

**CCSS UG PROGRAMME**  
**MATHEMATICS (OPEN COURSE)**  
**(for students not having Mathematics as Core Course)**  
**FIFTH SEMESTER**  
**MM5D03 : MATHEMATICS FOR SOCIAL SCIENCES**  
**3 hours/week                      4 credits                      30 weightage**

**Text Book:** Edward T. Dowling : Calculus for Business, Economics and Social Sciences, Schaum's Outline Series, TMH, 2005.

**Module I : Equations and Graphs (27 hrs)**

- 2.1 Equations
- 2.2 Cartesian Coordinate System
- 2.3 Graphing linear equations
- 2.4 The slope of a line
- 2.5 Solving linear equations simultaneously
- 2.6 Solving quadratic equations
- 2.7 Practical applications

**Functions**

- 3.1 Concepts and definitions
- 3.2 Functions and graphs
- 3.3 The Algebra of Functions
- 3.4 Applications of linear functions
- 3.5 Facilitating non-linear graphs
- 3.6 Applications of non-linear functions

**The derivative**

- 4.1 Limits
- 4.2 Continuity
- 4.3 Slope of a Curvilinear function
- 4.4 Rates of change
- 4.5 The derivative
- 4.6 Differentiability and Continuity
- 4.7 Application

**Differentiation**

- 5.1 Derivative rotation
- 5.2 Rules of differentiation
- 5.3 Derivation of the rules of differentiation
- 5.4 Higher order derivatives
- 5.5 Higher order derivative notation
- 5.6 Implicit differentiation
- 5.7 Applications

**Module II : Uses of Derivative (27 hrs)**

- 6.1 Increasing and decreasing functions
- 6.2 Concavity
- 6.3 Extreme points
- 6.4 Inflexion points
- 6.5 Curve sketching

**Exponential and Logarithmic functions**

- 7.1 Exponential functions
- 7.2 Logarithmic functions
- 7.3 Properties of exponents and logarithms
- 7.4 Natural exponential and Logarithmic functions
- 7.5 Solving natural exponential and logarithmic functions.
- 7.6 Derivatives of natural exponential and logarithmic functions.
- 7.7 Logarithmic differentiation
- 7.8 Applications of exponential functions
- 7.9 Application of Logarithmic functions

**Integration**

- 8.1 Antidifferentiation
- 8.2 Rules for indefinite integrals

## **Multivariable Calculus**

- 9.1 Functions of several variables
- 9.2 Partial derivatives
- 9.3 Rules of partial differentiation
- 9.4 Second order partial derivatives

## **More of Integration**

- 10.1 Integration by substitution
- 10.2 Integration by parts

## **References**

1. Srinath Baruah : Basic Mathematics and its Applications in Economics, Macmillan.
2. Taro Yamane: Mathematics for Economists, Second ed., PHI.