MTH 212: Business Mathematics II

Credit hours: 3

Course Objectives

The course introduces mathematical techniques through examples of their application to economic and business concepts. It also tries to get students tackling problems in economics and business using these techniques as soon as possible so that they can see how useful they are. The purpose of the course, then, is to present mathematical skills and concepts, and to apply them to ideas that are important to the management students. In addition, the course includes the basics of spreadsheet operations relating to solving equations, systems of equations, quadratic equations, matrices, the Mathematics of Finance and some numerical methods as well.

Course Contents

This course deals on integration and applications in production, first-order differential equations and applications, dynamics of market price, linear inequalities and linear programming, linear algebra and applications, numerical methods for solving systems of linear Equations, input/output analysis, functions of several variables and their applications in business and economics, difference equations and dynamic economic analysis.

Detailed Course

Unit 1: Integration and applications   8 hrs

Integration as the reverse of differentiation, Integration of the natural exponential function,

Integration by algebraic substitution, Definite integral, Area under a curve, Consumer and producer surplus.

Unit 2: First-order differential equations and applications   9 hrs

Differential equations for limited and unlimited growth, First-Order Linear Differential Equations with Constant, Coefficient and Constant Term, Dynamics of Market Price, Variable Coefficient and Variable Term, Exact Differential Equations, Nonlinear Differential Equations of the First Order and First Degree.

Unit 3: Linear inequalities and Linear programming   6 hrs

Linear Inequalities in Two Variables, Linear programming: Graphical method, Simplex method (two variables): Standard L P Problems, Duality and Standard Minimization L P Problems.

Online: Simplex method

Unit 4: Linear algebra and applications   7 hrs

Matrices, Elementary row operations, Solution of equations: Gauss elimination method and Gauss-Jordan method, Iterative Solution of equations: Gauss Siedel method, Determinants, Solution of equations: Cramer's rule, Inverse matrix: Gauss-Jordan method, Input/output analysis;

Lab. Work: Excel for linear algebra,

Online: Gauss elimination method for solving system of linear equations, Gauss-Jordan method for solving system of linear equations and finding inverse matrices.

Unit 5: Functions of several variables   9 hrs

Functions of several variables, Applications of functions of two variables in Business and economics, Partial differentiation, Applications of partial differentiation, Elasticity of Demand, Utility, Production, Graphical Representations, Unconstrained optimization,

Constrained optimization and Lagrange multipliers.

Unit 6: Dynamic economic analysis and Difference equations   9 hrs

Difference equations, Solution of difference equations (first-order), Cobweb: iterative solutions, Cobweb: difference equation solutions, Lagged Keynesian macroeconomic model, Duopoly price adjustment.

References

Teresa Bradley, **Essential Mathematics for Economics and Business**, John Wiley & Sons Ltd.

Frank S. Budnick, **Applied Mathematics for Business, Economics, and the Social Sciences,** McGraw-Hill Ryerson, Limited.

Ronald J. Harshbarger, James J. Reynolds, **Mathematical Applications for the Management, Life, and Social Sciences**, Houghton Mifflin Company.

Vassilis C. Mavron, Timothy N. Phillips, **Mathematics for Economics and Finance**, Springer-Verlag.

G. S. Monga, **Mathematics for management and economics**, Vikas Publishing House Pvt. Ltd., New Delhi.

Mike Rosser, **Basic Mathematics for Economists**, Routledge Taylor & Francis Group

Alpha C. Chiang, **Fundamental Methods Of Mathematical Economics**, McGraw-Hill, Inc.

Srinath Baruah, **Basic Mathematics and its Application in Economics,** Macmillan India Ltd.

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