ಮೈಸೂರು ವಿಶ್ವವಿದ್ಯಾನಿಲಯ

UNIVERSITY OF MYSORE

(Estd.1916)

CERTIFICATE COURSE
in
BASIC MATHEMATICS FOR RESEARCH

UNIVERSITY OF MYSORE

DEPARTMENT OF STUDIES IN ECONOMICS AND CO-OPERATION
MANASAGANGOTRI, MYSURU-570 006

CERTIFICATE COURSES

[Syllabus: 2017-2018]

INSTRUCTIONS:

1. **Duration**: Certificate Course is for a duration of THREE Months
2. **Number of Credits:** Number of Credits for each Course shall be 5.
3. **Teaching Hours**: 5 Hours per week for each course. [About 60 hours for each course]

   [This shall be inclusive of theory, application, practical work, tutorials, and seminars as required/applicable to each course depending on the content and approach by the faculty]
4. **Allocation of Marks: Number of Marks for Each Course: 100**

   Out of 100 Marks: 70 Marks is for Theory Examination [Comprehensive end Semester Exam]
   30 Marks is for Internal Assessment [for all the Courses in 2 Semesters]

   30 Marks for Internal Assessment shall have the break-up as follows:

   10 Marks for One Test
   05 Marks for One Assignment
   05 Marks for Seminar Presentation
5. **Fees Structure:**

- Diploma Course is fully Self-Finance Course.

6. **Eligibility Criteria:**

- Students who have completed their Bachelor's Degree with Economics as one of the Cognate Subjects, B.Sc., with Mathematics or Statistics as one of the Cognate Subjects in Bachelor's Programme, B.Com, BBM and Students with Masters' Degree in Social Science, Commerce & Management are eligible to purse this Course.

LIST OF CERTIFICATE COURSES

Sl. No.	Title of the Certificate Course	Marks for Theory	Internal Assessment	Total Marks
1	Certificate Course in Basic Mathematics for Research	70	30	100
2	Certificate Course in Basic Statistics for Research	70	30	100
3	Certificate Course in Theory of Econometrics for Research	70	30	100
4	Certificate Course in Applied Econometrics for Research	70	30	100
5	Certificate Course in Research Methodology	70	30	100
6	Certificate Course in Statistical Software for Data Analysis	70	30	100

CHAIRMAN
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CERTIFICATE COURSE IN BASIC MATHEMATICS FOR RESEARCH

[For Research in Social Science, Commerce & Management]

Preamble: Economics is incomplete without knowledge of mathematics, since mathematics gives flesh and blood to the subject of Economics. Mathematics for Economics deals with various applications of mathematical tools and techniques in defining and developing economic relationships. So this course, accordingly, is designed to include various mathematical methods to analyze and understand economic theories.

Module - 1: Basic Mathematics for Economic Analysis

Relationship between Mathematics and Economics - Applications of Mathematics in Economic Analysis - Its Uses and Limitations - Logic, Sets and Relations - Functions -Meaning and Types: Linear and Non-Linear, Power, Exponential and Logarithm - Analytical Geometry - Simultaneous Equations - Solutions for Two Variables Application to Market Equilibrium: Derivation of Demand and Supply Functions - Marshal and Walras' Stability Conditions - Effect of Taxes and Subsidies, Indifference Curves, National Income, Interest: Compounding and Discounting, Changes in Aggregate Demand and Supply Functions, Consumption Function.

Module - 2: Elementary Matrix Algebra

Basic Concepts - Types of Matrix - Matrix Operations - Transpose - Inverse Matrix -Determinants: Meaning, Properties, Rank of Matrix, Minor, Co-factor.
Functions of Several Variables - Cramer's Rule and its Applications in Economics.

Module - 3: Differential and Integral Calculus

Differential Calculus: Limits - Derivations - Rules of Differentiation - Partial Derivatives, Total Derivatives, - Maxima and Minima for One and Two Variables.

Applications to Economic Analysis:
Consumers Behavior: Elasticity of Demand, Relationship between Price Elasticity and TR, AR and MR, Consumers' Equilibrium and Utility Maximization

Firm's Behaviour: Production Function - Cost Function - Revenue Function - Equilibrium of Firm and its Profit Maximization - Homogenous Function - Cobb-Douglas Production Function - CES Production Function - Euler's Theorem - Monopoly and Joint Production -Duopoly, Monopolistic Competition and Oligopoly.
Integral Calculus: Techniques of Integration - Definite and Indefinite Integration.

Applications to Economic Analysis: Consumer's Surplus - Producer's Surplus.

Introduction to Frontier Analysis: Technical Efficiency - Technological Change and Total Productivity - Multi-Market Equilibrium.

Module - 4: Difference and Differential Equations

Difference Equations: Definitions and Concepts - Solutions to First Order and Second Order Difference Equations.
Applications to Economics: Cob-web Model.

Differential Equations: Definitions and Concepts - Solutions to First Order and Second Order Differential Equations.
Applications to Economics: Harrod-Domar Model, Multiplier and Accelerator.

Module - 5: Linear Programming and Input-Output Analysis

Linear Programming: Basic Concepts - Constrained Optimization - Formulation of Linear Programming Problem - Nature of Feasible and Optimal Solutions - Solution through Graphical Methods - Introduction to Simplex method - Duality Theorem.
Input-Output Analysis: Basic Concepts, Static, Open and Closed Input-Output Models

References: [Please refer to the Latest Editions]

1. Allen R.G.D., *Mathematical Analysis for Economists*, Macmillan.
2. Bose D., *An Introduction of Mathematical Economics*, Himalaya Publishing House, Mumbai.
3. Chiang A.C., *Fundamental Methods of Mathematical Economics*, McGraw-Hill Higher Education.
4. Veerachami R., *Quantitative Methods for Economists*, New Age International Pub., New Delhi
5. Yamane Taro, *Mathematics for Economists - An Implementer Analysis*, Phi Learning Publishers.