NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF MATHEMATICS

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech. / Computer Science and Engineering		
Course Title	Principles of Operations Research		
Course Code	MAIR 44	No. of Credits	3
Course Code of Pre-requisite subject(s)	MAIR 11, MAIR 21		
Session	January 2019	Section	B
Name of Faculty	Dr. Jitraj Saha	Department	Mathematics
Official Email	jitraj@nitt.edu	Telephone No.	9477033914
Name of Course Coordinator(s)	-		
Official E-mail	-	Telephone No.	-
Course Type	✓ Core course	☐ Elective course	

Syllabus (approved in BoS)

Introduction to operational research — Linear programming problems (LPP) — Graphical method — Simplex method — Big M Method — Dual simplex method — Primal Dual problems.

Dual theory and Sensitivity analysis — Transportation and assignment problems — Applications (Emphasis should be more on problems than theory)

CPM and PERT — Network diagram — Events and activities — Project Planning — Reducing critical events and activities — Critical path calculations — Example — Sequencing problems.

Replacement problems — Capital equipment — Discounting costs — Group replacement. Inventory models — various costs — Deterministic inventory models — Economic lot size — Stochastic inventory models — Single period inventory models with shortage cost.

Dynamic programming — Formulation — Invest problem — General allocation problem — Stage coach problem — Production Scheduling.

ESSENTIAL READINGS : Textbooks, reference books Website addresses, journals, etc

1. Taha, H.A., *Operations Research: An Introduction*, Pearson Education, 2014.
2. Hillier, F.S. and Lieberman, G. J., *Introduction to Operations Research*, McGraw—Hill, 2014
3. Gillet, B. E., *Introduction to Operations Research—A Computer Oriented Algorithmic Approach*, McGraw—Hill, 1989.
4. Wagner, H. M., *Principles of Operations Research with Applications to Managerial Decisions*, Prentice—Hall of India, 1999.

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COURSE OBJECTIVES

1. Introduce linear programming problem and discuss Graphical, Simplex, Big-M and Dual Simplex methods to solve it.

2. Study the Transportation and Assignment problems.

3. Explore the project management techniques.

4. Explain different types of models in replacement and inventory problems.

5. Analyze certain real life problems using dynamic programming.

Mapping of Course Outcomes (COs) with Programme Outcomes (POs)

Course Outcomes (CO)	Programme Outcomes (PO)
On completion of this course students will be able to 1. Solve linear programming problems using Graphical, Simplex, Big-M and Dual Simplex methods. 2. Determine an optimal solution for transportation and assignment problems. 3. Construct the project network, find the critical path and determine the expected project completion time. 4. Categorize and solve replacement and inventory problems. 5. Model and solve allocation, stage-coach and production scheduling problems using dynamic programming.	1, 2 and 3.

COURSE PLAN – PART II

COURSE OVERVIEW

- To study linear programming, transportation and assignment problems and present methods for solving these problems.

- To illustrate CPM and PERT techniques in project management.

- To discuss different types of replacement problems and various inventory models.

- To solve some particular real life problems using dynamic programming.

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S.No.	Week/Contact Hours	Topics	Mode of Delivery
	COURSE TEACHING AND LEARNING ACTIVITIES		
1.	1st, 2nd & 3rd week	Introduction to operational research — Linear programming problems (LPP) — Graphical method — Simplex method — Big M Method — Dual simplex method — Primal Dual problems.	Chalk and Talk
2.	4th & 5thweek	Dual theory and Sensitivity analysis — Transportation and assignment problems — Applications	Chalk and Talk
3.	6th Week	**Assessment - 1**	
4.	6th, 7th & 8th week	CPM and PERT — Network diagram — Events and activities — Project Planning — Reducing critical events and activities — Critical path calculations — Example — Sequencing problems.	Chalk and Talk
5.	9th, 10th & 11th week	Replacement problems — Capital equipment — Discounting costs — Group replacement. Inventory models — various costs — Deterministic inventory models — Economic lot size — Stochastic inventory models — Single period inventory models with shortage cost.	Chalk and Talk
6.	12th Week	**Assessment - 2**	
7.	12th,13th & 14th Week	Dynamic programming — Formulation — Invest problem — General allocation problem — Stage coach problem — Production Scheduling.	Chalk and Talk
8.	After 14th Week	**Final Assessment**	

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No	Mode of Assessment	Week / Date	Duration	% Weightage
1.	Assessment- 1 (Written Exam)	6th Week	1 hour	20%
2.	Assessment -2 (Written Exam)	12th Week	1 hour	20%
3.	Assessment -3 (Assignments)		Will be announced while distributing the assignments	10%
CPA	Compensation Assessment	14th Week	1 hour	20%
4.	Final Assessment (Written Exam)	After 14th Week	3 hours	50%

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

1. Feedback from the students during class committee meetings and in the class after the assessments 1 and 2.

2. Online feedback through questionnaire before the final assessment.

3. Student knowledge about the topics covered in this course will be judged through marks obtained in examination.

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

MODE OF CORRESPONDENCE (email / phone etc)

Students can meet the course faculty for clarifying doubts by fixing appointment through E-mail (jitraj@nitt.edu) or mobile (9477033914).

COMPENSATION ASSESSMENT POLICY

a) Students who have missed either Assessment-1 or Assessment-2 or both can register for Compensation Assessment which shall be conducted soon after the completion of the Assessment-2 and before the Final Assessment.

b) The Compensation Assessment shall be conducted for the weightage of 20% comprising the syllabus of both Assessment -1 & Assessment - 2.

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.

FOR APPROVAL

24/01/2019		29/1/19
Course Faculty	CC-Chairperson	HOD