MTH 201: Business Mathematics I

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

Straight lines and Functions, their Applications in Market Analysis, Excel for Linear Functions Simultaneous Equations and Use them in Equilibrium Market Analysis, Quadratic Equations and Economic Applications, Non-linear Functions, Numerical Methods for Solving Nonlinear Equations, their Graphs and Applications, Financial Mathematics, Excel for Financial Mathematics, Differentiation and Applications in Marginal Analysis, Economic Applications in Optimization.

Detailed Course

Unit 1: Straight lines and Functions **6 hrs**

Straight lines, Linear Functions,

Applications: demand, supply, cost, revenue, Elasticity of demand, supply and income,

Budget and cost constraints, Method of Least Squares;

Lab. Work: Introducing Excel, Excel for linear functions.

Unit 2: Simultaneous equations **6 hrs**

Simultaneous linear equations, Equilibrium and break-even, Consumer and producer surplus, the *IS-LM* model

Lab. Work: Excel for simultaneous linear equations.

Unit 3: Quadratic Equations **7 hrs**

Graphs of Quadratic Functions, Quadratic Equations, Applications to Economics;

Lab. Work: Excel for quadratic equations.

Unit 4: Non-linear functions, their graphs and applications **10 hrs**

Cubic and other polynomial functions, Exponential functions, Logarithmic functions,

Hyperbolic functions of the form $a/(bx + c)$;

Bisecton method, Newton-Raphson method for solving nonlinear equatons;

Lab. Work: Excel for non-linear functions;

Smart math calculator (software): Bisecton method, Newton-Raphson method.

Unit 5: Financial mathematics **10 hrs**

Arithmetic and geometric sequences and series; Simple interest, compound interest and annual percentage rates, Depreciation, Net present value and internal rate of return, Annuities, debt repayments, sinking funds; Relationship between interest rates and the price of bonds;

Lab. Work: Excel for financial mathematics.

Unit 6: Differentiation and applications **9 hrs**

Slope of a curve and differentiation, Rules of differentiation, Differentiation and marginal analysis, Optimization for functions of one variable, Economic applications of maximum and minimum points, Curvature and other applications, Elasticity and the derivative;

Lab. Work: Excel for applications of derivatives.

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.

A. B. Sthapit, P. M. Bajracharya and et al: ***Fundamentals of Business Mathematics****,* Buddha Academic Publishers & Distributors Pvt. Ltd., Nepal.