Syllabus for the post of PGT (Economics) in DOE & NDMC

INTRODUCTORY MICRO ECONOMICS AND MACRO ECONOMICS

1. **Introduction:** Central problems of an economy, production possibility curve and opportunity cost.

2. **Consumer Behaviour and Demand:** Consumer's Equilibrium - meaning and attainment of equilibrium through Utility Approach and Indifference Approach, Demand, market demand, determinants of demand, demand curve, movement along and shifts in demand curve. Law of demand and its exceptions. Price elasticity of demand, measurement of price elasticity of demand - percentage, total expenditure and geometric method.

3. **Producer Behaviour & Supply:** Agents of production. Production function. Cost and Revenue- meaning and various types of costs and revenue. Isoquants. Returns to a factor and returns to scale. Supply, market supply, determinants of supply, supply curve, movement along and shifts in supply curve, price elasticity of supply and its measurement. Components and theories of distribution. Welfare economics: Pareto-optimality, private and social products. Consumer surplus.

4. **Forms of Market and Price Determination:** Forms of market - meaning and features. Price determination under perfect competition, monopoly and imperfect competitions, effects of shifts in demand and supply,

5. **National Income and related aggregates:** Macroeconomics: Meaning. Circular flow of income, concepts of GDP, GNP, NDP, NNP (at market price and factor cost), National Disposable Income, Private Income, Personal Income and Personal Disposable Income. Measurement of National Income.

6. **Determination of Income and Employment:** Aggregate demand, Aggregate supply and their components. Propensity to consume and propensity to save. Involuntary unemployment and full employment. Determination of income and employment. Concept of investment multiplier and its working. Problems of excess and deficient demands Measures to correct excess and deficient demands - availability of credit, change in Government spending. Inflation: meaning, causes and remedies

7. **Money and Banking:** Money - meaning, evolution and functions. Central bank - meaning and functions. Commercial banks - meaning and functions. Recent significant reforms and issues in Indian Banking System-privatisation and modernisation

8. **Government Budget and the Economy:** Government budget - meaning and its components. Objectives of government budget. Classification of receipts; classification of expenditure. Types of budget. Revenue deficit, fiscal deficit and primary deficit: meaning and implications; measures to contain different deficits Downsizing the role of government.

9. **Balance of Payments:** Foreign exchange rate- meaning (Fixed and Flexible), merits and demerits; Determination through demand and supply. Balance of payments accounts - meaning and components

10. **International Economics:** Theories of international trade, free trade and protection, IMF – The World Bank and its associates. WTO.

11. **Concepts of shares, debentures, SEBI, NSEW, BSE and various indices.**

PART [illegible]

STATISTICS AND INDIAN ECONOMIC DEVELOPMENT

1. **Introduction and collection, organization of data:** Meaning, scope and importance of statistics in Economics. Collection and organisation of data. Census of India and National Sample Survey Organisation. **Statistical Tools and Interpretation:** Measures of Central Tendency. Geometric mean and harmonic mean. Measures of Dispersion. Lorenz Curve: Meaning and its application. Correlation – meaning. Measures of correlation - Karl Pearson's method, Spearman's rank correlation. Time series analysis. Introduction to Index Numbers - meaning, types - wholesale price index, consumer price index and index of industrial production, uses of index numbers; Inflation and index numbers.

2. **Development Policies and Experience:** A brief introduction of the state of Indian economy on the eve of independence. Common goals of Five Year Plans, major controversies on planning in India. Main features, problems and policies of agriculture, industry and foreign trade.

3. **Economic Reforms since 1991:** Need & main features - liberalisation, globalisation and privatisation; an appraisal of LPG policies

4. **Current challenges facing Indian Economy:** Poverty and programmes for poverty alleviation. Rural development: Key issues - credit and marketing - role of cooperatives; agricultural diversification; alternative farming - organic farming. Human Capital Formation. Growth of Education Sector in India. Employment: opportunities and other related issues. Infrastructural Problems and policies. Sustainable Economic Development: Meaning; Effects of Economic Development on Resources and Environment.

5. **Development Experience of India: A comparison with neighbours** India and Pakistan, India and China, Issues: growth, population, sectoral development and other developmental indicators.

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PGT ECONOMICS

1.				1. MONOPOLY 2. GENERAL EQUILOBRIUM 3. WELFARE ECONOMICS 4. IMPERFECT MARKET, EXTERNALITY AND PUBLIC GOODS 5. SOCIAL CHOICE AND WELFARE 6. CHOICE IN UNCERTAIN SITUATIONS 7. NON COOPERATIVE GAME THEORY 8. LINEAR ALGEBRA

MICROECONOMIC ANALYSIS

	:	**Consumer Behaviour**
1	:	Theory of Consumer Behavior: Basic Themes
2	:	Theory of Demand
3	:	Theory of Demand : Some Recent Developments
	:	**Producer Behaviour**
4	:	Theory of Production
5	:	Theory of Cost
6	:	Production Economics
	:	**Price and Output Determination**
7	:	Perfect Competition
8	:	Monopoly
9	:	Monopolistic Competition
10	:	Oligopoly
	:	**General Equilibrium**
11	:	General Equilibrium : Pure Exchange Model
12	:	General Equilibrium with Production
	:	**Welfare Economics**
13	:	Pigovian vs. Paretian Approach
14	:	Social Welfare Function
15	:	Imperfect Market, Externality and Public Goods

16 : Social Choice and Welfare

: **Economics of Uncertainty**

17 : Choice in Uncertain Situations

18 : Insurance Choice and Risk

19 : Economics of Information

: **Non-Cooperative Game Theory-I**

20 : Static Games of Complete Information

21 : Static Games with Complete Information: Applications

22 : Dynamic Games with Complete Information

: **Non-Cooperative Game Theory-II**

23 : Static Games of Incomplete Information (with Application to Auction)

24 : Dynamic Games with Incomplete Information: Perfect Bayesian Equilibrium

25 : Signaling Games and their Application

26 : Refinements of Perfect Bayesian Equilibrium

MACROECONOMIC ANALYSIS

Traditional Approaches to Macroeconomics

1 : Classical and Keynesian Approaches

2 : Neoclassical Synthesis

: **Economic Growth**

3 : The Solow Model

4 : Endogenous Growth Model

: **Rational Expectations**

5 : Rational Expectations and Economic Theory

6 : Policy-Making under Uncertainty

: **Inter-temporal Decision-Making**

7 : Consumption and Asset Prices

8 : The Ramsey Model

9 : The Overlapping Generations Model

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10 : Money and the Role of Monetary Policy

: Economic Fluctuations

11 : Traditional Theories of Business Cycles

12 : Real Business Cycles

: Unemployment

13 : Traditional Theories

14 : Search Theory and Unemployment

15 : Nominal and Real Rigidities

16 : New-Keynesian Theories of Unemployment

: Open-Economy Macro-Modelling

17 : Flexible Exchange-Rate System

18 : Fixed-Exchange Rate System

19 : Sluggish Price Adjustment

QUANTITATIVE METHODS

Introduction to Differential Calculus

1 : Set Theory

2 : Functions and their Graphical Representation

3 : Differential Calculus: Functions, Limit and Continuity

Extreme Values and Optimisation

4 : Maxima and Minima

5 : Unconstrained Optimisation

6 : Constrained Optimisation

Integral Calculus and Economic Dynamics

7 : Integration Techniques

8 : Integration and Economic Dynamics

9 : Difference Equations and Applications in Economic Dynamics

Linear Algebra and Economic Applications

10 : Vector Analysis

11 : Linear Algebra

12 : Input-Output Analysis

13 : Linear Programming

Statistical Methods-I

14 : Descriptive Statistics

15 : Correlation and Regression Analysis

16 : Probability Theory

17 : Probability Distribution

Statistical Methods-II

18 : Sampling Theory

19 : Sampling Distributions

20 : Statistical Inferences

ECONOMICS OF GROWTH AND DEVELOPMENT

Economic Growth Models - I

1 : Introduction to Economic Growth

2 : Harrod-Domar Growth Model

3 : Neo-classical Growth Models

Economic Growth Models –II

4 : Growth and Distribution

5 : Total Factor Productivity and Growth Accounting

6 : Technological Change and Progress

Economic Growth Model-III

7 : Models of Optimal Economic Growth

8 : Multi-Sector Models of Growth

9 : Endogenous Growth Models

10 : Stochastic Growth Models

Social and Institutional Aspects of Development

11 : Development and Underdevelopment
12 : Measurement and Indicators of Development
13 : Population and Development
14 : Economic Development and Institutions
15 : Market Incompleteness and Informal Institutions in the Rural Economy

Theories of Development

16 : Classical Theories of Development
17 : Schumpeter and Capitalistic Development
18 : Theories of Underdevelopment

Development Strategies

19 : Allocation of Resources
20 : Cost-Benefit Analysis
21 : Role of Planning
22 : Trade and Development

INDIAN ECONOMIC POLICY

Indian Economic Development: An Overview

1 : Growth and Structure of Indian Economy
2 : Population and Human Resources
3 : Natural Resources and Environment
4 : Physical Infrastructure

Development Strategies in India

5 : State Planning and Markets: Policy Choices
6 : Economic Reforms in India
7 : Major Developments in Post Economic Reforms Period

Sectoral Developments

8 : Issues and Concerns of Indian Agriculture
9 : Industrial Development in India: An Overview

10 : Services Sector

Major Issues Confronting Indian Economic Policy

11 : Poverty, Inequality and Inclusive Growth

12 : Employment and Unemployment: Policy Implications

13 : Regional disparity in India

Monetary and Fiscal Policies in India

14 : Credit and Monetary Policy

15 : Capital Market and its Regulation

16 : Public Finance and Fiscal Policy

17 : Fiscal Federalism in India

External Sector and Trade Policy

18 : Foreign Trade and Balance of Payment

19 : Foriegn Capital

20 : Trade Policy

Sector Specific Policies

21 : Agricultural Policy

22 : Industrial Policy

23 : Policies Relating to Services Sector

Implementation and Monitoring of Economic Policies

24 : Livelihood Protection and Social Security Measures with Speical References to MNREGA

25 : Political Economy of Indian Development

26 : Ingredients of Good Governance

PUBLIC ECONOMICS

Public Economics: Basic Concepts

1 : Welfare Foundations of Economic Policies

2 : Theory of Market Failure

3 : Voting and Local Public Goods

Social Choice and Collective Decision Making

4 : Arrow's Impossibility Theorem: Social Choice and Individual Values

5 : Normative Models: Equity and Justice

6 : Spatial Voting Models

Public Policy: Mechanism Design, Agenda Setting and Information

7 : The Basics of Public Policy

8 : Mechanism Design

9 : International Policy Coordination

Economics of Taxation

10 : Commodity Taxes

11 : Direct Taxes

12 : Introduction to Optimal Taxation

Public Debt

13 : Theory of Public Debt

14 : Sources of Public Debt

15 : Management of Public Debt

Fiscal Federalism

16 : Fiscal Federalism and Fiscal Policy

17 : Equity and Efficiency Issues

18 : State and Local Goods

INTERNATIONAL TRADE AND FINANCE

International Trade Theory

1 : Free Trade Theory

2 : Alternative Explanations of Trade

3 : Gains from Free Trade and Welfare

Trade Policy

4 : Theories of Protectionism;

5 : Role of WTO in Trade Policy

6 : Multilateralism and Problems of Developing Countries with WTO

Balance of Payments, BoP Adjustments, Exchange Rates

7 : Balance of Payments: Introduction

8 : International Monetary Systems and Exchange Rate Regimes

9 : International Financial Institutions

10 : International Debt and the Role of Financial Institutions

Globalisation, Trade and Developing Countries

11 : Trade and Development

12 : Issues Related to Trade in Primary Commodities

13 : Issues on Trade in Services (GATS)

14 : Trade Negotiations under the WTO: A Historical View

Theory of Regional Blocs

15 : Regional Trading Blocs

16 : International Capital Mobility and the Emerging Monetary System

International Trade and Payments in India

17 : India's Trade Policy: Historical Perspective and Recent Developments

18 : India's Balance of Payments

19 : Trade and Development in India

ECONOMICS OF SOCIAL SECTOR AND ENVIRONMENT

Society, Environment and Economy

1 : Society, State and Market

2 : Economy and Environment

3 : Society and Environment

Economics of Education

4 : Demand for Educational Services

5 : Supply of Educational Services

6 : Determinants of Educational Services

Economics of Health

7 : Demand for Health Services

8 : Supply of Helath Services

9 : Determinants of Health Services

Economics of Environment

10 : Demand for Natural and Environmental Resources

11 : Supply of Environmental and Ecosystem Services

12 : Determinants of Environmental Resources

Sustainable Development

13 : PIllars of Sustainable Development

14 : Green Accounting and Environmental Cost Benefit Analysis

15 : Common Property Resources Management

Institutions and Policies

16 : Education Sector.

17 : Health Sector

18 : Environmental Sector I

19 : Environmental Sector II

RESEARCH METHODS IN ECONOMICS

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Research Methodology: Issues and Perspectives

1 : Research Methodology: Conceptual Foundations

2 : Approaches to Scientific Knowledge: Positivism and Post Positivism

3 : Models of Scientific Explanation

4 : Debates on Models of Explanation in Economics

5 : Foundations of Qualitative Research: Interpretitivism and Critical Theory Paradigm

Research Design and Measurement

6 : Research Design and Mix Methods Research

7 : Data Collection & Sampling Design

8 : Measurement and Scaling Techniques

Quantitative Methods-I

9 : Two Variable Regression Models

10 : Multiple Regression Models

11 : Measures of Inequality

12 : Construction of composite index number in social sciences

Quantitative Methods-II

13 : Multivariate Analysis: Factor Analysis

14 : Canonical Correlation Analysis

15 : Cluster Analysis

16 : Correspondence Analysis

17 : Structural Equation Modelling (SEM)

Qualitative Methods

18 : Participatory Methods

19 : Conent Analysis

20 : Action Research

Data Base of Indian Economy

21 : Macro-variable Data: National Income, Saving and Investment

22 : Agricultural and Industrial Data

23 : Trade and Finance

24 : Social Sector

ECONOMETRIC METHODS

Basic Econometric Theory

1 : Introduction to Econometrics

2 : Estimation of Two-variable Regression Model

3 : Statistical Inference in Simple Regression Models

4 : Multiple Regression Model

5 : Generalised Least Squares

Treatment of Violations of Basic Assumptions

6 : Multicollinearity

7 : Auto Correlation

8 : Heteroscedasticity

9 : Errors in Variables

Extensions of Regression Models

10 : Dummy Variable Models

11 : Autoregressive and Distributed Lag Models

12 : Discrete Dependent Variable Models

Simultaneous Equation Models

13 : Introduction to Simultaneous Equation Models

14 : Identification Problem

15 : Estimation of simultaneous Equation Models

Multivariate Analysis

16 : Introduction to Multivariate Analysis

17 : Principal Component Analysis

18 : Factor Analysis

ACTUARIAL ECONOMICS

Quantitative Techniques for Risk Analsysis

1 : Applied Probability I

2 : Applied Probability II

3 : Stochastic Process

4 : Application to Finance

Actuarial Techniques I

5 : Valuing Risk Management

6 : Stochastic Models in Insurance

7 : Theory of Interest

Actuarial Modelling I

8 : Life Insurance

9 : Collective Insurance and Company Operations

10 : Insurance Pricing

Actuarial Techniques II

11 : Cash Flow Projections

12 : Life Contingencies

3 : Credibility Theory

Actuarial Modelling II

14 : Reinsurance

15 : Extreme Value

16 : Stochastic Control and Insurance

: Non-Life Reserving and Accounts

17 : Reserving Techniques

18 : Dynamic Financial Analysis

Introduction to Regulation of Insurance

'9 : Forms of Regulation

20 : Regulation of Insurance in India

FINANCIAL INSTITUTIONS AND MARKETS

Nature and Role of Financial System

1 : The Role of Financial Markets in the Economy

2 : Money and Finance

3 : Risk and Financial Assets

4 : Interest Rates and Cash Flows

: Financial Markets

5 : Money Markets

5 : Capital and Equity Markets

7 : Derivatives Markets

8 : Structure of Financial Markets

: Financial Institutions

9 : Financial Intermediaries

10 : Commercial Banking

11 : Investment Banking

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12 : Trading and Exchanges

The Financial Sector and Monetary Policy

13 : Money and the Economy

14 : Money Creation and Central Banking

15 : Interest Rate Risk

16 : Credit Risk and Other Risks

International Financial Markets

17 : Exchange Rates

18 : Rise and Fall of Brettonwood Institutions

19 : Regional Financial Institutions

GENDER ISSUES IN WORK, EMPLOYMENT AND PRODUCTIVITY

: **Gender Issues in Work**

1 : Gender Issues in Work

2 : Valuation of Women's Work

3 : Participation of Women in Pre-industrial and Industrial Socieities

: **Women's Contribution to National Economy**

4 : Women in Care Economy

5 : Women in Shadow Employment

6 : Search Theories

7 : The Indispensability of Voice Organizing for Social Protection in the Information Economy

8 : Towards a 'Generative' Model of Social Protection Making the Links to Development Policy

Gender and Labour Markets

: Labour Market Segmentation

10 : Gender Differential Impact on Labour Market

11 : Wage Differentials

12 : Social Security

: Legal Responses to Work

WOMEN IN THE ECONOMY

Conceptualizing Women's Work

1 : Defining Work

2 : Productive and Reproductive Work

3 : Segmentation

4 : Estimating Women's Work

Historiographical Issues and Debates in Women's Work

5 : International Debates

6 : Indian Debates-I

7 : Indian Debates-II

8 : Mobilization and Resistance

Participation

9 : Issues Concerning Participation

10 : Locations

11 : Sectors

12 : Occupation

Migration

13 : Theories and Typologies of Migration

14 : Migration, Inequality and Social Change

15 : Migration and Vulnerabilities to Trafficking

16 : Migration and Development

: Legislation, Social Protection and Policy

17 : Frameworks and Approaches

18 : Important Legislation and Landmark Judgments

19 : Welfare and Social Security Measures

20 : Women in Planning and Social Policy

Women and Globalization

21 : Globalization and Economic Change

22 : New International Division of Labour

23 : Questions of Feminization and Margination

DEVELOPMENT: ISSUES AND PERSPECTIVE

Development - An Overview

1 : Development Introduction and Paradigm

2 : Economic Development

3 : Human Development

4 : Political Development

Basic Issues in Development-I

5 : Population

6 : Poverty

7 : Inequality

8 : Unemployemnt

Basic Issues in Development-II

9 : Social and Cultural Issues in Development

10 : Development and Disparties

11 : Inclusive Development

12 : Marginalization

Sectoral Issues in Development

13 : Agriculture

14 : Industry

15 : Infrastucture

16 : Service

Sectoral Issues in Development-II

21 : Education

22 : Health

23 : Gender

Microeconomic Theory

Content: Unit-wise

1. Prices, Markets and Efficiency - Voluntary exchange, Pareto efficiency, quasilinear utility, cost functions, demand and supply, market equilibrium, comparative statics, taxes and subsidies, public goods, externalities.
2. Choice theory and Consumer Demand - The axiomatic approach, utility representation, demand and expenditure functions, duality, Slutsky decomposition, testable implications.
3. Production, Costs and the Firm - Production possibility sets, cost minimization and profit maximization, input demand and output supply, non-profit motives.
4. Monopoly - Profit maximization, dead-weight loss, price discrimination, monopolistic screening.

5. Choice under Uncertainty - The von-Neumann-Morgenstern axioms and expected utility theory, risk aversion, portfolio choice.

6. General Equilibrium Analysis: Barter; Core of Exchange economy; Market exchange; General equilibriun models of exchange and production; Existence of competitive equilibria; Competitive equilibrium as Core allocation Uniqueness and Stability of Competitive equilibrium; Comparative statics.

   Welfare Properties of Competitive Equilibria - First and Second Fundamental Theorems of Welfare Economics; Efficiency and fairness of Market wage; Factor Price Equalization Theorem.

7. Welfare Economics: Welfare Criteria - Fairness; Pareto optimality; Kaldor efficiency; Scitovsky Criterion; Samuelson Criterion; Cost Benefit Analysis.

   Social Choice; Social Welfare Function; Arrow's Impossibility Theorem and the related results.

8. Market Failures: Market failure; Sources of market failure and their implications Externalities; Public Good.

Mathematics for Economics:

- **Content: Unit-wise**

1. Preliminaries: Sets, relations, functions.
2. Linear Algebra:

   Vector spaces, subspaces.

   Convex sets, concave and quasiconcave functions, their characterisations.

   Linear independence. Linear mappings and matrix representation. Range, null space, rank-nullity theorem.

   Projection mappings and inverse mappings. Solutions of linear equations.

   Inner product and normed spaces. Orthogonality. Orthogonal projectors and distance-minimising property. Symmetric matrices. Quadratic forms.

   Spectrum of matrix, diagonalisation, similarity of matrices.
3. Basic Real Analysis:

   In normed spaces, notions of open, closed and compact sets, continuous functions, their optima and their existence.

   Notions of differentiability of mappings between Euclidean spaces, chain rule, higher order derivatives.

   Implicit and inverse function theorem, comparative statics.
4. Optimization:

   Characterisations of differentiable concave and quasiconcave functions. Characterisation of interior optima.

   Lagrange characterisation of optima subject to equality constraints.

   Karush-John-Kuhn-Tucker characterisation of optima subject to inequality constraints.
5. Differential Equations: First-order and systems of first-order differential equations (linear and nonlinear); some stability theory.

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Introductory Econometrics

- **Content: Unit-wise**

1. Probability, Random Variables, Distributions:
   Sample spaces, Counting methods, Conditional Probability, Bayes' Theorem.
   Discrete, continuous and mixed random variables, marginal and conditional distributions, multivariate distributions, distributions of functions of random variables. Expectations, conditional expectations and other moments.
2. Estimation: Properties of estimators, sufficient statistics, maximum likelihood estimation.
3. Sampling Distributions, Aymptotic Distribution Theory:
   Large Sample Results: Laws of large numbers and central limit theorems.
   Sampling Distributions of Estimators: The Chi-square, t and F distributions.
4. Hypothesis Testing: Definition of a statistical test. Size, significance and power. Likelihood ratio tests and the Neyman Pearson Lemma. Uniformly most powerful tests, t and F tests for moments of a distribution.
5. Linear Regression:
   Simple Linear Regression - Ordinary Least Squares (OLS) Estimation; Desirable properties of least squares estimators; Goodness-of-Fit; Normality assumption for the errors; Maximum likelihood estimation.

Multiple Linear Regression: Ordinary Least Squares (OLS) Estimation; Underlying assumptions: Goodness-of-Fit.

Dummy variables in regression models: Qualitative regressors; qualitative and quantitative regressors; interaction terms.

Multicollinearity, Heteroscedasticity, Autocorrelation: Nature; implications; detection; remedies

6. Dynamic Models:
   ARIMA models: AR, MA, and ARMA processes
   Distributed lag models
7. Model specification: Model selection criteria
8. Panel data regression: Fixed effects LSDV model; Fixed effects within-group model; Random effects model.

Macroeconomic Theory

- **Content: Unit-wise**

1. Aggregative Macro Models: The classical system; the Keynesian system; Role of expectations in the aggregative framework; various theories of expectation formation; solving aggregative macro models with different assumptions about expectation formation and their policy implications.
2. Mathematical Preliminaries:
   Methods of solving Ordinary Difference Equations; Systems of first-order difference equations; Steady states, Stability, Phase Diagrams, Linearization.
   Infinite Horizon Optimization in Discrete Time: Stationary Dynamic Programming with Discounting; Euler Equations and Transversality Condition; Solution techniques.
3. Microfounded Macro Models:
   Lucas Critique and the need for microfoundations; the Dynamic General Equilibrium (DGE) approach to macro analysis: optimization problem of a representative household; optimization problem of a representative firm.
4. Growth and Overlapping Generations models:
   Neoclassical Growth Models - The Solow model; The Ramsey-Cass-Koopmans model; The Samuelson-Diamond Overlapping Generations model.
   Endogenous Growth Models - the Basic AK-Model; Models with Externalities.
5. Basic Factors of Business Cycles: Evidence and Issues
6. Stochastic difference equations: First-Order Linear Systems; Scalar Linear Rational Expectations Models; Multivariate Linear Rational Expectations Models.
7. Real Business Cycle Theory - basic structure with and without labour; Money in utility; Effectiveness of Monetary Policy.
8. New Keynesian Model - basic framework, price stickiness (Calvo and Rottenberg), optimum pricing, dynamic IS and new Philips curve, monetary policy effectiveness. Monetary Policy Design: Rule vs Discretion. Sticky Wages and Unemployment.

Introduction to Game Theory

- **Content: Unit-wise**

1. Games with perfect information
   (a) Strategic form games: Dominated strategy, Nash and mixed strategy Nash equilibrium, Iterated elimination
   (b) Extensive form games: Action and strategy, Nash Equilibrium, Subgame perfect Nash equilibrium, One-deviation property and backward induction
   (c) Repeated games: Finitely and infinitely repeated game,
   (d) Bargaining: Alternating offers bargaining: Finite and infinite horizon
2. Games with Imperfect Information
   (a) Imperfect information and Subgame perfection: Information Set, Mixed and behavioural strategies
   (b) Static games of incomplete information: Bayesian Nash equilibrium, Harsanyi transformation, Auction

(c) Dynamic games of incomplete information: Perfect Bayesian Equilibrium, Signaling games, Reputation games, Intuitive Criterion

(d) Information Economics: Adverse selection, Monopolistic Screening, Moral hazard

Economic Development and Policy in India

- **Content: Unit-wise**

1. Poverty and inequality
2. Food and nutrition
3. Economic reforms and industrial performance
4. Agriculture

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177/C

Microeconomics

Mathematical Economics

- **Content: Unit-wise**

1. Set theory and preliminaries
2. Topological Spaces:
   Metric spaces, topological spaces and continuous functions; various useful constructions, e.g., projective and inductive topologies
   Countability and separability properties
   Compactness, completeness, connectedness, etc.
   Topologies on function spaces; linear spaces, weak topologies; topologies on space of probability measures
   Convex analysis; separation theorems
   Set-valued mappings, fixed point theorems
3. Arrow-Debreu model: existence and optimality

4. Debreu-Scarf theorem
5. Duality theory
6. Nash's existence theorem
7. Lattices, supermodularity and comparative statics

Contract Theory

- Content: Unit-wise

1. Decision Making Under Uncertainty:
   The Expected Utility Theorem; Money Lotteries; Measure of Risk aversion; Comparing Risk aversion; Comparison of risky alternatives, Insurance.

2. Hidden Information and Adverse Selection:

   The first-best versus the second-best in presence of informational asymmetry; Single-crossing condition and monotonicity of choice; The Revelation Principle; The Rent Extraction versus Allocative Efficiency Tradeoff; Screening and its applications - Credit Rationing, Regulation, Insurance; Signalling and its applications.

3. Hidden Action and Moral Hazard:

   The basic principal-agent problem; Rent Extraction-Efficiency Tradeoffs. The first-order approach; Linear and Non-linear Contracts; Insurance Contracts; Value of information; Adverse selection with Moral hazard; Multi-task moral hazard; Relational Contracts.

4. Competition and Moral hazard in Teams:

   Competition among agents; Symmetric and Asymmetric Competitions; Relative performance evaluation; Multi-agent moral hazard; Moral hazard in teams; Firm as a team.

5. Incomplete Contracts:

   Basic framework; Verifiability; Hold-up problem and its consequences; Market and Non-market Organizations; Markets and contracts; Foundations of Incomplete Contracts; Procurement Contracts for Public Goods; Short-term versus Long-term Procurement Contracts; Public versus Private ownership; Public Private Partnerships.

Game Theory

- **Content: Unit-wise**

  1. Formal representation of a non-cooperative game in extensive form. Important notions: information; pure, mixed, and behaviour strategies; Kuhn's theorem; equivalence notions.

     Normal form games. Agent-normal form. Connections with extensive form games. Interpretation of mixed strategies.

  2. Equilibrium notions. Dominant strategy equilibrium, iterated domination arguments, rationalisability. Nash equilibrium: Nash's existence theorem. Subgame perfect equilibria.

  3. Special classes of games: perfect information games and constant-sum games.

  4. Supermodular games, monotone comparative statics.

  5. Economic applications: oligopoly theory, some dynamic games applications.

  6. Incomplete information games. Mechanism design and implementation theory. Revelation principles.

  7. Economic applications, including auction theory and regulation theory.

Game Theory II

- **Content: Unit-wise**

  1. Auction Theory and Applications.
  2. Bargaining Theory and Applications.
  3. Matching Theory and Applications.
  4. Mechanism Design and Applications.
  5. Repeated Games and Applications.
  6. Global Games and Applications.
  7. Evolutionary Game Theory.
  8. Epistemic Game Theory.

Social Choice Theory

- **Content: Unit-wise**

1. Preference aggregation:
   Arrow's impossibility theorem; Welfare functional; Utilitarianism; Liberal paradox.
2. Fairness:
   Rawlsian justice; Capability; Equality of opportunity; Envy freeness.
3. Axiomatic bargaining, Axiomatic cost/surplus allocations, Matching.
4. Measures:
   Inequality; Poverty; Mobility; Vulnerability.
5. Mechanism design:
   Strategy proof mechanism, Nash and Bayes-Nash implementation, Auction, Regulation.

Topics in Economic Theory

- **Content : Unit-wise**

1. Metric spaces. Contraction mapping theorem. Correspondences. Theorem of the maximum. Blackwell's conditions for a contraction. Dynamic programming and applications from job search, theory of investment, growth.
2. Repeated games with perfect and imperfect monitoring. Applications to repeated moral hazard (and adverse selection): e.g., collusive repeated oligopoly, relational labour contracts.
3. Behavioural models of time discounting and applications: Time inconsistency. Hyperbolic discounting model. Dual-self model.

   Applications: consumption-saving choices. Behavioural industrial organisation applications.

International Trade Theory:

- **Content : Unit-wise**

1. Classical trade theories on comparative advantage (Ricardo and Heckscher-Ohlin frameworks), gains from trade, international equilibrium with continuum
2. Specific factor models, empirical approaches, HOV and paradox
3. Trade in intermediate inputs and wages: outsourcing, trade in tasks and sub-modularity
4. Imperfect Competition:
   Imperfect competition, homogeneity: Krugman, Brander-Spencer models
   Monopolistic competition, heterogeneity
   Generalised oligopoly framework, heterogeneity
5. FDI and global production, FDI vs. exports
6. Political economy of trade agreements and upcoming issues of protections
7. Trade and growth; immiserizing growth; endogenous growth with homogeneity and heterogeneity
8. Migration, international trade and capital formation

Macroeconomics

Dynamic Macroeconomics

- Content: Unit-wise

1. Competitive Equilibria in Dynamic Economies:
   Stochastic difference equations; Markov processes; Dynamic Programming, Complete Markets; sequential trading and Arrow securities; Recursive competitive equilibrium; examples of incomplete markets.
2. Optimal Fiscal Policy
3. Optimal Taxation with and without commitment
4. Search, Matching and Unemployment
   McCall's model of intertemporal job search, A lake model, A model of career choice, Jovanovic's matching model
5. The savings problem and Bewley models

Computational Macroeconomics

- Content: Unit-wise

1. Introduction of coding the dynamical Systems: Deterministic and stochastic difference equations, Markov Process, Ergodic Theory, basic programming with Dynare.

2. Dynamic Optimisation: Markov Decision Process Model, Finite-Horizon Dynamic Programming, Infinite-Horizon Dynamic Programming, Applications, hands-on exercise in dynare, Linear-Quadratic Models, Control under Partial Information, Numerical Methods.
3. Application of RBC and New Keynesian models and simulation, and Bayesian Estimation of DSGE Models Using Dynare.
4. Application of standard New Keynesian in open economy with informal sector
5. Estimating non-linear models with states and with filtering states
6. Dynamic programming and projection methods
7. Heterogeneous models and estimations
   Aiyari model and Krusell-Smith models and their extensions.

International Macroeconomics

- **Content: Unit-wise**

  1. Preliminaries and basic models:

     Business-Cycle Facts Around the World, Global imbalances and balances of payment accounting; An Open Endowment Economy; An Open Economy with Capital; The Open Economy Real-Business-Cycle Model.

  2. Standard New Keynesian model with open economy

  3. Business Cycles, Trade, Exchange Rates and Unemployment:

     Business Cycles in Emerging Countries: Productivity Shocks Versus Financial Frictions; Interest-Rate Shocks; Importable Goods, Exportable Goods and the Terms of Trade; Nontradable Goods and The Real Exchange Rate; Nominal Rigidity, Exchange Rates and Unemployment.

  4. Policy:

     Exchange Rate Policy And Capital Controls; Financial Frictions And Aggregate Instability.

  5. Sovereign debt, default and crises:

     Sovereign Default; Government debt in international macroeconomics; sovereign debt crises; International capital flow puzzles.

  6. Modeling joint dynamics of the current account and the real exchange rate under currency paradigms

Monetary Theory and Policy

- **Content: Unit-wise**

1. Money-in-the-Utility Function
   MIU model; steady state equilibrium; Nonsuperneutrality; Dynamics.
2. New Keynesian Models of Monetary Policy
   Basic New Keynesian model; Monetary policy analysis in the New Keynesian model
3. Monetary Policy in an Open Economy
   Two-country model; Policy coordination; Small open economy models
4. Discretionary Policy and Rules
   Policy Objectives; Targeting rules; Taylor Principle; Inflation Targeting framework; Commitment vs. Discretion
5. Monetary Policy Operating Procedures
   Instruments and goals; Effects of operating procedures; policy measures; Role and strategies of Central Bank communication in Monetary Policy; Forward guidance; Unconventional monetary policy

Macroeconomics of Development

- **Content: Unit-wise**

1. Proximate Causes of Growth:

   (a) Human Capital: The Ben Porath model of human capital accumulation; The Nelson-Phelps model of skill-technology complementarity.

   (b) Technology: Distance to the frontier and technology diffusion; Directed technological change; Appropriate versus inappropriate technologies.

2. Deeper Causes of Growth:

   (a) Imperfect Markets: Credit Market Imperfection and Indivisibility of investment; Risk, diversification and financial institutions.

   (b) Political Economy: Inequality, Taxation and Growth; Democracy versus Oligarchy.

   (c) History versus Expectations: Underdevelopment as coordination failure; Multiple equilibria in technology adoption.

   (d) Culture: Culture, risk and entrepreneurship; Culture, patience and occupational choice.

Economic History/History of Economic Thought

Contemporary Issues in Historical Perspective

- **Content: Unit-wise**

1. Historical facts about our changing environment:

   Trends in population, GDP, energy use and pollution. Milestones in environmental regulation since the early twentieth century.

2. The commons problem:

   Community institutions and collective action.

3. Environmental regulation:

   Types of international agreements that have emerged to avoid environmental degradation. Game-theoretic analysis of the stability of such agreements. Price versus quantity regulation.

4. Discrimination:

   Evidence on the practice of discrimination, correspondence studies, Models of statistical and preference-based discrimination. Segregation.

5. Social policy to address group inequalities:

   Affirmative action in historical and cross-national perspective.

Topics in Economic and Social History

- **Content : Unit-wise**

1. Global migration flows in the 19th century
2. Plantations in the colonies: indentured labour
3. Other types of labour contracts
4. Women workers in the 19th century
5. Role of plantations in the colonial economy

History of Economic Analysis

- **Content: Unit-wise**

1. Classical political economy:
   The development and growth of nations and the distribution of income across the owners of labour, capital and land.
2. Neoclassical microeconomics:
   Demand theory, welfare economics and general equilibrium analysis.
3. Information economics and game theory:
   The effects of missing information and strategic behaviour on the functioning of markets.
4. Macroeconomics and financial markets:
   Origins of macroeconomics in the Great Depression and its subsequent development.
5. The development of empirical methods:
   Statistical thinking and causal inference in economics.
6. Endogenous preferences and behavioral economics:
   The move beyond traditional notions of preferences and maximizing behavior.

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Econometric Methods and Applications

Econometric Methods

- Content: Unit-wise

1. Ordinary Least Squares, Hypothesis Tests and Model Selection.
2. Nonlinear, Semiparametric and Nonparametric Regression Models.
3. Endogeneity and Instrumental Variable Estimation.
4. Systems of Equations and Panel Data.
5. Simulation Based Inference.
6. Discrete Choice Models, Truncation and Censoring.
7. Special topic (will vary each year)

Impact Evaluation Methods

- **Content: Unit-wise**

1. Randomized Control Trials
2. Control Function Approaches
3. Matching Methods
4. Regression Discontinuity
5. Mixed Methods

Time Series Analysis

- **Content: Unit-wise**

1. Unit Roots, Cointegration and ARDL:
   Deterministic and stochastic trend, trend stationary and difference stationary process; Random walk model; Testing for unit roots, structural change, multiple unit roots, seasonal unit roots; Cointegration, error correction; Testing for cointegration; ARDL Bounds Testing Approach.
2. Box-Jenkins Methodology:
   Stationarity, invertibility; Autoregressive models, moving average models, mixed autoregressive and moving average models; Identification, estimation, diagnostic checking; Forecast function.
3. ARCH/GARCH:
   ARCH Processes; GARCH Processes; ARCH-M and GARCH-M Models.
4. VAR Models:
   Estimation and identification; Impulse response function; Variance decomposition.
5. Panel Data Methods:
   Panel Data Unit Root Tests; Panel Data Cointegration Test; Panel Estimation (FMOLS and DOLS).

Forecasting Methods and Applications

- Content : Unit-wise

1. Overview of Forecasting and Forecast Evaluation
   Applications of forecasting; Forecasting methods and forecast horizons; Nowcasting and backcasting; Measures and tests of accuracy; Choosing between forecasting methods; Unbiasedness and Rationality

2. Combination of Forecasts

   Forecast Encompassing; Optimal combining weights

3. Univariate Models: Smoothing Techniques and Box-Jenkins Methodology

   Averaging methods; Exponential smoothing methods; Decomposition methods; Unit roots; Autoregressive models, moving average models, mixed autoregressive and moving average models; Identification, estimation, diagnostic checking; Forecast function

4. Multivariate Models: Regression Models, Simultaneous Equations Models, VAR models

   Multivariate regression model; Implications of violation of OLS assumptions for forecasting; Observational Equivalence, reduced form representation; Estimation, forecasting and simulation with simultaneous equation model; VAR models; Cointegration

5. Judgmental Forecasting

   Jury of executive opinion; Delphi approach; Sales force composite methods; Anticipatory surveys and market research-based assessments

Applied Production Analysis

- **Content : Unit-wise**

1. Primal approaches in production economics: theory and econometric estimation
2. Dual approaches in production economics - cost minimization and cost function, profit maximization and profit function: theory and econometric estimation
3. Multi-output technologies and their estimation: input, output and directional distance functions
4. Functional forms used in applied production analysis: Cobb-Douglas, translog, quadratic etc. Unit V: Efficiency and Productivity Analysis: concepts and measurements (stochastic frontier analysis (SFA), DEA etc.)

Applied Consumption Analysis

- **Content: Unit-wise**

1. Review of Theory: Duality and Separability Concepts, Theoretical Restrictions.
2. Single-equation approaches: Engel functions, Demand for durable goods.
3. System Estimation: Functional forms, Estimation procedures, Assumption about error structures, Testing.
4. Dynamic Demand Systems: Habit formation models, Modelling changes in taste.
5. Demographically-Extended Demand Systems: Translation, Scaling approaches.
6. Non-parametric (Regression) Approaches. Applications of Demand Analysis: Food and Nutrition; Demand for non-marketed goods; Welfare applications.

Semi- and Nonparametric Estimation

- **Content : Unit-wise**

1. Parametric vs. nonparametric statistical models. The histogram and the kernel density estimator.
2. Statistical properties of the kernel density estimator. Bias-variance tradeoff.
3. Further statistical properties. Bandwidth choice in theory and practice. Kernel choice.
4. Multivariate kernel density estimator. Curse of dimensionality.
5. Some direct statistical applications of kernel density estimation.
6. Nonparametric regression: kernel estimator (Nadaraya-Watson) and local linear regression estimator.
7. Statistical properties of the Nadaraya-Watson and local linear regression estimator. Series estimation.
8. Some direct applications of nonparametric regression.
9. Application: estimating conditional average treatment effects.
10. Application: estimating regression discontinuity models.
11. Application: estimating sample selection models.

Topics in Econometrics

- **Content: Unit-wise**

  1. Linear regression models:
     Instruments, 2SLS estimator, Generalized Instrumental Variables estimator; Simultaneous equations.
  2. Generalised Method of Moments estimator:
     Efficient GMM estimation; Over-identifying restrictions.
  3. Panel Data Models:
     Fixed effects models, Random effects models, Arellano-Bond estimator in dynamic panel data models.
  4. Quantile regression estimation.
  5. Nonlinear Models:
     probit models, logit models (including their multivariate forms), Tobit models, models for count data, censored and missing data schemes.

Applied Environmental Analysis

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- **Content : Unit-wise**

1. Non-market valuation techniques: revealed and stated preferences.
2. Quasi-experimental methods in environmental economics
3. Environmental valuation at firm level: environment as an input in production; multi-output production technologies; emission generating production technologies.
4. Environmental valuation at the macro level: reduced form and computable general equilibrium models.
5. Environment and technological progress: econometric studies.
6. Dynamic applications: renewable and non-renewable resources; stock pollutants.

Coding Basics with Economic Applications

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- **Content : Unit-wise**

1. Coding in Python: Loops, Lists, Functions, Branching, Curve Plotting, Error Handling, Strings, basics of data handling and web scraping, object-oriented programming. Various Python libraries introduced alongside: Numpy, Scipy, Matplotlib, Pandas, BeautifulSoup, Regular Expressions.
2. Numerical methods for solving nonlinear equations, fixed points, optimisation, integration, simulation, dynamic programming.
3. Applications from macroeconomics: job search, stochastic optimal growth, rational expectations equilibrium, asset pricing.
4. Applications from Industrial Organisation: Estimating demand in differentiated product static oligopoly, estimating single agent dynamic models.
5. Applications from probability and statistics: generating random numbers and computing probabilities and distributions from first principles, Monte Carlo sampling methods, using the Scipy and Sympy statistics modules to illustrate types of convergence, estimation, confidence intervals, hypothesis testing, Bootstrapping, kernel density estimation, connections with machine learning using the Scikit-learn module.

Environmental Econometrics

- **Content: Unit-wise**

1. Review of econometric and impact evaluation methods.
2. Introduction to numerical computational methods, machine learning and Python.
3. Applications of impact evaluation methods: Environmental policies and programs.
4. Environmental applications of numerical computational methods and machine learning.
5. Spatial Econometrics application in environmental and urban economics

Finance: Theory, Institutions and Modelling

Corporate Finance:

- **Course Content**

  1. Credit rationing
  2. Capital structure
  3. Capital acquisition and initial public offering
  4. Dividend policy
  5. Market for corporate control
  6. Takeovers and acquisitions
  7. Financial intermediation
  8. Corporate governance and corporate board

Real Estate Economics and Finance

- **Course Content: Unit-wise**

  1. Real Estate values over space and time
  2. Why do cities exist? Agglomeration economies and urban consumption
  3. Monocentric City Model and spatial equilibrium City Systems, city size and prices
  4. Real estate supply
  5. Public policy and real estate
  6. Real estate price measurement: median price, hedonic regression, repeat sales
  7. Valuation and risk-assessment of income-producing properties
  8. Financial leverage Real estate investment trusts
  9. Optimal portfolio theory Dynamics of the last housing boom and bust
  10. Emerging market forces in commercial real estate

Financial Markets

- **Content: Unit-wise**

1. Money Market:

   Analytics of Monetary Policy; Rules v/s Discretion; Optimal Instruments of Monetary Policy; Transmission Channels of Monetary Policy; Unconventional Monetary Policy.

2. Credit Market:

   Imperfect Information in Credit Market; Market Failure.

3. Stock Market:

   Portfolio Selection-Markowitz Approach, Feasible and Efficient Set; New Portfolio Theory-Capital Asset Pricing Model, Arbitrage Pricing Theory; Consumption Capital Asset Pricing Model, Equity Premium Puzzle.

4. Financial Derivatives Market:

   Options and Futures, Pricing of Options-Black-Scholes Model and Binomial Option Pricing Model; Pricing of Futures.

5. Foreign Exchange Market:

   Exchange Rate-Portfolio Balance Model; Monetary Model; Dornbusch Model of Overshooting Exchange Rates; Asian Financial Crisis; Global Financial Crisis.

Public Policy: Theory and Institutions

Public Economics I

- **Content: Unit-wise**

  1. The emergence of a social state:
     The evolution of social spending across the world since the early twentieth century.
  2. Efficiency in the provision of public goods:
     The types and quantities of public goods that should be provided.
  3. Externalities and their regulation:
     Sources of externalities, their relationship to contracts and markets and their regulation.

4. Inequality and Distributive Justice:
   Theories of justice. Discrimination. Public policies to tackle group inequalities.
5. Preference Aggregation and Public debate:
   How do we determine provision when we do not know preferences? Voting and other forms of information aggregate in democracies.

Public Economics II

- **Content: Unit-wise**

  1. Taxation:

     Direct Tax, Optimal Taxation; Property and Wealth Taxes; Stamp-Duty Tax; Indirect Tax and Goods and Services Tax (GST); Taxation in India; Tax Evasion and Black Income; Income Inequalities.

  2. Land Markets:

     Land as a Factor of Production; Market in land property, Anti-commons and Land Assembly Problem; Compensation-Efficiency Paradox; Economics and Politics of Land Acquisition; Land supply regulations.

  3. Public Goods and Public Procurement:

     Public Goods; Public versus Private Provisions; Public versus Private Investment; Procurement Contracts; Public Private Partnerships (PPPs) versus Privatization; Incentives and Outcomes under PPP Contracts; Theories of neighborhood development.

  4. Public versus Private Organization:

     Basics of Contract Theory; Risk allocation and Moral Hazard; Incentives in Private and Public versus Private organizations; Bureaucrats versus Managers; Multi-tasks, etc.

Environmental Economics

- Course Content: **Unit-wise**

1. Externalities and public goods
2. Corrective mechanisms (taxes, subsidies, permits)
3. Regulation with moral hazard and adverse selection
4. Valuation of non-market goods and amenities: overview and basic theory.
5. Revealed preference (indirect market methods); health valuation; constructed markets (direct market methods).
6. Cost-benefit analysis: measuring the cost of environmental policy; estimation of abatement cost functions; damage function assessment; discounting.

Law and Economics

- **Content: Unit-wise**

1. Introduction:
   Efficiency criteria in Law and Economics.
2. Contract Law:
   Need for a contract; Legal contract; Role of Contracts for functioning of markets; Efficient contracts; Complete and Incomplete Contracts; Reliance; Damages measures and their efficiency properties; Contracts as instrument of risk-allocation and information revelation; Regulatory Contracts; Contracts and Courts.
3. Property Law and Eminent Domain:
   Property Rights and their role in resource allocation; Transaction costs and Coase theorem; Legal remedies for breach of property rights; Intellectual Property Rights; Eminent Domain and Compulsory acquisition of land and other private property.
4. Civil Liability and Criminal Law:
   Tort law; liability rules versus property rights; accident law; product liability; efficiency properties of liability rules; efficiency-compensation trade-off; Rational crimes; Crime and Punishment; Severity versus Certainty of punishment
5. Litigation and Arbitration:
   Litigation and Arbitration; Litigation under asymmetric information; Litigation over compensation under eminent domain; .
6. Topics in Law and Economics in India:
   Topics and Debt Contracts; Insurance Contracts; Insolvency and Bankruptcy Code.

Natural Resource Economics

- Content : Unit-wise

1. Dynamic optimisation: deterministic discrete-time and continuous-time models. Stochastic models.
2. Renewable resources: optimal management. Common property and open access. Fishery: Models of growth with open and regulated open access. Optimal harvest. Stochastic growth. Forestry: Optimal stopping rules.
3. Non-renewable resources: The Hotelling rule and social welfare. Variations on the Hotelling rule: exploration, uncertainty in demand and reserves, entry and exit.
4. Growth with exhaustible resources, concepts and measures of resource scarcity. Natural resource accounting.

Energy Economics

- **Content : Unit-wise**

1. Energy demand analysis and forecasting
2. Economics of energy supply
3. Energy markets
4. Economics of energy-environment interaction
5. Regulation and governance of energy sector
6. Energy efficiency and innovations

Welfare Economics

- **Content: Unit-wise**

1. Reasons for collective choice:
   Public goods, Externalities, Redistribution.
2. Public choice in direct and representative democracies:
   Collective decision making and voting rules; Voting and median voter model; Rent seeking, Lobbying and corruption.
3. Some applications:
   Fiscal policies and taxation; Local public goods; Market failure vs. Government failure.

Economics of Regulation

- **Content : Unit-wise**

1. The role of government. The making of a regulation. Possible instrument choices. Why one instrument over another? Social cost-benefit analysis. Consequences of regulation.
2. Introduction to economic regulation. Motivation behind economic regulation. Potential instruments for regulation. Goals of regulation. Historic background.
3. Theories of regulation: normative and positive analysis, interest groups theory.
4. Public Enterprise. The origins of public ownership as a way to regulate economic activity. Public vs. private ownership. Does the threat of nationalisation/municipalisation discipline private firms?
5. Regulating natural monopolies:
   (a) Pricing strategies, rate structure, peak load pricing. Averch-Johnson model.
   (b) Sustainability of natural monopolies and contestability
6. Regulating natural monopolies under asymmetric information: Problems of natural monopoly and theory of regulatory policy solutions.
   Incomplete information games. Mechanism design and implementation theory. Revelation principles.
7. Franchise bidding: The case of cable television. Using franchise bidding as an alternative to regulation in the case of a natural monopoly.

8. Regulation of innovation and patents.

Climate Change Economics

- **Content: Unit-wise**

  1. Overview:
     Basics of climate science; international response to climate change.
  2. Integrated Assessment Models (IAMs) and the social cost of carbon; choice of discount rate for climate policy; declining discount rate (DDR).
  3. Technical change and fossil energy consumption: responses to climate change in an endogenous growth model with clean and dirty technologies; implications of a transition to clean technologies in an IAM.
  4. Stern Review on the economics of climate change: analytical foundations, findings and policy implications.
  5. ?Tipping points? and non-lincaritics in the climate system and their role in formulating climate policy: fat tail probability distributions and Weitzman Dismal Theorem.
  6. Mitigation (tradable permits and carbon taxes); economic impacts and adaptation.
  7. Green paradox and carbon leakage.
  8. Environmental treaties; applying non-cooperative and co-operative game theory.

Development Economics

- **Content: Unit-wise**

1. International debt and development

   Two-gap models; transfer paradox; international debt issues; loan pushing; debt forgiveness; loan buybacks; debt-equity swaps; empirical studies

2. Intellectual property rights and development

   TRIPs Agreement; innovation systems; IPR and technology transfer, problems with IPR

3. Wage Rigidity and Unemployment

   Theory of implicit cooperation; labour turnover model; nutrition-based efficiency theory of wages

4. Rural Credit Markets

   Lender's risk hypothesis; monopolistic markets; implicit interest charges; credit as insurance; micro-finance

5. Interlinkage in Rural Markets

   Potential risk; models of interlinked markets; implications for theory and policy; moral hazard and interlinkage

6. Inequality and Development

   Reasons for a direct relation; reasons for an inverse relation; empirical studies

Trade and Development

- **Content: Unit-wise**

1. Trade policies (tariff and non-tariff barriers) and implications
2. Analytical Approaches to Global Institutions (Public and Private) and Trade Policy
3. Trade creation and diversion and gravity modelling
4. Political economy of trade agreements and role of WTO
5. Issues in Trade, Welfare and Growth
   - Trade - gains and methods
   - Trade, FDI and growth (immiserating growth, spillovers, competition effects)
   - Trade, inequality, distributive conflict, pro-poor growth

- Fair trade and industrial policy - labor standards, environment

6. Emigration, trade and development
7. Global production and issues

Environment and Development

- **Content: Unit-wise**

1. Overview: Eenvironmental problems and economic development in South Asia. Inter linkages between poverty, population and environmental degradation.
2. Sustainability:

   Concepts and measures of sustainability and whether sustainable development is desirable and feasible.
3. Economic growth and environment:

   Does economic growth inevitably result in environmental degradation? Is there a turning point beyond which increases in income lead to better environmental quality?
4. Institutions for management of common pool natural resources; applications in the context of deforestation and water.
5. Interlinkage in Rural Markets

   Potential risk; models of interlinked markets; implications for theory and policy; moral hazard and interlinkage
6. Urban/industrial environmental problems:

   Dimensions, special features (small-scale industries and informal sector), regulatory approaches, alternatives (judicial, market-based instruments).
7. International dimensions:

   Trade and environment: South Asian perspective, climate change: impacts, mitigation and adaptation strategies.

Agricultural Economics

- **Content: Unit-wise**

  1. Agricultural productivity trends and climate change
  2. Input-use efficiency and climate-related risk-mitigation strategies: Seeds; Water (and electricity); Fertilizer; Labour.
  3. Agricultural insurance
  4. Market infrastructure
  5. Price policy
  6. Agriculture and nutrition

Economics of Health and Education

- **Content: Unit-wise**

  1. **Measurement and trends:** Correlation between alternative measures of well-being. The spread of education across the world. Budgetary allocations across space and time.
  2. **Institutional design** Alternative systems for service delivery. The role of imperfect information, incentives and contracts.
  3. **Discrimination and inequality:** Models of preference-based and statistical discrimination. Effective policies to address historical inequalities
  4. **Environmental health:** Estimating impact and designing appropriate regulation to regulate social damages through environmental externalities
  5. **The political economy of public policy:** The role of community structure in determining the distribution of public goods. Models of voting and collective action.
  6. **Evaluating policy impact:** The estimation of treatment effects in randomized experiments and in observational data.

Industrial Economics

Industrial Organisation

- **Content : Unit-wise**

1. Static oligopoly models with homogenous and differentiated products. Strategic substitutes and strategic complements. Dynamic models: Stackelberg and free entry.

2. Spatial models of horizontal and vertical product differentiation.
3. Repeated game oligopoly: Stability and sustainability of cartels.
4. Entry and entry deterrence strategies.
5. Vertically related markets and vertical contracts between firms.

Economic Theory of the Firm:

- **Content: Unit-wise**

1. Boundaries and nature of the firm
2. Vertical and horizontal integration
3. Make or buy decisions and outsourcing of inputs
4. Managerial behaviour and incentives
5. Technology innovation and efficiency

Topics in Industrial Organisation

- **Content : Unit-wise**

1. Innovation and intellectual property rights:
   R&D race and innovation incentive, organisation of R&D, patent vs. trade secrecy, licensing and joint ventures.
2. Bundling and tying:
   Economics of bundling and tying, strategic reasons and efficiencies, market structures and outcomes
3. Competition with switching Costs, network effects and network standards:
   Consumer search, consumer inertia, competitive effects of switching cost, market with network goods, network effect, network effects and switching costs, markets for several network goods, oligopoly pricing and standardisation, strategies in standards wars.
4. Product quality, reputation and advertising:
   Vertical product differentiation, quality choice, demand effect, advertising and competition, advertising and price signals, advertising and quality, informative and persuasive advertising.
5. Markets with intermediated goods:
   Intermediaries as dealers, intermediaries as match-makers, intermediaries as two-sided platforms, intermediation and information, information overload, intermediation and reputation
6. Public policies in network goods:
   Regulation, auction and auction markets.

Economics of Innovation

- **Content : Unit-wise**

1. Incentives and management of innovation
   - Intellectual property rights
   - Sequential and complementary innovation
   - Network effect and standards
2. Patents and R&D:
   - Patents and litigation
   - Patent pool
   - R&D tournaments, race and R&D organisation
3. Diffusion of Innovation
4. Technology transfer and licensing
5. Innovation and public policy.

General

Ethics and Economics

- **Content: Unit-wise**

1. Introduction: The economic importance of morality; morality and economic outcomes; ethics and the market; economists and morality- an overview.
2. Morality and economic rationality:
   Preferences vs. rights; preferences vs. rights vs. needs; norms and economic behavior; adaptive preferences.
3. Morality and Welfare:
   The Pareto principle and its critics; outcomes vs. procedures. Liberty and rights.
4. The doctrine of equality: types of equality; critics of equality.
5. Theory of Justice.

Issues in Economic Systems and Institutions

- **Content: Unit-wise**

  1. Incentives and Motivation
  2. Communication
  3. Norms, Expectations and Coordination
  4. Information Aggregation
  5. Reputation
  6. History

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Economics of Discrimination

- **Content : Unit-wise**

1. Theories:
   Statistical discrimination, taste for discrimination, signalling models.
2. Overlap between economics of discrimination and related sub-disciplines:
   "Identity Economics", pioneered by George Akerlof and Rachel Kranton, "Feminist Economics" and "Stratification Economics".
3. Empirical methods of estimating discrimination in market settings: decomposition techniques
4. Experimental methods: both field-based as well as lab-based experiments to gauge discrimination outside the labour market.
5. Affirmative action

Political Economics:

- **Content: Unit-wise**

1. Democracy or dictatorship
2. Political rent, corruption, cronyism
3. Power of propertied classes in democracy
4. Divide and rule
5. Imperialism and colonialism
6. Role of media and experts
7. Collective action

Behavioural Economics

- **Content : Unit-wise**

1. Decision-making under risk and uncertainty.
2. Reference dependence and loss aversion.
3. Intertemporal decision-making.
4. Social preferences.
5. Behavioural game theory.
6. Behavioural welfare economics.

Economics of Organisations

- **Content : Unit-wise**

1. Boundaries of firms: transaction cost economies, property rights and incentives
2. Hierarchy, authority, leadership and efficiency
3. Agency and incentive problems in organisational design
4. Vertical and horizontal relations between firms
5. Outsourcing and in-house productions
6. Labour union and oligopolistic competition
7. Delegation and incentives
8. Formal and relational contracts between firms
9. Research and development and technology transfer
10. Corporate social responsibility
11. Economics of non- profit organisations
12. Lobbying and corruption
13. Regulation and public policy.

Health Economics

- **Content : Unit-wise**

1. Introduction to health economics: the economic way of thinking about health; health measurement, determinants and long run trends; health and socioeconomic status.
2. Economic models of health
3. Health Insurance: introduction and moral hazard; adverse selection in health insurance; social insurance in India and global examples.
4. The behavioural economics of health; unhealthy behaviour-evidence and policy issues.
5. Health and economic development
6. Health valuation: mortality risk valuation?static model, life cycle model, empirical models (hedonic wages, stated preference); valuing changes in morbidity-model of health production, revealed preference and stated preference approaches, quality adjusted life years.
7. Externalities and public health: air pollution, pandemics.

Labour Economics

- **Content : Unit-wise**

1. Labour Supply:
   Choice between Consumption and Leisure; Incorporating Household Production and Decisions.
2. Labour Demand and Equilibrium:
   Labour Demand Function, Competitive Equilibrium, Compensating Wage Differentials and Hedonic Theory of Wages
3. Investment in Education:
   Theory of Human Capital, Education as a Signalling Device, Returns to Education
4. Job Search
5. Discrimination
   Theories of Discrimination, Measuring Discrimination, Affirmative Action
6. Labour Market Institutions and Policies
   Collective Bargaining and Labour Unions, Minimum Wage and Employment, Unemployment Insurance, Job security regulations

7. Incentives, Agency and Efficiency Wages
8. Migration

Mathematical Economics

- **Content: Unit-wise**

1. Set theory and preliminaries
2. Topological Spaces:
   Metric spaces, topological spaces and continuous functions; various useful constructions, e.g., projective and inductive topologies
   Countability and separability properties
   Compactness, completeness, connectedness, etc.

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Topologies on function spaces; linear spaces, weak topologies; topologies on space of probability measures

Convex analysis; separation theorems

Set-valued mappings, fixed point theorems

3. Arrow-Debreu model: existence and optimality
4. Debreu-Scarf theorem
5. Duality theory
6. Nash's existence theorem

Macroeconomics of Development

- Content: Unit-wise

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1. Proximate Causes of Growth:

   (a) Human Capital: The Ben Porath model of human capital accumulation; The Nelson-Phelps model of skill-technology complementarity.

   (b) Technology: Distance to the frontier and technology diffusion; Directed technological change; Appropriate versus inappropriate technologies.

2. Deeper Causes of Growth:

   (a) Imperfect Markets: Credit Market Imperfection and Indivisibility of investment; Risk, diversification and financial institutions.

   (b) Political Economy: Inequality, Taxation and Growth; Democracy versus Oligarchy.

   (c) History versus Expectations: Underdevelopment as coordination failure; Multiple equilibria in technology adoption.

Public Economics

- **Content: Unit-wise**

1. The emergence of a social state:
   The evolution of social spending across the world since the early twentieth century.
2. Efficiency in the provision of public goods:
   The types and quantities of public goods that should be provided.
3. Externalities and their regulation:
   Sources of externalities, their relationship to contracts and markets and their regulation.
4. Preference Aggregation and Public debate:
   How do we determine provision when we do not know preferences? Voting and other forms of information aggregate in democracies.

16/C
108/C

Environmental Economics

- **Course Content: Unit-wise**

  1. Externalities and public goods
  2. Corrective mechanisms (taxes, subsidies, permits)
  3. Regulation with moral hazard and adverse selection
  4. Valuation of non-market goods and amenities: overview and basic theory.
  5. Revealed preference (indirect market methods); health valuation; constructed markets (direct market methods).

112/e 14/c

Topics of syllabus-Teaching Education and Methodology:-

1. Learning & Teaching
2. Language across the curriculum
3. Understanding discipline and subject
4. Gender school and Society
5. Pedagogy of a school subject
6. Knowledge and curriculum
7. Assessment for learning
8. Creating an inclusive school
9. Childhood and growing up
10. Drama and Art in Education