



COURSE PLAN – PART I			
Name of the programme and specialization	MBA		
Course Title	Advanced Operations Research		
Course Code	MB 862	No. of Credits	2
Course code of pre-requisite subjects	-		
Session	November 2020 - February 2021	Section (if applicable)	
Name of Faculty	Dr Yamini S.	Department	Management Studies
Email	syamini@nitt.edu	Telephone No.	9445371912
Name of Course Coordinator(s) (if, applicable)			
Course Type	<input type="checkbox"/> Core course <input checked="" type="checkbox"/> Elective course		
SYLLABUS (approved in BoS)			
<p>OBJECTIVE</p> <ul style="list-style-type: none"> • To create an understanding on advanced operational techniques in operations management • To apply mathematical techniques and algorithms to real world scenarios in various fields such as finance, healthcare, manufacturing, and transportation. • To develop skills in interpreting and communicating results, selecting appropriate tools, and critically analyzing the assumptions and limitations of the models. <p>Unit I Advanced Linear Programming Applications Make or Buy decision models - Inventory Management models - Financial Planning models - Marketing Research models - Work force assignment models.</p> <p>Unit II Sensitivity Analysis Introduction to sensitivity analysis - Maximization and Minimization problems - Shadow Price - Reduced Cost - Simultaneous change of Inputs using 100% rule.</p> <p>Unit III Variants of Linear Programming Models Introduction to Data Envelopment Analysis - Efficiency Frontier - Constant returns to scale and Variable returns to scale - Goal programming.</p> <p>Unit IV Non-Linear Programming Introduction to Nonlinear program - constrained and unconstrained non-linear models- Lagrange multiplier - Khun tucker conditions.</p>			



Unit V Stochastic Models

Introduction to Markov chains - Chapman Kolmogorov Equation- Applications of Markov Analysis - Markov Decision Models.

TEXT BOOKS:

Anderson, D.R., Sweeney, D.J., Williams, T.A. and Martin, K., An Introduction to Management Science: Quantitative Approach to Decision Making, 13th Edition, SouthWestern, (2012).

COURSE OBJECTIVES

To create an understanding and develop knowledge of the mathematical structure of the most-commonly used linear optimisation models and their applications.

MAPPING OF COs WITH POs

Course Outcomes	Programme Outcomes (PO)
1. To understand the sensitivity analysis and the related business implications	1,2,4
2. To know the applications of mixed integer linear programming	2,3,4,6
3. To understand how to measure the efficiency and productivity when we have multiple decision-making units	2,3,4,6,7
4. To learn to make decisions when there are multiple objectives	2,3,4,5
5. To understand how to make decisions under uncertainty	1,2,4,5,7

COURSE PLAN - PART II

COURSE OVERVIEW

This course will help you understand the applications of linear optimisation models. The primary deterministic models discussed will be Linear programming, Mixed Integer Linear programming, Data envelopment Analysis and Goal Programming. The sensitivity analysis involved in these models will also be discussed. Further, complex models such as non-linear programming and Markov processes will be covered as part of the course. The main emphasis will be on mathematical formulation and solution procedure using MS Excel.

COURSE TEACHING AND LEARNING ACTIVITIES

S. No	Week	Topic	Mode of Delivery
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1	1	Linear Programming – Formulation Applications of Linear Programming Solving LP models using Excel	Lecture, PPT, Hands-on sessions
2	2	Introduction to Sensitivity Analysis Understanding sensitivity analysis in complex LP applications Pricing out of a product using sensitivity analysis	PPT, In-class Activity
3	3	Introduction to Mixed Integer Linear programming Branch and bound Algorithm	In-class Activity, Tutorial
4	4	Formulating complex quantitative models Production and Inventory models Revenue Management Models Portfolio models	In-class Activity, Hands-on Session
5	5	Analysing problems with multiple objectives Goal Programming Data Envelopment Analysis	In-class Activity, Hands-on Session
6	6	Project Management using LP Crashing using Excel	In-class Activity, Hands-on Session
7	7	Introduction to Non-Linear Programming Analysing Global Optima	PPT, Lecture, In-class Activity
8	8	Analysing decisions under uncertainty Introduction to Markov Chains	PPT, Lecture, Classroom Discussion
9	9	Classification of States Marketing Analytics using Markov processes	PPT, Class-room Discussion
10	10	Markov Decision Process Assignment Presentation	Presentation, Lecture

COURSE ASSESSMENT METHODS (shall range from 4 to 6)

S.No	Mode of Assessment	Week / date	Duration	% Weightage
1	Cycle test I	December 2023	1.5 hour	25 %
2	Tutorial	January 2023	1 hour	15 %
3	Assignment Submission	January, February 2023		10 %
4	Final Assessment	March 2023	2.5 hours	50 %



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***mandatory; refer to guidelines on page 4**

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

Feedback received from student's anonymous survey

COURSE POLICY (including compensation assessment to be specified)

Mode of Correspondence: e-mail / Phone

- Assignment late submissions will not be allotted any marks



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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

- Any forms of cheating during the online-examinations, talking to other students, copying from others during an assessment, plagiarism in answers 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 programs.

ADDITIONAL INFORMATION, IF ANY

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Guidelines

- a) The number of assessments for any theory course shall range from 4 to 6.
- b) Every theory 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.

For Approval

Course Faculty: _____ CC Chairperson: _____ HOD: _____