

INTERNATIONAL MANAGEMENT INSTITUTE, BHUBANESWAR  
Post Graduate Diploma in Management (PGDM)  
Applications of Operations Research (OM617)  
CREDIT: Full (three credits)  
SESSION DURATION: 90 Minutes

TERM: V  
YEAR: 2015-2017  
BATCH: II

FACULTY: Mr. Pradipta Patra  
Telephone: 9515733562  
E-Mail: pradipdip1@gmail.com  
Office hours: 9.30 AM – 5.30 PM

**Course Introduction:** This course will help the students to understand the concepts related to applications of operations research (AOR) and the role played by OR in a firm's decision making. It will expose the students to applications of OR in numerous business fields like marketing, finance, operations management, human resource management and so on.

**Learning Outcome:**

1. To make the students aware of the application of Operations Research in business organizations.
2. To develop an understanding of the applications of Operations Research concepts in strategic decision making.
3. To equip the students with concepts, tools and techniques required in real world decision making.

At the end of the course the students should be able to:

- Understand the importance of Operations Research in organizations.
- Solve real world problems using operations research concepts.

**Course Pedagogy:**

Pedagogy would be a combination of lectures, case studies and problem solving. Lecture classes shall be discussion based and students are expected to read the relevant chapters from the book and any other reading material provided before they come to the class. Case studies will be discussed which will help in understanding the application of Operations Research in actual work situations. The course will be taught as per the session plan given in this document. Students are expected to participate in the class discussions.

**Course Readings:**

Text book

- David R. Anderson, Dennis J. Sweeney, Thomas A. Williams, and R. Kipp Martin. An Introduction to Management Science: Quantitative Approaches to Decision Making, 13<sup>th</sup> edition. Cengage Learning.

**Supplementary Text:**

- Operations Research- An Introduction, 7<sup>th</sup> Edition, 2002, Hamdy A. Taha, (Pearson Education: New Delhi)
- Quantitative Methods for Business, 8<sup>th</sup> Edition, 2001, David R. Anderson, Dennis J.

Sweeney and Thomas A. Williams, (South-Western College Publishing: Cincinnati, Ohio)

□ Introduction to Operations Research Concepts & Cases ( 8<sup>th</sup> edition) , Frederick S. Hillier, Gerald J. Lieberman ( Tata McGraw-Hill )

### Course Evaluation criteria

Component	Weight
Case Analysis	15%
Presentation	15%
Mid-Term	30%
End-term	40%
Total	100%

### Session Plan:

Session	Topic	Learning Outcome
1-2	<p>Introduction to Applications of Operations Research, Linear Programming (LP)</p> <p>□ LP formulation</p> <p>□ Applications in marketing, finance, operations and HR.</p> <p>Readings:</p> <p>Text Book Chapter: 1, 4</p> <p>Case Study:</p> <p>□ GENEVA BANK - Nikos Tsikriktsis</p> <p>□ M2 UNIVERSAL COMMUNICATIONS - Srinivas Krishnamoorthy; Peter C. Bell; Ankur Bansal; Peter Vaz</p>	LO1,LO2
3-4	<p>Solving LP problems</p> <p>□ Graphical Method</p> <p>□ Basics of Simplex Method</p> <p>□ Using Excel-solver to solve LP problems</p> <p>□ Extreme points, slack variables, surplus variables</p> <p>□ Alternative optimal solutions, infeasibility, unbounded</p> <p>□ Binding and Non-binding constraints</p> <p>Readings:</p> <p>Text Book Chapter: 2</p> <p>Materials: Class notes / handouts for the simplex method basics</p>	LO1,LO2,LO3

5-6	<p>LP Sensitivity Analysis</p> <ul style="list-style-type: none"> <li>▢ Shadow price/ dual price</li> <li>▢ Simultaneous changes (100% rule)</li> <li>▢ Reduced cost</li> <li>▢ Allowable increase, allowable decrease</li> </ul> <p>Readings:</p> <p>Text Book Chapter: 3</p> <p>Case Study: Merton Truck Company – Anirudh Dhebar.</p>	LO1,LO2,LO3
7-8	<p>Advanced application of LP</p> <ul style="list-style-type: none"> <li>▢ Transportation problem</li> <li>▢ Transshipment problem</li> <li>▢ Assignment problem; shortest route problem; Maximal flow problem</li> <li>▢ Revenue Management and other applications</li> </ul> <p>Readings:</p> <p>Text Book Chapter: 5, 6</p> <p>Case Study: Container Transportation Company- Peter C. Bell; Bai Xiaodong; Richard C.H. Lee; Michael Zhang</p>	LO1,LO2,LO3
9-10	<p>Duality in LP problems</p> <ul style="list-style-type: none"> <li>▢ Primal and Dual Problems</li> <li>▢ Significance of the Dual Problem</li> <li>▢ Complementary Slackness Properties and examples.</li> </ul> <p>Readings:</p> <p>Materials: Class notes / handouts given in the class</p>	LO1,LO2
11-12	<p>Integer Programming</p> <ul style="list-style-type: none"> <li>▢ Problem formulation</li> <li>▢ Modelling using binary variables</li> <li>▢ Applications – set covering, capital budgeting and other problems</li> <li>▢ Branch and Bound algorithm</li> </ul> <p>Readings:</p> <p>Text Book Chapter: 7</p> <p>Case Study: Managing Linen at Apollo Hospitals - Apoorva Sara Prakash; Muthu Solayappan; Dinesh Kumar Unnikrishnan</p>	LO1,LO2,LO3
14-15	<p>Goal Programming Solution</p> <p>Readings:</p>	LO1,LO2,LO3

	Text Book Chapter: 14.1 – 14.2  Material: Cases and problems given in the text book will be used.	
16	Analytic Hierarchy Process (AHP) ▯Developing AHP  Readings:  Text Book Chapter: 14.4 – 14.6  Case Study: Namo Alloys Pvt. LTD. - A Drive To Sustainable Investment Decision - Jitendar Khatri Bittoo; Ashutosh Dash	LO1,LO2,LO3
17-18	Waiting Line Models and Simulation ▯Different waiting line models ▯Simulating waiting line models and other examples  Readings:  Text Book Chapter: 11, 12  Case Study: Cases given in the text book will be used.	LO1,LO2,LO3
19-20	Case analysis presentations	LO3
	▯Solution  Readings:  Text Book Chapter: 14.1 – 14.2  Material: Cases and problems given in the text book will be used.	