INTERNATIONAL MANAGEMENT INSTITUTE
BHUBANESWAR
Shaping global leaders for tomorrow

INTERNATIONAL MANAGEMENT INSTITUTE, BHUBANESWAR
POST GRADUATE DIPLOMA IN MANAGEMENT (PGDM)
MANAGEMENT SCIENCE APPLICATION (OM505)
CREDIT: 2 CREDITS
SESSION DURATION: 60 MINUTES

TERM: III
ACADEMIC YEAR: 2019-2020
BATCH: PGDM (2019-2021)

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Course Introduction: The objective of management science is to solve the decision-making problems that confront and confound managers in both the public and the private sector by developing mathematical models of those problems. These models have traditionally been solved with various mathematical techniques, all of which lend themselves to specific types of problems. Thus, management science as a field of study has always been inherently mathematical in nature, and as a result sometimes complex and rigorous. Even if these techniques are not used on the job, the logical approach to problem solving embodied in management science is valuable for all types of jobs in all types of organizations. Management science consists of more than just a collection of mathematical modeling techniques; it embodies a philosophy of approaching a problem in a logical manner, as does any science. Thus, management science not only teaches specific techniques but also provides a very useful method for approaching problems. Management science is important because it is a helpful tool used to solve complex problems under uncertainty. Management science techniques fill this void with methods that quantify issues and give business managers a better basis for making decisions.

Learning Outcomes:
LO-1: To develop competence and skill sets in using management science in a variety of contexts.
LO-2: To display familiarity with management science and how management science concepts can be used to improve the competitive position of the firm.
LO-3: To use analytical software tools to solve management science problems.

Course Pedagogy: The sessions will be a blend of interactive lectures with case/problem discussions and will be supplemented by class exercises (Computer-based problems). **Students are expected to come prepared and participate in the discussions.**

Course Readings:
1. Taylor, B.W. (2017). *Introduction to Management Science*. Pearson Education. (IMS)
2. Taha, H.A. (2002). *Operations Research: An Introduction*. Pearson. (OR).

Course Evaluation criteria:

Evaluation Components	**Learning Outcomes**	**Weightage (%)**
Class Participation (Including Case Discussion and Project/Assignment)	LO – 1, 2, 3	10%

Quiz	LO - 2, 3	20%
Mid-Term	LO – 2, 3	30%
End-Term	LO – 2, 3	40%
	Total	**100%**

Academic integrity:

We are committed to upholding the highest standards of academic integrity and honesty. Plagiarism is the use of or presentation of ideas, works that are not one's own and which are not common knowledge, without granting credit to the originator. You may refer the already available content just for your reference and to get the basic ideas. Only 20% of such content is acceptable, above that comes under the definition of Plagiarism which is unacceptable in IMI and will be treated seriously. All such cases will be referred to the appropriate body of the Institute for suitable disciplinary action.

Session Plan:

Session	Topic	Learning Outcomes	Readings
1-2	**Management Science** ❖ The management science approach to problem solving ❖ Model building: break-even analysis ❖ Computer solution ❖ Management science modeling techniques ❖ Business usage of management science techniques **Linear Programming: Computer Solution and Sensitivity Analysis** ❖ Computer solution ❖ Sensitivity analysis	LO – 1 LO – 2	**Text Book:** (IMS: Ch-1, Pages 21-42) (IMS: Ch-3, Pages 94-115)
3-4	**Linear Programming: Modeling Applications** ❖ A product mix example ❖ A diet problem ❖ An investment/a marketing application ❖ A transportation application	LO – 1 LO – 3	**Text Book:** (IMS: Ch-4, Pages 133-171)
5-6	**Integer Programming** ❖ Integer programming models ❖ Integer programming graphical solution ❖ Computer solution of integer programming problems with excel	LO – 1 LO – 3	**Text Book:** (IMS: Ch-5, Pages 203-230)
7-8	**Transshipment and Assignment Problems** ❖ The transshipment model ❖ Computer solution with excel ❖ The assignment model ❖ Computer solution of an assignment problem	LO – 1 LO – 2	**Text Book:** (IMS: Ch-6, Pages 266-278) **Case/Problem**: *Wheat-shipping problem, pp. 266*

9-11	**Network Flow Models** ❖ Network components ❖ The shortest route problem ❖ The minimal spanning tree problem ❖ The maximal flow problem ❖ Computer solution of the shortest route/maximal flow problems with excel	LO – 1 LO – 3	**Text Book:** (IMS: Ch-7, Pages 315-338) **Case**: *Healthproof Pharmaceutical Company, pp. 336*
12-14	**Multi-Criteria Decision-Making Technique** ❖ Goal programming ❖ Graphical interpretation of goal programming ❖ Computer solution of goal programming problems with excel ❖ The analytic hierarchy process (AHP)	LO – 1 LO – 2 LO – 3	**Text Book:** (IMS: Ch-9, Pages 435-466) **Case:** *Katherine Miller's Job Satisfaction, pp. 504* **Case:** *Suntrek's Global Denim Jeans Factory and Distribution Center, pp. 505*
15-16	**Nonlinear Programming** ❖ Nonlinear profit analysis ❖ Constrained optimization ❖ Solution of nonlinear programming problems with excel ❖ A nonlinear programming model with multiple constraints	LO – 1 LO – 3	**Text book:** (IMS: Ch-10, Pages 506-524) **Problem**: *Nonlinear programming problems with excel, pp. 512*
17-18	**Decision Analysis** ❖ Decision making without probabilities ❖ Decision making with probabilities (decision trees) ❖ Decision analysis with additional information	LO – 1 LO – 2 LO – 3	**Text book:** (IMS: Ch-12, Pages 566-601) **Case**: *Textile Company Problem, pp. 598*
19-20	**Queuing Analysis** ❖ The single-server waiting line system ❖ Undefined and constant service times ❖ Finite queue length ❖ Finite calling population ❖ The multiple-server waiting line ❖ Simulation of a queuing system ❖ Computer simulation of the queuing example with excel	LO – 1 LO – 3	**Text book:** (IMS: Ch-13, Pages 627-652) (IMS: Ch-14, Pages 678-681) **Problem**: *Queuing Example with Excel, pp. 680*

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