.	Chalk and Talk

7.	7	Introduction to Dynamic Programming - Multistage graphs	Chalk and Talk
8.	8	All pair's shortest paths algorithm - Optimal binary search trees	Chalk and Talk
9.	9	Travelling salesman problem - Fast Fourier transform.	Chalk and Talk
10.	10	Randomized Algorithms and Amortized Analysis	PPT
11.	11	Las Vegas and Monte Carlo types	PPT
12.	12	Randomized quick sort and its analysis - Min-Cut algorithm	PPT
13.	13	NP-Hard and NP-complete problems - Basic concepts - Reducibility	PPT
14.	14	Cook's theorem (without proof) - Turing machines - NP-Hard graph problems	PPT

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No.	Mode of Assessment	Week/Date	Duration	% Weightage
1	Assignment 1	1St week of Feb	-	5%
2	Cycle Test-1	20-02-2019	1 hour	20%
3	Assignment 2	1st week of March	-	5%
4	Cycle Test-2	04-04-2019	1 hour	20%
5	Compensation assessment	1st week of May	1 hour	20%
6	Final Assessment Theory	13-05-2019	3 hours	50%
TOTAL				100%

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

1. Students' feedback through class committee meetings.
2. Feedback questionnaire from students – from MIS at the end of the semester.

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

MODE OF CORRESPONDENCE (email/ phone etc)

Mode of Correspondence through Phone or email.

COMPENSATION ASSESSMENT POLICY

In case of emergency, the student should submit compensatory assignments on submission of appropriate documents as proof. Compensatory assessments would be framed according to the time frame available and the assessment task missed by the students.

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 programmers.

ADDITIONAL INFORMATION

The students can get their doubts clarified at any time with their faculty member.
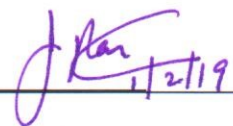
FOR APPROVAL

Course Faculty _____ CC-Chairperson _____ HOD _____ 1/2/19