

Institute for Excellence in Higher Education (IEHE), Bhopal

Department of Mathematics

Program Code:

Syllabus: Theory Paper(04 Credits)

PART-A: Introduction		
Program: B.Sc.		Semester: IV
Session: <u>wef 2022-2023</u>		
Subject: Mathematics		
1.	Course Code	<u>SEC-461</u>(TH) (Please mention code as decided by Exam Cell)
2.	Course Title	Optimization Technique(Theory)
3.	Course Type	Skill Enhancement Course: SEC
4.	Pre-Requisite (if any)	
5.	Course Outcomes(COs)	After completing this course student will be able to: CO-1: Formulate real life problems into linear programming problem. CO-2: Apply the simplex method to find an optimal vector for the standard linear programming problem and the corresponding dual problem. CO-3: Solve the system of linear equations using Simplex method and Big-M method. CO-4: Find optimal solution of transportation. CO-5: Formulate and solve linear programming model of two-person zero sum game.
6.	Credit Value	04 (TH) Credits
PART-B: Content of the Course		
Total Number of Lectures / Practical (in hours per week): L-4 Hours		
Total Number of Lectures: L – 60 Hours		
Module	Topics	No. of Lectures (Hrs)
I	Linear Programming Problem: Basic concepts of linear programming problem, Mathematical formulation of the problem, Corner Point Method, Graphical method of solving linear programming problems.	10
II	Simplex Method: Simplex method and algorithm. Artificial variables technique, Big-M method, Two-phase method, Formulation of the dual problem, Dual simplex Method.	20
III	Transportation Problems: Mathematical model, Balanced and unbalanced problems, Algorithm for solving	20

Code Details: Gender-[1], Environment & Sustainability -[2], Human-Values -[3], Professional-Ethics -[4], Employability -[5], Entrepreneurship -[6], Skill-Development -[7]

Signature of Members:

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Date of BOS: 21.10.2022

Signature of the Chairmen(BOS):

Name: Dr. Manoj Kumar Shukla

	transportation problem, Northwest-Corner method, Least cost method, Vogel approximation method.	
IV	Game Theory: Basic Terminologies, Two-Person Zero-Sum Game, Pure Strategies (Minimax and Maximin Criterion), Mixed Strategy: Game without A Saddle Point, $2 \times n$ Games.	10
	Keywords: Linear programming problem, Simplex method, Two-phase method, Big-M method, Transportation Problem, Game Theory.	

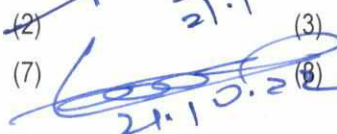
PART-C: Learning Resources	
Textbooks, Reference Books, Other Resources	
Suggested Readings:	
Text Books: 1. G. Hadley: Linear Programming, Narosa Publishing House, New Delhi, 2002. 2. Pundir S. K.: Linear Programming with Game Theory, CBS Publications, 2020. 3. Nita H. Shah, Ravi M. Gor, Hardik Soni: Operations Research, PHI Learning Pvt. Ltd., 2007. Reference Books: 1. Mokhtar S. Bazaraa, John J. Jarvis and Hanif D. Sherali: Linear Programming and Network Flows, 2nd Ed., John Wiley and Sons, India, 2004. 2. S. K. Sharma: Linear Programming, Cyber Tech Publications, 2009. 3. S. D. Sharma - Operations Research, Kedar Nath Publication, 2012. 4. Kanti Swarup, P.K. Gupta and Manmohan: Operations Research, Sultan Chand and Sons, New Delhi, 2014.	
Suggestive digital platform web links	
https://epathshala.ncert.org.in/ https://epgp.inflibnet.ac.in/ http://www.ignouhelp.in/ignou-ms-51-study-material/	
Equivalent Courses (NPTEL/UGC/IGNOU/etc):	
https://nptel.ac.in/courses/110106062 https://nptel.ac.in/courses/111107128	

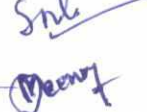
PART-D:Assessmentand Evaluation(For theory of4 credits)			
Internal Assessment: Continuous Comprehensive Evaluation (CCE): 40 Marks <i>The distribution of marks shall be as follows:</i>		External Evaluation: Term-endExamination(EE): 60 Marks Time: 3 hours	
(1) Class Tests [#] (<i>best 2 out of 3</i>)	2×10 Marks	Section (A): <i>12(MCQ) questions of one mark each.</i>	12×01 = 12 Marks
(2) Any one of the following: • Quizzes/Objective Tests ^{##} (<i>best1 outof2</i>) • GroupTasks(<i>Group Discussion/ Fishbowl/Technique; Role-Play/ Authentic-Problem Solving</i>)	08 Marks		

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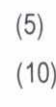
Signature of Members:

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(3) Any one of the following: • Home Assignments <i>(followed by presentation)</i> • Class Assignments • Class-Teaching • Poster Presentations • Portfolios • Annotated Bibliographies* • Reports* • Book Review* • Article Review* • Journal Writing* • Paper Presentations* • Seminar* • Field Assignments* * Only for Fast-Learners/3rd & 4th yr students.	08 Marks	Section (B): <i>Four short questions with internal choice (200 Words Each)</i>	04 × 04 = 16 Marks
(4) Attendance ○ 75%-80% : 01 Mark ○ 80%-85% : 02 Marks ○ 85%-90% : 03 Marks ○ 90% & above: 04 Marks	04 Marks	Section (C): <i>Four long questions with internal choice (500 Words Each)</i>	04 × 08 = 32 Marks
Total (A+B+C+D):	40 Marks	Total (A+B+C):	60 Marks

#Various options for conducting Class Tests are as follows:

- Open-Book/Open-Notes Tests/Class-Assignments
- Self-Test / Online Test
- Essay/Article Writing
- Case Studies *(Only for 3rd & 4th year students)*

##Quizzes/Objective Tests should include the following types of questions:

- Recognition Type (such as MCQs; Multiple Response; True or False; Matching; Classifying)
- Recall Type - Filling Blanks *(One word / Phrase Answers)*

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Signature of Members:

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 (4)  (5) 
 (6)  (7)  (8) 
 (9)  (10) 

Date of BOS: 21.10.2022

Signature of the Chairman (BOS):

Name: Dr. Manoj Kumar Shukla