Program: Bachelor of Commerce (Economics)					Semester: II	
Course: Quantitative Techniques for Economics-II Academic Year: 2023-24 Batch: 2023-27					Code:	

Teaching Scheme				Evaluation Scheme	
Lectures	**Practical**	**Tutorials**	**Credits**	**Internal Continuous Assessment (ICA)** **(weightage)**	**Term End Examinations (TEE)** **(weightage)**
30	**Nil**	**Nil**	**02**	**20 marks**	**30 marks**

Learning Objectives:
- The objective is to rigorously introduce and teach several areas of mathematics that are widely-used in Microeconomics, Macroeconomics and Econometrics.
- To study economic models to illustrate the method of applying mathematical techniques to economic theory in general.

Learning Outcomes:

At the end of the course, the students should be able to:

- The course hones and upgrades the mathematical skills paves the way for the fourth semester course Econometrics. Collectively, the two papers provide the mathematical foundations necessary for further study of a variety of disciplines including economics, statistics, computer science, finance and data analytics.
- The analytical tools introduced in this course have applications wherever optimisation techniques are used in business decision-making.
- These tools are necessary for anyone seeking employment as an analyst in the corporate world.
- The course additionally makes the student more logical in making or refuting arguments.

Pedagogy: Classroom Learning, problem solving, case studies, games and simulations, peer teaching, role play, projects or assignments.

Detailed Syllabus: (Per session plan)
Session Outline For Quantitative techniques for Economics-II
Each lecture session would be of one hour duration (30 sessions)

Module	Module Content	Module Wise	Module Wise	Module Wise

		Pedagogy Used	Duration	Reference Books
I	Multivariable optimisation: Two variables: necessary condition, sufficient condition, local extreme points, linear models with quadratic objectives, the extreme value theorem, three or more variables, comparative statics and envelope theorem. Constrained optimization: The lagrangian multiplier method, interpreting the lagrangian multiplier, several solution candidates, why the lagrangian works?, additional variables and constraints, non-linear programming: a simple case, multiple inequality constraints, non-negativity constraints.	Class room lectures	15	Mathematics for Economic Analysis by K. Sydsaeter and P. Hammond: Chapter 13 and 14
II	Linear programming: Transformation of linear inequalities into linear equation: Slack variable-Geometry of linear programming problem-feasible and basic solution, duality, symmetry between primal and dual-an economic interpretation of duality. Input-output analysis: Technological coefficient matrix, closed and open input-output model, the Hawkins-Simon conditions, leontief production function.	Class room lectures	15	Mehta-Madnani chapter 18, chapter 19,

Reference books:
1. Fundamental Methods of Mathematical Economics by C. Alpha Chiang
2. Mathematics for Economic Analysis by K. Sydsaeter and P. Hammond: Pearson Educational Asia: Delhi (2006)

Evaluation Pattern:

Courses carrying 2 credits shall be evaluated for total of 50 marks, which means 30 marks Semester End Examination and 20 marks for Internal Continuous Assessment.

a. For Internal Continuous Assessment, there shall be two tests of 10 marks each held at regular intervals during the semester. These tests may be conducted either in online mode or as a pen paper test. An average of best two marks obtained shall be considered as final marks.
   The other component for 10 marks shall be chosen by the department. This can be a project/ assignment/ field study/ seminar/group discussion and so on.

b. For Semester End Examination, the question paper pattern shall be as follows:

Maximum Marks: 30

Duration: One hour

All questions will be compulsory carrying 15 marks each with internal choice in Q1 and Q 2

Q. 1 Any two out of the following(15 marks)

A. Descriptive

B. Numerical or application based

C. Numerical or application based(case study)

Q. 2 Any two out of the following (15 marks)

A. Descriptive

B. Numerical or application based

C. Numerical or application based(case study)