International Institute of Health Management Research, New Delhi

PGDHM II Year – Hospital Management

Operations Research (OR) in Health Care Management (HEM-713)

Course coordinator: **Dr. Pankaj Talreja**

Subject Title: **Operations Research (OR) in Health Care Management.**

Subject Code: **HEM-713**

Credit Point: **06**

Contact Hours: **60**

Subject Description

The purpose of the course is to acquaint the students with very basic quantitative decision making tools. These tools, collectively discussed (with many other tools) under the title of Operations Research have been largely developed since the World War II. These techniques, supported by sophisticated software programs, are now routinely employed to guide and support management decisions in healthcare industry.

The course broadly covers deterministic and stochastic decision models for planning, decision making, resource allocation, and control at a very basic level. Given the time constraint and non mathematical background of the students, the course will focus primarily on five basic models: A)Linear Programming, B)Transportation and Assignment, C)Project Management (PERT/CPM), D)Inventory Management, and E)Queuing and Waiting times.

In particular, the course focuses on thinking structurally about decision problems and understanding why and how the quantitative techniques are applied in solving them. The course is designed to equip future healthcare administrators with a conceptual understanding of quantitative decision making tools and the skill to use them effectively in making managerial decisions. The content is presented in the context of practical administrative situations in healthcare organizations.

Expected Learning Outcomes

Upon successful completion of the course, the students will be able to:

- Describe the difficulties and challenges involved in decision making under uncertain or risky conditions.
- Use quantitative data effectively in making managerial decisions.
- Understand how and why certain techniques are used and what are their strengths or limitations when applied in administrative setting.
- Formulate and express decision problems in a quantitative manner and use appropriate Operations Research Techniques in finding optimal solutions.
- Build quantitative / mathematical models for decision problems in a variety of functional areas of healthcare management.
- In the context of specific managerial problems, describe and interpret the results obtained through the use of various Operations Research methodologies.

Teaching Methods

The class will use following formats:

- Lecture format, where the nature of the material makes it necessary.
- Seminar format, directed by instructor, for presentation of distributed topics, as individual assignments. Each concept on OR techniques would be explained and then exercises would be given to students to work. The emphasis would be given on proper formulation of research question.

Mode of Delivery

The course will be delivered through a mix of approaches. The main theme and topics will be introduced by lectures and by solving the typical cases. Exercises will be given in the class and the students will be asked to carry out the exercises in class. Cases will be discussed in the class. Assignments will be given to individual students. The course will be supported by tutorials and self-study.

Course Material

All basic reading materials are given in the course pack, distributed before the course starts. Students are required to read the assigned course material of each day, before they are discussed in the class.

Contents

Week	Hours	Units	Content
1	**2**		**Course Orientation and Overview** a. Introduction to Operations Research b. Concept and Definition of OR
	6	**1**	**Operations Research – What and Why?**
	8	**2**	**Linear Programming** a. Linear programming – problem formulation b. Solution by graphical methods c. Special Cases and Limitations.
	12	**3**	**Applications and Extensions of LP** a. Transportation Problems b. Assignment Problems c. Integer and Goal Programming
2	**6**	**4**	**Inventory Control Models** a. EOQ Model b. Quantity Discount Models c. ABC Analysis.
	8	**5**	**Project Management** a. PERT b. CPM
	6	**6**	**Queuing Theory Models**
	6	**7**	**Waiting Times**
	6		**Cases / Exercises.**

Assessment:

The students will be assessed by a written examination and assignments. The distribution of marks will be as follows:

Assignments, Presentations: 30%
Final written examination: 70%

Reading Materials / References

IIHMR Course Material: The reading package has been compiled from various sources (internet, articles, and books). The contents have been slightly modified whenever necessary. The package is expected to provide the students with basic understanding. For detailed exposure the following text books can be referred:

- Hanmdy. A.Taha: Operations Research: Introduction -3rd Edition - New York Macmillan Publishing. Co. Inc, 1982
- C.R. Kothari: Introduction to Operation Research -2nd edition. New Delhi, Vikas Publishing House Private , Ltd. 1982
- G.V. Shenoy, U.K. Srivastava and S.C. Verma : Operation Research for Management - 2nd edition -New Delhi, Willey Eastern Ltd. 1991
- T.A. Burley and G.O. Sullivian: Work out Operational Research
- Fedwick. S. Hiller and Gerald J liberman: Introduction to Operation Research - 4th edition - New York-Macgraw Hill, Book Company 1989.
- Quantitative Analysis for Management – Render, Stair and Hanna. Prentice Hall Of India, New Delhi, 2005.