Elementary Mathematics for Finance and Economics

Unit I

1. Mathematical Models in Economics-
   Introduction, A model of the market, Market equilibrium, Excise Tax.
2. The elements of Finance-
   Interest and capital growth, Income generation, The interval of compounding.
3. The Cobweb Model-
   Stability of market equilibrium, The general linear case, Economic interpretation
4. Mathematical terms and notations-
   Sets, functions, Graphs, Equations, Supply and demand sets for a market.

Unit II

1. Introduction to Calculus-
   Rate of change of a function, rules for finding the derivative, Marginal cost as a derivative, derivative of composite and inverse functions.
2. Introduction to Optimization-
   Profit maximization, critical points, optimization in an interval, infinite interval.
3. The derivative in Economics-
   Nonlinear economic models, Elasticity of demand, profit maximization, competition versus monopoly, The efficient small firm, startup and breakeven points.

Unit III

1. Matrix Algebra-
   Matrix, multiplication of matrix, inverse of matrix, Determinant, Cramer's rule.
2. Linear equations-
   Linear equations in matrix form, solutions of linear equations by row operations, Echelon form, consistent and inconsistent systems, Rank, A two-industry 'economy', Arbitrage portfolios and state prices, Income determination model.
3. Input-Output model-
   An economy with many industries, Technology matrix, Existence of solution.

Unit IV

1. Linear Programming-

Graphical approach- production, diet problem
Simplex algorithm, Dual problem.

2. General Equilibrium and Game Theory-
   Utility maximization and demand function, Profit maximization and supply function, abstract economy and a competitive equilibrium

Unit V

1. First order differential equations-
   Continuous time models, types of differential equations, separable differential equations, continuous time model of price adjustment.
2. Second order differential equations-
   Market trends and consumer demand, Linear equations with constant coefficients, Solution of homogeneous equations, behavior of solutions.

Book Name:
Mathematics for Economics and Finance- by M. Anthony and N.Biggs
Cambridge University Press

Elementary Mathematics for Social Sciences

Unit-I: Algebra and Equations

The Real Numbers, Polynomials, Factoring ,Rational Expressions, Exponents and Radicals, First-Degree Equations, Quadratic Equations.

Unit-II: Graphs, Lines, and Inequalities

Graphs, Equations of Lines, Linear Models, Linear Inequalities, Polynomial and Rational Inequalities,

Unit-III: Functions and Graphs

Functions, Graphs of Functions, Applications of Linear Functions, Quadratic Functions and Applications, Polynomial Functions, Rational Functions

Unit-IV: Exponential and Logarithmic Functions

Exponential Functions, Applications of Exponential Functions, Logarithmic Functions, Logarithmic and Exponential Equations

Unit-V: Systems of Linear Equations and Matrices

Systems of Two Linear Equations in Two Variables, Larger Systems of Linear Equations, Applications of Systems of Linear Equations, Basic Matrix Operations, Matrix Products and Inverses, Applications of Matrices

Recommended Book:

M.L.Lial,. T.W.Hungerford, J.P.Holcomb, B.Mullins: *Mathematics with Applications in the Management, Natural and Social Sciences*, 7th ed. Pearson.