IMI

INTERNATIONAL MANAGEMENT INSTITUTE BHUBANESWAR
PGDM [2018-2020]
BUSINESS MATHEMATICS, QM501
Credit (2), Session Duration: 60 minutes
TERM I

Course Outline and Session Plan

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Introduction

The numbers can give mystical insights to   manager which he/she can use to make rational decisions. In this world where situations are volatile and dynamic the quantitative layers of situation are necessary in mind to make informed decision. This course is an introduction to concepts and fundamentals from mathematics to apply them in business situations. These concepts are fundamentals which are applied as roots to any decision-making process. The course is designed to provide students with the ability to understand basic concepts of quantitative methods applicable to different business settings. Students will also be taught on how to apply concepts like matrices, simple and compound interest, progressions, transportations and probability.

The focus of this course has been kept giving student hand on experience on calculating and applying the concepts mentioned above. This course will act as building block for development of capacity to envisage business situations. This content of this course will increase the problem solving and analytical skill of attendees.

Learning Outcomes
The specific learning outcomes of the course are:

1. To understand the basic concept of matrices, linear equations and their applications to solve the business or daily life problems.
2. To develop and interpret the financial instruments.
3. To impart the knowledge of arithmetic and geometric progressions in developing financial instruments (Trend analysis, growth speculation).
4. To know, how to minimize total transportation cost while satisfying all the supply and demand restrictions.
5. To interpret, how to solve a decision problem involving uncertainty.

Pedagogy

The class interaction will be mix of interactive lectures, class discussions and will be supplemented by real life examples, case analysis and exercises. In each session students will have hands-on exercises and through these exercises they will understand application of concept of mathematics into business scenarios.

Course Reading Material

Books

- Trivedi, K. and Trivedi, C. (2011). *Business Mathematics*. Pearson Education. (BM).
- Raghavachari, M. (1980). *Mathematics for Management.* Tata McGraw Hill Education Pvt. Ltd., New Delhi. (MFM).
- Sharma, J.K. (2009). *Fundamentals of Business Statistics.* Pearson. (FOBS).
- Taha, H.A. (2002). *Operations Research: An Introduction*. Pearson. (OR).
- Levin, R.I. and Rubin, D.S. (2012). *Statistics for Management*, 7ᵗʰ Edition. Pearson Education, New Delhi (SFM).

Evaluation Criteria (in %)

Component	Percentage
Quiz-I	10
Assignment	10
*Class Participation (Class Exercise & Presentation)	10
Mid-Term	30
End Term Exam	40
Total	**100**

*Class Participation: Students are expected to be sincere in the class in terms of reaching the class on time, solving the class-room problems or exercises properly and submitting assignments on time. They should maintain the decorum inside the class and respect the fellow participants. Mere presence in the class doesn't guarantee full CP marks. Students should actively involve in solving the problems and give their inputs constructively to drive class further in a positive direction.

Session Plan

Unit Head	Lecture No.	Topics	Learning Outcomes	Readings
	1	Introduction to course and Types of matrices; Operations on matrices (addition, subtraction, multiplication); Scalar multiplication.	Understanding the basics of matrices, linear equations and the applications of linear equations and matrices in real life. For example, it is used in computer-based applications and play a vital role in the projection of three-	(MFM: Ch-8, Page No. 110-138) (BM: Ch-22, Page No. 549-560)
	2	Transpose of a matrix; Properties of transpose; Symmetric & Skew-symmetric matrix;		(MFM: Ch-8, Page No. 110-138) (BM: Ch-22, Page No. 560-562)

			dimensional image into a two-dimensional screen, and the most important usage of matrices in computer side applications are encryption of message codes.	
Matrices and Determinants		Orthogonal; Idempotent; Nilpotent; Involutory matrix.		
	3	Determinant; Properties of Determinant; Adjoint matrix; Inverse of a matrix.		(MFM: Ch-8, Page No. 138-147) (BM: Ch-21, Page No. 514-519; Ch-22, Page No. 563-571, 594-599)
	4	Linear equations (by matrix method and Cramer's rule)		(MFM: Ch-9, Page No. 154-164) (BM: Ch-21, Page No. 527-533; Ch-22, Page No. 576-579)
	5	Applications of systems of linear equations; Applications of matrices in real life (with examples).		Discuss how to decode a message by using matrix and its inverse? Other applications of addition and subtraction matrices (MFM: Ch-8, Page No. 118-124).
Simple Interest & Compound Interest	1	Principal; Rate of interest; Simple interest, Amount.	Students' will understand about the basic terminology (principal, rate of int., S.I., amount, C.I.) and how banks calculate the simple interest and compound interest or the interest for the different years.	(BM: Ch-7, Page No. 148-154)
	2	Compound interest; If the rate of interest is for different conversion period; Depreciation.		(BM: Ch-8, Page No. 174-180, 184)
Arithmetic Progression and Geometric Progression	1	Sequence and series; Basics of A.P.; Sum of an A.P.	It will help in developing and interpreting financial instruments.	(MFM: Ch-7, Page No. 89-94) (BM: Ch-26, Page No. 658-696)
	2	Arithmetic mean; Business & economic application of A.P. series.		(MFM: Ch-7, Page No. 89-94) (BM: Ch-26, Page No. 658-696)
	3	Basics of G.P.; Sum of a G.P.		(MFM: Ch-7, Page No. 95-102) (BM: Ch-26, Page No. 658-696)
	4	Geometric mean; Business & economic application of G.P. series.		(MFM: Ch-7, Page No. 95-102) (BM: Ch-26, Page No. 658-696)

Transportation Problem	1	Introduction to transportation; Balancing the transportation model	Understanding the use of transportation problem, basically in industries how they use transportation model to minimize the total transportation cost while satisfying all the supply and demand restrictions.	(MFM: Ch-14, Page No. 357-358) (OR: Ch-5, Page No. 195-207)
	2	North-west corner method.		(MFM: Ch-14, Page No. 357-370) (OR: Ch-5, Page No. 195-211)
	3	Least-cost method.		(OR: Ch-5, Page No. 195-211)
	4	Vogel approximation method (VAM).		(MFM: Ch-14, Page No. 357-370) (OR: Ch-5, Page No. 195-211)
Probability & Probability Distributions	1	Concept of probability; Types of probability; Probability rules.	Probability is a part of our everyday lives. Students will learn about the rain forecasting, sales forecasting, risk evaluation and how to solve a decision problem involving uncertainty.	(MFM: Ch-10, Page No. 182-196) (SFM: Ch-4, Page No. 153-171) (FOBS: Ch-6, Page No. 185-205)
	2	Probability under conditions of statistical independence.		(SFM: Ch-4, Page No. 171-179)
	3	Probability under conditions of statistical dependence; Bayes' theorem.		(SFM: Ch-4, Page No. 179-186) (SFM: Ch-4, Page No. 189)
	4	Probability distributions; Types of probability distributions.		(SFM: Ch-5, Page No. 210-213) (FOBS): Ch-4, Page No. 209-210, 212)
	5	Random variables; Use of expected value in decision making. - Maximizing profits - Conditional profits - Expected profits		(FOBS): Ch-4, Page No. 213) (SFM: Ch-5, Page No. 214, 220-223; Ch-17, Page No. 913-919)

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