



INTERNATIONAL MANAGEMENT INSTITUTE, BHUBANESWAR
PROGRAMME NAME: POST GRADUATE DIPLOMA IN MANAGEMENT (PGDM)
BUSINESS MATHEMATICS (QM501)
CREDIT: FULL (2 CREDITS)
SESSION DURATION: 60 MINUTES

TERM: I
YEAR: 2019-2020
BATCH: I

Faculty: Prof. Rajesh Katiyar
Telephone: (0674)3042-128
E-Mail: rajesh.katiyar@imibh.edu.in
Office hours: 9.30 AM – 5.30 PM

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.

Learning Outcomes:

1. To understand the basic concepts of mathematics and their applications to solve the business and real-life problems.
2. To enable the student to gain a quantitative orientation.
3. To improve the ability to formulate and resolve complex decision problems in a practical manner.
4. To provide insight into various quantitative methods of decision making, their uses and their limitations.

Course Pedagogy: The class interaction will be mix of interactive lectures, class discussions and will be supplemented by real life examples, case discussions 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 Readings:

- 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).
- Taylor, B.W. (2017). *Introduction to Management Science*. Pearson. (IMS).
- 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).

Course Evaluation Criteria:

*Quiz (2)	20
**Class Participation (Class Exercise/Assignments, Case/Problem Discussion & Presentation)	20
Mid-Term	30
End-Term	30
Total	100

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

**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.

Academic integrity

a) 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. Plagiarism is unacceptable in IMI and will invite penalty. Type and extent of penalty will be at the discretion of the concerned faculty.

b) Cheating means using written, verbal or electronic sources of aid during an examination/ quiz/ assignment or providing such assistance to other students (except in cases where it is expressly permitted by the faculty). It also includes providing false data or references/list of sources which either do not exist or have not been used, having another individual write your paper or assignment or purchasing a paper for one's own submission. Cheating is strictly prohibited at IMI and will invite penalty as per policies of the Institute.

Session Plan:

Session	Topic	Learning Outcomes	Readings
1-2	Introduction to course Matrices ❖ Operations on matrices (addition, subtraction & multiplication) ❖ Scalar multiplication ❖ Transpose of a matrix ❖ Properties of transpose ❖ Symmetric & Skew-symmetric matrix	LO – 1 LO – 2 LO – 3	(MFM: Ch-8, Page No. 110-138) (BM: Ch-22, Page No. 549-562)

	❖ Orthogonal; Idempotent; Nilpotent; Involutory matrix.		
3-4	Determinant <ul style="list-style-type: none"> ❖ Properties of Determinant ❖ Adjoint matrix ❖ Inverse of a matrix ❖ Linear equations (by Matrix method and Cramer's rule) 		(MFM: Ch-8, Page No. 138-147) (BM: Ch-21, Page No. 514-519; Ch-22, Page No. 563-571, 594-599) (MFM: Ch-9, Page No. 154-164) (BM: Ch-21, Page No. 527-533; Ch-22, Page No. 576-579) (Attempt: 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).
5-6	Simple Interest and Compound Interest <ul style="list-style-type: none"> ❖ Principal, Rate of interest, Simple interest, Amount ❖ Compound interest, If the rate of interest is for different conversion period, Depreciation 	LO – 1 LO – 3	(BM: Ch-7, Page No. 148-154) (BM: Ch-8, Page No. 174-180, 184)
7-9	Progressions <ul style="list-style-type: none"> ❖ Arithmetic progression ❖ Sum of an A.P. ❖ Arithmetic mean ❖ Geometric progression ❖ Sum of a G.P. ❖ Business & economic application of A.P. & G.P. series 	LO – 1 LO – 3	(MFM: Ch-7, Page No. 89-94) (BM: Ch-26, Page No. 658-696) (MFM: Ch-7, Page No. 95-102) (Attempt: Some business & economic applications of A.P. & G.P. series)
10-12	Linear Programming <ul style="list-style-type: none"> ❖ Two-variable LP model ❖ Model formulation ❖ Graphical LP solution ❖ Solution of a maximization model ❖ Solution of a minimization model ❖ Solving linear programming problem using solver (MS-excel) 	LO – 1 LO – 2 LO – 3 LO – 4	(MFM: Ch-14, Page No. 339-356) (IMS: Ch-2, Page No. 51-81) (IMS: Ch-3, Page No. 94-98) (OR: Ch-2, Page No. 13-30) (Attempt: Diet Problem-Ozark Farms through solver) (Attempt: The Reddy Mikks Company Problem through solver)
13-16	Transportation Model <ul style="list-style-type: none"> ❖ Introduction to transportation ❖ Balancing the transportation model ❖ North-west corner method 	LO – 1 LO – 2 LO – 3 LO – 4	(MFM: Ch-14, Page No. 357-370) (OR: Ch-5, Page No. 195-211)

	<ul style="list-style-type: none"> ❖ Least-cost method ❖ Vogel approximation method (VAM) ❖ Solving transportation problem using solver (MS-excel) 		<p>(Attempt: The SunRay Transport Company Problem through solver) (IMS: Ch-6, Page No. 257-266) (Attempt: The Wheat Shipping Problem)</p>
17-20	<p>Probability</p> <ul style="list-style-type: none"> ❖ Concept of probability ❖ Types of probability ❖ Probability rules ❖ Probability under conditions of statistical independence ❖ Probability under conditions of statistical dependence ❖ Bayes' theorem ❖ Probability distributions ❖ Types of probability distribution ❖ Random variables ❖ Use of expected value in decision making. <ul style="list-style-type: none"> - Maximizing profits - Conditional profits - Expected profits 	<p>LO – 1 LO – 2 LO – 3 LO – 4</p>	<p>(MFM: Ch-10, Page No. 182-196) (SFM: Ch-4, Page No. 153-186; 189) (SFM: Ch-5, Page No. 209-223; Ch-17, Page No. 913-919) (Attempt: Strawberry Dealer Problem)</p>

-----***-----