

COURSE OUTLINE TABLE

- **SUBJECT TITLE:** MATHEMATICAL ECONOMICS (222203)
- ❖ **COURSE TEACHER:** MD. ABDUS SALAM(T-8)& MD. ALHAJ UDDIN(T-9)

Chapter No & Chapter Title	Number of Classes with Class Title	Learning Outcomes At the end of the class the students would be able to
1. Linear Algebra (T-9)	1. Matrix, Determinants & Types of matrices	<ol style="list-style-type: none"> 1. Define Matrix and Determinants 2. Explain Types of Matrices 3. Calculate Addition, Subtraction and Multiplications.
	2. Rank of a matrix	<ol style="list-style-type: none"> 1. Define Rank of a Matrix 2. Calculate Rank of a Matrix
	3. Inverse Matrix & Minor, Cofactor Matrix and Adjoint Matrix	<ol style="list-style-type: none"> 1. Define Inverse Matrix 2. Interpret properties of Inverse Matrix 3. Relate Minor, Cofactor, Transposed Matrix, Cofactor Matrix and Adjoint Matrix
	4. Inverse Matrix	<ol style="list-style-type: none"> 1. Compute the solution using an Inverse Matrix
	5. Application of Matrix in National Income Model	<ol style="list-style-type: none"> 1. Solve the National Income Model and Market Model by using an Inverse Matrix.
	6. Cramer's Rule and application of Matrix in National Income and Market model	<ol style="list-style-type: none"> 1. Compute the solution using Cramer's Rule 2. Solve National Income Model and Market model by using Cramer's Rule
	7. Application of Matrix in IS-LM Model	<ol style="list-style-type: none"> 1. Solve the IS-LM Model by using Cramer's Rule & Inverse Matrix.
2. Optimization (T-8)	8. Maximum and Minimum Value and point of inflection.	<ol style="list-style-type: none"> 1. Discuss Extreme values. 2. Calculate Extreme value with one choice variable and point of inflection.
	9. Economic interpretation for one choice variable.	<ol style="list-style-type: none"> 1. Explain and calculate one choice variable and its economic interpretation.
	10. Saddle point and Extreme value of two choice variables.	<ol style="list-style-type: none"> 1. Calculate Extreme value (maximum and minimum value) under two choice variables & saddle point.
	11. Unconstrained optimization in case of three choice variables.	<ol style="list-style-type: none"> 1. 1. Discuss how to calculate optimization in case of three choice variables.
	12. Constrained optimization.	<ol style="list-style-type: none"> 1. Discuss constrained optimization 2. Calculate constrained optimization under various methods.

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3. Dynamic and integral Calculus (T-9)	13. Dynamic Economics and Integration	1. Illustrate the nature of dynamic economics and the fundamental concepts of integration. 2. Solve rules and models of integration
	14. Integration by Substitution and by Parts	1. Solve complex integrals using substitution and by parts Integration with Special Rules
	15. Economic Applications of Integration	1. Solving economic problems, including marginal function to total function, investment and capital formation.
	16. Definite Integration	1. Interpret definite integration. 2. Calculate definite integration.
	17. Economic Applications of Integration	1. Solve economic problems, including consumer surplus and producer surplus.
4. Differential equation (T-8)	18. Primary concept of differential Equation.	1. Explain differential Equation, its order, degree and various types. 2. Formulate Of Differential Equations from General Equations.
	19. Homogeneous & non-homogeneous 20. Differential Equation.	1. Describe homogeneous and Nonhomogeneous 2. Differential Equation. 3. Calculate of Homogeneous Differential Equations.
	21. Exact differential Equation & Integrating factor.	1. Summarize Integrating factor. 2. Calculate exact differential Equation.
	22. Dynamic Stability of Equation.	1. Discuss Dynamic Stability. 2. Calculate Dynamic Stability of Equilibrium and its uses.
5. Difference Equation (T-9)	23. Difference Equation	1. Explain the difference equation. 2. Solve first order linear homogeneous and nonhomogeneous difference equations.
	24. Dynamic stability of equilibrium	1. Illustrate dynamic stability of equilibrium. 2. Solution of homogeneous and nonhomogeneous difference equations.
	25. Application Of Difference Calculus in Economics	1. Solve Cobweb Market Model and Market Model with Inventory.
	26. Application Of Difference Calculus in Economics	1. Solve lagged Income Determination Model.
	27. Basic Concept of Linear Programming.	1. Formulate and understand linear programming. 2. Calculate linear programming under

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6. Linear Programming (T-8)		graphical method.
	28. Simplex Method	<ol style="list-style-type: none"> 1. Explain simplex method and Steps for its application. 2. Calculate linear programming under simplex method(Maximization)
	29. Simplex Method	<ol style="list-style-type: none"> 1. Calculate linear programming under simplex method (Minimization)
	30. Tie in Pivot Column & Row	<ol style="list-style-type: none"> 1. Calculate and understand ties in pivot column and pivot row.
	31. Duality Theorem	<ol style="list-style-type: none"> 1. Explain duality, duality theorem and its economic interpretation. 2. Calculate duality theorem under linear programming. (Minimization)
	32. Shadow Price	<ol style="list-style-type: none"> 1. Discuss shadow price. 2. Calculate shadow price and duality theorem under linear programming (Maximization)