INTERNATIONAL MANAGEMENT INSTITUTE, BHUBANESWAR
POST GRADUATE DIPLOMA IN MANAGEMENT (PGDM)
BUSINESS MATHEMATICS (QM501)
CREDIT: FULL (3 CREDITS)
SESSION DURATION: 90 MINUTES

TERM: I
YEAR: 2017-2018
BATCH: I

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Course Introduction: Mathematics is a tool required to allow you to excel in business. Business mathematics is clearly an example of a body of ideas and techniques where the whole is bigger than the sum of its parts. This course addresses the need of executives to get acquainted with the basic concepts and areas of managerial applications of mathematics, probability and operation research. The course would help the students to understand the relevance of mathematics in business decision making.

Course Objectives:
➢   To understand mathematics from a business application perspective.
➢   To enable the student to gain a quantitative orientation.
➢   To improve the ability to formulate and resolve complex decision problems in a practical manner.
➢   To provide insight into various quantitative methods of decision making, their uses and their limitations

Course Pedagogy: The sessions will be a blend of interactive lectures and discussions and will be supplemented by case discussions and exercises.

Course Readings:

Books
1.   Raghavachari, M. (1980) *Mathematics for Management.* Tata McGraw-Hill Pub. Co. Ltd., New Delhi (MFM).
2.   Levin, R.I. and Rubin, D.S. (2012) *Statistics for Management*, 7th Edition. Pearson Education, New Delhi (SFM).
3.   Anderson. D.R., Sweeney, D.J. and Williams, T.A., 2011. *Statistics for Business and Economics*. Cengage Learning.
4.   Akhilesh, K.B. and Balasubrahmanyam, S., 2011. *Mathematics and Statistics for Management*. Vikas Publishing.
5.   Winston, W.L., 2011. *Microsoft Excel 2010: Data Analysis and Business Modeling*. PHI Learning.
6.   Taha, H.A., 2002. *Operations Research: An Introduction*. PHI Learning.

Course Evaluation criteria:

Class participation (Including Case preparation, discussion & presentation)	10%
Quiz (2)*	20%
Mid-term	30%
End-term	40%
Total	**100%**

*Quiz 1 and 2 will be held after 9 and 18 sessions respectively.

Session Plan:

Session	Topic	Reading
1.	Matrices: Introduction to the course and to Matrices	Text book (MFM): Ch. 8 (Pages 118-129 and 132-133). RM: The place of quantitative methods in management curriculum. Prisoner's dilemma.
2.	Matrices: Transpose, Determinant, Adjoint and Inverse of a Matrix.	Text book (MFM): Ch. 8 (Pages 130-147). Attempt: Problems 2, 7, 15, 21, 29, 30 & 35 from Ex. 8.10.
3.	Matrices: Linear equations	Text book (MFM): Ch. 9 (Pages 154-174). RM: Attempt: Problems 3, 11 & 14 from Ex. 9.6.
4.	Functions: Mathematical representation of consequences	Text book (MFM): Ch. 2 (Pages 18-26 & 31-33) Attempt: Problems 16, 18 & 19 from Ex. 2.6.
5.	Functions: Application of linear functions	Attempt: Case: Imperfect testing of a chemical. Case: Prakash Textile Mills.
6.	Functions: Application of Maxima and Minima.	Text book (MFM): Ch. 5 (Pages 67-72) Attempt: Problems 2, 8, 9, 12 & 13 from Ex. 5.4.
7.	Progressions: Arithmetic & Geometric progressions	Text book (MFM): Ch. 7 (Pages 89-102) Attempt: Problems 1, 2, 4, 5, 18 & 20 from Ex. 7.5.
8.	Progressions: Simple aggregation of consequences	Attempt (MFM): Problems 8, 9, 10 & 17 from Ex. 7.5.
9.	Progressions: Sum of a geometric series	Attempt (MFM): Problem 3 from Ex. 7.5. Case: Khit khit diversifiers.
10.	Linear Programming: Formulation of linear programs Solving using graphical LP solution	Text book (MFM): Ch. 14 (Pages 339-346) Attempt: Reddy Mikks diet problem
11.	Linear Programming: Graphical solution	Text book (MFM): Ch. 14 (Pages 346-356)

12.	Linear Programming: Solving Linear programming problem using MS Excel Solver	Case: Outdoors Inc. Case: Sherman Motors.
13.	Transportation: North West corner method	Text book (MFM): Ch. 14 (Pages 357-370)
14.	Transportation: Vogel's approximation method	Text book (MFM): Ch. 14 (Pages 357-370)
15.	Concept of probability & probability rules Probability under conditions of statistical independence	Text book (SFM): Ch. 4 (Page 160-174); (MFM): Ch. 10 (Page 182-196) Attempt: Problems 4-9, 4-11, 4-13, 4-15, 4-17, 4-21, 4-22, 4-23, 4-26, 4-28, 4-32.
16.	Probability under conditions of statistical dependence Revising prior estimates of probabilities: Bayes' theorem	Text book (SFM): Ch. 4 (Page 176-197) Attempt: Problems SC4-10, 4-37, 4-41, 4-42, 4-48, 4-49, 4-71, 4-74, 4-86.
17.	Probability distributions, Random variables and their Expected values - Maximizing profits - Conditional profits - Expected profits - Expected profits with perfect information	Text book (SFM): Ch. 5 (Page 222-235) & Ch. 17 (Page 972-977) Attempt: Problems SC5-2, 5-11, 5-12, 5-13, 5-15 & 5-16. Problems 17-4, 17-5, 17-7 & 17-8.
18.	Introduction to Decision Tree analysis	Text book (SFM): Ch. 17 (Page 997-1006) Reading material: Decision Tree Case: Christie's Snow Fun Ski Resort.
19.	Decision Tree analysis – Rollback process	Text book (SFM): Ch. 17 (Page 997-1006) Case: Sarah's electronic company Attempt: Problem SC 17-4, 17-25
20.	Decision Tree analysis – Comprehensive application	Text book (SFM): Ch. 17 (Page 997-1006) Attempt: Problems 17-27, 17-28, 17-29