LESSON PLAN

Department of Economics, St. Paul's Cathedral Mission College, Kolkata

Program: B.A./ B.Sc. in Economics (CCF)
Program Specification: Major -- Minor -- MDC --IDC
Course: Economics (1st Sem -- 6th Sem)

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Prepared by,
Department of Economics
St. Paul's Cathedral Mission College, Kolkata

Contents

Program: B.A./ B.Sc. in Economics
- **Learning Objective**
  - **Link:**

- **Learning Resources**
  - **Link:** https://www.caluniv.ac.in/ccf-ug/files/Economics-CSR-61.pdf

- **End semester Evaluation Modalities (Theory & Tutorial)**
  - **Link:** https://www.caluniv.ac.in/ccf-ug/files/CSR-49-2023.pdf
  - **Page no.:** 20-23

Department of Economics

The Department of Economics at St. Paul's Cathedral Mission College (affiliated to University of Calcutta) teaches the syllabus designed by the University of Calcutta. The new syllabus (NEP), introduced by the University in 2023 (CCF), offers an introductory treatment of economic theory with some discussion of policy applications and economic institutions. The courses have been designed to develop and sharpen skills of analysis, logical reasoning, interpretation and understanding of various economic issues in our everyday lives.

Department of Economics, SPCMC has 4 full time substantive teachers. They are:

Name	Qualification	Designation	Teaching Experience
Dr. Sudeshna Mitra (SMI)	M.Sc., Ph.D.	Associate Professor	20+ years
Dr. Indrani Banerjee (IB)	M.A., M.Phil., Ph.D.	Associate Professor	30+ years
Dr. Jaya Mukherjee (JM)	M.A, Ph.D.	Associate Professor	20+ years
Dr. Shirsendu Mukherjee (SM)	M.Sc., M. Phil., Ph.D.	Associate Professor	20+ years

Program Specification: Economics (Major)

Sem1 (July - December)

Paper	Course	Name of the Paper	Credit	Teacher
DSCC1	ECOM	Microeconomics (I)	3+1	SMI + IB
SEC1	ECOM	Introductory Statistics & Application (I)	3+1	SM +JM

Sem2 (January - June)

Paper	Course	Name of the Paper	Credit	Teacher
DSCC2	ECOM	Macroeconomics (I)	3+1	SMI + IB
SEC2	ECOM	Introductory Statistics & Application (II)	1+3	SM +JM

Sem 3 (July - December)

Paper	Course	Name of the Paper	Credit	Teacher
DSCC3	ECOM	Microeconomics (II)	3+1	JM
DSCC4	ECOM	Development Economics (I)	3+1	SMI
SEC3	ECOM	Data Analysis and Research Methodology	2+2	SM

Sem 4 (January - June)

Paper	Course	Name of the Paper	Credit	Teacher
DSCC5	ECOM	Mathematical Economics (I)	3+1	SM
DSCC6	ECOM	Macroeconomics (II)	3+1	IB
DSCC7	ECOM	Statistics for Economics	3+1	JM
DSCC8	ECOM	Indian Economics (I)	3+1	SMI

Sem 5 (July - December)

Paper	Course	Name of the Paper	Credit	Teacher
DSCC9	ECOM	Microeconomics (III)	3+1	SMI
DSCC10	ECOM	Macroeconomics (III)	3+1	IB
DSCC11	ECOM	Mathematical Economics (II)	3+1	SM
DSCC12	ECOM	Econometrics (I)	3+1	JM

Sem 6 (January - June)

Paper	Course	Name of the Paper	Credit	Teacher
DSCC13	ECOM	International Economics (I)	3+1	SMI
DSCC14	ECOM	Environmental & Resource Economics (I)	3+1	SM
DSCC15	ECOM	Public Economics (I)	3+1	JM
Internship	ECOM	**Summer Internship**	3	IB

Internship Notifications:

1. UGC Notification (www.ugc.gov.in/pdfnews/0063650_ Draft-Guidelines-for-Internship-and-Research-Internship -for-Under-Graduate-Students.pdf)
2. CU Notification no. CSR/48/2023 (https://www.caluniv.ac.in/ccf-ug/files/CSR-48-2023.pdf)
3. CU Corrigendum (https://www.caluniv.ac.in/ccf-ug/files/corri-SI-CUS-111(Cir.)-24.pdf)
4. CU Explanation (https://www.caluniv.ac.in/ccf-ug/files/Notice-SIP-CUS-155-24.pdf)
5. CU Notification no. CSR/29/2024 (https://www.caluniv.ac.in/ccf-ug/files/SIS-UGCSR-29.pdf). Economics: Page no.7

Sem 7 (July - December)

Paper	Course	Name of the Paper	Credit	Teacher
DSCC16	ECOM	Financial Economics (I)	3+1	
DSCC17	ECOM	Development Economics (II)	3+1	
DSCC18	ECOM	Environmental & Resource Economics (II)	3+1	
DSCC19	ECOM	Advanced Microeconomic Theory	3+1	
DSCC20	ECOM	Public Economics (II)/ Indian Economics (II)/ **Dissertation**	3+1=4	

Sem 8 (January - June)

Paper	Course	Name of the Paper	Credit	Teacher
DSCC16	ECOM	Econometrics (II)	3+1	
DSCC17	ECOM	International Economics (II)	3+1	
DSCC18	ECOM	Advanced Macroeconomic Theory	3+1	
DSCC19	ECOM	Financial Economics (II)/ Managerial Economics/ **Dissertation**	3+1=4	
DSCC20	ECOM	Gender Economics/ Economic History of India (1857-1947)/ **Dissertation**	3+1=4	

Program Specification: Economics (Minor & MDC)

Sem1 (July - December)

Paper	Course	Name of the Paper	Credit	Teacher
MN1	MECO	Microeconomics (I)	3+1	SM
CC1/CC2	MECO-MDC1-CC	Microeconomics (I)	3+1	SMI
SEC1	MECO-SEC	Economic Data Analysis and Report Writing/ Entrepreneurship and Development	3+1	IB + JM

Sem2 (January - June)

Paper	Course	Name of the Paper	Credit	Teacher
MN2	MECO	Macroeconomics (I)	3+1	SM
CC1/CC2	MECO-MDC2-CC	Macroeconomics (I)	3+1	SMI
SEC2	MECO-SEC	Economic Data Analysis and Report Writing/ Entrepreneurship and Development	3+1	IB + JM

Sem 3 (July - December)

Paper	Course	Name of the Paper	Credit	Teacher
MN3	MECO	Microeconomics (I)	3+1	SM
CC1/CC2	MECO-MDC3-CC	Development Economics (I)	3+1	SMI
MDC_m 1	MECO-MDC1-Minor	Microeconomics (I)	3+1	IB + JM
SEC1	MECO-SEC	Economic Data Analysis and Report Writing/ Entrepreneurship and Development	3+1	IB + JM

Sem 4 (January - June)

Paper	Course	Name of the Paper	Credit	Teacher
MN4	MECO	Macroeconomics (I)	3+1	SM
CC1/CC2	MECO-MDC4-CC	Indian Economics (I)	3+1	SMI
CC1/CC2	MECO-MDC5-CC	Sustainable Development	3+1	JM
MDC_m 2	MECO-MDC2-Minor	Macroeconomics (I)	3+1	IB

Sem 5 (July - December)

Paper	Course	Name of the Paper	Credit	Teacher
MN5	MECO	Development Economics (I)	3+1	SMI
CC1/CC2	MECO-MDC6-CC	Economic History of India (1857-1947)	3+1	JM
CC1	MECO-MDC7-CC	Public Finance	3+1	SM
MDC_m 3	MECO-MDC3-Minor	Development Economics (I)	3+1	SMI
MDC_m 4	MECO-MDC4-Minor	Indian Economics (I)	3+1	IB

Sem 6 (January - June)

Paper	Course	Name of the Paper	Credit	Teacher
MN6	MECO	Indian Economics (I)	3+1	IB
CC2	MECO-MDC7-CC	Public Finance	3+1	SM
CC1/CC2	MECO-MDC8-CC	Rural Development	3+1	SMI
MDC_m 5	MECO-MDC5-Minor	Sustainable Development	3+1	SM
MDC_m 6	MECO-MDC6-Minor	Economic History of India (1857-1947)	3+1	JM

Program Specification: Economics (IDC)

Sem1 or, Sem2 or, Sem 3

Paper	Course	Name of the Paper	Credit	Teacher
IDC1/ IDC2/ IDC3	ECOD	Elementary Economics	3+1	SM+JM+IB+SMI

Microeconomics (I)

Unit 1: Exploring the subject matter of Economics (Approx. 5 Lecture Hours)

Lesson Procedure:

- **Lecture 1: Introduction to Economics:**

    o Engage students with real-world examples of scarcity and choice.

    o Define economics and discuss its scope.

    o Introduce the concepts of wants, scarcity, competing ends, and the fundamental economic problem.

    o Explain the basic economic questions (What to produce? How to produce? For whom to produce?).

    o Briefly introduce households and firms as key economic agents.

    o End with a discussion on the importance of demand and supply as foundational concepts.

- **Lecture 2: Thinking like an Economist:**

    o Focus on the "economic way of thinking."

    o Introduce basic concepts of utility (intuitive definition) and production (production function, average and marginal product definitions – no complex calculations yet).

    o Differentiate between microeconomics and macroeconomics with clear examples.

    o Explain the distinction between normative and positive economics using current events.

- **Lecture 3: Principles of Microeconomics (Individual Decision Making):**

    o Discuss the principles of trade-offs and opportunity cost with relatable examples.

    o Explain the concept of efficiency.

    o Introduce the idea of marginal changes and cost-benefit analysis through simple scenarios.

- **Lecture 4-5: Principles of Microeconomics (Economic Interactions) & Interdependence and Gains from Trade:**

    o Explain how trade can make everyone better off.

    o Introduce the concept of a market economy and the role of property rights.

    o Discuss the concepts of market failure, externality, and market power with introductory examples.

- Introduce the Production Possibilities Frontier (PPF) using diagrams to illustrate scarcity, trade-offs, and increasing costs.
- Explain absolute and comparative advantage with simple numerical examples (no complex calculations).
- Demonstrate how comparative advantage leads to gains from trade.

Classroom Teaching Method:

- **Interactive Lectures:** Incorporate questions, short discussions, and real-world examples throughout the lectures.
- **Case Studies:** Use simple case studies or news articles to illustrate economic concepts.
- **Group Discussions:** Facilitate short group discussions on trade-offs and opportunity costs in everyday life.
- **Visual Aids:** Utilize diagrams (like the PPF), charts, and simple graphs to explain concepts.
- **Problem-Solving (Qualitative):** Pose simple qualitative problems that require students to apply the basic principles.

Continuous Classroom Evaluation:

- **Class Participation:** Observe and encourage active participation in discussions.
- **Quick Quizzes:** Conduct short, ungraded quizzes at the beginning or end of lectures to check understanding of key concepts.
- **Concept Checks:** Ask direct questions during lectures to gauge immediate comprehension.
- **Short Written Responses:** Assign brief written responses to questions related to the principles discussed.
- **Analysis of Simple Scenarios:** Present short scenarios and ask students to apply the learned principles to analyze them.

Unit 2: Utility Theory (Approx. 20 Lecture Hours)

Lesson Procedure:

- **Lecture 1-3: Introduction to Utility: Cardinal vs. Ordinal Approach:**
  - Introduce the concept of utility as satisfaction derived from consumption.
  - Explain the difference between the cardinal and ordinal approaches to utility (emphasize the intuitive understanding, not mathematical derivations).
  - Focus on the idea that the ordinal approach is more about ranking preferences.

- **Lecture 4-6: Utility in Cardinal Approach:**

  o Explain Total Utility and Marginal Utility with simple examples (using tables and bar graphs).

  o Discuss the relationship between total utility and marginal utility (diminishing marginal utility).

  o Intuitively link the concept of diminishing marginal utility to the theory of demand (as you consume more of a good, the additional satisfaction you get tends to decrease, so you are willing to pay less for additional units).

- **Lecture 7-14: Ordinal Utility: Indifference Curves:**

  o Introduce the concept of preferences and the assumptions behind preference ordering (completeness, transitivity, more is better - explained intuitively).

  o Explain what an Indifference Curve (IC) represents (combinations of goods providing the same level of satisfaction).

  o Use diagrams to illustrate the properties of indifference curves:

    ▪ Higher ICs represent higher levels of satisfaction.

    ▪ ICs are downward sloping (trade-off between goods).

    ▪ ICs cannot intersect.

    ▪ Explain the concept of the Marginal Rate of Substitution (MRS) intuitively as the rate at which a consumer is willing to give up one good to get more of another, while staying on the same IC.

    ▪ Explain the convexity of ICs based on the idea of a diminishing MRS (as you have more of one good, you are willing to give up less of the other to get even more of the first).

- **Lecture 15-20: Ordinal Utility: Budget Constraint and Consumer's Equilibrium:**

  o Introduce the concept of the budget constraint as the limit on what a consumer can afford.

  o Explain how to represent the budget constraint graphically (budget line).

  o Explain consumer's equilibrium as the point where the budget line is tangent to the highest attainable indifference curve (emphasize the intuitive understanding that this is where the consumer gets the most satisfaction given their budget).

  o Briefly discuss the concepts of interior and corner solutions with simple diagrammatic examples.

Classroom Teaching Method:

- **Diagrammatic Explanations:** Heavily rely on diagrams to illustrate utility, indifference curves, and budget constraints.

- **Real-Life Examples:** Use everyday examples of consumer choices to explain the concepts.

- **Thought Experiments:** Pose thought experiments to help students understand preference ordering and trade-offs.

- **Interactive Drawing Exercises:** Have students draw and interpret simple indifference curves and budget lines.

- **Avoid Calculus:** Ensure all explanations and analyses are purely conceptual and graphical, without any mathematical derivations involving calculus.

Continuous Classroom Evaluation:

- **Interpretation of Diagrams:** Ask students to interpret indifference curves and budget lines.

- **Scenario Analysis:** Present scenarios involving consumer choices and ask students to explain them using utility theory concepts.

- **Drawing Exercises (Graded/Ungraded):** Assign simple drawing exercises of indifference curves and budget lines with specific properties.

- **Explanation of Key Terms:** Ask students to define and explain key terms like marginal utility, MRS, and consumer's equilibrium in their own words.

- **Problem-Solving (Graphical):** Present simple graphical problems where students need to identify the consumer's equilibrium.

Unit 3: Demand and Supply: How Markets Work (Approx. 8 Lecture Hours)

Lesson Procedure:

- **Lecture 1-2: Elementary Theory of Demand:**

    o Define demand and the law of demand.

    o Discuss the factors influencing individual household demand (price, income, tastes, expectations, prices of related goods).

    o Explain how individual demand curves are aggregated to form the market demand curve.

    o Illustrate the demand curve graphically (downward sloping).

    o Clearly differentiate between "movement along the demand curve" (due to a change in price) and "shift of the demand curve" (due to a change in other factors). Use real-world examples for each.

- **Lecture 3-4: Elementary Theory of Supply:**

    o Define supply and the law of supply.

- o Discuss the factors influencing supply (price, input prices, technology, expectations, number of sellers).

- o Illustrate the supply curve graphically (upward sloping).

- o Clearly differentiate between "movement along the supply curve" (due to a change in price) and "shift of the supply curve" (due to a change in other factors). Use real-world examples for each.

- **Lecture 5-8: The Elementary Theory of Market Price:**

  - o Explain how demand and supply interact in a competitive market.

  - o Define equilibrium price and equilibrium quantity as the point where the demand and supply curves intersect.

  - o Illustrate the determination of equilibrium price and quantity graphically.

  - o Explain the concepts of surplus (excess supply) and shortage (excess demand) and how market forces push the price towards equilibrium.

Classroom Teaching Method:

- **Graphical Analysis:** Emphasize the use of demand and supply curves to explain market dynamics.

- **Real-World Examples:** Use current events and everyday markets to illustrate the concepts of demand, supply, and equilibrium.

- **Scenario Analysis:** Present scenarios involving changes in factors affecting demand and supply and ask students to predict the impact on equilibrium price and quantity (graphically).

- **Market Simulation (Simple):** Conduct a simple classroom simulation of a market to demonstrate price determination.

- **Think-Pair-Share Activities:** Pose questions about factors affecting demand and supply and have students discuss them in pairs before sharing with the class.

Continuous Classroom Evaluation:

- **Drawing and Labelling Curves:** Ask students to draw and correctly label demand and supply curves and identify the equilibrium.

- **Explaining Shifts vs. Movements:** Assess their understanding of the difference between shifts and movements along the curves.

- **Predicting Market Outcomes:** Present scenarios (e.g., increase in income, technological improvement) and ask students to predict the impact on equilibrium price and quantity.

- **Problem-Solving (Graphical):** Provide simple graphical exercises where students need to find the new equilibrium after a shift in demand or supply.

- **Understanding Market Disequilibrium:** Ask students to explain what happens in the case of surplus or shortage.

Unit 4: Market and Adjustments (Approx. 4 Lecture Hours)

Lesson Procedure:

- **Lecture 1: The Evolution of Market Economies and the Price System:**

  - Discuss the evolution from traditional economies to market economies.

  - Explain the role of the price system as a mechanism for allocating resources and conveying information (the "invisible hand").

  - Discuss the advantages of a market economy (efficiency, innovation).

- **Lecture 2: The Decision-takers and Concepts of Markets:**

  - Revisit the roles of households, firms, and briefly introduce the concept of central authorities (in the context of mixed economies).

  - Explain the concept of an individual market and the separation and interlinking of different markets (e.g., the market for coffee and the market for sugar).

- **Lecture 3: Differences Among Markets:**

  - Discuss the degree of competitiveness in different markets (perfect competition as a benchmark, moving towards less competitive structures intuitively).

  - Differentiate between goods markets and factor markets (labor, capital).

  - Explain the difference between free markets and controlled markets (price ceilings, price floors with examples).

  - Introduce the concepts of market and non-market sectors, public and private sectors.

- **Lecture 4: Different Goods:**

  - Define and provide examples of private goods (rivalrous and excludable).

  - Define and provide examples of public goods (non-rivalrous and non-excludable) and the free-rider problem.

  - Define and provide examples of common resources (rivalrous and non-excludable) and the tragedy of the commons.

  - Define and provide examples of natural monopolies (non-rivalrous and excludable with high fixed costs).

  - Briefly discuss the implications of these different types of goods for market provision and potential government intervention.

Classroom Teaching Method:

- **Comparative Analysis:** Compare and contrast different types of economies and markets.

- **Real-World Examples:** Use current events and policy debates to illustrate market interventions and the provision of different types of goods.

- **Case Studies (Simple):** Analyze simple case studies of market failures or government interventions.

- **Debates/Discussions:** Facilitate discussions on the pros and cons of free markets versus controlled markets, or the role of government in providing public goods.

- **Venn Diagrams/Classification Exercises:** Use visual aids to help students classify different types of markets and goods.

Continuous Classroom Evaluation:

- **Defining Key Terms:** Ask students to define and differentiate between different types of markets and goods.

- **Identifying Market Structures:** Present scenarios and ask students to identify the likely market structure.

- **Analyzing Government Interventions:** Discuss the potential impacts of price controls or taxes on markets.

- **Classifying Goods:** Provide examples of goods and ask students to classify them as private, public, common resources, or natural monopolies.

- **Understanding Market Failure:** Ask students to explain the concept of market failure and provide examples.

Unit 5: Market Sensitivity and Elasticity (Approx. 8 Lecture Hours)

Lesson Procedure:

- **Lecture 1-2: Importance of Elasticity and Method of Calculation:**

    o Introduce the concept of elasticity as a measure of responsiveness to change.

    o Explain the importance of elasticity in decision-making for consumers and producers.

    o Define Arc Elasticity and Point Elasticity conceptually (emphasize the idea of measuring responsiveness over a range vs. at a specific point). Focus on the definition and intuitive understanding, avoid complex formulas and calculations if the focus is on conceptual understanding.

- **Lecture 3-4: Demand Elasticities:**

- o Define Price Elasticity of Demand and explain its different types (elastic, inelastic, unit elastic, perfectly elastic, perfectly inelastic) with graphical illustrations.

  - o Discuss the factors affecting the price elasticity of demand (availability of substitutes, necessity vs. luxury, proportion of income spent, time horizon).

- **Lecture 5-6: Demand Elasticity and Revenue & Supply Elasticities:**

  - o Explain the relationship between price elasticity of demand and total revenue (how changes in price affect total revenue depending on the elasticity). Use simple numerical examples.

  - o Define Price Elasticity of Supply and explain its different types.

  - o Discuss the factors affecting the price elasticity of supply (availability of inputs, production capacity, time horizon).

- **Lecture 7-8: Income and Cross Price Elasticity & Applications:**

  - o Define Income Elasticity of Demand and explain its significance in classifying goods (normal, inferior, luxury).

  - o Define Cross Price Elasticity of Demand and explain its significance in identifying related goods (substitutes, complements).

  - o Discuss the applications of elasticity using case studies, such as the OPEC and oil price example (focus on the qualitative analysis of how elasticity influences the impact of supply changes on price and revenue).

Classroom Teaching Method:

- **Numerical Examples (Simple):** Use simple numerical examples to illustrate the concept of elasticity and its impact on revenue.

- **Graphical Illustrations:** Use graphs to visually represent different types of elasticity.

- **Real-World Case Studies:** Analyze real-world examples and case studies (like OPEC) to understand the applications of elasticity.

- **Interactive Questioning:** Pose questions that require students to apply the concept of elasticity to different scenarios.

- **Group Activities:** Have students work in groups to analyze the elasticity of demand for different products.

Continuous Classroom Evaluation:

- **Defining Elasticity:** Ask students to define different types of elasticity and explain what they measure.

- **Interpreting Elasticity Values:** Provide elasticity values and ask students to interpret their meaning.

- **Relating Elasticity to Revenue:** Present scenarios involving price changes and ask students to predict the impact on total revenue based on the elasticity of demand.

- **Identifying Factors Affecting Elasticity:** Ask students to identify the factors that would make the demand or supply for a particular good more or less elastic.

- **Analyzing Case Studies:** Ask students to analyze the provided case study (OPEC) using the concept of elasticity.

By following these unit-wise suggestions for lesson procedure, classroom teaching methods, and continuous classroom evaluation, you can effectively deliver your Microeconomics (I) course while keeping in mind the time frame and the specific requirements of your syllabus, particularly the focus on intuitive explanations and diagrams over calculus in Unit 2. Remember to adapt these suggestions based on your students' specific needs and the overall context of your course.

Introductory Statistics and Applications (I)

Unit 1: Introduction and Overview (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Subject Matter and Basic Steps:

  - Introduce Statistics as a discipline, its importance, and applications in various fields.

  - Discuss the subject matter of statistics: data, variation, uncertainty, and drawing inferences.

  - Outline the basic steps in statistical methods: Collection, Presentation, and Analysis.

  - Emphasize the cyclical nature of the statistical process.

- **Lectures 3-4:** Collection of Data:

  - Explain the difference between primary and secondary data sources, highlighting their advantages and disadvantages.

  - Discuss various methods of collecting primary data (e.g., surveys, experiments, observation) with examples of each.

  - Explain different types of secondary data sources (e.g., government publications, research articles, online databases).

  - Compare and contrast complete enumeration surveys and sample surveys, discussing their feasibility and limitations.

  - Introduce the concepts of Population and Sample, and the need for representative samples.

- **Lectures 5-7:** Basic Concepts and Presentation of Data:

  o Define Variable and Attribute (categorical variable) with clear examples.

  o Distinguish between Discrete, Continuous, and Categorical Variables.

  o Explain the different methods of presenting data: Textual, Tabular (constructing frequency tables), and Diagrammatic (bar charts, pie charts – emphasizing appropriate use).

- **Lectures 8-10:** Frequency Distribution and Basic Analysis Concepts:

  o Explain the concept of a Frequency Distribution and how to construct one for discrete and continuous data (including class intervals, frequency, relative frequency, cumulative frequency).

  o Demonstrate the construction of Ogives (less than and more than), Column diagrams (histograms for continuous data, bar charts for discrete/categorical), Frequency Polygons, and Frequency Curves. Emphasize the interpretation of these graphical representations.

  o Introduce the basic concepts of Univariate Analysis (describing a single variable) and Bivariate Analysis (exploring the relationship between two variables) without going into calculations.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage student participation through questions, discussions, and real-life examples.

- **Case Studies:** Use simple case studies to illustrate the application of statistical methods in different contexts.

- **Data Collection Activities:** Involve students in small-scale data collection exercises (e.g., surveying classmates on a simple attribute).

- **Visual Aids:** Utilize diagrams, charts, and graphs extensively to explain concepts and illustrate data presentation methods.

- **Software Introduction (Optional):** If resources permit, briefly introduce basic statistical software for data entry and visualization (emphasize the "why" before the "how").

- **Group Discussions:** Facilitate discussions on the advantages and disadvantages of different data collection methods or the suitability of different types of graphs for specific data.

Continuous Classroom Evaluation:

- **Class Participation:** Assess the level and quality of student engagement in discussions.

- **Short Quizzes:** Conduct brief quizzes on basic definitions and concepts (e.g., types of variables, data sources).

- **Data Presentation Exercises:** Assign short exercises where students are given a small dataset and asked to present it using appropriate tables and graphs.

- **Concept Mapping:** Ask students to create concept maps to show the relationships between different topics covered.

- **Identification Tasks:** Present examples and ask students to identify the type of variable, data source, or appropriate presentation method.

Unit 2: Descriptive Statistics (35 Lecture Hours)

2.1 Central Tendency (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Measures for Ungrouped Data:

  - Define Central Tendency and its importance in summarizing data.

  - Introduce and explain the calculation of Arithmetic Mean (simple and composite), Geometric Mean, and Harmonic Mean for ungrouped data. Emphasize their properties, advantages, disadvantages, and appropriate uses.

  - Explain the concepts of Median and Mode for ungrouped data and how to determine them. Discuss situations where median or mode might be preferred over the mean.

- **Lectures 4-6:** Measures for Grouped Data:

  - Explain how to calculate the Arithmetic Mean, Median (using the formula for grouped data), and Mode (modal class) for grouped frequency distributions. Provide step-by-step examples.

  - Discuss the assumptions made when calculating these measures for grouped data.

- **Lectures 7-8:** Composite Measures and Comparison:

  - Explain how to calculate composite measures of central tendency when combining different datasets.

  - Compare and contrast the different measures of central tendency (mean, median, mode, geometric mean, harmonic mean) based on their properties, sensitivity to outliers, and suitability for different types of data.

- **Lectures 9-10:** Quartiles, Deciles, and Percentiles:

  - Introduce the concepts of Quartiles, Deciles, and Percentiles as positional measures.

  - Explain how to calculate these measures for both ungrouped and grouped data.

o Discuss their use in understanding the distribution of data and identifying specific data points.

Classroom Teaching Method:

- **Problem-Solving Sessions:** Dedicate significant time to working through numerical examples of calculating different measures of central tendency for both ungrouped and grouped data.

- **Step-by-Step Explanations:** Clearly explain the formulas and procedures involved in calculations.

- **Comparative Exercises:** Provide datasets where students need to calculate multiple measures of central tendency and compare the results.

- **Real-World Applications:** Use examples from various fields to illustrate the practical application of these measures (e.g., average income, typical test score).

- **Group Work:** Assign small group problems where students can collaborate on calculations and interpretations.

Continuous Classroom Evaluation:

- **Calculation Exercises:** Regularly assign problems requiring students to calculate different measures of central tendency.

- **Conceptual Questions:** Ask questions that test students' understanding of the properties and appropriate uses of each measure.

- **Interpretation of Results:** Provide calculated values and ask students to interpret them in the context of the given data.

- **Identifying Appropriate Measures:** Present scenarios and ask students to identify the most appropriate measure of central tendency to use.

2.2 Dispersion (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Absolute Measures for Ungrouped Data:

  o Define Dispersion and its importance in understanding the spread or variability of data.

  o Introduce and explain the calculation of Range, Quartile Deviation, Mean Deviation (from mean and median), and Standard Deviation (including the formula and its interpretation) for ungrouped data.

  o Explain the concept of Composite Standard Deviation when combining datasets.

- **Lectures 4-6:** Absolute Measures for Grouped Data:

- Explain how to calculate Range (using class boundaries), Quartile Deviation, Mean Deviation, and Standard Deviation for grouped frequency distributions. Provide step-by-step examples.

- **Lectures 7-8:** Relative Measures:

  - Introduce the concept of Relative Measures of Dispersion for comparing the variability of different datasets.

  - Explain and calculate the Coefficient of Variation, Coefficient of Mean Deviation, and Coefficient of Quartile Deviation. Discuss their interpretation.

- **Lectures 9-10:** Distribution of Income and Wealth:

  - Introduce the concept of income and wealth inequality.

  - Explain how to construct a Lorenz Curve and interpret its shape in relation to income/wealth distribution.

  - Define the Gini Coefficient and explain how it is derived from the Lorenz Curve and its interpretation as a measure of inequality.

  - Introduce Theil's Index as another measure of inequality (conceptual understanding, calculation complexity can be adjusted based on the level).

Classroom Teaching Method:

- **Problem-Solving Sessions:** Focus on numerical calculations of different measures of dispersion for both ungrouped and grouped data.

- **Visual Representation:** Use diagrams to illustrate the concept of dispersion (e.g., comparing datasets with the same mean but different spreads).

- **Comparative Analysis:** Provide datasets and ask students to calculate and compare different measures of dispersion.

- **Graphical Construction:** Guide students in constructing Lorenz Curves from given income/wealth distribution data.

- **Discussion on Inequality:** Facilitate discussions on the causes and consequences of income and wealth inequality and the role of statistical measures in understanding it.

Continuous Classroom Evaluation:

- **Calculation Exercises:** Regularly assign problems on calculating different measures of dispersion.

- **Conceptual Questions:** Test understanding of the meaning and interpretation of different dispersion measures.

- **Interpretation of Lorenz Curve and Gini Coefficient:** Provide Lorenz curves or Gini coefficients and ask students to interpret the level of inequality.

- **Choosing Appropriate Measures:** Present scenarios and ask students to select the most appropriate measure of dispersion for the given situation.

2.3 Skewness and Kurtosis (5 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Moments:

    o Introduce the concept of Moments (central and non-central).

    o Explain how to compute the first four central and non-central moments for ungrouped data.

    o Explain the relationship and formulas for conversion between central and non-central moments.

- **Lectures 3-4:** Measures of Skewness:

    o Define Skewness and explain its significance in understanding the asymmetry of a distribution (positive, negative, symmetric).

    o Introduce and explain Bowley's measure of skewness (based on quartiles) and its interpretation.

    o Explain the coefficient of quartile deviation as another measure related to skewness.

    o Introduce the measure of skewness based on the third central moment (emphasize the sign and its relation to the direction of skewness).

- **Lecture 5:** Measure of Kurtosis:

    o Define Kurtosis and explain its significance in understanding the peakedness or flatness of a distribution (leptokurtic, platykurtic, mesokurtic).

    o Introduce the measure of kurtosis based on the fourth central moment and its interpretation (beta-2 coefficient).

Classroom Teaching Method:

- **Formula Explanation:** Clearly explain the formulas for calculating moments and measures of skewness and kurtosis.

- **Computational Examples:** Work through examples of calculating these measures for simple datasets.

- **Visual Interpretation:** Use diagrams of different distributions to illustrate the concepts of skewness and kurtosis.

- **Comparison of Measures:** Discuss the advantages and disadvantages of different measures of skewness.

Continuous Classroom Evaluation:

- **Calculation Problems:** Assign problems on calculating moments and measures of skewness and kurtosis.

- **Interpretation of Skewness and Kurtosis:** Provide calculated values and ask students to interpret the shape of the distribution.

- **Conceptual Understanding:** Ask questions about the meaning of skewness and kurtosis.

2.4 Bivariate Analysis (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Bivariate Data and Scatter Diagram:

  - Introduce the concept of Bivariate Data (data involving two variables).

  - Explain how to create and interpret a Scatter Diagram to visualize the relationship between two variables (positive, negative, no correlation, linear, non-linear).

- **Lectures 3-6:** Simple Correlation Coefficient:

  - Define Simple Correlation Coefficient (Pearson's r) as a measure of the strength and direction of the linear relationship between two variables.

  - Explain the formula for calculating the correlation coefficient for ungrouped data (emphasize the conceptual understanding of covariance and standard deviations).

  - Discuss the properties of the correlation coefficient (range -1 to +1, interpretation of different values).

  - Highlight the limitations of the correlation coefficient (only measures linear relationships, sensitive to outliers, does not imply causation).

- **Lectures 7-10:** Simple Linear Regression:

  - Introduce the concept of Simple Linear Regression as a method for modeling the linear relationship between two variables.

  - Explain the simple linear regression equation (y = a + bx) and the meaning of the intercept (a) and slope (b).

  - Introduce the Least Squares Technique as a method for estimating the values of 'a' and 'b' that best fit the data (conceptual understanding of minimizing the sum of squared errors).

  - Discuss the properties of the regression line (passes through the mean of x and y).

Classroom Teaching Method:

- **Scatter Plot Construction:** Guide students in creating and interpreting scatter plots.

- **Calculation Exercises:** Work through examples of calculating the simple correlation coefficient and estimating the regression line using the least squares method.

- **Interpretation of Correlation and Regression Coefficients:** Emphasize the interpretation of the correlation coefficient (strength and direction) and the slope of the regression line (change in y for a unit change in x).

- **Real-World Examples:** Use examples to illustrate situations where correlation and regression analysis can be applied.

- **Software Demonstration (Optional):** If available, demonstrate how statistical software can be used to generate scatter plots, calculate correlation coefficients, and estimate regression lines.

Continuous Classroom Evaluation:

- **Scatter Plot Interpretation:** Provide scatter plots and ask students to describe the relationship between the variables.

- **Correlation Coefficient Calculation:** Assign problems on calculating the correlation coefficient.

- **Interpretation of Correlation Coefficient:** Provide correlation coefficient values and ask students to interpret the strength and direction of the relationship.

- **Regression Equation Interpretation:** Provide a regression equation and ask students to interpret the slope and intercept.

- **Identifying Appropriate Techniques:** Present scenarios and ask students whether correlation or regression analysis would be more appropriate.

2.5 Index Numbers (Covered within Central Tendency Time - Adjust if needed)

Lesson Procedure:

- **Lectures (Integrated within Central Tendency):**

  o Introduce the concept and uses of Index Numbers (measuring changes over time).

  o Focus on Price Index Numbers and the problems of their construction (definition of base period, selection of commodities, price quotations, weighting).

  o Explain the methods of construction: Aggregative (Simple and Weighted) and Averaging Price-Relatives (Simple and Weighted).

  o Explain and calculate Laspeyre's, Paasche's, and Fisher's Index Numbers.

  o Introduce Quantity Index Numbers conceptually.

  o Discuss the Tests of Index Numbers (Time Reversal Test, Factor Reversal Test).

- o Explain the difference between Fixed Base and Chain Base Index Numbers.

- o Discuss Wholesale Price Index (WPI) and Cost of Living Index (CPI) and their uses.

Classroom Teaching Method:

- **Formula Explanation:** Clearly explain the formulas for different index numbers.

- **Numerical Examples:** Work through examples of calculating various price index numbers.

- **Comparison of Methods:** Discuss the differences between Laspeyre's and Paasche's index numbers and the rationale for Fisher's Ideal Index.

- **Real-World Applications:** Discuss the use of WPI and CPI in economic policy and decision-making.

Continuous Classroom Evaluation:

- **Calculation of Index Numbers:** Assign problems on calculating different types of price index numbers.

- **Understanding the Concepts:** Ask questions about the base period, weights, and interpretation of index numbers.

- **Distinguishing between Different Indices:** Ask students to differentiate between Laspeyre's, Paasche's, WPI, and CPI.

By following this unit-wise breakdown, you can effectively structure your lectures, employ relevant teaching methods, and implement continuous classroom evaluation to ensure student understanding of the fundamental concepts in Introductory Statistics and Applications (I). Remember to adapt the time allocation and specific activities based on your students' learning pace and available resources.

Economic Data Analysis and Report Writing (EDARW)

Unit 1: Tabular and Graphical Representation of Statistical Data (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Tabular Representation of Data for Analysis:

- o Introduce the importance of organizing data in tables for effective analysis and communication.

- o Discuss the key components of a good statistical table (title, stub, caption, body, footnotes, source).

- o Explain different types of tables based on purpose and complexity (simple frequency tables, cross-tabulations, contingency tables).

- o Provide guidelines for constructing clear and informative tables for economic data.

- o Emphasize how different types of economic data (e.g., time series, cross-sectional) might be presented in tables.

- **Lectures 4-7:** Graphical Representation of Data:

  - o Introduce the principles of effective graphical representation.

  - o Explain the construction and appropriate use of:

    - ▪ **Line Diagrams:** For time series data, showing trends and patterns.

    - ▪ **Bar Charts (Simple, Multiple, Component):** For comparing categorical data or different series at specific points.

    - ▪ **Divided Bar Charts (Stacked Bar Charts):** For showing components of a whole across categories.

    - ▪ **Pie Charts:** For showing proportions of a whole (emphasize limitations with many categories).

  - o Provide examples of how these graphs are used to visualize economic data (e.g., GDP growth, unemployment rates, market shares).

- **Lectures 8-10:** Frequency Distribution Table and Pictorial Descriptions:

  - o Review the construction and uses of Frequency Distribution Tables (for both discrete and continuous data).

  - o Discuss the implications of different frequency distributions (e.g., symmetry, skewness – introduce these concepts intuitively).

  - o Explain the construction and interpretation of:

    - ▪ **Frequency Polygon:** Connecting midpoints of histogram bars to show the shape of the distribution.

    - ▪ **Histogram:** Using bars to represent the frequency of data within class intervals (emphasize its use for continuous data).

    - ▪ **Ogive (Cumulative Frequency Curve):** Showing the cumulative frequency and its use in finding percentiles (introduce intuitively).

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to ask questions and discuss real-world examples of tables and graphs in economic reports and publications.

- **Hands-on Exercises:** Provide datasets and guide students in creating different types of tables and graphs using spreadsheet software (e.g., MS Excel, Google Sheets) or by hand.

- **Critical Evaluation:** Present examples of poorly designed tables and graphs and ask students to identify the flaws and suggest improvements.

- **Case Studies:** Analyze tables and graphs from actual economic reports and discuss the insights they provide.

- **Group Activities:** Assign small group tasks where students choose appropriate graphical methods to represent a given economic dataset.

Continuous Classroom Evaluation:

- **Table and Graph Construction Assignments:** Assign practical exercises where students need to create specific types of tables and graphs from provided data.

- **Interpretation Questions:** Ask students to interpret the information presented in given tables and graphs.

- **Identification of Appropriate Methods:** Present scenarios and ask students to choose the most suitable tabular or graphical method for data representation.

- **Peer Review:** Have students critique each other's tables and graphs based on clarity and accuracy.

Unit 2: Basic Descriptive Statistics and its Role in Data Analysis (25 Lecture Hours)

2.1 Measures of Central Tendency (8 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Arithmetic Mean:
  - Introduce the concept of central tendency and its importance in summarizing data.
  - Explain the concept and calculation of the arithmetic mean for ungrouped and grouped data.
  - Discuss the uses of the arithmetic mean in analyzing economic data (e.g., average income, average price).
  - Highlight the sensitivity of the mean to outliers with examples.

- **Lectures 3-4:** Geometric Mean and Harmonic Mean:
  - Explain the concept and calculation of the geometric mean.
  - Discuss its specific uses in analyzing economic data, particularly for averages of ratios, growth rates, and index numbers.
  - Explain the concept and calculation of the harmonic mean.
  - Discuss its specific uses in analyzing economic data involving rates and ratios (e.g., average speed, average price per unit over different quantities).

- **Lectures 5-6:** Median and Mode:

- o Explain the concept of the median as the middle value and how to find it for ungrouped and grouped data.

- o Discuss the uses of the median in analyzing economic data, particularly when dealing with skewed distributions or outliers (e.g., median income).

- o Explain the concept of the mode as the most frequent value and how to find it for ungrouped and grouped data.

- o Discuss the uses of the mode in analyzing economic data (e.g., most common price).

- **Lectures 7-8:** Comparison of Mean, Median, and Mode:

- o Compare and contrast the mean, median, and mode as measures of central tendency.

- o Discuss their relative advantages and disadvantages in different contexts and for different types of economic data.

- o Explain how the relationship between the mean, median, and mode can provide insights into the skewness of a distribution.

Classroom Teaching Method:

- **Problem-Solving Sessions:** Focus on numerical calculations of the mean, geometric mean, harmonic mean, median, and mode for various economic datasets.

- **Real-World Examples:** Use examples of economic data to illustrate when each measure of central tendency is most appropriate.

- **Comparative Analysis:** Provide datasets where students calculate all three measures and discuss the differences and their implications.

- **Data Interpretation:** Ask students to interpret the calculated measures of central tendency in the context of the economic data.

Continuous Classroom Evaluation:

- **Calculation Exercises:** Assign regular problems requiring students to calculate different measures of central tendency.

- **Conceptual Questions:** Ask questions about the properties and appropriate uses of each measure.

- **Data Analysis Tasks:** Provide economic datasets and ask students to calculate and interpret the most relevant measure(s) of central tendency.

2.2 Measures of Dispersion (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Range and Mean Deviation:

- o Introduce the concept of dispersion and its importance in understanding the variability of economic data.

- o Explain the calculation and interpretation of the range. Discuss its limitations.

- o Explain the calculation and interpretation of the mean deviation (from mean and median). Discuss its advantages and disadvantages.

- **Lectures 3-5:** Standard Deviation:

  - o Explain the concept and calculation of standard deviation for ungrouped and grouped data.

  - o Emphasize its importance as a widely used measure of dispersion.

  - o Discuss the properties of standard deviation and its implications (e.g., relation to the spread of data around the mean).

- **Lectures 6-7:** Quartile Deviation:

  - o Explain the concept and calculation of quartile deviation.

  - o Discuss its use as a measure of dispersion that is less affected by extreme values.

- **Lecture 8:** Comparison of Measures of Dispersion:

  - o Compare and contrast the range, mean deviation, standard deviation, and quartile deviation based on their properties and sensitivity to outliers.

  - o Discuss when each measure might be most appropriate for analyzing economic data.

- **Lecture 9:** Coefficient of Variation:

  - o Explain the significance of the concept of the coefficient of variation as a relative measure of dispersion.

  - o Demonstrate its calculation and use in comparing the variability of datasets with different units or scales.

- **Lecture 10:** Measuring Income Inequality:

  - o Explain how range, standard deviation, and coefficient of variation can be used as basic indicators of income inequality.

  - o Introduce the basic concept of the Gini coefficient and the Lorenz curve as more comprehensive measures of income inequality (focus on the visual interpretation of the Lorenz curve and the conceptual understanding of the Gini coefficient).

Classroom Teaching Method:

- **Problem-Solving Sessions:** Focus on numerical calculations of different measures of dispersion.

- **Comparative Exercises:** Provide datasets and ask students to calculate and compare different measures of dispersion.

- **Real-World Applications:** Use examples of economic data (e.g., income distributions, price volatility) to illustrate the application of dispersion measures.

- **Graphical Interpretation:** Relate measures of dispersion to the spread of data as seen in histograms and other graphs.

- **Lorenz Curve Construction (Basic):** Guide students in the basic construction and interpretation of Lorenz curves from income distribution data.

Continuous Classroom Evaluation:

- **Calculation Exercises:** Assign regular problems on calculating different measures of dispersion and the coefficient of variation.

- **Conceptual Questions:** Test understanding of the meaning and interpretation of different dispersion measures.

- **Data Analysis Tasks:** Provide economic datasets and ask students to calculate and interpret the most relevant measure(s) of dispersion.

- **Interpretation of Inequality Measures:** Ask students to interpret the implications of different values of range, standard deviation, coefficient of variation, and the Gini coefficient for income inequality.

2.3 Introductory Ideas of Correlation and Regression Analysis (7 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Correlation Analysis:

  - Introduce the concept of correlation as a measure of the linear relationship between two economic variables.

  - Explain the use of scatter plots to visually assess the relationship.

  - Explain the concept and basic interpretation of the correlation coefficient (positive, negative, zero, strong, weak).

  - Discuss the limitations of correlation (correlation does not imply causation, sensitive to outliers).

  - Provide examples of economic variables that might be correlated (e.g., advertising expenditure and sales, interest rates and investment).

- **Lectures 4-7:** Simple Linear Regression Analysis:

  - Introduce the basic idea of regression analysis for modeling the relationship between two economic variables (one dependent, one independent).

- Explain the simple linear regression equation ($Y = a + bX$) and the interpretation of the intercept (a) and the slope (b) in an economic context.

- Explain the basic idea of the least squares method (intuitively – finding the "best fit" line).

- Discuss how the regression line can be used for prediction (with caveats).

- Provide examples of how regression analysis is used in economics (e.g., predicting demand based on price, analyzing the impact of government spending on GDP).

Classroom Teaching Method:

- **Scatter Plot Creation and Interpretation:** Guide students in creating and interpreting scatter plots to understand the relationship between economic variables.

- **Conceptual Explanation:** Focus on the conceptual understanding of correlation and regression without heavy mathematical derivations.

- **Real-World Examples:** Use numerous examples from economics to illustrate the application of correlation and regression analysis.

- **Interpretation of Output (Conceptual):** If using software for demonstration, focus on interpreting the correlation coefficient and regression coefficients in the context of the economic problem.

Continuous Classroom Evaluation:

- **Interpretation of Scatter Plots:** Provide scatter plots and ask students to describe the nature of the relationship between the variables.

- **Conceptual Questions:** Ask questions about the meaning of correlation and regression coefficients.

- **Identifying Relationships:** Present scenarios involving economic variables and ask students whether correlation or regression analysis might be useful.

- **Interpretation of Results (Conceptual):** Provide simple correlation coefficients or regression equations and ask students to interpret their meaning in the economic context.

Unit 3: Elements of Report Writing (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Locating Basic Issues and Developing Writing Skills:

  - Discuss the importance of identifying a clear research question or theme for an economic report.

  - Guide students on how to conduct a basic theme-based literature survey to understand existing knowledge and identify gaps.

- o Emphasize the importance of clearly stating the motivation behind the study and formulating specific and measurable objectives.

- o Provide practical tips for developing effective writing skills for economic reports (clarity, conciseness, logical flow, avoiding jargon).

- **Lectures 4-7:** Methodological Issues:

  - o Discuss the crucial role of methodology in a report.

  - o Emphasize the importance of clearly explaining the data sources (primary/secondary), data collection methods (if applicable), and the period of study.

  - o Focus on the effective use of tables and graphs to present data and findings clearly and concisely (reinforce concepts from Unit 1).

  - o Guide students on how to select and use appropriate measures of central tendency and dispersion to analyze and summarize the results in the report (reinforce concepts from Unit 2).

  - o Provide examples of how to integrate statistical analysis into the narrative of the report.

- **Lectures 8-9:** Insertion of Footnotes/Endnotes and Preparation of Bibliography:

  - o Explain the purpose and different styles of using footnotes or endnotes for citing sources, providing additional information, or clarifying points.

  - o Guide students on the correct format for inserting footnotes or endnotes in a report.

  - o Explain the importance of a comprehensive bibliography for acknowledging sources and allowing readers to explore further.

  - o Provide guidelines and examples for preparing a bibliography using different citation styles (e.g., APA, MLA).

- **Lecture 10:** Review and Structure of a Complete Economic Report:

  - o Discuss the typical structure of an economic report (Title page, Abstract/Executive Summary, Introduction, Literature Review, Methodology, Results and Discussion, Conclusion, Recommendations (if applicable), Appendices, Bibliography).

  - o Provide examples of well-structured economic reports.

  - o Offer guidance on reviewing and revising a report for clarity, accuracy, and completeness.

Classroom Teaching Method:

- **Interactive Discussions:** Encourage students to discuss their potential research topics and the challenges of report writing.

- **Examples and Case Studies:** Analyze excerpts from existing economic reports to illustrate good writing practices, methodological approaches, and citation styles.

- **Practical Exercises:** Assign short writing exercises focusing on specific elements of report writing (e.g., writing an introduction, describing methodology, summarizing findings using tables).

- **Literature Survey Guidance:** Provide guidance and resources for conducting basic literature surveys.

- **Citation Style Practice:** Provide exercises on formatting footnotes/endnotes and bibliography entries according to a specific style.

- **Peer Review:** Have students review drafts of each other's report sections to provide constructive feedback.

Continuous Classroom Evaluation:

- **Outline of a Report:** Ask students to submit a preliminary outline of a potential economic report.

- **Literature Review Snippet:** Assign a short task of writing a brief literature review on a chosen topic.

- **Methodology Section Draft:** Ask students to draft the methodology section for their potential report.

- **Use of Tables and Graphs in Analysis:** Evaluate how effectively students integrate tables and graphs into their written analysis of data.

- **Footnotes/Endnotes and Bibliography Exercise:** Assess students' ability to correctly format citations and bibliographies.

- **Final Report Submission:** The culminating assessment will be the submission of a complete economic report based on a chosen topic, evaluating all aspects of report writing covered in the unit.

By following this unit-wise structure, you can guide students through the process of economic data analysis and effective report writing, ensuring they develop both the analytical and communication skills necessary in the field of economics. Remember to emphasize practical application and provide ample opportunities for students to practice their skills.

Entrepreneurship and Development (ED)

Unit 1: Basic Issues of Entrepreneurship and Economic Development (15 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Basic Features of Entrepreneurship:

- o Introduce the concept of entrepreneurship, defining key terms like entrepreneur, enterprise, and entrepreneurial process.

- o Discuss the core characteristics and traits of successful entrepreneurs (e.g., innovation, risk-taking, leadership, perseverance, opportunity recognition).

- o Differentiate between entrepreneurship, management, and self-employment.

- o Explore different types of entrepreneurship (e.g., small business, scalable startup, social entrepreneurship).

- **Lectures 4-6:** Entrepreneurship and its Linkages with Economic Development:

  - o Explain the crucial role of entrepreneurship in driving economic growth and development.

  - o Discuss the linkages between entrepreneurship and:

    - Job creation

    - Innovation and technological advancement

    - Resource mobilization and utilization

    - Increased competition and productivity

    - Regional development and poverty reduction

    - Improved quality of life

- **Lectures 7-9:** Growth of Entrepreneurship in India and its Role in Economic Development:

  - o Trace the historical growth and evolution of entrepreneurship in India.

  - o Analyze the current landscape of entrepreneurship in India, including key sectors and trends.

  - o Deepen the discussion on the specific role of entrepreneurship in India's economic development, considering its unique challenges and opportunities.

  - o Discuss the impact of government policies and initiatives on promoting entrepreneurship in India.

- **Lectures 10-12:** Planning Commission's Guidelines for Formulating a Project Report:

  - o Introduce the concept and importance of a project report for entrepreneurs seeking funding and guidance.

- Discuss the key components and structure of a typical project report as per the erstwhile Planning Commission's (now NITI Aayog) guidelines (or current relevant guidelines). This may include:
  - Executive Summary
  - Business Description
  - Market Analysis
  - Technical Feasibility
  - Financial Projections
  - Management Team
  - Social and Environmental Impact
- **Lectures 13-15:** Problem of Rural Entrepreneurship in India:
  - Analyze the specific challenges and opportunities associated with promoting entrepreneurship in rural India.
  - Discuss the unique problems faced by rural entrepreneurs (e.g., access to finance, infrastructure, markets, skills, technology).
  - Explore potential strategies and solutions for fostering rural entrepreneurship and its contribution to rural economic development.
  - Discuss successful examples of rural entrepreneurship initiatives in India.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage active student participation through discussions, debates, and sharing of personal observations.
- **Case Studies:** Analyze real-life examples of successful and unsuccessful entrepreneurs and their ventures, both in India and globally.
- **Guest Speakers:** Invite local entrepreneurs or experts from entrepreneurship development organizations to share their experiences and insights.
- **Brainstorming Sessions:** Conduct brainstorming sessions to generate business ideas and explore entrepreneurial opportunities.
- **Video Presentations:** Use documentaries or short videos showcasing entrepreneurial journeys and the impact of entrepreneurship.
- **Role-Playing:** Engage students in role-playing scenarios related to entrepreneurial decision-making.

Continuous Classroom Evaluation:

- **Class Participation:** Assess the quality and frequency of student contributions to discussions.

- **Short Quizzes:** Conduct brief quizzes on key concepts and definitions covered in each topic.

- **Case Study Analysis:** Assign short written analyses of presented case studies.

- **Brainstorming Reports:** Evaluate the creativity and feasibility of ideas generated during brainstorming sessions.

- **Concept Mapping:** Ask students to create concept maps illustrating the linkages between entrepreneurship and economic development.

Unit 2: Financial Resources for New Ventures of an Entrepreneur (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Sources of Finance:

    o Introduce the different sources of finance available to new ventures.

    o Categorize and explain internal sources of finance (e.g., personal savings, retained earnings).

    o Categorize and explain external sources of finance:

        ▪ Debt financing (e.g., loans from banks and financial institutions)

        ▪ Equity financing (e.g., angel investors, venture capital)

        ▪ Government grants and subsidies

        ▪ Informal sources (e.g., friends, family)

- **Lectures 4-6:** Capital Structure:

    o Explain the concept of capital structure and its importance for new ventures.

    o Discuss the factors influencing the choice of capital structure (e.g., risk, control, cost of capital, stage of business).

    o Analyze the trade-offs between debt and equity financing.

    o Introduce basic concepts of financial planning and forecasting for new ventures.

- **Lectures 7-10:** Institutional Support to Enterprises (National and State Levels):

    o Discuss the role and functions of the National Small Industries Board (NSIB) in supporting small enterprises in India.

    o Explain the objectives and activities of State Small Industries Development Corporations (SSIDCs) in promoting entrepreneurship at the state level.

    o Describe the functions and services provided by District Industries Centers (DICs) to entrepreneurs at the district level.

- o Discuss the concept and benefits of Industrial Estates in providing infrastructure and support to small businesses.

- o Share the Indian experience with these institutional support mechanisms, including their successes and challenges.

Classroom Teaching Method:

- **Interactive Lectures:** Facilitate discussions on the pros and cons of different sources of finance.

- **Expert Talks:** Invite representatives from banks, financial institutions, or government agencies to discuss funding opportunities for startups.

- **Case Studies:** Analyze case studies of startups that have successfully raised funding from different sources.

- **Group Discussions:** Engage students in discussions on the optimal capital structure for hypothetical new ventures.

- **Online Resource Exploration:** Guide students to explore the websites and resources of the mentioned institutional support organizations.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student engagement in discussions about financing options.

- **Short Essays:** Assign short essays comparing different sources of finance or analyzing the role of a specific institution.

- **Presentations:** Have students research and present on different funding options or institutional support schemes.

- **Financial Planning Exercises (Basic):** Assign simple exercises related to identifying potential funding sources for a business idea.

Unit 3: Growth Strategies in Small Business (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Stages of Growth:

  - o Introduce the typical stages of growth in a small business lifecycle (e.g., startup, early growth, maturity, potential decline/rejuvenation).

  - o Discuss the characteristics, challenges, and opportunities associated with each stage.

  - o Analyze how growth strategies might differ depending on the stage of the business.

- **Lectures 4-6:** Types of Growth Strategies - Expansion and Diversification:

- Explain the concept of expansion as a growth strategy (e.g., increasing market share, entering new geographic markets, increasing production capacity).
- Discuss different methods of expansion and their implications.
- Explain the concept of diversification as a growth strategy (e.g., entering new product/service categories, related vs. unrelated diversification).
- Analyze the risks and rewards associated with diversification.

- **Lectures 7-8:** Types of Growth Strategies - Joint Venture and Merger:
  - Explain the concept of a joint venture as a collaborative growth strategy (advantages, disadvantages, types of joint ventures).
  - Discuss the process and considerations involved in forming a joint venture.
  - Explain the concept of a merger as a growth strategy (horizontal, vertical, conglomerate mergers).
  - Analyze the motivations and challenges associated with mergers.

- **Lectures 9-10:** Types of Growth Strategies - Subcontracting:
  - Explain subcontracting as a growth strategy (outsourcing production or specific tasks).
  - Discuss the advantages and disadvantages of subcontracting for small businesses.
  - Analyze how subcontracting can facilitate growth and market access.

Classroom Teaching Method:

- **Interactive Lectures:** Use real-world examples of small businesses that have adopted different growth strategies.

- **Case Study Analysis:** Analyze case studies of companies that have successfully or unsuccessfully implemented various growth strategies.

- **Group Discussions:** Engage students in discussions on the suitability of different growth strategies for specific types of small businesses.

- **SWOT Analysis:** Introduce and apply SWOT analysis to evaluate potential growth strategies.

- **Simulation Exercises (Optional):** Conduct simple business simulation exercises where students make decisions about growth strategies.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student engagement in discussions about growth strategies.

- **Case Study Presentations:** Have students research and present case studies of small business growth.

- **Comparative Analysis:** Assign short essays comparing different growth strategies.

- **Strategic Planning Exercises (Basic):** Ask students to propose suitable growth strategies for hypothetical small businesses.

Unit 4: Sickness in Small Business (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Concept of Industrial Sickness:

  - Define industrial sickness in the context of small businesses.

  - Discuss the characteristics and stages of industrial sickness.

  - Differentiate between temporary difficulties and chronic sickness.

  - Explain the importance of early detection and intervention.

- **Lectures 4-6:** Symptoms of Sickness in Small Business:

  - Identify and explain various financial symptoms of sickness (e.g., declining profitability, increasing debt, liquidity problems, negative cash flow).

  - Identify and explain various non-financial symptoms of sickness (e.g., production inefficiencies, marketing problems, management issues, technological obsolescence, poor industrial relations).

- **Lectures 7-10:** Causes and Consequences of Sickness in Small Business:

  - Analyze the internal causes of sickness (e.g., poor management, lack of planning, inadequate financial control, operational inefficiencies).

  - Analyze the external causes of sickness (e.g., economic downturn, changes in market demand, increased competition, government policy changes, infrastructure bottlenecks).

  - Discuss the consequences of sickness in small businesses for:

    - The entrepreneur and employees

    - Financial institutions

    - The economy (e.g., loss of production, unemployment, non-performing assets)

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to share their understanding of business failures and challenges.

- **Case Study Analysis:** Analyze case studies of sick small businesses, identifying the symptoms and causes of their sickness.

- **Expert Talks:** Invite professionals involved in business turnaround or rehabilitation to share their experiences.

- **Group Discussions:** Engage students in discussions on preventive measures and potential solutions for industrial sickness.

- **Problem-Solving Exercises:** Present scenarios of struggling small businesses and ask students to identify potential causes and suggest remedies.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student engagement in discussions about industrial sickness.

- **Case Study Analysis Reports:** Assign written reports analyzing the causes and consequences of sickness in specific case studies.

- **Identification of Symptoms and Causes:** Present scenarios and ask students to identify potential symptoms and underlying causes of business sickness.

- **Problem-Solving Tasks:** Ask students to propose strategies for preventing or addressing sickness in small businesses.

By implementing these unit-wise lesson procedures, classroom teaching methods, and continuous classroom evaluation strategies, you can effectively deliver the Entrepreneurship and Development course and ensure that students gain a comprehensive understanding of the subject matter. Remember to adapt the specific activities and assessments based on the needs and learning styles of your students.

Elementary Economics

Unit 1: Elementary Microeconomic Concepts (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Theory of Demand and Supply:

    o Introduce the basic concepts of markets, demand, and supply.

    o Explain the determinants of demand (price, income, tastes, expectations, prices of related goods) and the Law of Demand, illustrating with examples.

    o Explain the determinants of supply (price, input costs, technology, expectations, number of sellers) and the Law of Supply, illustrating with examples.

    o Introduce and explain the demand curve (downward sloping) and the supply curve (upward sloping) using diagrams.

- o Explain the concept of market equilibrium (where demand and supply intersect) and how equilibrium price and quantity are determined.

- o Discuss the concepts of surplus and shortage and how markets adjust to equilibrium.

- **Lectures 4-5:** Elasticity of Demand and Supply:

  - o Introduce the concept of elasticity as a measure of responsiveness.

  - o Explain Price Elasticity of Demand (PED) – definition, types (elastic, inelastic, unit elastic), and factors affecting PED (availability of substitutes, necessity vs. luxury). Discuss implications for pricing decisions.

  - o Introduce Income Elasticity of Demand – definition and its use in classifying goods (normal, inferior). Discuss implications for businesses.

  - o Introduce Price Elasticity of Supply (PES) – definition and factors affecting PES (time horizon, availability of inputs). Discuss implications for production decisions.

- **Lectures 6-8:** Theory of Production and Cost:

  - o Introduce the concept of a Production Function (relationship between inputs and output).

  - o Explain the concepts of Total Product (TP), Average Product (AP), and Marginal Product (MP) using simple examples and diagrams.

  - o Differentiate between the short run (at least one fixed input) and the long run (all inputs variable).

  - o Introduce and explain different cost curves in the short run: Total Cost (TC), Fixed Cost (FC), Variable Cost (VC), Average Total Cost (ATC), Average Fixed Cost (AFC), Average Variable Cost (AVC), and Marginal Cost (MC) using diagrams (focus on the shapes and relationships).

  - o Briefly introduce the concepts of social costs and external costs with examples.

- **Lectures 9-10:** Market Structures: Perfect Competition and Monopoly:

  - o Introduce the concept of a market and different market structures.

  - o Explain the features of Perfect Competition (many buyers and sellers, homogeneous products, free entry and exit, perfect information).

  - o Explain Total Revenue (TR), Average Revenue (AR), and Marginal Revenue (MR) under perfect competition (AR = MR = Price).

  - o Explain the concept of equilibrium under perfect competition (where MR = MC) using a diagram to show profit maximization (or loss minimization).

- Explain the features of Monopoly (single seller, unique product, barriers to entry).

- Explain TR, AR, and MR under monopoly (MR curve below the AR curve).

- Explain the concept of equilibrium under monopoly (where MR = MC) using a diagram to show price and output determination (emphasize that price is above MR).

Classroom Teaching Method:

- **Interactive Lectures:** Encourage student participation through questions, discussions, and real-life examples.

- **Diagrammatic Explanations:** Heavily rely on diagrams to illustrate demand, supply, elasticity, production, cost curves, and market equilibrium.

- **Simple Numerical Examples:** Use basic numerical examples to reinforce the understanding of concepts like elasticity and cost calculations.

- **Real-World Scenarios:** Connect theoretical concepts to real-world market situations and business decisions.

- **Think-Pair-Share Activities:** Pose questions related to the application of concepts and have students discuss in pairs before sharing with the class.

Continuous Classroom Evaluation:

- **Class Participation:** Observe and encourage active participation in discussions.

- **Quick Quizzes:** Conduct short, ungraded quizzes at the beginning or end of lectures to check understanding of key concepts.

- **Drawing and Labeling Diagrams:** Ask students to draw and correctly label demand, supply, cost, and revenue curves.

- **Scenario Analysis:** Present simple scenarios and ask students to apply the learned concepts (e.g., what happens to equilibrium price if demand increases?).

- **Short Answer Questions:** Ask brief questions to assess understanding of definitions and basic principles.

Unit 2: Elementary Macroeconomic Concepts (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** National Income Accounting:

  - Introduce the concept of the circular flow of income in a simple economy.

  - Explain the concepts of Gross National Product (GNP), Gross Domestic Product (GDP), Net National Product (NNP), Net Domestic Product (NDP), and National Income (NI) – definitions and basic relationships between them.

- o Discuss the different methods of measuring national income (product, income, expenditure approach – conceptual understanding only).

- **Lectures 4-6:** Money and Banking:

  - o Define money and discuss its functions.

  - o Explain the different measures of money supply in India (e.g., M1, M2, M3, M4) – basic understanding of what each includes.

  - o Differentiate between Central Bank (Reserve Bank of India - RBI) and Commercial Banks in terms of their objectives and functions.

  - o Explain the key functions of the Central Bank (e.g., issuing currency, banker to the government, banker's bank, controller of credit).

  - o Explain the key functions of Commercial Banks (e.g., accepting deposits, lending loans, creating credit).

- **Lecture 7:** Inflation:

  - o Define inflation as a sustained increase in the general price level.

  - o Explain different types of inflation (e.g., demand-pull, cost-push – basic understanding of the causes).

  - o Briefly discuss the concept of anti-inflationary policies.

- **Lecture 8:** Fiscal Policy & Monetary Policy:

  - o Explain the objectives of Fiscal Policy (government's use of spending and taxation to influence the economy).

  - o Briefly discuss the main instruments of Fiscal Policy (e.g., government spending, taxes, budget).

  - o Explain the objectives of Monetary Policy (actions undertaken by the central bank to manipulate the money supply and credit conditions to influence the economy).

  - o Briefly discuss the main instruments of Monetary Policy (e.g., repo rate, reverse repo rate, cash reserve ratio, statutory liquidity ratio – conceptual understanding of how they affect money supply).

- **Lectures 9-10:** International Trade and Contemporary Issues:

  - o Introduce the concept of Balance of Payments (BOP) – a systematic record of a country's economic transactions with the rest of the world.

  - o Explain the concepts of autonomous transactions (undertaken for economic reasons) and accommodating transactions (undertaken to balance the BOP).

  - o Briefly discuss the functions of the International Monetary Fund (IMF), World Bank, and World Trade Organization (WTO).

- o Introduce the concept of Exchange Rates (the price of one currency in terms of another).

- o Briefly explain the concept of Purchasing Power Parity (PPP) as a theory of exchange rate determination.

Classroom Teaching Method:

- **Interactive Lectures:** Use current economic news and events to illustrate macroeconomic concepts.

- **Flow Charts and Diagrams:** Use flow charts to explain the circular flow of income and the structure of the financial system.

- **Real-World Examples:** Relate macroeconomic concepts to the Indian economy and global economic issues.

- **Simplified Models:** Use simplified models to explain complex concepts like national income determination.

- **Discussion of Policy Issues:** Encourage discussions on the objectives and effectiveness of fiscal and monetary policies in India.

Continuous Classroom Evaluation:

- **Class Participation:** Encourage and assess participation in discussions on macroeconomic issues.

- **Short Quizzes:** Conduct brief quizzes on definitions and basic concepts of national income, money, banking, inflation, and policy.

- **Fill-in-the-Blanks and Multiple Choice Questions:** Use these formats to assess understanding of key terms and relationships.

- **Explanation of Concepts:** Ask students to explain macroeconomic concepts in their own words.

- **Analyzing Current Events:** Ask students to relate current economic news to the macroeconomic concepts learned.

Unit 3: Elementary Economic Development Concepts (5 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Growth vs. Development:

  - o Clearly differentiate between economic growth (quantitative increase in output) and economic development (qualitative improvement in living standards, well-being, and capabilities).

  - o Use examples to illustrate the difference (e.g., a rise in GDP vs. improvements in health and education).

- **Lectures 3-4:** Development Indicators:

- o Introduce and explain the following development indicators:

    - ▪ Human Development Index (HDI): components (life expectancy, education, per capita income) and its significance. Discuss India's rank (refer to the latest available data).

    - ▪ Gender Development Index (GDI): its focus on gender disparities in HDI components. Discuss India's situation.

    - ▪ Multidimensional Poverty Index (MPI): its focus on multiple deprivations at the household level (health, education, living standards). Discuss India's situation.

    - ▪ Inequality (GINI) Index: its measurement of income inequality (or wealth inequality). Discuss India's level of inequality.

- **Lecture 5:** Sustainable Development:

    - o Introduce the concept of Sustainable Development – development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

    - o Discuss the key principles of sustainable development (economic, social, and environmental pillars).

    - o Briefly introduce the Sustainable Development Goals (SDGs) adopted by the United Nations.

Classroom Teaching Method:

- **Interactive Lectures:** Use examples and stories to illustrate the concepts of growth and development.

- **Data Interpretation:** Present simple data related to development indicators and ask students to interpret India's performance.

- **Discussions on Global Issues:** Encourage discussions on the challenges of achieving sustainable development.

- **Visual Aids:** Use charts and graphs to illustrate trends in development indicators.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions about development issues.

- **Short Answer Questions:** Ask students to define and differentiate between growth and development.

- **Identification of Indicators:** Ask students to list and briefly explain the components of different development indices.

- **Discussion on Sustainability:** Ask students to share their understanding of sustainable development.

Unit 4: Elementary Concepts of Indian Economics (5 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Economic Reforms in India:

    o Provide the background and context for the economic reforms initiated in India in the early 1990s (e.g., balance of payments crisis).

    o Explain the basic steps and objectives of:

        ▪ Trade Reforms (e.g., reduction in tariffs, removal of import restrictions).

        ▪ Industrial Sector Reforms (e.g., delicensing, privatization).

        ▪ Financial Sector Reforms (e.g., liberalization of banking, capital market reforms).

    o Briefly discuss the intended and actual impacts of these reforms.

- **Lectures 4-5:** NITI Aayog:

    o Explain the background and rationale for the establishment of NITI Aayog (National Institution for Transforming India) as a replacement for the Planning Commission.

    o Discuss the structure of NITI Aayog (governing council, vice-chairperson, CEO, etc.).

    o Explain the key objectives and functions of NITI Aayog (e.g., fostering cooperative federalism, creating a national development agenda, monitoring and evaluation).

Classroom Teaching Method:

- **Interactive Lectures:** Use timelines and historical context to explain the economic reforms.

- **Discussion of Policy Changes:** Encourage discussions on the reasons behind and the impact of the reforms.

- **Online Resource Exploration:** Guide students to explore the website of NITI Aayog.

- **Comparison with Planning Commission:** Briefly compare the roles and approaches of the Planning Commission and NITI Aayog.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions about Indian economic reforms and NITI Aayog.

- **Short Answer Questions:** Ask students to explain the background and basic steps of the reforms.

- **Distinguishing Roles:** Ask students to differentiate between the roles of the Planning Commission and NITI Aayog.

- **Identifying Objectives:** Ask students to list the key objectives of NITI Aayog.

By following this unit-wise structure, you can provide a comprehensive introduction to elementary economics, employing appropriate teaching methods and continuous evaluation to ensure student understanding of the fundamental concepts. Remember to adapt the pace and depth of coverage based on the specific needs and learning abilities of your students.

Macroeconomics (I)

Unit 1: National Income Accounting (12 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Basic Concepts and Circular Flow:

  - Introduce the scope and importance of macroeconomic data.

  - Explain the basic concepts of National Income accounting.

  - Illustrate the circular flow of income in a three-sector economy (households, firms, government) using diagrams and explanations of flows (goods, services, factor payments, taxes, government spending).

- **Lectures 4-6:** Key National Income Aggregates:

  - Define and explain the concepts of Gross National Product (GNP), Gross Domestic Product (GDP), Net National Product (NNP), and Net Domestic Product (NDP) at both market prices and factor cost.

  - Differentiate between Real and Nominal GDP and GNP, explaining the impact of price changes.

  - Introduce and explain the concept of the Implicit Price Deflator (GDP deflator) as a measure of the overall price level.

- **Lectures 7-8:** Measurement of National Income and Double Counting:

  - Discuss the three main methods of measuring national income (Product/Value Added, Income, Expenditure approaches) with simple examples.

  - Explain the problem of double counting in national income accounting and methods to avoid it (e.g., using value added).

- **Lectures 9-10:** Role of Government and Related Concepts:

  - Discuss the role of the government in the circular flow and its impact on national income.

- Define and explain the concepts of Corporate Income, Corporate Savings, Personal Income, Personal Disposable Income, and Personal Savings with simple examples and relationships between them.

- **Lectures 11-12:** Saving-Investment Gap, Budget Deficit, and Trade Surplus:

  - Explain the Saving-Investment gap and its macroeconomic significance.

  - Analyze the relationship between the Saving-Investment gap, the government budget deficit (or surplus), and the trade surplus (or deficit) using national income identities.

  - Discuss the limitations of national income accounting and its relation to the cost of living (brief introduction to CPI/WPI).

Classroom Teaching Method:

- **Interactive Lectures:** Encourage student participation through questions, discussions, and real-world examples related to national income statistics.

- **Diagrammatic Representation:** Utilize circular flow diagrams and flowcharts to illustrate the relationships between different macroeconomic variables.

- **Numerical Examples:** Work through simple numerical examples to demonstrate the calculation of GNP, GDP, NNP, NDP, real vs. nominal values, and related concepts.

- **Data Interpretation:** Present basic national income data for India and discuss its implications.

- **Group Discussions:** Facilitate discussions on the importance of national income accounting and its limitations.

Continuous Classroom Evaluation:

- **Class Participation:** Observe and encourage active participation in discussions.

- **Short Quizzes:** Conduct brief quizzes on definitions and basic concepts.

- **Problem-Solving Exercises:** Assign simple numerical problems related to calculating national income aggregates.

- **Conceptual Questions:** Ask questions that test understanding of the relationships between different concepts (e.g., how does an increase in exports affect GDP?).

- **Analysis of News Articles:** Ask students to analyze news articles related to national income and economic growth.

Unit 2: Income Determination in the Short Run (Part-I): The Simple Keynesian Model in a Closed Economy (12 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Consumption and Saving Functions:

- o Introduce the Simple Keynesian Model (SKM) and its assumptions (closed economy, fixed prices in the short run, underemployment).

- o Explain the Keynesian Consumption Function ($C = a + bY_d$) and its components (autonomous consumption, marginal propensity to consume). Illustrate graphically.

- o Derive and explain the Keynesian Saving Function ($S = -a + (1-b)Y_d$) and its components (dissaving, marginal propensity to save). Illustrate graphically.

- o Discuss the stability of equilibrium in the SKM.

- **Lectures 4-6:** Equilibrium Income Determination and Effective Demand:

  - o Introduce the concept of Aggregate Expenditure ($AE = C + I$) in a closed economy without government.

  - o Explain the equilibrium condition in the SKM ($Y = AE$). Determine equilibrium income graphically and algebraically.

  - o Introduce the concept of effective demand as the level of aggregate expenditure that determines the equilibrium level of output. Discuss the idea of demand-determined output.

- **Lectures 7-9:** The Simple Keynesian Multiplier:

  - o Explain the concept of the multiplier effect – how a change in autonomous expenditure leads to a larger change in equilibrium income.

  - o Derive the formula for the simple Keynesian multiplier ($1/(1-MPC)$ or $1/MPS$).

  - o Work through numerical examples to illustrate the multiplier effect.

  - o Discuss the paradox of thrift and its implications in the SKM.

- **Lectures 10-12:** SKM with Government: Government Expenditure and Tax:

  - o Introduce the role of government in the SKM (government expenditure and taxes).

  - o Modify the aggregate expenditure function to include government expenditure ($AE = C + I + G$).

  - o Incorporate different types of taxes (lump-sum, proportional) into the model and analyze their impact on disposable income and equilibrium income.

  - o Determine the new equilibrium income in the SKM with government expenditure and taxes (graphically and algebraically).

  - o Explain the concept and calculate the Balanced Budget Multiplier.

Classroom Teaching Method:

- **Interactive Lectures:** Engage students in discussions about the assumptions and implications of the Keynesian model.

- **Graphical Analysis:** Emphasize the use of diagrams (aggregate expenditure-output model) to explain equilibrium income determination and the multiplier effect.

- **Algebraic Derivations:** Guide students through the basic algebraic derivations of the equilibrium conditions and the multiplier.

- **Numerical Exercises:** Assign problems involving the calculation of consumption, saving, equilibrium income, and the multiplier.

- **Real-World Policy Discussions:** Relate the concepts of the Keynesian model to real-world fiscal policy decisions.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions and problem-solving.

- **Problem Sets:** Assign problem sets involving calculations related to the consumption function, saving function, equilibrium income, and the multiplier.

- **Graphical Interpretation:** Ask students to interpret diagrams related to the SKM.

- **Conceptual Questions:** Test understanding of the core principles of the Keynesian model, effective demand, and the paradox of thrift.

- **Short Essays:** Ask students to explain the multiplier process or the impact of government intervention in the SKM.

Unit 3: Basic Theory of Investment (3 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Investment Function and Determinants:

    o Introduce the investment function and explain that investment is a crucial component of aggregate expenditure.

    o Discuss the key determinants of investment decisions by firms, including:

        ▪ Expected rate of profit

        ▪ Interest rates

        ▪ Business confidence

        ▪ Technological advancements

        ▪ Government policies (e.g., tax incentives)

- **Lecture 3:** Marginal Productivity of Capital (MPK), Marginal Efficiency of Capital (MEC), and Marginal Efficiency of Investment (MEI):

- o Define and explain the concept of the Marginal Productivity of Capital (MPK).

- o Introduce and differentiate between the Marginal Efficiency of Capital (MEC) as the expected rate of return on a new capital asset, and the Marginal Efficiency of Investment (MEI) as the rate of return on additional investment spending. Explain how MEC and MEI relate to the interest rate in determining investment levels.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to think about factors that influence business investment decisions.

- **Real-World Examples:** Discuss current investment trends and the factors driving them.

- **Conceptual Explanation:** Focus on the intuitive understanding of MPK, MEC, and MEI and their role in investment decisions.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions about investment determinants.

- **Short Answer Questions:** Ask students to list and explain the determinants of investment.

- **Conceptual Understanding:** Test understanding of the differences between MPK, MEC, and MEI.

Unit 4: The Classical System (12 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Basic Ideas of Classical Macroeconomics and Say's Law:

  - o Introduce the core tenets of Classical Macroeconomics (e.g., self-regulating economy, full employment as the norm in the long run, flexible prices and wages).

  - o Explain Say's Law of Markets ("Supply creates its own demand") and its implications for the possibility of prolonged underemployment. Discuss the classical view on aggregate demand and aggregate supply.

- **Lectures 4-6:** Quantity Theory of Money:

  - o Introduce the Quantity Theory of Money (QTM) and its basic equation (MV = PY), explaining the meaning of each variable.

  - o Discuss the classical assumptions underlying the QTM (e.g., velocity of money is stable).

- Explain the implications of the QTM for the relationship between money supply and the price level (neutrality of money in the long run).

- **Lectures 7-9:** Loanable Funds Theory:

  - Explain the Loanable Funds Theory as the classical theory of interest rate determination.

  - Discuss the supply of loanable funds (savings by households and firms) and the demand for loanable funds (investment by firms and government borrowing).

  - Explain how the equilibrium interest rate is determined by the interaction of the supply and demand for loanable funds.

- **Lectures 10-11:** Classical Theory of Income and Employment Determination:

  - Explain the classical view that the level of output and employment is primarily determined by the supply side factors (labor, capital, technology).

  - Discuss the role of flexible wages and prices in ensuring full employment in the classical model.

- **Lecture 12:** Full Employment, Wage-Price Flexibility, Neutrality of Money, and Classical Dichotomy:

  - Summarize the classical view on full employment and the role of wage-price flexibility in maintaining it.

  - Reiterate the concept of the neutrality of money in the classical system (changes in money supply affect only the price level, not real variables).

  - Introduce the basic concept of the Classical Dichotomy – the idea that real variables (output, employment, real interest rate) are determined in the real sector, while nominal variables (price level, nominal interest rate) are determined in the monetary sector, with no significant interaction between the two in the long run.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to compare and contrast the assumptions and conclusions of the classical and Keynesian models.

- **Conceptual Explanation:** Focus on the logical reasoning behind the classical theories.

- **Graphical Representation:** Use simple graphs to illustrate the loanable funds market and the classical view of aggregate supply.

- **Thought Experiments:** Pose thought experiments to explore the implications of wage-price flexibility and the neutrality of money.

- **Historical Context:** Briefly discuss the historical context in which classical economics developed.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions comparing classical and Keynesian ideas.

- **Short Answer Questions:** Ask students to explain Say's Law, the Quantity Theory of Money, and the Loanable Funds Theory.

- **Conceptual Understanding:** Test understanding of the implications of wage-price flexibility and the neutrality of money.

- **Comparison Essays:** Ask students to compare and contrast the classical and Keynesian views on income and employment determination.

Unit 5: Inflation (6 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Concepts and Types of Inflation:

  o Define inflation and discuss different ways to measure it (e.g., CPI, WPI).

  o Explain the concept of the Inflationary Gap using the aggregate expenditure-output model.

  o Differentiate between Demand-Pull Inflation (caused by excess aggregate demand) and Cost-Push Inflation (caused by increases in the costs of production). Explain the mechanisms behind each type.

- **Lectures 3-6:** Anti-inflationary Policy:

  o Discuss the objectives of anti-inflationary policies.

  o Explain the fiscal policy measures that can be used to combat inflation (e.g., reducing government spending, increasing taxes). Analyze their impact on aggregate demand.

  o Explain the monetary policy measures that can be used to combat inflation (e.g., increasing interest rates, raising reserve requirements, open market operations). Analyze their impact on money supply and aggregate demand.

  o Discuss the challenges and potential side effects of anti-inflationary policies.

Classroom Teaching Method:

- **Interactive Lectures:** Use current economic events and policy debates related to inflation to illustrate the concepts.

- **Graphical Analysis:** Use the aggregate expenditure-output model to illustrate the inflationary gap and the impact of anti-inflationary fiscal policy.

- **Discussion of Policy Tools:** Analyze the effectiveness and limitations of different fiscal and monetary policy instruments in controlling inflation.

- **Case Studies:** Discuss historical or contemporary examples of inflation and the policies implemented to address it.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions about inflation and anti-inflationary policies.

- **Short Answer Questions:** Ask students to define inflation, differentiate between demand-pull and cost-push inflation, and explain the concept of the inflationary gap.

- **Policy Analysis:** Ask students to explain how specific fiscal and monetary policy measures can be used to combat inflation.

- **Scenario Analysis:** Present scenarios involving inflation and ask students to suggest appropriate policy responses.

By following this unit-wise breakdown, you can effectively deliver the Macroeconomics (I) course, incorporating diverse teaching methods and continuous evaluation to facilitate student learning and understanding of the core macroeconomic principles. Remember to adapt the pace and depth of coverage based on the specific needs and learning abilities of your students.

Introductory Statistics and Applications (II)

Theory (15 Lecture Hours)

Unit 1: Basic Ideas of Economic Data (15 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Types of Data:

  - Introduce the fundamental concept of data in economic analysis.

  - Define and explain different types of data with relevant economic examples:

    - Cross-sectional data (data collected at a single point in time across multiple units).

    - Time series data (data collected over a sequence of time periods for a single unit).

    - Pooled data (a combination of cross-sectional and time series data).

    - Panel data (a specific type of pooled data where the same cross-sectional units are observed over multiple time periods).

- o Discuss the characteristics, advantages, and disadvantages of each data type.

- **Lectures 4-6:** Nature of Field Survey Data:

  - o Focus on field survey data as a primary source for cross-sectional analysis in economics.

  - o Explain the process of conducting a field survey.

  - o Discuss different types of cross-sectional data obtained from field surveys (e.g., household surveys, firm surveys).

  - o Highlight the unique challenges and considerations involved in collecting and working with field survey data.

- **Lectures 7-9:** Advantages and Disadvantages of Field Survey Data:

  - o Systematically analyze the advantages of using field survey data in economic research (e.g., collection of specific information, control over data definition, capturing micro-level details).

  - o Systematically analyze the disadvantages and potential pitfalls of field survey data (e.g., cost and time intensive, potential for biases, issues with sampling and non-response).

- **Lectures 10-12:** Importance of Field Survey Data for Economic Analysis:

  - o Emphasize the crucial role of field survey data in addressing various economic research questions, particularly at the microeconomic level.

  - o Provide examples of how field survey data is used to study:

    - ▪ Household consumption and expenditure patterns

    - ▪ Labor market characteristics

    - ▪ Firm behavior and investment decisions

    - ▪ Poverty and inequality

    - ▪ Impact of specific policies

- **Lectures 13-15:** Role of Pilot Survey:

  - o Explain the purpose and importance of conducting a pilot survey before a full-scale field survey.

  - o Discuss the key objectives of a pilot survey, such as:

    - ▪ Testing the survey instrument (questionnaire) for clarity and completeness.

    - ▪ Identifying potential problems with data collection procedures.

    - ▪ Estimating the time and resources required for the main survey.

- ▪ Assessing the feasibility of the sampling design.
- ▪ Refining the survey methodology.

Classroom Teaching Method (Theory):

- **Interactive Lectures:** Encourage student participation through discussions, questions, and sharing of examples.

- **Case Studies:** Present real-world examples of economic research that utilize different types of data, particularly field survey data.

- **Comparative Analysis:** Facilitate comparisons of the characteristics, advantages, and disadvantages of different data types.

- **Guest Speakers (Optional):** Invite researchers who have experience in conducting field surveys to share their insights.

- **Group Discussions:** Engage students in discussions about the challenges and ethical considerations of collecting field survey data.

Continuous Classroom Evaluation (Theory):

- **Class Participation:** Assess the level and quality of student engagement in discussions.

- **Short Quizzes:** Conduct brief quizzes on the definitions and characteristics of different data types.

- **Concept Mapping:** Ask students to create concept maps illustrating the relationships between different types of data and the process of field surveys.

- **Short Answer Questions:** Assess understanding of the advantages, disadvantages, and importance of field survey data.

- **Case Study Analysis (Written):** Assign short written analyses of research examples using different data types.

Practical (45 Lecture Hours - Computer Laboratory based Worksheet Program)

Unit 2.1: Concept on Data Frame (13 Lecture Hours)

Lesson Procedure (Practical):

- **Lectures 1-2 (Lab):** Introduction to Microsoft Excel Interface:

  - o Familiarize students with the Excel environment (ribbon, tabs, cells, worksheets, workbooks).

  - o Explain the purpose and benefits of using spreadsheets for data management and analysis.

  - o Guide students on navigating the Excel interface efficiently.

- **Lectures 3-4 (Lab):** Data Entry and Formatting:

- o Demonstrate and provide hands-on practice in entering different types of data (numeric, text, dates) accurately into cells.

- o Explain and demonstrate various formatting options to enhance data presentation (number formats, date formats, alignment, fonts, cell borders, colors).

- o Provide exercises on applying different formatting techniques to given datasets.

- **Lectures 5-6 (Lab):** Variables & Observations:

  - o Reinforce the concepts of variables and observations in the context of a worksheet.

  - o Guide students on organizing data in a structured format (variables in columns, observations in rows).

  - o Provide examples of how economic data is typically organized in a spreadsheet.

- **Lectures 7-8 (Lab):** Data Validation and Conditional Formatting:

  - o Demonstrate how to set data validation rules to ensure data accuracy and consistency (e.g., restricting data entry to specific ranges, data types, or lists).

  - o Explain and demonstrate different conditional formatting options to highlight specific data patterns or trends (e.g., color scales, icon sets, highlighting cells based on rules).

  - o Provide exercises on applying data validation and conditional formatting to identify potential errors or patterns in datasets.

- **Lectures 9-10 (Lab):** Data Sorting and Filtering:

  - o Demonstrate how to sort data in ascending or descending order based on one or multiple criteria.

  - o Explain and demonstrate various filtering techniques to display only relevant information based on specific conditions (e.g., using AutoFilter, Advanced Filter).

  - o Provide exercises on sorting and filtering datasets to answer specific analytical questions.

- **Lectures 11-13 (Lab):** Basic Formulas and Functions:

  - o Introduce the concept of formulas and their role in performing calculations in Excel.

  - o Explain the use of basic mathematical operators (+, -, *, /) to create simple formulas.

- Introduce and provide hands-on practice with commonly used built-in functions (SUM, AVERAGE, MAX, MIN, COUNTIF, AND, IF, OR).

- Demonstrate the use of VLOOKUP and HLOOKUP for data retrieval (basic application).

- Provide exercises on using basic formulas and functions to perform calculations on economic datasets.

- **Self-Study/Practice:** Encourage students to practice data entry, formatting, validation, sorting, filtering, and basic formulas outside of lab hours.

Classroom Teaching Method (Practical):

- **Demonstration:** Instructor demonstrates the features and functions of Microsoft Excel step-by-step using examples relevant to economic data.

- **Hands-on Practice:** Students actively participate by performing the demonstrated tasks on their computers in the lab.

- **Guided Exercises:** Instructor provides structured exercises with clear instructions for students to apply the learned concepts.

- **Problem-Solving:** Students work on specific data management and calculation problems using Excel.

- **Peer Learning:** Encourage students to help each other and learn from their peers.

Continuous Classroom Evaluation (Practical - Unit 2.1):

- **Observation of Lab Work:** Instructor observes students' progress and provides feedback during lab sessions.

- **Completion of Exercises:** Assess students' ability to complete the assigned exercises accurately and efficiently.

- **Short Practical Quizzes:** Conduct short quizzes in the lab where students need to perform specific tasks in Excel.

- **Assignment Submissions:** Assign short practical assignments that require students to apply the learned skills to manage and manipulate data in Excel.

Unit 2.2: Frequency Analysis and Data Visualization (12 Lecture Hours)

Lesson Procedure (Practical):

- **Lectures 1-2 (Lab):** Raw Data to Group Data:

  - Demonstrate how to convert raw data into grouped data by defining class intervals.

  - Provide hands-on practice in creating frequency distributions from raw economic data using Excel features (e.g., FREQUENCY function, manual binning).

- **Lectures 3-4 (Lab):** Different Types of Frequency Tables:
  - Guide students in creating different types of frequency tables:
    - Simple frequency tables
    - Relative frequency tables
    - Cumulative frequency tables
  - Explain the purpose and interpretation of each type.
- **Lectures 5-7 (Lab):** Different Types of Tabulation:
  - Demonstrate how to create two-way and three-way tables (cross-tabulations) to analyze relationships between categorical variables using Excel features.
  - Introduce and provide hands-on practice with Pivot Tables for summarizing and analyzing data from different perspectives. Explain their flexibility and power in economic data analysis.
- **Lectures 8-11 (Lab):** Different Types of Frequency Graphs:
  - Demonstrate how to create various frequency graphs in Excel:
    - Bar Charts (for categorical data)
    - Column Charts (for discrete or grouped data)
    - Frequency Polygons (using line charts with midpoints of class intervals)
    - Histograms (for continuous grouped data)
    - Pie Diagrams (for showing proportions)
  - Emphasize the appropriate use of each chart type based on the nature of the data.
- **Lecture 12 (Lab):** Customization of Graph Frames:
  - Demonstrate how to customize chart elements in Excel to improve readability and presentation (e.g., adding titles, axis labels, legends, data labels, formatting axes, changing colors).
  - Provide exercises on customizing graphs for effective data visualization.
- **Self-Study/Practice:** Encourage students to practice creating different types of tables and graphs for various economic datasets.

Classroom Teaching Method (Practical):

- **Demonstration:** Instructor demonstrates the creation and customization of tables and charts in Excel.

- **Hands-on Practice:** Students actively create tables and graphs based on provided datasets.

- **Guided Exercises:** Instructor provides exercises with specific requirements for table and chart creation.

- **Data Visualization Principles:** Discuss basic principles of effective data visualization.

Continuous Classroom Evaluation (Practical - Unit 2.2):

- **Observation of Lab Work:** Assess students' ability to create different tables and graphs.

- **Completion of Exercises:** Evaluate the accuracy and appropriateness of the tables and graphs created by students.

- **Short Practical Tasks:** Assign tasks where students need to choose the correct chart type for a given dataset and customize it effectively.

- **Interpretation of Visualizations:** Ask students to interpret the information presented in the tables and graphs they create.

Unit 2.3: Descriptive Statistics (20 Lecture Hours)

Lesson Procedure (Practical):

- **Lectures 1-4 (Lab):** Calculation of Mean, Median & Mode (Un-Grouped Data):

  o Demonstrate the use of Excel functions (AVERAGE, MEDIAN, MODE.SNGL/MODE.MULT) to calculate measures of central tendency for ungrouped data.

  o Provide hands-on practice with various ungrouped economic datasets.

- **Lectures 5-8 (Lab):** Calculation of Mean, Median & Mode (Grouped Data - Approximations):

  o Demonstrate how to calculate approximate measures of central tendency for grouped data using Excel (e.g., using SUMPRODUCT for weighted mean, identifying the median class and modal class).

  o Emphasize that these are approximations based on the grouped data.

- **Lectures 9-12 (Lab):** Dispersion & Inequality Measures (Un-Grouped Data):

  o Demonstrate the use of Excel functions (RANGE - manual calculation, STDEV.S/STDEV.P, VAR.S/VAR.P, AVEDEV, QUARTILE.INC/QUARTILE.EXC, PERCENTILE.INC/PERCENTILE.EXC) to calculate measures of dispersion for ungrouped data.

  o Provide hands-on practice with various ungrouped economic datasets.

- **Lectures 13-16 (Lab):** Dispersion & Inequality Measures (Grouped Data - Approximations):

- o Demonstrate how to calculate approximate measures of dispersion for grouped data using Excel (e.g., using formulas involving class midpoints and frequencies).

- o Introduce the concept and demonstrate the creation of a Lorenz Curve in Excel using cumulative frequencies and cumulative proportions.

- o Demonstrate the approximate calculation of the Gini Coefficient based on the Lorenz Curve (using the area under the curve).

- **Lectures 17-18 (Lab):** Findings the Observations from different Descriptive Statistical Measures with Graphics:

- o Demonstrate how to create Box Plots (Box and Whisker Charts) in Excel to visualize the distribution of data and identify outliers, relating them to measures of central tendency and dispersion.

- o Reinforce the use of Histograms to visualize frequency distributions and their relationship with descriptive statistics.

- **Lecture 19 (Lab):** Scatter Diagram - Correlation Coefficient:

- o Demonstrate how to create Scatter Diagrams in Excel to visualize the relationship between two variables.

- o Demonstrate the use of the CORREL function to calculate the Pearson correlation coefficient.

- o Explain the interpretation of the correlation coefficient.

- **Lecture 20 (Lab):** Simple Regression (Two Variables) - Estimation of Predicted Value & Regression Residuals:

- o Demonstrate how to perform simple linear regression in Excel using the Data Analysis ToolPak (if available) or using functions like SLOPE, INTERCEPT, and TREND.

- o Explain how to obtain the estimated regression equation.

- o Demonstrate how to calculate predicted values and regression residuals in Excel.

- **Self-Study/Practice:** Encourage students to practice calculating descriptive statistics and creating relevant graphics for various economic datasets.

Classroom Teaching Method (Practical):

- **Demonstration:** Instructor demonstrates the use of Excel functions and tools for descriptive statistics and visualization.

- **Hands-on Practice:** Students actively calculate statistics and create graphics in the lab.

- **Guided Exercises:** Instructor provides exercises with specific analytical questions that require the use of descriptive statistics and visualizations.

- **Interpretation of Results:** Emphasize the interpretation of the calculated statistics and the insights gained from the visualizations in an economic context.

Continuous Classroom Evaluation (Practical - Unit 2.3):

- **Observation of Lab Work:** Assess students' ability to use Excel for statistical calculations and graphics.

- **Completion of Exercises:** Evaluate the accuracy of the calculated statistics and the appropriateness of the visualizations.

- **Practical Assignments:** Assign tasks where students need to analyze a given economic dataset using descriptive statistics and present their findings with relevant tables and charts.

- **Interpretation of Statistical Output:** Ask students to interpret the results of their Excel-based statistical analysis.

Practical Examination (50 Marks Worksheet Program + 25 Marks Viva):

- **Worksheet Program (Computer Laboratory):** Students will be given an economic dataset and asked to perform various tasks using Microsoft Excel, demonstrating their skills in:
    - Data entry and formatting
    - Data validation, sorting, and filtering
    - Using basic formulas and functions
    - Creating frequency tables and different types of graphs
    - Calculating measures of central tendency and dispersion (for ungrouped and grouped data)
    - Creating Lorenz Curve and calculating approximate Gini Coefficient
    - Generating Scatter Diagrams and calculating the correlation coefficient
    - Performing simple linear regression and obtaining predicted values and residuals.

- **Viva-Voce:** The supervisor and external examiner will conduct a viva-voce based on the student's practical work in the computer laboratory and their understanding of the underlying statistical concepts and their application in economic analysis. Students will be expected to explain the methods they used, interpret their results, and demonstrate their overall knowledge in the context of the practical syllabus.

This detailed breakdown should provide a comprehensive guide for your lesson procedures, teaching methods, and continuous evaluation for Introductory Statistics and

Applications (II), considering both the theoretical and practical components of the syllabus. Remember to adapt the specific exercises and examples to the context of economic data analysis.

Microeconomics (II)

Unit 1: Theories of Consumer Behaviour and Applications (14 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Derivation of Demand Curves and Applications:

    o Review indifference curves (ICs) and budget constraints from Microeconomics (I).

    o Explain how to derive the individual demand curve for a good by changing its price and observing the consumer's new equilibrium on different ICs (Price Consumption Curve - PCC).

    o Introduce the composite good convention to analyze choices involving one specific good and "all other goods."

    o Application: Analyze the impact of a cash subsidy versus a subsidy in kind (e.g., food stamps) on consumer welfare and consumption choices using IC-budget line diagrams.

- **Lectures 4-6:** Price, Income, and Substitution Effects:

    o Explain the Income Consumption Curve (ICC) derived by changing consumer income and observing new equilibria.

    o Derive the Engel curve from the ICC, showing the relationship between income and the quantity demanded of a good.

    o Decompose the Price Effect into Income and Substitution Effects using both Hicksian (compensating variation) and Slutskian (cost difference) approaches. Illustrate diagrammatically.

    o Define and explain inferior goods (income elasticity of demand is negative) and Giffen goods (a special case of inferior goods where the demand curve is upward sloping).

    o Differentiate between Marshallian (nominal income constant) and compensated (real income constant) demand curves.

- **Lectures 7-8:** Applications of Consumer Behaviour:

    o Labour-Leisure Trade-off: Model the consumer's decision between allocating time to work (generating income for consumption) and leisure using an IC-budget line framework. Analyze the impact of wage changes on labour supply.

- o Inter-temporal Choice (Saving and Borrowing): Model the consumer's decision of allocating consumption across two time periods (present and future) using an IC-budget line framework with the interest rate as the "price" of future consumption. Analyze the impact of interest rate changes on saving and borrowing decisions.

- **Lectures 9-11:** Revealed Preference Theory:

  - o Introduce the fundamental idea of Revealed Preference: observing consumer choices to infer their underlying preferences.

  - o Explain how observed choices can reveal preference ("directly revealed preferred to").

  - o Discuss how to infer preference relations from revealed preference.

  - o Introduce the Weak Axiom of Revealed Preference (WARP) and explain how to check for its violation using choice data.

  - o Introduce the Strong Axiom of Revealed Preference (SARP) and its stricter consistency requirement. Briefly explain how to check for SARP (understanding the principle is key).

- **Lectures 12-14:** Choice Under Uncertainty:

  - o Introduce the concept of decision-making under uncertainty and the role of expected utility.

  - o Explain the concept of a utility function over wealth and how individuals make choices when outcomes are uncertain.

  - o Define and illustrate expected utility as the weighted average of the utilities of possible outcomes.

  - o Explain the concepts of risk aversion (concave utility function), risk preference (convex utility function), and risk neutrality (linear utility function) using diagrams.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage active student participation through discussions and problem-solving.

- **Diagrammatic Analysis:** Heavily rely on indifference curve and budget line diagrams to illustrate consumer choices and the effects of price and income changes.

- **Numerical Examples:** Use simple numerical examples to reinforce the understanding of income and substitution effects, revealed preference, and expected utility.

- **Real-World Applications:** Connect the theoretical concepts to real-world examples of consumer behavior, government policies (subsidies), labor supply

decisions, saving and borrowing, and choices involving risk (e.g., insurance, investments).

- **Thought Experiments:** Pose thought experiments to help students understand the underlying logic of revealed preference and choice under uncertainty.

Continuous Classroom Evaluation:

- **Class Participation:** Assess the quality and frequency of student contributions to discussions.

- **Problem Sets:** Assign problem sets involving the derivation of demand curves, decomposition of price effects, analysis of labor-leisure trade-off, checking for WARP violations, and calculating expected utility.

- **Diagrammatic Exercises:** Ask students to draw and interpret IC-budget line diagrams for various scenarios.

- **Short Quizzes:** Conduct brief quizzes on key concepts and definitions.

- **Application-Based Questions:** Present real-world scenarios and ask students to apply the theories of consumer behavior to analyze them.

Unit 2: Production and Costs (13 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Technology and Production Function:

  o Introduce the general concept of a Production Function (relationship between inputs and output).

  o Analyze production with one variable input: explain Total Product (TP), Average Product (AP), and Marginal Product (MP) curves, their relationship, and the Law of Diminishing Marginal Returns. Illustrate graphically.

  o Analyze production with two variable inputs in the long run: introduce Isoquants (curves showing combinations of inputs yielding the same output), their properties, and the Marginal Rate of Technical Substitution (MRTS).

- **Lectures 4-6:** Firm's Equilibrium:

  o Introduce Isocost Lines (curves showing combinations of inputs that cost the same total amount).

  o Explain the firm's equilibrium conditions for:

    ▪ Output Maximization (producing the highest possible output for a given cost - tangency of isoquant and isocost).

- Cost Minimization (producing a given level of output at the lowest possible cost - tangency of isoquant and isocost). Illustrate diagrammatically.

- o Derive the Expansion Path (locus of cost-minimizing input combinations as output expands).

- o Introduce Ridge Lines and explain their significance in defining the economically relevant region of production.

- o Define and explain the elasticity of substitution between inputs.

- **Lectures 7-8:** Types of Production Functions:

  - o Explain the characteristics and graphical representation of:

    - Cobb-Douglas Production Function (properties related to returns to scale and elasticity of substitution - no complex derivations required).

    - Fixed-Coefficient Production Function (L-shaped isoquants, limited input substitutability).

    - CES (Constant Elasticity of Substitution) Production Function (mention its generality regarding elasticity of substitution).

- **Lectures 9-11:** Cost Structure:

  - o Define and differentiate between:

    - Implicit Cost (opportunity cost of using firm's own resources).

    - Explicit Cost (out-of-pocket expenses).

    - Accounting Cost (explicit cost).

    - Sunk Cost (irrecoverable past costs).

    - Economic Cost (implicit cost + explicit cost).

  - o Analyze short-run costs: Fixed Cost (FC), Variable Cost (VC), Total Cost (TC), Average Fixed Cost (AFC), Average Variable Cost (AVC), Average Total Cost (ATC), and Marginal Cost (MC). Explain their determinants and relationships. Illustrate the short-run cost curves graphically.

- **Lectures 12-13:** Short Run vs. Long Run Costs and Economies of Scale:

  - o Explain the relationship between short-run and long-run average cost curves (LAC as the envelope of SACs).

  - o Define and explain Economies of Scale (decreasing LAC), Diseconomies of Scale (increasing LAC), and Constant Returns to Scale (flat LAC). Discuss their potential sources.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to think critically about production processes and cost implications.

- **Diagrammatic Analysis:** Heavily rely on isoquant-isocost diagrams and cost curve diagrams to illustrate production decisions and cost structures.

- **Numerical Examples:** Use simple numerical examples to demonstrate the calculation of TP, AP, MP, and different cost concepts.

- **Real-World Examples:** Connect the theoretical concepts to real-world production processes and cost management in firms.

- **Graphical Derivations:** Guide students through the logical derivation of cost curves from production functions (conceptually).

Continuous Classroom Evaluation:

- **Class Participation:** Assess student engagement in discussions.

- **Problem Sets:** Assign problems involving the analysis of production functions, cost calculations, and firm equilibrium.

- **Diagrammatic Exercises:** Ask students to draw and interpret isoquant-isocost diagrams and cost curves for various scenarios.

- **Short Quizzes:** Conduct brief quizzes on key concepts and definitions related to production and costs.

- **Case Study Analysis:** Present short case studies of firms and ask students to analyze their production and cost decisions.

Unit 3: The Firm and Perfect Market Structure (10 Lecture Hours)

Lesson Procedure:

- **Lecture 1:** Organization, Firms, and Profit Maximization:

  - Discuss different forms of business organization.

  - State the primary objective of firms as profit maximization (total revenue minus total cost).

- **Lecture 2:** Relationship among TR, AR, MR, and Price Elasticity of Demand:

  - Define Total Revenue (TR), Average Revenue (AR), and Marginal Revenue (MR).

  - Explain the relationship between AR and the demand curve (AR = Price).

  - Derive and explain the relationship between MR and the price elasticity of demand ($MR = P(1 - 1/|Ed|)$).

- **Lecture 3:** Marginal Revenue, Marginal Cost, and Profit Maximization:

- o Explain the general rule for profit maximization for any firm: produce where Marginal Revenue (MR) equals Marginal Cost (MC). Illustrate graphically.

- **Lectures 4-6:** Perfect Competition:

  - o Explain the characteristics of Perfect Competition (many buyers and sellers, homogeneous product, free entry and exit, perfect information).

  - o Analyze the short-run competitive equilibrium of the firm (price-taker, horizontal demand curve, profit maximization at MR=MC). Illustrate diagrammatically.

  - o Derive the short-run supply curve of the firm (the portion of the MC curve above the AVC curve).

  - o Derive the short-run supply curve of the industry (horizontal summation of individual firm supply curves).

- **Lectures 7-8:** Long-Run Equilibrium in Perfect Competition:

  - o Explain the process of entry and exit in the long run in perfect competition.

  - o Analyze the long-run competitive equilibrium (price equals minimum ATC, zero economic profit). Illustrate diagrammatically.

  - o Discuss the concepts of economic rent and profit in the long run.

  - o Explain long-run industry supply under conditions of constant costs, increasing costs, and decreasing costs.

- **Lecture 9:** Consumer and Producer Surplus, Welfare, and Efficiency:

  - o Define and illustrate Consumer Surplus and Producer Surplus using demand and supply curves.

  - o Explain how perfect competition leads to economic efficiency (maximization of total surplus).

- **Lecture 10:** Government Intervention and Deadweight Loss:

  - o Analyze the effects of government interventions like minimum prices (price floors) and price supports on market equilibrium and welfare.

  - o Explain the concept of deadweight loss (reduction in total surplus) resulting from such interventions. Briefly mention price ceilings.

- **(Time Permitting - Can be integrated):** Tax and Market Adjustment, Elasticity and Tax Incidence:

  - o Analyze how the imposition of a tax affects market equilibrium (price and quantity).

  - o Explain the concept of tax incidence (who bears the burden of the tax) and how it is influenced by the price elasticities of demand and supply.

Classroom Teaching Method:

- **Interactive Lectures:** Engage students in analyzing the behavior of firms in a perfectly competitive market.

- **Diagrammatic Analysis:** Heavily rely on demand, supply, TR, AR, MR, and cost curves to illustrate firm behavior and market equilibrium.

- **Numerical Examples:** Use simple numerical examples to demonstrate profit maximization and the effects of government interventions.

- **Real-World Examples:** Discuss examples of markets that approximate perfect competition and the implications of government policies.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student engagement in discussions.

- **Problem Sets:** Assign problems involving profit maximization, market equilibrium, and the effects of government interventions.

- **Diagrammatic Exercises:** Ask students to draw and interpret diagrams related to perfect competition.

- **Short Quizzes:** Conduct brief quizzes on key concepts and definitions.

- **Analysis of Policy Impacts:** Present scenarios involving government policies and ask students to analyze their impact on perfectly competitive markets.

Unit 4: Input Market in Perfect Competition (8 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Basic Concepts:

  - Introduce the concept of derived demand for inputs (demand for inputs depends on the demand for the final product).

  - Define and explain the productivity of an input, Marginal Product of an input (MPP), Value of Marginal Product (VMP = MPP x Price of Output), and Marginal Revenue Product (MRP = MPP x Marginal Revenue of Output). In perfect competition, VMP = MRP.

- **Lectures 3-4:** Marginal Productivity Theory of Distribution:

  - Explain the marginal productivity theory of distribution, which suggests that in competitive markets, factors of production are paid a return equal to their marginal revenue product.

  - Discuss the implications of this theory for the determination of wages, rent, and interest.

- **Lectures 5-6:** Labor Market:

- o Analyze the supply of labor (individual labor supply curve and its determinants, market labor supply curve).

- o Analyze the demand for labor by a firm in a perfectly competitive output market (MRP of labor as the demand curve).

- o Explain the determination of equilibrium wage and employment in a competitive labor market.

- **Lectures 7-8:** Land Markets and Rent:

  - o Define economic rent as payment to a factor of production in excess of its opportunity cost.

  - o Explain the Ricardian Theory of Rent (differential rent based on differences in land fertility).

  - o Introduce the Modern Theory of Rent (rent as a surplus earned by any factor with a perfectly inelastic supply in the short run).

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to think about the factors that determine the demand and supply of inputs.

- **Diagrammatic Analysis:** Use diagrams to illustrate the demand and supply of labor and the determination of wages.

- **Real-World Examples:** Discuss examples of labor markets and the determination of wages in different industries.

- **Conceptual Explanation:** Focus on the underlying logic of the marginal productivity theory and the different theories of rent.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student engagement in discussions.

- **Short Answer Questions:** Ask students to define key concepts like derived demand, VMP, and MRP.

- **Problem Sets:** Assign problems involving the determination of optimal input usage and equilibrium in input markets.

- **Conceptual Understanding:** Test understanding of the marginal productivity theory and the different theories of rent.

By following these unit-wise lesson procedures, classroom teaching methods, and continuous classroom evaluation strategies, you can effectively deliver the Microeconomics (II) course and ensure that students develop a deeper understanding of consumer and producer behavior, market structures, and input markets. Remember to adapt the specific activities and assessments based on the needs and learning styles of your students.

Development Economics (I)

Unit 1: Introduction to Development Economics (9 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Definition, Scope, and Historical Perspective:

  o Define Development Economics, distinguishing it from traditional economics. Discuss its focus on structural transformation, poverty reduction, and improving living standards in developing countries (India context relevant).

  o Outline the scope of Development Economics, including topics like poverty, inequality, growth, human capital, institutions, and international trade.

  o Provide a brief overview of historical perspectives on development theories (e.g., modernization theory, dependency theory, world-systems theory) – focus on the core ideas and their evolution, not in-depth analysis.

- **Lectures 3-4:** Growth vs. Development and Goals/Indicators:

  o Clearly differentiate between economic growth (increase in output) and economic development (broader improvement in well-being, capabilities, and structural change). Use examples.

  o Discuss the key goals of economic development (e.g., poverty reduction, improved health and education, reduced inequality, environmental sustainability).

  o Introduce and explain various indicators of economic development, focusing on the Human Development Index (HDI) – explain its components (life expectancy, education, GNI per capita) and its significance as a composite measure.

- **Lectures 5-6:** Income Approach and Capability Approach:

  o Explain the traditional income-based approach to measuring development and its limitations in capturing the full picture of human well-being.

  o Introduce Amartya Sen's Capability Approach, emphasizing the importance of individuals' capabilities (the freedom to achieve functionings or valuable beings and doings).

  o Compare and contrast the income and capability approaches, highlighting the broader perspective offered by the latter.

- **Lectures 7-9:** International Comparisons and Challenges/Opportunities:

  o Discuss the importance of international comparisons in understanding development levels and progress across countries.

o Analyze key challenges faced by developing economies (e.g., poverty, inequality, weak institutions, infrastructure deficits, health and education gaps, vulnerability to shocks).

o Explore the opportunities available to developing economies (e.g., demographic dividend, technological leapfrogging, globalization, potential for structural transformation). Use India's context for examples.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage student participation through discussions, questions, and sharing of observations about development issues in India and other countries.

- **Case Studies:** Use brief case studies of different countries to illustrate the concepts of growth vs. development and the challenges they face.

- **Visual Aids:** Utilize charts, graphs, and maps to present data on development indicators and facilitate international comparisons.

- **Think-Pair-Share Activities:** Pose questions related to the definition and scope of development economics and have students discuss in pairs before sharing with the class.

- **Current Events:** Relate the concepts to current economic and social issues in developing economies.

Continuous Classroom Evaluation:

- **Class Participation:** Observe and encourage active participation in discussions.

- **Short Quizzes:** Conduct brief quizzes on key definitions and concepts (e.g., growth vs. development, HDI components).

- **Concept Mapping:** Ask students to create concept maps illustrating the scope of development economics or the differences between income and capability approaches.

- **Short Answer Questions:** Assess understanding of the historical perspectives and the challenges/opportunities faced by developing economies.

Unit 2: Poverty, Inequality, And Development (12 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Causes and Consequences of Poverty:

o Analyze the multifaceted causes of poverty in developing economies, including economic factors (unemployment, low wages, lack of access to resources), social factors (inequality, lack of education and healthcare), and institutional factors (corruption, weak governance). Focus on the Indian context.

- Discuss the severe consequences of poverty at the individual (health, education, well-being) and societal (crime, social unrest, slower economic growth) levels.

- **Lectures 4-6:** Measurement of Poverty:

  - Explain the concept of a Poverty Line (absolute and relative poverty). Discuss the challenges in defining and measuring poverty lines in developing countries (India's poverty line methodology can be discussed).

  - Introduce and explain different Poverty Indices:

    - Headcount Ratio

    - Poverty Gap Index

    - Squared Poverty Gap Index (brief conceptual understanding of its sensitivity to the depth of poverty)

    - Human Poverty Index (HPI) – explain its components (probability of not surviving to a certain age, adult illiteracy rate, lack of access to clean water and healthcare).

    - Multidimensional Poverty Index (MPI) – explain its focus on multiple deprivations across health, education, and living standards.

  - Explain the Vicious Circle of Poverty Hypothesis with diagrams, illustrating how low income and capital stock can perpetuate poverty.

- **Lectures 7-9:** Income Inequality and Wealth Distribution:

  - Define income inequality and wealth distribution.

  - Introduce and explain commonly used Inequality Measures:

    - Lorenz Curve – explain how to plot and interpret the Lorenz Curve to visualize income/wealth distribution.

    - Gini Coefficient – explain its derivation from the Lorenz Curve and its interpretation as a numerical measure of inequality (ranging from 0 to 1). Discuss the limitations of the Gini Coefficient.

  - Compare and contrast the Lorenz Curve and Gini Coefficient as measures of inequality.

- **Lectures 10-12:** Gender Inequality:

  - Define Gender Inequality and its various dimensions (economic, social, political).

  - Introduce and explain the Gender Inequality Index (GII) – explain its components (reproductive health, empowerment, and economic activity) and its significance in measuring gender disparities.

o Discuss the causes and consequences of gender inequality for economic development.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage discussions on the causes and consequences of poverty and inequality in India.

- **Data Analysis:** Present data on poverty and inequality in India and other developing countries and guide students in interpreting it.

- **Graphical Representation:** Use Lorenz Curves and other diagrams to illustrate income/wealth distribution and poverty concepts.

- **Case Studies:** Analyze case studies of successful poverty reduction programs or the impact of gender inequality on economic outcomes.

- **Debates:** Organize short debates on policy measures aimed at reducing poverty and inequality.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions on poverty and inequality.

- **Short Quizzes:** Conduct brief quizzes on poverty measures and inequality indices.

- **Problem Solving:** Assign simple problems related to interpreting poverty indices or understanding the Gini Coefficient (conceptually).

- **Essay Questions:** Ask students to write short essays on the causes and consequences of poverty or the impact of gender inequality.

- **Interpretation of Data:** Provide data on poverty and inequality and ask students to interpret the findings.

Unit 3: Dual Economy and Development Strategies (12 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Surplus Labour and Disguised Unemployment:

    o Explain the concept of a Dual Economy, characterized by a traditional (often agrarian) sector with low productivity and a modern (industrial) sector with higher productivity.

    o Define and explain the concepts of Surplus Labour (MPL is zero or very low) and Disguised Unemployment in the context of the traditional sector. Discuss their implications for development.

- **Lectures 4-7:** Lewis Model of Economic Development:

    o Introduce and explain the Lewis Model (also known as the surplus labor model).

- o Outline the key assumptions of the model (unlimited supply of labor in the traditional sector, constant real wages in the modern sector initially, reinvestment of profits).

- o Explain the process of labor transfer from the traditional to the modern sector and its role in driving economic growth. Use diagrams to illustrate the model's dynamics.

- o Discuss the limitations and criticisms of the Lewis Model in the context of real-world developing economies.

- **Lectures 8-10:** Balanced and Unbalanced Growth Strategies:

  - o Explain the Balanced Growth strategy, advocating for simultaneous investments across a wide range of industries to create a self-reinforcing cycle of demand and supply (e.g., Nurkse's idea of a "big push"). Discuss its potential benefits and drawbacks.

  - o Explain the Unbalanced Growth strategy, advocating for strategic investments in key leading sectors to create linkages and induce further investment in other sectors (e.g., Hirschman's "forward and backward linkages"). Discuss its potential benefits and drawbacks.

  - o Compare and contrast the balanced and unbalanced growth strategies, considering their applicability in different contexts.

- **Lectures 11-12:** Choice of Techniques:

  - o Discuss the issue of choosing appropriate production techniques in developing countries, considering factor endowments (labor abundance, capital scarcity).

  - o Explain the concepts of Labour-Intensive Techniques and Capital-Intensive Techniques.

  - o Analyze the factors influencing the choice of techniques (relative factor prices, availability of technology, scale of production, development objectives like employment generation).

  - o Discuss the concept of "appropriate technology" that aligns with the specific needs and resources of developing economies.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to critically analyze the assumptions and implications of different development models and strategies.

- **Diagrammatic Explanation:** Use diagrams to illustrate the Lewis Model and the concepts of linkages in balanced/unbalanced growth.

- **Case Studies:** Analyze historical examples of countries that pursued balanced or unbalanced growth strategies.

- **Debates:** Organize debates on the relative merits of balanced vs. unbalanced growth or the choice of appropriate techniques.

- **Model Building (Simplified):** Guide students in building simplified conceptual models to understand the dynamics of dual economies.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions on development strategies.

- **Short Quizzes:** Conduct brief quizzes on the key features of the Lewis Model and the balanced/unbalanced growth strategies.

- **Essay Questions:** Ask students to compare and contrast different development strategies or analyze the relevance of the Lewis Model.

- **Problem Solving (Conceptual):** Present scenarios related to surplus labor or choice of techniques and ask students to apply the learned concepts.

Unit 4: Financial Inclusion and Development (12 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Financial Inclusion and its Impact:

  - Define Financial Inclusion as access to and use of affordable and appropriate financial services by all segments of society, particularly the poor and vulnerable.

  - Discuss the various dimensions of financial inclusion (access to savings, credit, insurance, payments).

  - Analyze the significant impact of financial inclusion on economic development, including poverty reduction, income generation, entrepreneurship, and overall economic growth. Provide examples from India.

- **Lectures 4-6:** Access to Credit and Financial Services in Rural Areas:

  - Discuss the specific challenges faced by rural populations in accessing formal financial services (e.g., lack of collateral, information asymmetry, remoteness).

  - Explain the concept of Microfinance and its role in providing small loans and other financial services to the poor, particularly women, in rural areas.

  - Discuss the successes and limitations of microfinance as a tool for poverty alleviation.

- **Lectures 7-9:** Role of Banks and Financial Institutions:

  - Analyze the crucial role of banks (commercial banks, regional rural banks, cooperative banks) and other financial institutions (NBFCs) in promoting

economic development through financial intermediation, credit creation, and facilitating investment.

- o Discuss the challenges faced by the formal banking sector in reaching underserved populations and the initiatives taken to promote financial inclusion (e.g., branch expansion, mobile banking, digital payments).

- **Lectures 10-12:** Objectives and Functions of IMF, World Bank, WTO:

  - o Explain the primary objectives and key functions of the International Monetary Fund (IMF) in promoting global monetary cooperation, financial stability, and sustainable economic growth. Discuss its role in providing financial assistance and policy advice to developing countries.

  - o Explain the primary objectives and key functions of the World Bank Group in reducing poverty and promoting shared prosperity. Discuss its role in providing financial and technical assistance for development projects in developing countries.

  - o Explain the primary objectives and key functions of the World Trade Organization (WTO) in regulating international trade, reducing trade barriers, and providing a forum for trade negotiations. Discuss its impact on developing economies.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage discussions on the importance of financial inclusion in India's development.

- **Case Studies:** Analyze case studies of successful microfinance initiatives or the impact of financial inclusion programs.

- **Guest Speakers (Optional):** Invite representatives from banks, microfinance institutions, or development organizations to share their experiences.

- **Policy Discussions:** Discuss government policies and initiatives aimed at promoting financial inclusion in India.

- **Role-Playing:** Simulate scenarios involving access to credit in rural areas.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions on financial inclusion.

- **Short Quizzes:** Conduct brief quizzes on the definitions and roles of financial institutions.

- **Essay Questions:** Ask students to analyze the impact of financial inclusion on economic development or the role of microfinance.

- **Presentation/Research:** Assign short research tasks on specific financial inclusion initiatives or the functions of international financial institutions.

By following this unit-wise breakdown, you can effectively deliver the Development Economics (I) course, incorporating diverse teaching methods and continuous evaluation to facilitate student learning and understanding of the core concepts and issues in development economics. Remember to adapt the specific examples and case studies to the Indian context to make the subject matter more relevant for your students.

Data Analysis and Research Methodology

Theory (30 Lecture Hours)

Unit 1: Methodologies of Collection of Data (5 Lecture Hours)

Lesson Procedure:

- **Lecture 1:** Complete Enumeration vs. Sample Survey:

    o Introduce the concept of collecting data for research.

    o Explain the difference between complete enumeration (census) and sample survey, highlighting their advantages, disadvantages, feasibility, and cost-effectiveness in different scenarios. Provide real-world examples.

- **Lectures 2-3:** Sampling Techniques (Basic Ideas):

    o Introduce the need for sampling and the concept of a representative sample.

    o Explain the basic ideas (without mathematical proofs) of the following sampling techniques:

        ▪ Simple Random Sampling (with and without replacement): Emphasize the principle of equal chance.

        ▪ Stratified Random Sampling: Explain the concept of dividing the population into strata and then drawing random samples from each. Discuss the benefits of stratification.

        ▪ Circular Sampling: Briefly introduce this systematic sampling method.

        ▪ Sampling Proportional to Size (PPS): Explain the idea of giving larger units a higher probability of being selected.

    o Focus on the conceptual understanding and application scenarios for each technique.

- **Lecture 4:** Practical Methods of Drawing Random Samples:

    o Demonstrate the practical methods of drawing simple random samples using random number tables (provide examples and guide students through the process).

- **Lecture 5:** Prerequisites for Field Survey and Questionnaire Preparation:

- Discuss the essential prerequisites for conducting a field survey, including defining objectives, target population, scope, and preparing blank tables for data recording.

- Explain the process of preparing a questionnaire, emphasizing the importance of clear, concise, and unbiased questions.

- Provide illustrations and guide students in preparing hypothetical questionnaires based on different survey objectives (e.g., consumer behavior, household income).

Classroom Teaching Method (Theory):

- **Interactive Lectures:** Encourage student participation through discussions and examples from everyday life.

- **Real-World Examples:** Use examples of surveys and data collection methods used in various fields (economics, marketing, social sciences).

- **Comparative Analysis:** Compare and contrast different sampling techniques based on their suitability for different research questions and populations.

- **Practical Demonstrations:** Demonstrate the use of random number tables for sample selection.

- **Group Discussions:** Facilitate discussions on the challenges of designing effective questionnaires.

Continuous Classroom Evaluation (Theory):

- **Class Participation:** Assess the level and quality of student engagement in discussions.

- **Short Quizzes:** Conduct brief quizzes on the definitions and basic principles of sampling techniques.

- **Conceptual Questions:** Ask questions that test understanding of the advantages and disadvantages of different sampling methods.

- **Questionnaire Critique:** Ask students to critique hypothetical questionnaires for clarity, bias, and completeness.

Unit 2: Recording & Validating of Data (5 Lecture Hours)

Lesson Procedure:

- **Lecture 1:** Recording of Data After Survey:

  - Discuss the importance of systematic data recording after completing a survey.

  - Explain different methods of manual data recording (e.g., filling questionnaires, data entry sheets).

- Introduce digital methods of data recording (e.g., using spreadsheets, survey software on tablets/smartphones). Discuss the advantages and disadvantages of each method.

- **Lecture 2:** Tabular Representation of Data Collected:

  - Emphasize the importance of organizing collected data into tables for analysis.

  - Guide students on creating different types of tables (frequency tables, cross-tabulations) from raw survey data.

- **Lecture 3:** Cross-Checking of Data After Tabular Representation:

  - Explain the crucial step of data validation and error checking after data recording and tabulation.

  - Discuss various methods of cross-checking data for inconsistencies, outliers, and missing values (e.g., comparing different sources, logical checks, range checks).

- **Lecture 4-5:** Role of Units of Measurement:

  - Highlight the critical role of units of measurement in data collection, recording, and analysis.

  - Discuss the importance of consistency in units and the potential errors that can arise from using different or incorrect units.

  - Provide examples of common units of measurement in economic and social data and the need for careful attention to them.

Classroom Teaching Method (Theory):

- **Interactive Lectures:** Encourage students to share their experiences or ideas about data recording and validation.

- **Real-World Examples:** Use examples of data errors and their consequences in research.

- **Practical Demonstrations:** Show examples of data entry formats and basic error-checking techniques in spreadsheets.

- **Case Studies:** Discuss scenarios where data recording or validation errors could lead to misleading conclusions.

Continuous Classroom Evaluation (Theory):

- **Class Participation:** Assess student engagement in discussions.

- **Short Answer Questions:** Ask students to explain different methods of data recording and validation.

- **Error Identification Exercises:** Present examples of datasets with potential errors and ask students to identify them.

- **Importance of Units:** Ask students to explain the significance of units of measurement in data analysis.

Unit 3: Elements of Report Writing (5 Lecture Hours)

Lesson Procedure:

- **Lecture 1:** Locating Basic Issues and Developing Writing Skills:

  - Discuss the initial steps in report writing: identifying the core research question or theme.

  - Guide students on conducting a basic theme-based literature survey to understand existing research and establish the motivation for their study.

  - Emphasize the importance of clearly defining the objectives of the study.

  - Provide basic tips for developing clear, concise, and logical writing skills for research reports.

- **Lecture 2:** Methodological Issues: Use of Tables and Graphs:

  - Reiterate the importance of clearly outlining the research methodology used (sampling technique, data collection method).

  - Emphasize the effective use of tables and graphs to present data and findings in a clear and understandable manner (refer back to basic statistical presentation techniques).

- **Lecture 3:** Use of Measures of Central Tendency and Dispersion in Analyzing Results:

  - Explain how to select and use appropriate measures of central tendency (mean, median, mode) and dispersion (range, standard deviation, etc.) to summarize and analyze the collected data.

  - Guide students on interpreting these measures in the context of their research questions.

- **Lecture 4:** Insertion of Footnotes or Endnotes:

  - Explain the purpose and proper methods of inserting footnotes or endnotes for citing sources, providing additional information, or clarifying points.

  - Discuss different citation styles (briefly).

- **Lecture 5:** Preparation of Bibliography:

  - Explain the importance of a comprehensive bibliography to acknowledge all sources used in the research.

  - Provide guidelines and examples for preparing a bibliography using a consistent citation style.

Classroom Teaching Method (Theory):

- **Interactive Lectures:** Encourage discussions on the different components of a research report.

- **Examples and Case Studies:** Analyze excerpts from research reports to illustrate good writing practices, methodological descriptions, and citation styles.

- **Group Discussions:** Facilitate discussions on the challenges of writing a clear and concise research report.

Continuous Classroom Evaluation (Theory):

- **Class Participation:** Assess student engagement in discussions about report writing.

- **Outline of a Report:** Ask students to prepare a basic outline for a research report on a hypothetical topic.

- **Bibliography Exercise:** Assign a short exercise on preparing a bibliography for a given set of sources.

- **Critique of Report Excerpts:** Ask students to critique excerpts from research reports based on clarity, methodology description, and citation.

Unit 4: Basics of Power Query in MS Excel, Power BI (15 Lecture Hours)

Lesson Procedure:

- **Lectures 1-5 (Lab/Theory):** Power Query in Excel - Connect:

  - Introduce Power Query as a data transformation and preparation tool within Excel.

  - Demonstrate how to connect to various data sources (Excel files, CSV files, web data - basic examples).

  - Explain the Power Query Editor interface.

- **Lectures 6-10 (Lab/Theory):** Power Query in Excel - Transform:

  - Demonstrate and provide hands-on practice with common data transformation operations:

    - Filtering rows

    - Removing columns

    - Renaming columns

    - Changing data types

    - Splitting columns

    - Merging columns

- ▪ Handling missing values

  - ▪ Adding custom columns (basic formulas).

- **Lectures 11-12 (Lab/Theory):** Power Query in Excel - Combine & Load:

  - o Demonstrate how to combine data from multiple sources (append queries, merge queries - basic examples).

  - o Explain how to load the transformed data back into an Excel worksheet or the Data Model.

- **Lectures 13-14 (Lab/Theory):** Power BI - Loading Excel Data & Basic Visualization:

  - o Introduce Power BI Desktop and its interface.

  - o Demonstrate how to load data from Excel files into Power BI.

  - o Introduce basic data visualization techniques in Power BI: creating bar charts, column charts, line charts, pie charts from the loaded data.

- **Lecture 15 (Lab/Theory):** Power BI - Explore Data & Informed Decisions (Conceptual):

  - o Briefly explain how to interact with visualizations in Power BI to explore data (e.g., drilling down, filtering).

  - o Discuss the potential of Power BI for making informed decisions based on data insights (emphasize the conceptual link to the data analysis skills learned).

Classroom Teaching Method (Theory & Lab):

- **Demonstration:** Instructor demonstrates the features and functionalities of Power Query and Power BI.

- **Hands-on Practice:** Students actively work with Excel and Power BI in a computer lab setting, following the demonstrations and completing exercises.

- **Guided Exercises:** Provide structured exercises that require students to use Power Query to clean and transform data, and Power BI to visualize it.

- **Real-World Examples:** Use examples of messy datasets and how Power Query can be used to prepare them for analysis. Show examples of basic dashboards in Power BI.

Continuous Classroom Evaluation (Theory & Lab):

- **Observation of Lab Work:** Monitor students' progress and provide feedback during lab sessions.

- **Completion of Exercises:** Assess students' ability to perform data transformation and visualization tasks.

- **Short Practical Quizzes:** Conduct short quizzes where students need to perform specific tasks in Power Query or Power BI.

- **Assignment Submissions:** Assign short assignments that require students to use Power Query to clean a given dataset and create basic visualizations in Power BI.

Practical (30 Lecture Hours - Sample Survey, Report Writing, Presentation)

Lesson Procedure (Practical):

- **Weeks 1-3 (Lab/Field):** Sample Survey (Questionnaire Preparation & Data Collection - 25 marks):

  o Students, individually or in small groups (as per internal examiner's decision), will choose a research topic relevant to their field of study.

  o They will prepare a questionnaire based on their research objectives (guided by the theoretical knowledge from Unit 1).

  o They will conduct a small sample survey to collect primary data using an appropriate sampling technique (emphasize the importance of understanding the chosen sampling procedure).

  o Instructor will provide guidance and feedback on questionnaire design and data collection methods.

- **Weeks 4-7 (Lab):** Report Writing (Data Analysis & Dashboard Creation - 15 marks):

  o Students will enter and organize their collected data in Microsoft Excel.

  o They will perform statistical analysis using Excel functions (descriptive statistics, basic cross-tabulations, etc.).

  o They will design and create a Dynamic Interactive Dashboard in MS Excel to present their key findings visually (using charts, tables, slicers, etc.).

  o Instructor will provide guidance on data analysis techniques in Excel and dashboard creation.

- **Week 8 (Lab):** Report Writing (Interpretation & Analysis):

  o Students will write a brief report summarizing their research objectives, methodology (including the sampling procedure used), key findings (presented through their dashboard), and interpretation of the results.

- **Week 9 (Examination):** Practical Examination & Viva (10 marks):

  o Students will present their Dynamic Interactive Dashboard in the computer laboratory.

  o Examiners (supervisor and external) will assess their ability to use Excel for data analysis and dashboard creation (by asking them to demonstrate functionalities and answer questions related to their work).

- A viva-voce will be conducted for each individual student to assess their understanding of the research topic, the sampling procedure used, the data collected, the statistical analysis performed, and the economic insights derived from their findings. Students must bring their original dataset to the examination.

Classroom Teaching Method (Practical):

- **Project-Based Learning:** The practical component is structured around a small research project.

- **Hands-on Application:** Students apply the theoretical knowledge gained in the theory classes to real-world data collection and analysis.

- **Software Training:** Focus on developing practical skills in using Microsoft Excel for data management, analysis, visualization, and dashboard creation.

- **Supervised Lab Sessions:** Instructor provides guidance and support during lab sessions as students work on their projects.

- **Peer Learning:** Encourage students to learn from each other during group work (if applicable).

Continuous Classroom Evaluation (Practical):

- **Questionnaire Assessment:** Evaluate the quality and relevance of the questionnaires prepared by students.

- **Data Collection Process:** Observe and provide feedback on students' data collection efforts.

- **Excel Skills Assessment:** Evaluate students' proficiency in using Excel for data entry, organization, analysis, and visualization.

- **Dashboard Evaluation:** Assess the effectiveness and clarity of the Dynamic Interactive Dashboards created by students.

- **Report Assessment:** Evaluate the quality of the written report, including the clarity of methodology, presentation of findings, and interpretation of results.

- **Viva-Voce Performance:** Assess individual students' understanding of their research project, data, analysis, and insights during the viva-voce examination.

This detailed breakdown should provide a comprehensive guide for your lesson procedures, teaching methods, and continuous evaluation for Data Analysis and Research Methodology, effectively integrating the theoretical concepts with the practical application using Microsoft Excel and Power BI. Remember to emphasize the importance of ethical data collection and responsible data analysis throughout the course.

Mathematical Economics (I)

Unit 1: Preliminaries (20 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Sets and Matrices (Part 1):

  o Introduce the concept of sets, their operations (union, intersection, complement, difference), and Cartesian products with examples relevant to economic modeling.

  o Define open and closed sets on the real line and in higher dimensions (intuitive understanding).

  o Introduce convex sets and their properties, illustrating with geometric examples.

  o Introduce matrices, their types, and basic elementary row operations.

- **Lectures 4-6:** Matrices (Part 2):

  o Explain how to find the rank of a matrix using elementary row operations.

  o Define the determinant of a square matrix (up to 3x3) and its properties.

  o Explain how to find the inverse of a square matrix using the adjoint method and elementary row operations (if time permits).

- **Lectures 7-8:** Solution of Linear Equations and Eigenvalues/Eigenvectors:

  o Explain how to solve a system of linear equations using Cramer's rule. Provide economic examples (e.g., market equilibrium).

  o Introduce the concepts of eigenvalues and eigenvectors (focus on definition and basic calculation for 2x2 matrices; economic intuition can be briefly mentioned).

- **Lectures 9-12:** Functions of One Real Variable:

  o Define functions, their domain, and range.

  o Explain geometric properties: increasing/decreasing, convex/concave (using first and second derivatives intuitively), quasi-concave/quasi-convex (geometric intuition).

  o Introduce monomial, polynomial, linear, non-linear, explicit, and implicit functions with examples.

  o Review the number system (real numbers).

  o Introduce the concept of the limit of a function (intuitive understanding). State different limit theorems without proofs.

  o Define continuity of a function.

  o Explain the concept of differentiability from first principles. Introduce first and second-order differentiation.

- State and explain L'Hospital's Rule and its application.

- Relate the first derivative to the slope and the second derivative to the curvature of a function.

- Sketch graphs of linear, quadratic, polynomial, power, exponential, and logarithmic functions.

- Explain conditions for checking quasi-convexity/quasi-concavity (using first and second derivatives).

- Applications: Define and explain marginal and average functions and elasticity in economics using derivatives.

- **Lectures 13-17:** Functions of Several Variables:

  - Define functions of several variables.

  - Explain partial and total derivatives and their economic interpretations (e.g., marginal utility, marginal product).

  - Introduce the Hessian Matrix.

  - Explain monotonic transformations of functions with economic examples (e.g., utility).

  - Define homogeneous and homothetic functions and state Euler's theorem (without proof). Provide economic examples (e.g., production functions with constant returns to scale).

  - State the Implicit Function Theorem (without proof) and explain the concept of the Jacobian determinant and its role in the existence of solutions for systems of non-linear equations.

  - Explain conditions for convexity/concavity and quasi-convexity/quasi-concavity for two-variable functions using partial derivatives and the Hessian.

- **Lectures 18-20:** Level Curves and Economic Applications:

  - Define level curves (e.g., indifference curves, isoquants).

  - Explain how to find the slope (MRS, MRTS) and interpret the curvature of level curves using derivatives.

  - Applications:

    - Utility function: Marginal Utility, Indifference curves and their properties (using calculus).

    - Demand function: Price elasticity, income elasticity, cross-price elasticity (using partial derivatives).

    - Production function: Marginal Product of labor and capital, Isoquants and their slope (MRTS), Output elasticity.

- Introduce the concept of Comparative Static Analysis using derivatives (e.g., effect of a parameter change on equilibrium).

Classroom Teaching Method:

- **Interactive Lectures:** Encourage student participation through problem-solving and asking conceptual questions.

- **Problem-Solving Sessions:** Dedicate time to working through examples and exercises related to each concept.

- **Geometric Intuition:** Use diagrams and graphs to build geometric intuition for concepts like convexity, concavity, level curves, and derivatives.

- **Economic Interpretation:** Emphasize the economic interpretation and application of each mathematical concept.

- **Use of Examples:** Illustrate abstract mathematical ideas with concrete economic examples.

Continuous Classroom Evaluation:

- **Class Participation:** Assess the quality and frequency of student contributions.

- **Homework Assignments:** Assign regular problem sets covering the topics taught.

- **Short Quizzes:** Conduct brief quizzes on basic definitions, formulas, and problem-solving techniques.

- **Mid-Term Exam:** Cover the topics from sets and matrices to functions of one variable.

- **Problem-Solving in Class:** Regularly ask students to solve problems during lectures.

Unit 2: Single Variable Optimization (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Concepts of Maxima and Minima:

  - Define local and global maximum/minimum with graphical illustrations.

  - Explain the difference between interior and boundary optima.

  - Introduce the concept of stationary/critical points where the first derivative is zero.

  - Explain extreme values (maximum or minimum values of a function on a given interval).

- **Lectures 4-6:** First and Second Order Conditions:

- State and explain the significance of the first-order condition (FOC) for maximization/minimization (f'(x) = 0).

- State and explain the significance of the second-order condition (SOC) for maximization (f''(x) < 0) and minimization (f''(x) > 0).

- Discuss cases where the second derivative test fails and higher-order derivatives might be needed (briefly).

- **Lectures 7-10:** Applications in Economics:

  - Profit maximization for a competitive firm: Set up the profit function ($\pi(q)$ = TR(q) - TC(q)), find the first and second-order conditions, and solve for the profit-maximizing output.

  - Effects of a lump-sum tax: Analyze how a fixed tax affects the profit-maximizing output.

  - Effects of a specific tax: Analyze how a per-unit tax affects the profit-maximizing output and price.

  - Effects of an ad valorem tax: Analyze how a percentage tax affects the profit-maximizing output and price.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to apply the optimization conditions to economic problems.

- **Problem-Solving Sessions:** Focus on working through various profit maximization problems with different cost and revenue functions.

- **Graphical Interpretation:** Use graphs of total revenue, total cost, marginal revenue, and marginal cost to illustrate the conditions for profit maximization.

- **Comparative Statics:** Analyze how changes in parameters (e.g., tax rates) affect the optimal output.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student engagement in problem-solving.

- **Homework Assignments:** Assign problems on finding maxima and minima and applying them to firm behavior.

- **Short Quizzes:** Conduct quizzes focusing on the first and second-order conditions and their application.

- **Problem-Solving in Class:** Ask students to solve profit maximization problems during lectures.

Unit 3: Optimisation of Several Variable Functions (15 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Unconstrained Optimization - Concepts and Conditions:

  - Introduce the concepts of unconstrained and constrained optimization.

  - Focus on unconstrained optimization of a function of two variables ($z = f(x, y)$).

  - Explain the first-order conditions ($\partial f/\partial x = 0$ and $\partial f/\partial y = 0$) for locating stationary points.

- **Lectures 3-5:** Second Order Conditions - Hessian Determinant:

  - Introduce the Hessian Matrix and the Hessian determinant.

  - Explain the second-order conditions for maximization (Hessian determinant > 0 and $f\_xx < 0$) and minimization (Hessian determinant > 0 and $f\_xx > 0$).

  - Discuss the case of a saddle point (Hessian determinant < 0).

- **Lectures 6-7:** Application - Profit Maximization with Factor Uses:

  - Set up the profit maximization problem for a competitive firm with a production function $z = f(L, K)$ and given prices of output, labor (w), and capital (r).

  - Derive the first-order conditions for optimal factor usage ($VMP\_L = w$ and $VMP\_K = r$).

  - Apply the second-order conditions to ensure profit maximization.

- **Lectures 8-10:** Constrained Optimization with Equality Constraint - Lagrange Method:

  - Introduce the method of Lagrange multipliers for solving constrained optimization problems (maximize/minimize $f(x, y)$ subject to $g(x, y) = c$).

  - Explain the formation of the Lagrangian function and the derivation of the first-order conditions.

  - Introduce the Bordered Hessian determinant as the second-order condition for constrained optimization.

- **Lectures 11-13:** Applications in Economics (Part 1):

  - Utility Maximization: Set up the utility maximization problem (maximize $U(x, y)$ subject to $Px x + Py y = M$). Derive the first-order conditions and interpret the Lagrange multiplier (marginal utility of income). Derive demand curves and the income consumption curve. Introduce the indirect utility function. State Roy's identity (without proof) and demonstrate its use.

  - Expenditure Minimization: Set up the expenditure minimization problem (minimize $Px x + Py y$ subject to $U(x, y) = U\_bar$). Derive the first-order

conditions and interpret the Lagrange multiplier. Derive compensated demand functions. State Shephard's Lemma (without proof) and demonstrate its use. Derive the Slutsky equation (conceptually, relating the derivatives of Marshallian and Hicksian demand).

- **Lectures 14-15:** Applications in Economics (Part 2):

  o Optimal Choice of Labor and Leisure: Set up the consumer's problem of maximizing utility from consumption and leisure subject to a time constraint and a budget constraint. Derive the optimal choice.

  o Cost Minimization: Set up the cost minimization problem (minimize $wL + rK$ subject to $f(L, K) = Q\_bar$). Derive the first-order conditions and interpret the Lagrange multiplier. Derive factor demand functions and the cost function. Explain the expansion path.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to formulate economic problems mathematically and apply optimization techniques.

- **Problem-Solving Sessions:** Dedicate significant time to working through constrained optimization problems in consumer theory and producer theory.

- **Diagrammatic Interpretation:** Connect the mathematical solutions to graphical representations (e.g., tangency conditions for utility maximization and cost minimization).

- **Economic Intuition:** Emphasize the economic meaning of the first and second-order conditions and the Lagrange multiplier.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student engagement in problem-solving.

- **Homework Assignments:** Assign problems on unconstrained and constrained optimization in various economic contexts.

- **Short Quizzes:** Conduct quizzes focusing on the Lagrange method and its applications.

- **Mid-Term Exam (covering Unit 2 and Unit 3):** Include problems on both single and multivariable optimization.

- **Problem-Solving in Class:** Ask students to set up and solve optimization problems during lectures.

Unit 4: Constrained Optimisation with Inequality Constraint and Linear Programming Problem (15 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Constrained Optimization with Inequality Constraints:

- o Introduce the concept of inequality constraints.

- o Explain the application of Kuhn-Tucker conditions (focus on the statement of the conditions and their economic intuition, not rigorous proofs).

- o Work through simple economic examples involving inequality constraints (e.g., budget constraints with non-negativity conditions).

- **Lectures 4-6:** Linear Programming Problem (LPP) - Formulation and Graphical Solution:

  - o Introduce Linear Programming as a technique for optimizing a linear objective function subject to linear inequality constraints.

  - o Explain how to formulate economic problems (e.g., production planning, diet problem) as LPPs.

  - o Teach how to solve LPPs graphically for two-variable problems, identifying the feasible region and the optimal solution.

- **Lectures 7-8:** Basic Feasible Solution, Slack and Surplus Variables:

  - o Introduce the concepts of basic feasible solutions, corner points, and their relationship to optimal solutions.

  - o Explain the role and interpretation of slack variables (for ≤ constraints) and surplus variables (for ≥ constraints).

- **Lectures 9-11:** Duality and Duality Theorems:

  - o Introduce the concept of duality in linear programming (the primal and the dual problem).

  - o State the basic Duality Theorems (without proofs):

    - ▪ Weak Duality Theorem

    - ▪ Strong Duality Theorem

    - ▪ Complementary Slackness Theorem

  - o Explain the economic intuition behind duality.

- **Lectures 12-15:** Economic Applications of LPP:

  - o Diet Problem: Formulate and interpret the solution of a classic diet problem using LPP.

  - o Production Problem: Formulate and interpret the solution of a production planning problem with resource constraints using LPP.

  - o Leontief Static Open Model: Introduce the input-output framework. Explain the basic equations and the use of the Leontief inverse to determine output levels required to meet final demand.

- Leontief Static Closed Model: Briefly introduce the closed model where labor is also considered an endogenous sector.

- Hawkins-Simon Conditions: State and explain the economic interpretation of the Hawkins-Simon conditions for the existence of a viable solution in the Leontief open model.

- Economic Interpretation of the Dual: Explain the economic meaning of the dual variables (shadow prices) in the context of resource allocation.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to formulate economic problems as LPPs.

- **Problem-Solving Sessions:** Focus on working through LPP examples, including graphical solutions and interpretation of results.

- **Economic Interpretation:** Emphasize the economic meaning of the primal and dual problems, slack/surplus variables, and shadow prices.

- **Case Studies (Simplified):** Use simplified case studies to illustrate the application of linear programming in economic decision-making.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student engagement in problem formulation and solution.

- **Homework Assignments:** Assign problems on formulating and solving LPPs graphically.

- **Short Quizzes:** Conduct quizzes on the concepts of duality, slack/surplus variables, and the Hawkins-Simon conditions.

- **Problem-Solving in Class:** Ask students to formulate and start solving LPPs during lectures.

- **Final Exam (comprehensive):** Include problems from all four units, with a significant weight on optimization techniques and their economic applications.

By following this unit-wise breakdown, you can effectively deliver the Mathematical Economics (I) course, integrating mathematical rigor with economic intuition and applications. Consistent problem-solving practice and emphasis on economic interpretation are crucial for student success in this subject.

Macroeconomics (II)

Unit 1: Income Determination in the Short-run (Part-II): The IS-LM Model (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Introduction to the IS Curve:

  - Review the goods market equilibrium from Macroeconomics (I) (Y = AE).

  - Introduce the concept of the IS curve as representing equilibrium in the goods market at different levels of income (Y) and the interest rate (r).

  - Derive the IS curve graphically and algebraically, showing the negative relationship between r and Y. Explain the factors that shift the IS curve (changes in autonomous spending, taxes).

- **Lectures 3-4:** Introduction to the LM Curve:

  - Review the money market equilibrium (Money Demand = Money Supply).

  - Introduce the concept of the LM curve as representing equilibrium in the money market at different levels of income (Y) and the interest rate (r).

  - Derive the LM curve graphically and algebraically, showing the positive relationship between Y and r. Explain the factors that shift the LM curve (changes in money supply, price level, autonomous money demand).

- **Lectures 5-6:** IS-LM Equilibrium and Stability:

  - Explain how the intersection of the IS and LM curves determines the simultaneous equilibrium in both the goods and money markets (equilibrium Y and r).

  - Discuss the concept of stability of the IS-LM equilibrium (how the economy adjusts back to equilibrium after a disturbance – intuitive explanation).

- **Lectures 7-8:** Comparative Statics: Effects of Fiscal Policy:

  - Analyze the effects of changes in government spending and taxes (fiscal policy) on the IS curve, the equilibrium Y and r.

  - Explain the concept of the fiscal policy multiplier in the IS-LM framework and how it differs from the simple Keynesian multiplier.

- **Lectures 9-10:** Comparative Statics: Effects of Monetary Policy and Crowding Out:

  - Analyze the effects of changes in the money supply (monetary policy) on the LM curve, the equilibrium Y and r.

  - Explain the concept of "crowding out" – how expansionary fiscal policy can lead to an increase in interest rates and a reduction in private investment. Discuss the factors affecting the extent of crowding out (slope of IS and LM curves).

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to actively participate in deriving and analyzing the IS and LM curves.

- **Graphical Analysis:** Heavily rely on diagrams to illustrate the IS and LM curves, their shifts, and the equilibrium.

- **Algebraic Derivations:** Guide students through the basic algebraic derivations of the IS and LM equations and the equilibrium.

- **Numerical Examples:** Use simple numerical examples to demonstrate the impact of policy changes on equilibrium Y and r.

- **Real-World Policy Discussions:** Relate the IS-LM model to real-world fiscal and monetary policy decisions and their observed effects.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions and problem-solving.

- **Problem Sets:** Assign problems involving the derivation and analysis of the IS and LM curves, and the effects of policy changes.

- **Graphical Interpretation:** Ask students to interpret IS-LM diagrams for various scenarios.

- **Conceptual Questions:** Test understanding of the underlying mechanisms and the concept of crowding out.

- **Short Quizzes:** Conduct brief quizzes on key concepts and the slopes of the IS and LM curves.

Unit 2: Aggregate Demand and Aggregate Supply- the Complete Keynesian Model (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Derivation of the Aggregate Demand (AD) Curve:

  o Explain how the IS-LM model can be used to derive the Aggregate Demand (AD) curve, which shows the relationship between the price level (P) and the equilibrium level of output (Y).

  o Show how changes in the price level shift the LM curve and lead to a new equilibrium Y at each P, tracing out the downward-sloping AD curve.

  o Explain the factors that shift the AD curve (the same factors that shift the IS and LM curves, except for changes in P).

- **Lectures 4-6:** Derivation of Aggregate Supply (AS) Curves:

  o Derive the short-run Aggregate Supply (SRAS) curve in the presence of wage rigidity (nominal wages are fixed in the short run). Explain why it is upward sloping (as price level rises, real wages fall, firms hire more, output increases).

- o Derive the long-run Aggregate Supply (LRAS) curve, assuming flexible wages and prices, at the potential level of output (Y*). Explain why it is vertical.

- o Briefly discuss the case of an upward-sloping SRAS even without strict wage rigidity (e.g., due to imperfect information or sticky prices).

- **Lectures 7-8:** Equilibrium, Stability, and Comparative Statics:

  - o Explain the short-run equilibrium where the AD and SRAS curves intersect, determining the equilibrium P and Y.

  - o Explain the long-run equilibrium where the AD, SRAS, and LRAS curves intersect at Y*.

  - o Analyze the effects of monetary and fiscal policies on the AD curve and the short-run and long-run equilibrium (shifts in AD and movements along/shifts in SRAS).

- **Lectures 9-10:** Effects of Wage Cut and Unemployment Equilibrium:

  - o Analyze the effects of a nominal wage cut on the SRAS curve and the equilibrium P and Y. Discuss the conditions under which a wage cut might increase employment.

  - o Explain the concept of unemployment equilibrium in the Keynesian model (equilibrium Y below Y* due to insufficient aggregate demand).

  - o Discuss the causes of unemployment equilibrium (e.g., sticky wages, pessimistic expectations).

  - o Briefly introduce possible solutions, including the "real balance effect" (how changes in the real value of money balances can affect aggregate demand).

Classroom Teaching Method:

- **Building on Previous Concepts:** Clearly link the derivation of AD to the IS-LM model.

- **Graphical Analysis:** Heavily rely on AD-AS diagrams to illustrate equilibrium and the effects of policy changes and wage cuts.

- **Logical Explanation:** Provide clear explanations for the slopes of the AS curves under different assumptions.

- **Policy Discussions:** Discuss the implications of the AD-AS model for macroeconomic policy aimed at stabilizing output and prices.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions about the AD-AS model.

- **Problem Sets:** Assign problems involving the derivation and analysis of the AD and AS curves, and the effects of policies and wage changes.

- **Graphical Interpretation:** Ask students to interpret AD-AS diagrams for various scenarios.

- **Conceptual Questions:** Test understanding of the assumptions behind the different AS curves and the concept of unemployment equilibrium.

- **Short Quizzes:** Conduct brief quizzes on the factors that shift the AD and AS curves.

Unit 3: Keynes vs. Classics (7 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Contrasting the Systems:

  - Systematically compare and contrast the key assumptions and conclusions of the Keynesian and Classical macroeconomic systems across various aspects:

    - Aggregate Supply (horizontal/upward sloping vs. vertical)

    - Role of Aggregate Demand

    - Flexibility of Wages and Prices

    - Say's Law

    - Role of Government Intervention

    - Interest Rate Determination (liquidity preference vs. loanable funds)

    - View on Unemployment (involuntary vs. voluntary/frictional)

    - Effectiveness of Fiscal and Monetary Policies

- **Lectures 4-5:** Hybrid Models:

  - Discuss the idea of hybrid models that attempt to bridge the gap between the Keynesian and Classical frameworks, often incorporating elements of both depending on the time horizon (e.g., short run vs. long run).

  - Briefly introduce concepts like the expectations-augmented Phillips curve as a hybrid idea.

- **Lectures 6-7:** Friedman's Restatement of Classical Ideas:

  - Discuss Milton Friedman's contributions that represent a restatement and modification of classical ideas, emphasizing the importance of money supply, the natural rate of unemployment, and the long-run neutrality of money.

o Briefly touch upon concepts like the quantity theory of money in Friedman's view and the role of expectations.

Classroom Teaching Method:

- **Comparative Analysis:** Use tables and point-by-point comparisons to highlight the differences between the two systems.

- **Discussion-Oriented:** Encourage students to critically evaluate the assumptions and implications of each system.

- **Historical Context:** Briefly discuss the historical context in which these different schools of thought emerged.

- **Connecting to Previous Units:** Relate the discussion back to the AD-AS framework and the assumptions about wage and price flexibility.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in comparative discussions.

- **Short Answer Questions:** Ask students to list and explain the key differences between Keynesian and Classical systems.

- **Comparison Essays:** Assign short essays comparing and contrasting specific aspects of the two systems (e.g., the role of aggregate demand).

- **Conceptual Understanding:** Test understanding of the core tenets of each school of thought.

Unit 4: Money Supply, Monetary Policy and Government Budgetary Operations (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Measures of Money Supply in India:

    o Define and explain the different measures of money supply in India (M1, M2, M3, and M4), detailing the components of each measure.

    o Discuss the relative importance and liquidity of these different measures.

- **Lectures 3-4:** Balance Sheet View of Money Supply and High-Powered Money:

    o Explain how the money supply can be viewed from the consolidated balance sheet of the banking sector.

    o Define High-Powered Money (Reserve Money or Monetary Base) and its components (currency held by the public and reserves held by commercial banks with the RBI).

- **Lectures 5-6:** RBI and Commercial Bank Balance Sheets & Money Multiplier Theory:

- o Briefly discuss the key assets and liabilities on the balance sheet of the Reserve Bank of India (RBI) and their relationship to high-powered money.

- o Briefly discuss the key assets and liabilities on the balance sheet of Commercial Banks.

- o Introduce the basic idea of the money multiplier – how an initial change in the monetary base leads to a larger change in the money supply.

- **Lectures 7-8:** Different Multipliers and Interest Sensitivity:

  - o Explain the concepts and basic formulas (without rigorous derivations if time is limited) of:

    - ▪ Deposit Multiplier

    - ▪ Currency Multiplier

    - ▪ Reserve Multiplier

    - ▪ Credit Multiplier

    - ▪ Money Multiplier (show how it relates to the currency-deposit ratio and the reserve-deposit ratio).

  - o Discuss the interest sensitivity of money supply and how it can affect the slope of the LM curve (a more interest-elastic money supply leads to a flatter LM curve).

- **Lectures 9-10:** Monetary Policy and Government Budget Deficit:

  - o Explain the instruments of monetary policy used by the RBI:

    - ▪ Open Market Operations (OMOs)

    - ▪ Statutory Liquidity Ratio (SLR)

    - ▪ Bank Rate (now Marginal Standing Facility Rate and Bank Rate are aligned)

    - ▪ Variable Reserve Ratio (CRR)

    - ▪ Repo Rate and Reverse Repo Rate

  - o Discuss how each of these instruments affects the money supply and credit conditions.

  - o Explain the concept of Government Budget Deficit and discuss deficit financing (borrowing, printing money). Analyze the potential implications of deficit financing for monetary policy and inflation.

Classroom Teaching Method:

- **Conceptual Explanation:** Focus on clear explanations of the components of money supply and the mechanisms of the money multiplier.

- **Balance Sheet Analysis:** Use simplified balance sheets to illustrate the creation of money.

- **Policy Discussions:** Discuss the current monetary policy stance of the RBI and the rationale behind it.

- **Relating to IS-LM:** Connect the discussion of money supply and monetary policy to the LM curve and its role in the IS-LM model.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions about monetary policy.

- **Short Answer Questions:** Ask students to define different measures of money supply and high-powered money.

- **Numerical Problems:** Assign simple numerical problems related to the money multiplier (if formulas are taught).

- **Policy Analysis:** Ask students to explain how different monetary policy instruments work.

Unit 5: Inflation-Unemployment Trade-off and Expectations (8 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Inflation and Unemployment Trade-off:

  - Introduce the concept of the Inflation-Unemployment Trade-off and the early Phillips Curve (empirical observation of a negative relationship).

- **Lectures 3-5:** Models of Aggregate Supply:

  - Explain the theoretical underpinnings of the upward-sloping Short-Run Aggregate Supply (SRAS) curve through four models:

    - The Sticky-Wage Model: Nominal wages adjust slowly to changes in the price level.

    - The Worker-Misperception Model: Workers temporarily misinterpret nominal wage changes as real wage changes.

    - The Imperfect Information Model: Producers have imperfect information about the overall price level.

    - The Sticky-Price Model: Firms adjust prices slowly due to menu costs or other factors.

  - Focus on the intuition behind each model.

- **Lecture 6:** Deriving the Phillips Curve:

  - Show how the upward-sloping SRAS curve can be transformed into a downward-sloping short-run Phillips Curve, depicting the trade-off between inflation and unemployment.

- **Lectures 7-8:** Short Run vs. Long Run Phillips Curve and Expectations:

  o Explain the concept of the Long-Run Phillips Curve as being vertical at the natural rate of unemployment, based on the idea that in the long run, expectations adjust fully to actual inflation.

  o Discuss the role of adaptive expectations (people form expectations based on past inflation) and rational expectations (people form expectations based on all available information) in shaping the short-run and long-run Phillips Curves.

  o Briefly discuss the implications of rational expectations for policy ineffectiveness.

  o Introduce the concepts of Disinflation (reducing inflation), Sacrifice Ratio (the output loss required to reduce inflation), and their relationship to expectations.

Classroom Teaching Method:

- **Graphical Analysis:** Use AD-AS and Phillips Curve diagrams to illustrate the trade-off and the role of expectations.

- **Conceptual Explanation:** Focus on the intuition behind the different models of aggregate supply and the formation of expectations.

- **Policy Discussions:** Discuss the implications of the Phillips Curve for inflation targeting and monetary policy.

- **Historical Examples:** Briefly refer to historical episodes of inflation and unemployment to illustrate the concepts.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions about the Phillips Curve and expectations.

- **Short Answer Questions:** Ask students to explain the different models of aggregate supply and the role of expectations.

- **Graphical Interpretation:** Ask students to interpret Phillips Curve diagrams.

- **Conceptual Understanding:** Test understanding of the short-run and long-run trade-offs and the implications of different expectation formation mechanisms.

By following this unit-wise structure, you can provide a comprehensive understanding of Macroeconomics (II), building upon the foundations laid in Macroeconomics (I). Emphasizing the links between different models (IS-LM to AD-AS), using graphical and algebraic tools, and relating the concepts to real-world policy issues will be crucial for effective teaching and learning.

Statistics for Economics

Unit 1: Elementary Probability Theory (8 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Sample Spaces and Events:

    o Introduce the fundamental concepts of probability: experiment, sample space (using set notation and Venn diagrams), and events (as subsets of the sample space). Provide economic examples of experiments with uncertain outcomes.

    o Define different types of events (simple, compound, mutually exclusive, exhaustive). Explain set operations (union, intersection, complement) in the context of events.

- **Lectures 3-4:** Definitions of Probability:

    o Explain the Classical definition of probability (for equally likely outcomes) and its limitations.

    o Introduce the Axiomatic definition of probability (non-negativity, probability of the sample space, additivity for mutually exclusive events). Compare and contrast the two definitions.

- **Lectures 5-6:** Conditional Probability and Independence:

    o Define conditional probability and illustrate with examples (including economic scenarios). Introduce the formula $P(A|B) = P(A \cap B) / P(B)$.

    o Explain the concept of independence of two events ($P(A \cap B) = P(A)P(B)$ or $P(A|B) = P(A)$).

    o Extend the concept to pairwise and mutual independence with examples.

- **Lectures 7-8:** Theorems of Probability:

    o State and explain the Theorem of Total Probability with applications (e.g., probability of a certain economic outcome based on different scenarios).

    o State and explain the Theorem of Compound Probability (multiplication rule) for two or more events.

    o Introduce and explain Bayes' Theorem, emphasizing its use in updating probabilities based on new information (provide economic applications like updating beliefs about market conditions).

Classroom Teaching Method:

- **Interactive Lectures:** Encourage student participation through discussions and solving probability problems.

- **Real-World Examples:** Use examples from economics and everyday life to illustrate probability concepts.

- **Set Theory and Venn Diagrams:** Utilize set theory notation and Venn diagrams to visually represent sample spaces, events, and their relationships.

- **Problem-Solving:** Focus on working through a variety of probability problems, starting with simple examples and progressing to more complex applications of the theorems.

- **Group Activities:** Assign short group activities where students work together to solve probability scenarios.

Continuous Classroom Evaluation:

- **Class Participation:** Observe and encourage active participation in discussions and problem-solving.

- **Short Quizzes:** Conduct brief quizzes on basic definitions and formulas.

- **Problem Sets:** Assign regular problem sets covering the topics taught.

- **Conceptual Questions:** Ask questions that test understanding of the underlying concepts and the differences between definitions of probability.

Unit 2: Probability Distributions (15 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Random Variables and Probability Distributions:

  o Define a random variable (discrete and continuous) with economic examples.

  o Explain the concept of a probability distribution for both discrete and continuous random variables.

  o Define and explain the Probability Mass Function (pmf) for discrete random variables and the Probability Density Function (pdf) for continuous random variables.

  o Introduce the concept of the Cumulative Distribution Function (CDF) or distribution function and its properties.

- **Lectures 3-5:** Expected Values:

  o Define the expected value (mean) of a random variable (discrete and continuous) and its interpretation.

  o Define variance as a measure of dispersion and explain its calculation.

  o Introduce raw moments ($E[X^k]$) and central moments ($E[(X-\mu)^k]$).

  o Define the Moment Generating Function (mgf) and explain its properties and uses (without rigorous derivations of all properties).

- **Lectures 6-9:** Properties of Discrete Distributions:

  - Binomial Distribution: Introduce the binomial experiment, define the pmf, and discuss its properties (mean, variance, mgf - state the formulas). Explain the measures of skewness and kurtosis (mention the formulas and their implications). Provide economic examples (e.g., number of successful investments out of a portfolio).

  - Poisson Distribution: Introduce the Poisson process, define the pmf, and discuss its properties (mean, variance, mgf - state the formulas). Explain the measures of skewness and kurtosis (mention the formulas and their implications). Provide economic examples (e.g., number of customer arrivals at a bank per hour).

- **Lectures 10-12:** Properties of Continuous Distributions:

  - Normal Distribution: Introduce the normal distribution, define the pdf, and discuss its key properties (mean, median, mode, variance, mgf - state the formulas). Explain the symmetry and bell shape, and the location of points of inflection. Discuss the importance of the normal distribution in statistics.

- **Lectures 13-15:** Joint Distribution of Random Variables:

  - Introduce the concept of the joint distribution of two (or more) random variables (discrete and continuous).

  - Define the joint pmf (for discrete) and joint pdf (for continuous).

  - Explain how to obtain marginal pmf/pdf from the joint distribution.

  - Define conditional pmf/pdf.

  - Explain the concept of independence of jointly distributed random variables.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to understand the conditions under which each distribution is applicable.

- **Derivations (Basic):** Provide basic derivations of mean and variance for some distributions.

- **Problem-Solving:** Focus on applying the formulas and properties of different distributions to solve economic problems.

- **Graphical Representation:** Use graphs of pmfs and pdfs to illustrate the shape and characteristics of different distributions.

- **Using Statistical Software (Optional):** If resources permit, briefly demonstrate how to work with these distributions in statistical software.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions and problem-solving.

- **Problem Sets:** Assign problems involving calculations of expected values, probabilities for different distributions, and working with joint distributions.

- **Short Quizzes:** Conduct quizzes on the pmf/pdf and basic properties of the distributions.

- **Conceptual Questions:** Ask questions that test understanding of the characteristics and applications of each distribution.

Unit 3: Sampling Theory and Distribution (7 Lecture Hours)

Lesson Procedure:

- **Lecture 1:** Basic Concepts of Sampling:

  - Review the concepts of complete enumeration and sample survey.

  - Explain sampling and non-sampling errors.

  - Define population, sample, statistic, parameter, sample size, population size.

  - Introduce the concept of random sampling and its importance for valid inference.

  - Define sampling distribution of a statistic and the standard error of a statistic.

- **Lectures 2-3:** Methods of Random Sampling:

  - Simple Random Sampling (SRS): Explain SRS with replacement (SRSWR) and without replacement (SRSWOR). Discuss practical methods of drawing SRSWR (e.g., lottery method, random number tables) and SRSWOR.

- **Lectures 4-5:** Properties of Sample Mean and Proportion:

  - State (without detailed derivations) the mean and standard error of the sample mean in cases of SRSWR and SRSWOR.

  - State (without detailed derivations) the mean and standard error of the sample proportion in cases of SRSWR and SRSWOR.

  - State (without detailed derivations) the mean of the sample variance in the case of SRSWR.

- **Lecture 6:** Other Sampling Methods (Basic Concepts):

  - Briefly introduce the basic concepts of Stratified Sampling (dividing the population into strata and then drawing random samples) and Multi-stage Sampling (sampling at different levels). Explain the rationale behind these methods.

- **Lecture 7:** Basic Sampling Distributions:

- o Introduce the Chi-square, Student's t, and F distributions. Provide their definitions and state their important properties (mean, variance, skewness - without derivations). Explain their relevance in statistical inference.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to understand the rationale behind different sampling methods.

- **Real-World Examples:** Use examples of surveys and sampling in economic research.

- **Demonstrations:** Demonstrate practical methods of drawing simple random samples.

- **Conceptual Explanation:** Focus on the understanding of sampling distributions and standard error.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions about sampling.

- **Short Answer Questions:** Ask students to define key terms related to sampling.

- **Conceptual Problems:** Ask questions that test understanding of the properties of sample statistics and the differences between sampling methods.

Unit 4: Statistical Inference (15 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Introduction to Estimation and Testing:

  - o Introduce the basic ideas of statistical inference: using sample data to draw conclusions about the population.

  - o Differentiate between Estimation (estimating population parameters) and Testing of Hypothesis (making decisions about population parameters).

  - o Distinguish between Point Estimation (providing a single value estimate) and Interval Estimation (providing a range of values).

- **Lectures 3-5:** Point Estimation:

  - o Discuss the criteria of a good estimator: unbiasedness (E[estimator] = parameter), minimum variance (among unbiased estimators), Mean Square Error (MSE = Variance + Bias^2), Consistency (estimator converges to the parameter as sample size increases), and Sufficiency (estimator uses all information in the sample).

  - o Briefly introduce the basic principles of methods of point estimation: Ordinary Least Square (OLS) (mention its goal of minimizing the sum of squared errors), Maximum Likelihood Estimation (MLE) (mention the idea of finding parameter values that maximize the likelihood of observing the

sample data), and Method of Moments (equating sample moments to population moments).

- **Lectures 6-8:** MLEs of Parameters:

  - o Derive (or state and explain the intuition behind) the MLEs of the parameters for the Binomial (p), Poisson (λ), and Normal (μ, σ^2) distributions.

- **Lectures 9-11:** Interval Estimation:

  - o Explain the concept of a Confidence Interval (CI) and its interpretation (probability that the interval contains the true parameter).

  - o Derive (or state and explain) the formula for the confidence interval for the population mean (μ) of a Normal distribution when the population standard deviation (σ) is known and unknown (using the t-distribution).

  - o Derive (or state and explain) the formula for the confidence interval for the population standard deviation (σ) of a Normal distribution (using the Chi-square distribution).

  - o Derive (or state and explain) the formula for the confidence interval for a Population Proportion (p) (using the normal approximation).

- **Lectures 12-15:** Testing of Hypothesis:

  - o Introduce the concepts of Null Hypothesis (H0) and Alternative Hypothesis (H1).

  - o Explain Type I error (rejecting H0 when it is true) and Type II error (failing to reject H0 when it is false).

  - o Define the Power of a test (probability of correctly rejecting a false H0).

  - o Explain the concept of a p-value (the probability of observing a test statistic as extreme as, or more extreme than, the one calculated, assuming H0 is true) and its use in decision making.

  - o Discuss testing hypotheses related to the mean (one sample and two independent samples) and standard deviation of a normal distribution (using z, t, and Chi-square tests).

  - o Discuss testing hypotheses related to a Population Proportion (one sample and two independent samples using the z-test approximation).

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to understand the logic behind estimation and hypothesis testing.

- **Problem-Solving:** Focus on working through examples of point and interval estimation, and hypothesis testing.

- **Relating to Sampling Distributions:** Emphasize the role of sampling distributions in constructing confidence intervals and performing hypothesis tests.

- **Using Critical Values and p-values:** Teach students how to make decisions using both the critical value approach and the p-value approach.

- **Economic Examples:** Apply the concepts of statistical inference to economic problems (e.g., estimating average income, testing for differences in unemployment rates).

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions and problem-solving.

- **Problem Sets:** Assign problems involving point and interval estimation, and hypothesis testing.

- **Short Quizzes:** Conduct quizzes on key concepts and the steps involved in inference.

- **Conceptual Questions:** Ask questions that test understanding of the criteria for good estimators, the interpretation of confidence intervals, and the meaning of Type I and Type II errors.

- **Mid-Term and Final Exams:** Include problems requiring students to apply the methods of statistical inference to different scenarios.

By following this unit-wise structure, you can provide a comprehensive introduction to probability and statistical inference relevant for economics students. Emphasizing the intuition behind the concepts, working through numerous examples, and connecting the theory to economic applications will be key to effective teaching and learning.

Indian Economics (I)

Unit 1: Economic Development since Independence (15 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Growth and Development under Planning (Objectives, Achievements, Failures):

  - Introduce the context of India's economic development after independence and the adoption of economic planning.

  - Explain the objectives of India's Five-Year Plans (e.g., growth, self-reliance, social justice).

  - Discuss the strategies adopted during the planning era (e.g., import substitution, public sector dominance).

  - Analyze the key achievements of planning in India (e.g., industrialization, development of infrastructure, poverty reduction in initial phases).

- o Critically evaluate the failures and limitations of planning (e.g., slow growth rates, inefficiencies in the public sector, persistence of poverty and inequality, bureaucratic hurdles).

- **Lectures 4-5:** Economic Crisis during the Late 1980s:

  - o Explain the factors leading to the economic crisis of the late 1980s in India (e.g., fiscal imbalances, balance of payments issues, rising debt).

  - o Discuss the immediate consequences of the crisis and the need for a change in economic policy direction.

- **Lectures 6-9:** Economic Reforms - Critical Analysis:

  - o Introduce the major economic reforms initiated in 1991 (Liberalization, Privatization, Globalization - LPG).

  - o Critically analyze the rationale behind these reforms and their key components.

  - o Discuss the arguments for and against the reforms, considering their intended and unintended consequences.

  - o Evaluate the impact of reforms on different sectors of the economy and different sections of society.

- **Lectures 10-12:** Structural Changes in the Post-Reforms Period:

  - o Analyze the significant structural changes that have occurred in the Indian economy since the reforms (e.g., shift towards services sector, changing composition of GDP, growth of the private sector, increased foreign investment and trade).

  - o Discuss the implications of these structural changes for growth, employment, and income distribution.

- **Lectures 13-15:** Regional Variation of Growth and Development:

  - o Examine the significant regional disparities in economic growth and development across different states in India.

  - o Discuss the factors contributing to these regional variations (e.g., historical factors, resource endowments, infrastructure development, governance, social indicators).

  - o Analyze the policy challenges posed by regional imbalances and potential strategies to address them.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage student participation through discussions, debates, and sharing of perspectives on India's economic journey.

- **Use of Data and Statistics:** Present relevant data and statistics on growth rates, sectoral contributions, and regional disparities to support the analysis.

- **Case Studies:** Analyze specific policy initiatives or economic events to illustrate the concepts.

- **Guest Lectures (Optional):** Invite economists or policymakers to share their insights on India's development experience.

- **Documentary Screenings (Optional):** Show relevant documentaries or excerpts to provide a historical and contextual understanding.

Continuous Classroom Evaluation:

- **Class Participation:** Assess the quality and frequency of student contributions to discussions.

- **Short Quizzes:** Conduct brief quizzes on key policy changes, periods of crisis, and structural shifts.

- **Essay Assignments:** Assign short essays analyzing the objectives and outcomes of planning or critically evaluating specific economic reforms.

- **Data Interpretation Exercises:** Provide data on growth and development indicators and ask students to interpret the trends and regional variations.

Unit 2: Population and Human Development (9 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Demographic Trends and Issues:

    o Analyze the key demographic trends in India (e.g., population size and growth rate, age structure, sex ratio, rural-urban migration, demographic dividend).

    o Discuss the associated issues and challenges (e.g., pressure on resources, unemployment, aging population in the future).

- **Lectures 4-6:** Health: Basic Problems and Government Measures:

    o Identify the major health problems in India (e.g., communicable and non-communicable diseases, maternal and child health issues, malnutrition).

    o Discuss the social and economic determinants of health.

    o Analyze the government's policies and programs to address these health challenges (e.g., National Health Policy, specific disease control programs, public health infrastructure). Evaluate their effectiveness.

- **Lectures 7-9:** Education: Basic Problems and Government Measures, RTE Act 2009:

- o Identify the key problems in India's education sector (e.g., low literacy rates, gender disparities, quality concerns, infrastructure gaps, high dropout rates).

- o Discuss the importance of education for human development and economic growth.

- o Analyze the government's policies and programs to improve education (e.g., Sarva Shiksha Abhiyan, Rashtriya Madhyamik Shiksha Abhiyan).

- o Focus specifically on the Right to Education (RTE) Act 2009: its key provisions, objectives, and impact on ensuring universal elementary education.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage discussions on population issues and the challenges in health and education sectors.

- **Data Analysis:** Present demographic data and health/education statistics for India and compare them with other countries.

- **Policy Analysis:** Discuss and critically evaluate government policies and programs.

- **Case Studies:** Analyze successful interventions or ongoing challenges in health and education.

- **Debates:** Organize debates on specific issues like population control measures or the effectiveness of the RTE Act.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions on population and human development.

- **Short Quizzes:** Conduct quizzes on demographic indicators, health problems, and education policies.

- **Essay Assignments:** Assign essays analyzing the impact of population growth or evaluating the effectiveness of government initiatives in health or education.

- **Presentation/Report:** Ask students to research and present on a specific health or education program in India.

Unit 3: Growth and Distribution: Policy Perspectives (9 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Trends in GDP and Per Capita GDP:

- o Analyze the trends in India's Gross Domestic Product (GDP) growth over different time periods (pre-reforms, post-reforms).

- o Discuss the factors driving these growth trends.

- o Analyze the trends in per capita GDP and its significance as an indicator of average living standards.

- o Compare India's growth performance with other developing countries.

- **Lectures 4-6:** Poverty and Inequality:

  - o Examine the trends in poverty in India using different measures and methodologies.

  - o Discuss the causes and consequences of poverty.

  - o Analyze the trends in income inequality and wealth distribution in India using indicators like the Gini coefficient.

  - o Discuss the social and economic implications of high levels of poverty and inequality.

- **Lectures 7-9:** Unemployment, Youth Unemployment (School Transition to Work):

  - o Analyze the trends in unemployment rates in India, including different types of unemployment (e.g., open unemployment, disguised unemployment).

  - o Focus specifically on the issue of youth unemployment and the challenges faced by young people transitioning from school to work (e.g., skill gaps, lack of job opportunities).

  - o Discuss government policies and programs aimed at addressing unemployment and promoting skill development.

Classroom Teaching Method:

- **Data-Driven Analysis:** Present time-series data on GDP, per capita GDP, poverty, inequality, and unemployment. Guide students in interpreting these trends.

- **Policy Discussions:** Analyze government policies aimed at promoting growth, reducing poverty and inequality, and addressing unemployment.

- **Comparative Analysis:** Compare India's performance on these indicators with other countries.

- **Guest Lectures (Optional):** Invite experts on poverty, inequality, or employment to share their perspectives.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions related to growth and distribution.

- **Short Quizzes:** Conduct quizzes on key trends and policy measures.

- **Data Analysis Exercises:** Provide data sets on growth, poverty, inequality, or unemployment and ask students to analyze them.

- **Essay Assignments:** Assign essays analyzing the relationship between growth and distribution or evaluating the effectiveness of poverty alleviation programs.

Unit 4: Economic Reforms in India (12 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Industrial Sector Reform:

  - Discuss the key reforms in the industrial sector since 1991, including delicensing, privatization, changes in FDI policy, and policies for small-scale industries.

  - Analyze the impact of these reforms on industrial growth, productivity, and competitiveness.

- **Lectures 4-6:** Financial Sector Reforms:

  - Explain the major reforms in the financial sector, including banking sector reforms (e.g., deregulation of interest rates, prudential norms), capital market reforms (e.g., SEBI's role, foreign institutional investment), and insurance sector reforms.

  - Analyze the impact of these reforms on the efficiency and stability of the financial system.

- **Lectures 7-8:** Fiscal Sector Reforms:

  - Discuss the key reforms in the fiscal sector, including tax reforms (e.g., GST), expenditure management, and efforts to reduce the fiscal deficit.

  - Analyze the impact of these reforms on government revenue, expenditure patterns, and fiscal sustainability.

- **Lecture 9:** Trade & External Sector Reforms:

  - Explain the major reforms in trade policy, including reduction in tariffs, removal of quantitative restrictions, and promotion of exports.

  - Discuss the impact of these reforms on India's trade flows, balance of payments, and integration with the global economy.

- **Lecture 10:** Labour Market Reforms:

  - Discuss the challenges and debates surrounding labour market reforms in India.

  - Analyze the key issues related to labour laws, flexibility, and social security.

  - Discuss the progress and challenges in implementing effective labour market reforms.

- **Lectures 11-12:** Reforms in the Public Sector:

- Discuss the rationale and approaches to public sector reforms, including privatization, disinvestment, and improving the efficiency of public sector enterprises.
- Analyze the progress and challenges of public sector reforms in India.

Classroom Teaching Method:

- **Sector-Specific Analysis:** Dedicate time to analyzing reforms in each key sector of the economy.

- **Policy Documents and Reports:** Refer to relevant government policy documents and reports to understand the details and impact of reforms.

- **Expert Opinions and Debates:** Discuss different perspectives and debates surrounding the effectiveness and direction of economic reforms.

- **Case Studies of Specific Reforms:** Analyze the impact of specific reform measures (e.g., GST, privatization of a particular PSU).

- **Student Presentations:** Ask students to research and present on specific aspects of economic reforms.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions on economic reforms.

- **Short Quizzes:** Conduct quizzes on the key features of reforms in different sectors.

- **Essay Assignments:** Assign essays analyzing the impact of reforms on specific sectors or evaluating the overall success of India's economic reforms.

- **Policy Analysis Papers:** Ask students to analyze a specific economic reform policy and its outcomes.

By following this unit-wise structure, you can provide a comprehensive understanding of the Indian economy, its development trajectory, and the impact of policy changes since independence. Encouraging critical thinking, data-based analysis, and engagement with current economic issues will be crucial for effective teaching and learning. Remember to keep the discussions relevant to the contemporary economic landscape of India.

Sustainable Development

Unit 1: The Approach Towards Sustainability-Introductory Ideas (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Key Environmental Issues and Economic Thinking:

  - Introduce the interconnectedness of the economy and the environment.

- Discuss key environmental issues and problems (e.g., pollution - air, water, land; resource depletion; biodiversity loss; deforestation; climate change). Provide local examples relevant to India.

- Introduce the economic way of thinking about these problems: scarcity, trade-offs, externalities (negative environmental externalities), market failures. Explain how economic activities contribute to these issues.

- **Lectures 4-6:** Circular Flow of Pollutants, Waste Recycling, and Thermodynamics:

  - Illustrate the circular flow of economic activity and how it generates environmental pollutants and waste. Use flow diagrams.

  - Discuss the concept and importance of waste recycling and the circular economy as approaches to sustainability.

  - Introduce the basic Laws of Thermodynamics (First Law: Conservation of Energy and Matter; Second Law: Entropy and the increasing disorder in closed systems) and explain their implications for resource use and waste generation in the context of sustainability.

- **Lectures 7-10:** Renewable and Non-renewable Resources and Sustainability:

  - Define and differentiate between renewable and non-renewable natural resources with examples relevant to India (e.g., water, forests, solar energy vs. fossil fuels, minerals).

  - Discuss the economic characteristics of these resource types.

  - Introduce the fundamental issue of sustainability in the context of resource use, particularly the depletion of non-renewable resources and the sustainable management of renewable resources.

  - Pose the question: Can economic growth be sustained given environmental limits?

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to share their observations and understanding of local environmental issues.

- **Case Studies:** Use short case studies of environmental problems and potential solutions (e.g., Ganga pollution, renewable energy initiatives in India).

- **Visual Aids:** Utilize diagrams, charts, and photographs to illustrate environmental issues and the flow of resources and pollutants.

- **Class Discussions:** Facilitate discussions on the economic drivers of environmental degradation and the challenges of achieving sustainability.

- **Brainstorming Sessions:** Engage students in brainstorming solutions to specific environmental problems.

Continuous Classroom Evaluation:

- **Class Participation:** Assess the quality and frequency of student contributions to discussions.

- **Short Quizzes:** Conduct brief quizzes on key definitions and concepts (e.g., externalities, renewable vs. non-renewable resources, laws of thermodynamics).

- **Concept Mapping:** Ask students to create concept maps illustrating the links between economic activity and environmental problems.

- **Short Answer Questions:** Assess understanding of the economic way of thinking about environmental issues.

Unit 2: The Meaning of Sustainable Development (20 Lecture Hours)

Lesson Procedure:

- **Lectures 1-4:** Different Definitions of Sustainable Development:

  o Explore various definitions of Sustainable Development from different perspectives (e.g., Brundtland Commission, ecological economics, social equity perspectives).

  o Analyze the common themes and differences across these definitions.

  o Discuss the evolution of the concept of sustainable development over time.

- **Lectures 5-8:** Rules of Sustainable Development:

  o Introduce and explain key "rules" or principles often associated with sustainable development (e.g., Hartwick's Rule for constant capital stock, Daly's Steady-State Economy principles - ecological integrity, social equity, economic efficiency within ecological limits).

  o Discuss the implications of these rules for economic policy and resource management.

- **Lectures 9-12:** Measures of Sustainable Development:

  o Discuss the challenges of measuring sustainable development.

  o Introduce various indicators and measures that attempt to capture different dimensions of sustainability (e.g., Adjusted Net Savings, Ecological Footprint, Genuine Progress Indicator (GPI), Human Development Index adjusted for environmental factors).

  o Critically evaluate the strengths and weaknesses of these measures.

- **Lectures 13-16:** Sustainable Management of Resources and Property Rights:

  o Explain the role of property rights (private, common, open access, state) in resource management and their implications for sustainability.

  o Discuss how well-defined and enforced property rights can incentivize sustainable resource use and prevent the "tragedy of the commons."

- - Analyze situations where property rights are unclear or absent and the resulting environmental consequences.

- **Lectures 17-19:** Stakeholders and Sustainable Management of Renewable Resources:

  - Examine the different stakeholders involved in the sustainable management of specific renewable resources:

    - Fishery: Fishers, consumers, government agencies, environmental organizations.

    - Forestry: Forest dwellers, timber industry, government agencies, conservationists.

    - Water: Farmers, industries, households, government agencies, environmental groups.

  - Discuss the conflicting interests and the importance of stakeholder engagement for sustainable resource management.

- **Lecture 20:** Sustainable Livelihood in Sustainable Resource Management:

  - Define the concept of Sustainable Livelihood and its key components (human, social, natural, physical, financial capital).

  - Explain how sustainable resource management is crucial for securing sustainable livelihoods, particularly for communities dependent on natural resources.

  - Discuss strategies that integrate sustainable resource management with livelihood development.

Classroom Teaching Method:

- **Lectures with In-depth Discussion:** Dedicate more time for detailed exploration of the meaning and principles of sustainable development.

- **Reading Assignments:** Assign readings from seminal works and reports on sustainable development.

- **Group Presentations:** Have students research and present on different definitions, measures, or case studies of resource management.

- **Debates:** Organize debates on the merits and limitations of different sustainability rules or measurement indicators.

- **Role-Playing:** Simulate stakeholder meetings for the management of a specific renewable resource.

Continuous Classroom Evaluation:

- **Class Participation:** Assess the depth and thoughtfulness of student contributions to discussions.

- **Essay Assignments:** Assign essays exploring different definitions of sustainable development, analyzing the implications of sustainability rules, or evaluating measures of sustainability.

- **Group Presentations:** Evaluate the quality of research, presentation skills, and understanding of the topic.

- **Case Study Analysis:** Ask students to analyze case studies of resource management through the lens of property rights and stakeholder involvement.

- **Mid-Term Exam:** Cover the concepts, definitions, rules, and measures of sustainable development.

Unit 3: Trans-boundary Pollution, Climate Change and Sustainable Development (15 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Implementation of Environmental Policies and International Experience:

  - Discuss the challenges of implementing environmental policies in developing countries (e.g., lack of resources, weak institutions, competing development priorities).

  - Examine international experiences (successes and failures) in implementing environmental policies, drawing lessons for developing countries like India.

- **Lectures 4-7:** Transboundary Environmental Problems:

  - Define and provide examples of transboundary environmental problems (e.g., acid rain, ozone depletion, shared water resources, biodiversity loss).

  - Discuss the challenges of addressing these problems due to the involvement of multiple countries and the lack of a single overarching authority.

- **Lectures 8-11:** International Meetings, Protocols and Treaties:

  - Review key international meetings, protocols, and treaties related to environmental protection and sustainable development (e.g., Stockholm Conference, Rio Earth Summit, Kyoto Protocol, Paris Agreement, Convention on Biological Diversity).

  - Discuss the objectives, key provisions, successes, and limitations of these agreements.

  - Analyze India's role and commitments in these international environmental agreements.

- **Lectures 12-15:** Economics of Climate Change and Carbon Markets:

- o Introduce the basic economics of climate change: greenhouse gas emissions as a negative externality, the social cost of carbon, the need for mitigation and adaptation.

- o Explain the basic ideas of the Carbon Credit Market, including the concept of carbon credits and carbon trading.

- o Discuss the Clean Development Mechanism (CDM) and its role in promoting sustainable development in developing countries through emission reduction projects.

- o Explain the concept of International Emission Trading schemes and their potential benefits and drawbacks.

Classroom Teaching Method:

- **Lectures with Current Affairs Integration:** Connect the topics to current environmental news and international negotiations.

- **Guest Lectures (Optional):** Invite experts on international environmental law or climate change economics.

- **Documentary Screenings:** Show documentaries on transboundary pollution or climate change impacts.

- **Simulations:** Conduct simulations of international environmental negotiations.

- **Research Projects:** Assign students to research and present on specific international environmental agreements or mechanisms like CDM.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions on international environmental issues.

- **Essay Assignments:** Assign essays on the challenges of transboundary pollution or the effectiveness of international climate agreements.

- **Presentations/Reports:** Evaluate the quality of research and understanding of international environmental policies and mechanisms.

- **Policy Briefs:** Ask students to write policy briefs on specific environmental challenges and potential international solutions.

- **Final Exam:** Cover all units, with a focus on the interconnectedness of environmental issues, sustainable development principles, and international cooperation.

By following this unit-wise structure, you can provide a comprehensive understanding of sustainable development, encompassing its theoretical underpinnings, practical challenges, and global dimensions. Emphasizing critical thinking, interdisciplinary perspectives, and engagement with real-world issues will be key to effective teaching and

learning in this subject. Remember to incorporate local examples and the Indian context wherever relevant.

Microeconomics (III)

Unit 1: Imperfect Market Structure (20 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Monopoly: Barriers to Entry, Output and Price Determination:

    o Define monopoly and discuss the various barriers to entry that create and sustain monopoly power (e.g., legal restrictions, economies of scale, control of essential resources, network externalities). Provide examples relevant to the Indian context (e.g., government-owned utilities, companies with strong patent protection).

    o Explain how a monopolist determines its profit-maximizing output level (MR = MC) and sets its price using the demand curve. Derive the monopolist's price rule (P > MC).

- **Lectures 4-5:** Monopoly Power: Measurement and Sources:

    o Introduce measures of monopoly power, such as the Lerner Index. Explain how to calculate and interpret it.

    o Discuss the sources of monopoly power, linking back to barriers to entry and the elasticity of demand.

- **Lectures 6-7:** Social Costs of Monopoly Power: Deadweight Loss:

    o Explain the social costs of monopoly power, focusing on the concept of deadweight loss (the reduction in total surplus compared to perfect competition). Illustrate this using diagrams.

- **Lectures 8-11:** Pricing with Market Power: Price Discrimination (First, Second, Third Degree):

    o Define price discrimination and explain the conditions necessary for it to be successful.

    o Explain first-degree (perfect) price discrimination: concept, implementation challenges, and impact on output and surplus.

    o Explain second-degree price discrimination (block pricing): concept and examples (e.g., bulk discounts).

    o Explain third-degree price discrimination (market segmentation): concept, profit maximization condition (MR1 = MR2 = MC), and examples (e.g., student discounts, differential pricing in domestic vs. international markets).

- **Lecture 12:** Pricing with Market Power: Intertemporal Price Discrimination and Peak-Load Pricing:

    o Explain intertemporal price discrimination (charging different prices at different points in time) with examples (e.g., introductory offers, sales).

    o Explain peak-load pricing (charging higher prices during periods of peak demand) with examples (e.g., electricity pricing, transportation fares).

- **Lecture 13:** Pricing with Market Power: Two-Part Tariff:

    o Explain the concept of a two-part tariff (a fixed fee plus a per-unit charge) and how a firm can use it to extract more consumer surplus. Provide examples (e.g., membership fees for clubs, amusement park entry with per-ride charges).

- **Lecture 14:** Multiplant Monopoly:

    o Explain how a monopolist operating with multiple plants determines the optimal output level for each plant to maximize overall profit (MC1 = MC2 = MR).

- **Lectures 15-17:** Monopolistic Competition: Short Run and Long Run Equilibrium, Excess Capacity:

    o Define monopolistic competition and its key characteristics (many firms, differentiated products, free entry and exit). Provide examples of industries in India that exhibit monopolistic competition (e.g., restaurants, clothing brands).

    o Explain the short-run equilibrium of a firm under monopolistic competition (profit maximization similar to a monopolist).

    o Explain the long-run equilibrium (entry and exit drive economic profit to zero, but price is above MC, leading to excess capacity). Illustrate with diagrams.

- **Lectures 18-20:** Oligopoly: Non-Collusive and Collusive Models:

    o Define oligopoly and its key characteristics (few firms, interdependence).

    o Introduce the concept of Nash equilibrium in the context of oligopoly.

    o Explain the Cournot model (quantity competition): assumptions, reaction functions, and equilibrium. Use isoprofit curves to illustrate (briefly).

    o Explain the Bertrand model (price competition): assumptions and the resulting equilibrium (often similar to perfect competition if products are homogeneous).

    o Explain the Stackelberg model (leader-follower model): assumptions and the strategic advantage of the leader.

- o Explain Sweezy's kinked demand curve model and its explanation for price rigidity in oligopoly (non-collusive equilibrium).

- o Discuss the Prisoners' Dilemma as a simple game-theoretic interpretation of the tension between competition and collusion in oligopoly.

- o Explain Collusive Oligopoly: Cartels (formal agreements) and Price Leadership (tacit collusion). Discuss the factors affecting the stability of cartels and price leadership in the Indian context (e.g., regulatory environment).

Classroom Teaching Method:

- **Interactive Lectures:** Encourage student participation through discussions and problem-solving.

- **Graphical Analysis:** Heavily rely on diagrams to illustrate market structures, equilibrium conditions, and welfare implications.

- **Mathematical Derivations:** Guide students through the basic mathematical derivations of cost, revenue, and profit functions under different market structures.

- **Numerical Examples:** Use numerical examples to solidify understanding of equilibrium concepts and calculations (e.g., profit maximization under monopoly, Cournot equilibrium).

- **Real-World Case Studies:** Analyze real-world examples of firms and industries that exhibit imperfect competition in India and globally (e.g., telecom industry, pharmaceutical companies).

- **Game Theory Exercises (Simple):** Introduce basic game theory concepts using the Prisoners' Dilemma and apply them to oligopoly behavior.

Continuous Classroom Evaluation:

- **Class Participation:** Assess the quality and frequency of student contributions to discussions and problem-solving.

- **Problem Sets:** Assign regular problem sets covering calculations of equilibrium price and quantity, monopoly power, deadweight loss, and oligopoly models.

- **Short Quizzes:** Conduct brief quizzes on key definitions, assumptions of different models, and basic formulas.

- **Mid-Term Exam:** Cover the concepts of monopoly, price discrimination, and monopolistic competition.

- **Case Study Analysis:** Ask students to analyze short case studies of imperfectly competitive markets.

Unit 2: Input market under Imperfect Competition (5 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Monopsony in the Labour Market:

  o Define monopsony as a market with a single buyer of labor. Discuss the sources of monopsony power (e.g., isolated communities, specialized labor). Provide examples relevant to India (e.g., a dominant employer in a rural area).

  o Explain how a monopsonist determines the profit-maximizing level of employment (MRP_L = MCL, where MCL is marginal cost of labor and is above the wage rate). Show how the monopsonist hires less labor and pays a lower wage compared to a competitive labor market.

  o Define and explain monopsonistic exploitation (the difference between the value of the marginal product of labor and the wage rate).

- **Lectures 3-4:** Bilateral Monopoly in the Labour Market:

  o Define bilateral monopoly as a market with a single seller of labor (e.g., a strong labor union) and a single buyer of labor (a monopsonist).

  o Explain why the outcome in a bilateral monopoly is indeterminate within a range, depending on the bargaining power of the union and the employer. Discuss factors influencing bargaining power.

- **Lecture 5:** Monopolistic Exploitation:

  o Define and explain monopolistic exploitation (the difference between the value of the marginal product of labor and the marginal revenue product of labor, arising from the firm's output market power).

  o Distinguish between monopolistic and monopsonistic exploitation.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to think about real-world labor markets that might exhibit elements of monopsony or bilateral monopoly in India.

- **Graphical Analysis:** Use diagrams to illustrate the equilibrium wage and employment levels under monopsony and the bargaining range under bilateral monopoly.

- **Case Discussions:** Discuss case studies of labor markets with dominant employers or strong labor unions in India.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions about imperfect competition in input markets.

- **Short Answer Questions:** Ask students to define monopsony, bilateral monopoly, and the two types of exploitation.

- **Problem Sets:** Assign simple problems involving a monopsonist's hiring decision.

Unit 3: General Equilibrium, Efficiency and Welfare (20 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** General Equilibrium: Exchange Economy:

  - Introduce the concept of general equilibrium, contrasting it with partial equilibrium analysis.

  - Focus on a pure exchange economy with two consumers and two goods.

  - Introduce the Edgeworth box diagram and explain how to represent initial endowments and preferences (indifference curves).

  - Define and illustrate Pareto efficient allocations in an exchange economy as points on the contract curve (tangency of indifference curves).

- **Lectures 4-6:** General Equilibrium: Production Economy:

  - Extend the analysis to include production with two consumers, two goods, and two factors of production.

  - Introduce the concept of the production possibility frontier (PPF) and its relationship to the efficient allocation of resources in production.

  - Explain Pareto efficient allocations in a production economy (MRTS = price ratio = MRS).

- **Lectures 7-9:** General Equilibrium: Welfare Economics and Pareto Optimality:

  - Define Pareto optimality (an allocation where it is impossible to make one person better off without making someone else worse off).

  - State and explain the First Welfare Theorem: Under certain conditions (perfect competition, complete markets, no externalities), a competitive equilibrium is Pareto efficient.

  - State and explain the Second Welfare Theorem: Under certain conditions (convex preferences and production sets), any Pareto efficient allocation can be achieved as a competitive equilibrium with an appropriate redistribution of initial endowments.

- **Lectures 10-13:** Reasons for Market Failure: Externalities:

  - Define market failure as a situation where the market fails to allocate resources efficiently.

  - Explain externalities (costs or benefits imposed on third parties who are not directly involved in the production or consumption of a good or service).

  - Differentiate between positive and negative externalities (production and consumption). Provide examples relevant to India (e.g., industrial pollution

as a negative production externality, education as a positive consumption externality).

- o Explain why externalities lead to Pareto inefficiency (market equilibrium quantity differs from the socially optimal quantity).

- **Lectures 14-16:** Reasons for Market Failure: Public Goods:

  - o Define public goods and their key characteristics: non-rivalry (one person's consumption does not diminish another's) and non-excludability (it is difficult or impossible to prevent people from consuming the good even if they don't pay). Provide examples relevant to India (e.g., national defense, public parks, clean air).

  - o Explain the "free-rider problem" associated with public goods and why private markets tend to underprovide them, leading to Pareto inefficiency.

- **Lectures 17-18:** Property Rights and the Coase Theorem:

  - o Discuss the role of well-defined and enforced property rights in addressing externalities.

  - o Explain the Coase Theorem: If property rights are well-defined and transaction costs are zero, then an efficient allocation of resources can be reached through bargaining between the affected parties, regardless of the initial allocation of property rights. Discuss the limitations of the Coase Theorem (e.g., high transaction costs, difficulty in identifying and organizing affected parties).

- **Lectures 19-20:** Markets with Asymmetric Information:

  - o Introduce the concept of asymmetric information (one party in a transaction has more or better information than the other).

  - o Explain adverse selection (occurs before the transaction, where one party uses private information to their advantage, e.g., the market for lemons in used cars, health insurance).

  - o Explain moral hazard (occurs after the transaction, where one party has an incentive to behave differently because they do not bear the full consequences of their actions, e.g., reckless driving with insurance, shirking by employees).

  - o Briefly introduce the concept of agency problems (conflicts of interest between a principal and an agent, e.g., shareholders and managers).

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to think critically about the conditions for market efficiency and the reasons for market failure in the Indian context.

- **Graphical Analysis:** Heavily rely on the Edgeworth box, PPF, and supply-demand diagrams to illustrate general equilibrium and the impact of externalities and public goods.

- **Thought Experiments:** Use thought experiments and simple scenarios to explain the Coase Theorem and the problems arising from asymmetric information.

- **Real-World Examples:** Discuss examples of externalities (pollution, vaccination), public goods (infrastructure, law and order), and asymmetric information (financial markets, labor markets) in India.

- **Policy Discussions:** Briefly touch upon policy interventions aimed at addressing market failures (e.g., pollution taxes, subsidies for public goods, regulations to mitigate information asymmetry).

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions about general equilibrium, efficiency, and market failure.

- **Problem Sets:** Assign problems involving the Edgeworth box, identifying Pareto efficient allocations, and analyzing the impact of externalities and public goods.

- **Short Quizzes:** Conduct quizzes on key definitions (Pareto optimality, externalities, public goods) and the Welfare Theorems.

- **Essay Assignments:** Assign essays analyzing the conditions for market efficiency or discussing the role of government in addressing market failures in India.

- **Case Study Analysis:** Ask students to analyze real-world cases of externalities or public goods provision in India.

By following this unit-wise structure, you can provide a comprehensive understanding of imperfect market structures, input markets under imperfect competition, and the fundamental concepts of general equilibrium, efficiency, and welfare economics. Emphasizing the application of these concepts to the Indian economy through relevant examples and policy discussions will enhance student learning.

Macroeconomics (III)

Unit 1: Basic Tenets of New Classical and New Keynesian Theories (10 Lectures)

Lesson Procedure:

- **Lectures 1-3:** New Classical Theory - Rational Expectations:

  o Introduce the limitations of traditional macroeconomic models, particularly regarding expectations formation.

  o Explain the concept of rational expectations: individuals use all available information efficiently to form expectations about the future. Contrast this with adaptive expectations.

- o Discuss the implications of rational expectations for the effectiveness of government policies (policy ineffectiveness proposition). Use simple examples to illustrate.

- **Lectures 4-7:** New Classical Theory - Real Business Cycle (RBC) Theory:

  - o Introduce the core idea of RBC theory: fluctuations in aggregate economic activity are primarily driven by real shocks (e.g., technology shocks, changes in preferences, government spending) that affect the economy's production possibilities.

  - o Explain how these real shocks propagate through the economy, influencing labor supply, investment, and output, assuming optimizing behavior and flexible prices.

  - o Provide introductory ideas of the basic RBC model without delving into complex mathematical derivations. Focus on the intuition and key mechanisms.

- **Lectures 8-10:** New Keynesian Theory - Nominal and Real Rigidities, Interest Rate Rigidities, Credit Rationing:

  - o Introduce the New Keynesian response to the New Classical critique, emphasizing the role of market imperfections and rigidities in explaining persistent deviations from full employment.

  - o Explain nominal rigidities (e.g., sticky wages, sticky prices, menu costs) and how they can prevent the economy from quickly adjusting to shocks. Provide examples relevant to the Indian context.

  - o Explain real rigidities (e.g., efficiency wages, insider-outsider models) and how they can also contribute to slow adjustments in employment and output.

  - o Introduce the idea of rigidities in interest rates (e.g., due to imperfect information in financial markets) and the concept of credit rationing (lenders limit the supply of loans even to creditworthy borrowers at the prevailing interest rate). Provide introductory ideas for each.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage critical thinking by comparing and contrasting the assumptions and implications of the different theories.

- **Thought Experiments:** Use thought experiments to illustrate the logic of rational expectations and the mechanisms of RBC and New Keynesian models.

- **Discussion of Assumptions:** Focus on the underlying assumptions of each theory and their plausibility in the real world, particularly in the context of the Indian economy.

- **Simple Graphical Illustrations:** Use basic graphs to illustrate the impact of shocks and the adjustment mechanisms in the different models.

- **Case Studies (Conceptual):** Discuss hypothetical scenarios or stylized facts that align with the predictions of each theory.

Continuous Classroom Evaluation:

- **Class Participation:** Assess the quality and frequency of student contributions to discussions.

- **Short Answer Questions:** Ask students to define key concepts like rational expectations, real shocks, nominal rigidities, and credit rationing.

- **Conceptual Questions:** Test understanding of the core arguments and differences between New Classical and New Keynesian perspectives.

- **Brief Essays:** Assign short essays comparing and contrasting the policy implications of the two schools of thought.

Unit 2: Macroeconomic Foundations (15 Lectures)

Lesson Procedure:

- **Lectures 1-3:** Consumption - Keynesian Consumption Function:

    o Review the basic Keynesian consumption function (C = a + bYd) and its key properties (autonomous consumption, marginal propensity to consume).

    o Discuss the psychological law of consumption and its implications.

    o Analyze the limitations of the simple Keynesian consumption function in explaining long-run consumption patterns.

- **Lectures 4-7:** Consumption - Fisher's Theory of Optimal Inter-temporal Choice:

    o Introduce Fisher's model of inter-temporal consumption choice, emphasizing the role of current and future income, interest rates, and preferences.

    o Explain the budget constraint and indifference curves in the two-period model.

    o Analyze how changes in income and interest rates affect optimal consumption and saving decisions.

- **Lectures 8-10:** Consumption - Life-Cycle and Permanent Income Hypotheses:

    o Explain the Life-Cycle Hypothesis (LCH) by Modigliani, focusing on how individuals plan their consumption and saving over their lifetime. Discuss the role of wealth accumulation for retirement.

    o Explain the Permanent Income Hypothesis (PIH) by Friedman, emphasizing that consumption depends primarily on permanent income (the long-run average income) rather than current income. Discuss the

implications for the effectiveness of temporary income changes on consumption.

- **Lectures 11-12:** Consumption - Duesenberry's Relative Income Hypothesis:

  - Explain Duesenberry's Relative Income Hypothesis, highlighting the concepts of the "demonstration effect" (individuals' consumption is influenced by the consumption of others) and the "ratchet effect" (consumption is harder to reduce when income falls after a period of high income).

- **Lectures 13-15:** Demand for Money:

  - Review the transactions and precautionary motives for holding money.

  - Explain the Regressive Expectations model of money demand, where individuals' demand for money depends on their expectation of future interest rate movements.

  - Explain Tobin's portfolio choice model of money demand, where individuals allocate their wealth among different assets (including money) based on risk and return.

  - Explain Baumol's inventory theoretic model of money demand, which views holding money as similar to holding inventory, balancing the opportunity cost of holding money (foregone interest) against the transaction costs of converting other assets into money.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to relate the consumption theories to their own experiences and observations.

- **Graphical Analysis:** Use diagrams to illustrate the budget constraints, indifference curves, and optimal choices in the inter-temporal consumption models and portfolio choice model.

- **Mathematical Derivations (Basic):** Guide students through the basic algebraic representations of the consumption functions and money demand models.

- **Real-World Examples:** Discuss how these theories can explain observed consumption and money holding behavior in India.

- **Critical Evaluation:** Encourage students to critically evaluate the assumptions and predictions of each theory.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions about consumption and money demand.

- **Problem Sets:** Assign problems involving calculations based on the different consumption functions and money demand models.

- **Short Quizzes:** Conduct quizzes on the core assumptions and predictions of each theory.

- **Comparative Analysis:** Ask students to compare and contrast the different theories of consumption and money demand.

Unit 3: Economic Growth (20 Lectures)

Lesson Procedure:

- **Lectures 1-4:** Harrod-Domar Models of Economic Growth:

  - Introduce the Harrod-Domar models, emphasizing the role of the savings rate, capital-output ratio, and investment in determining the rate of economic growth.

  - Explain the concepts of the warranted growth rate, the natural growth rate, and the actual growth rate.

  - Discuss the "knife-edge" instability problem associated with the Harrod-Domar models.

  - Analyze the policy implications of the Harrod-Domar models for promoting economic growth, particularly in developing economies like India.

- **Lectures 5-12:** Solow One-Sector Growth Model:

  - Introduce the Solow growth model as a more nuanced framework for understanding long-run growth.

  - Explain the model's assumptions (e.g., diminishing returns to capital and labor, constant returns to scale, exogenous savings rate).

  - Derive the equation for capital accumulation and explain the concept of the steady state (where investment equals depreciation, and capital per worker is constant).

  - Analyze how the savings rate, depreciation rate, and population growth rate affect the steady-state level of capital per worker and output per worker.

  - Define the Golden Rule level of capital per worker (the steady state that maximizes consumption per worker) and discuss how to achieve it.

  - Explain the concept of dynamic efficiency in the context of the Golden Rule.

- **Lectures 13-16:** Technological Progress in the Solow Model:

  - Introduce the role of exogenous technological progress as the primary driver of sustained long-run growth in the Solow model.

  - Explain how technological progress shifts the production function and leads to increases in output per worker even in the steady state.

- Discuss the limitations of the Solow model in explaining the sources of technological progress.

- **Lectures 17-20:** Elements of Endogenous Growth Theory:

  - Introduce the basic ideas of endogenous growth theory, which attempts to explain the determinants of technological progress and long-run growth within the model itself.

  - Explain the concept of human capital and its role in driving growth.

  - Introduce the AK model as a simple example of endogenous growth, where constant returns to capital (broadly defined to include human capital and knowledge) can lead to sustained growth even without exogenous technological progress. Discuss the policy implications of endogenous growth theory for promoting long-run growth in India (e.g., investment in education, R&D).

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to actively participate in deriving and analyzing the growth models.

- **Mathematical Derivations:** Guide students through the key mathematical steps in the Harrod-Domar and Solow models.

- **Graphical Analysis:** Use diagrams to illustrate the steady state, the Golden Rule, and the impact of technological progress in the Solow model.

- **Comparative Analysis:** Compare and contrast the assumptions and predictions of the Harrod-Domar and Solow models.

- **Policy Discussions:** Discuss the policy implications of the growth models for promoting long-run economic development in India.

- **Simple Numerical Exercises:** Use numerical examples to illustrate the dynamics of the growth models and the calculation of steady-state values.

Continuous Classroom Evaluation:

- **Class Participation:** Assess engagement in discussions about economic growth.

- **Problem Sets:** Assign problems involving calculations related to the Harrod-Domar and Solow models (e.g., finding steady-state capital and output levels, growth rates).

- **Short Quizzes:** Conduct quizzes on the key concepts and assumptions of the growth models.

- **Mid-Term Exam (covering Unit 2 and Unit 3):** Include questions on both macroeconomic foundations and economic growth theories.

- **Analytical Questions:** Ask students to analyze the factors driving India's long-run growth in light of the theories discussed.

By following this unit-wise structure, you can provide a solid foundation in modern macroeconomic theory, covering both the short-run dynamics emphasized by New Keynesian economics and the long-run growth perspectives of New Classical and endogenous growth theories. Relating these theories to the specific context of the Indian economy will enhance their relevance and understanding for students in India.

Mathematical Economics (II)

Unit 1: Game Theory (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Introduction to Games:

    o Define the concept of a game, its essential elements (players, strategies, payoffs, rules).

    o Distinguish between pure strategy and mixed strategy.

    o Classify games as constant-sum and non-constant-sum games. Explain why a constant-sum game can be treated as a zero-sum game. Provide economic examples for each type.

- **Lectures 3-5:** Static Games - Pure Strategy Solutions:

    o Introduce the Maximin-Minimax technique for finding optimal strategies in zero-sum games. Illustrate with payoff matrices and examples.

    o Define dominant strategy and dominant strategy equilibrium. Explain how to identify them and discuss their stability.

    o Introduce iterated dominant strategy equilibrium and the process of eliminating dominated strategies to find the solution.

- **Lectures 6-8:** Static Games - Nash Equilibrium:

    o Define Nash equilibrium as a set of strategies where no player can unilaterally improve their payoff by changing their strategy, given the strategies of the other players.

    o Explain how to find Nash equilibria in pure strategies using best response functions.

    o Introduce the concept of mixed strategy Nash equilibrium and the conditions under which it exists.

- **Lectures 9-10:** Common Games and Dynamic Games (Basic Concept):

    o Analyze the classic games: Prisoners' Dilemma (illustrating the conflict between individual rationality and collective well-being), Battle of the Sexes (coordination problem), and Matching Pennies (no pure strategy Nash equilibrium).

- o Introduce the concept of dynamic games (games played sequentially). Explain the method of backward induction with a simple example (e.g., a sequential bargaining game).

Classroom Teaching Method:

- **Interactive Lectures:** Encourage student participation through discussions and working through game scenarios.

- **Matrix Representation:** Heavily utilize payoff matrices to represent games and identify equilibria.

- **Problem-Solving:** Focus on solving a variety of game theory problems using the different solution methods.

- **Real-World Examples:** Relate game theory concepts to real-world economic situations like oligopoly behavior, bargaining, and auctions.

- **Group Activities:** Assign short group exercises where students analyze simple games and identify equilibria.

Continuous Classroom Evaluation:

- **Class Participation:** Assess the quality and frequency of student contributions to discussions and problem-solving.

- **Short Quizzes:** Conduct brief quizzes on key definitions (e.g., Nash equilibrium, dominant strategy) and basic solution techniques.

- **Problem Sets:** Assign regular problem sets covering the different solution methods for static games.

- **Game Analysis:** Ask students to analyze specific game scenarios (e.g., Prisoners' Dilemma in a specific economic context).

Unit 2: Integration of Functions (5 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Basic Integration Techniques:

  - o Introduce the concept of integration as the reverse process of differentiation.

  - o Explain basic rules of integration (power rule, constant multiple rule, sum/difference rule).

  - o Provide examples of integrating simple polynomial and other basic functions.

- **Lecture 3:** Integration by Substitution:

  - o Explain the technique of integration by substitution (u-substitution) and when it is applicable.

- Work through examples of integration using substitution.

- **Lecture 4:** Integration by Parts:

  - Explain the technique of integration by parts and when it is applicable.

  - Work through examples of integration using integration by parts.

- **Lecture 5:** Applications in Economics:

  - Demonstrate how integration can be used to find total functions from given marginal functions (e.g., total cost from marginal cost, total revenue from marginal revenue).

  - Introduce the concept of Present Value and show how definite integrals can be used to calculate the present value of a continuous stream of income.

Classroom Teaching Method:

- **Step-by-Step Explanations:** Provide clear and step-by-step explanations of the integration techniques.

- **Worked Examples:** Focus on working through a variety of examples to illustrate each technique.

- **Connecting to Differentiation:** Emphasize the relationship between integration and differentiation.

- **Economic Relevance:** Highlight the practical applications of integration in economic analysis.

Continuous Classroom Evaluation:

- **Class Participation:** Encourage students to ask questions and participate in solving examples.

- **Short Quizzes:** Conduct brief quizzes on basic integration rules and techniques.

- **Problem Sets:** Assign regular problem sets covering integration by substitution and by parts.

- **Application Problems:** Ask students to solve economic problems involving finding total functions from marginal functions and calculating present value.

Unit 3: Difference Equations (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** First Order Linear Difference Equations:

  - Define a first-order linear difference equation and its general form.

  - Explain how to find the homogeneous and particular solutions.

  - Discuss the stability of first-order linear difference equations based on the root of the characteristic equation.

- o   Work through examples of solving first-order linear difference equations.

- **Lectures 4-6:** Second Order Linear Difference Equations:

  - o   Define a second-order linear difference equation and its general form.

  - o   Explain how to find the homogeneous solution (considering cases of distinct real roots, repeated real roots, and complex roots of the characteristic equation).

  - o   Introduce the method of undetermined coefficients for finding the particular solution.

  - o   Discuss the stability of second-order linear difference equations based on the roots of the characteristic equation.

  - o   Work through examples of solving second-order linear difference equations.

- **Lectures 7-8:** Non-linear Difference Equations - Qualitative-Graphic Approach:

  - o   Introduce non-linear difference equations.

  - o   Explain the qualitative-graphic approach using phase diagrams (plotting x(t+1) against x(t)) to analyze the behavior of solutions (convergence, divergence, cycles, fixed points).

  - o   Illustrate with simple non-linear examples.

- **Lectures 9-10:** Applications in Economics:

  - o   Explain the Cobweb model of price adjustment using a first-order difference equation and analyze its stability conditions based on the slopes of the supply and demand curves.

  - o   Introduce a simple economic model with lagged adjustment (e.g., inventory adjustment) formulated as a first-order difference equation.

  - o   Explain Samuelson's multiplier-accelerator model using a second-order difference equation and discuss the conditions for different types of economic fluctuations.

Classroom Teaching Method:

- **Step-by-Step Explanations:** Provide clear and systematic methods for solving difference equations.

- **Worked Examples:** Focus on solving a variety of first and second-order linear difference equations.

- **Graphical Interpretation:** Emphasize the graphical interpretation of stability conditions and the qualitative behavior of non-linear difference equations.

- **Economic Modeling:** Clearly demonstrate how difference equations can be used to model dynamic economic processes.

Continuous Classroom Evaluation:

- **Class Participation:** Encourage students to actively participate in solving equations and interpreting results.

- **Short Quizzes:** Conduct brief quizzes on the definitions and methods for solving difference equations.

- **Problem Sets:** Assign regular problem sets covering first and second-order linear difference equations and applications.

- **Model Analysis:** Ask students to analyze the stability of given economic models formulated as difference equations.

Unit 4: Differential Equations (20 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** First Order Linear Differential Equations:

  o Define a first-order linear differential equation and its standard form.

  o Explain the method of finding the integrating factor and the general solution.

  o Discuss the stability of first-order linear differential equations.

  o Work through examples of solving first-order linear differential equations.

- **Lectures 4-7:** Second Order Linear Differential Equations:

  o Define a second-order linear differential equation with constant coefficients.

  o Explain how to find the homogeneous solution (considering cases of distinct real roots, repeated real roots, and complex roots of the characteristic equation).

  o Introduce the method of undetermined coefficients for finding the particular solution.

  o Discuss the stability of second-order linear differential equations based on the roots of the characteristic equation.

  o Work through numerous examples.

- **Lectures 8-11:** Solution of Linear System of Differential Equations:

  o Explain how to solve a system of two linear first-order differential equations using the eigenvalue method.

  o Explain how to solve a system of two linear first-order differential equations using the substitution method.

  o Work through examples of both methods.

- **Lecture 12:** Fixed Point and Stability:

    o   Define a fixed point (equilibrium) of a differential equation or a system of differential equations.

    o   Introduce the concept of stability of a fixed point (local and global stability).

- **Lectures 13-15:** Qualitative-Graphic Approach:

    o   One-variable Phase Diagrams: Explain how to use phase diagrams (plotting dx/dt against x) to analyze the stability of fixed points in single-variable differential equations.

    o   Two-variable Phase Diagrams: Introduce the concept of nullclines and how they can be used to analyze the stability of fixed points in two-variable systems. Sketch simple phase portraits.

- **Lecture 16:** Linearization of a Non-linear Differential-Equation System and Stability Analysis:

    o   Explain the process of linearizing a non-linear system of differential equations around a fixed point using Taylor series approximation.

    o   Discuss how the stability of the linearized system can provide information about the local stability of the fixed point of the original non-linear system.

- **Lectures 17-20:** Applications in Microeconomics and Macroeconomics:

    o   Price dynamics in a single market: Model price adjustment using a first-order differential equation and analyze its stability.

    o   Multi-market equilibrium and stability: Use a system of linear differential equations to model the dynamics of prices in multiple interconnected markets and analyze stability using eigenvalues.

    o   A model with inflation-unemployment interaction (briefly introduce a simple Phillips curve model as a differential equation system).

    o   Solow model: Formulate the Solow growth model (or a simplified version) as a differential equation and analyze the stability of the steady state.

    o   IS-LM model: Introduce a dynamic version of the IS-LM model using a system of differential equations to analyze the stability of the equilibrium.

Classroom Teaching Method:

- **Step-by-Step Explanations:** Provide clear and systematic methods for solving differential equations and systems.

- **Worked Examples:** Focus on solving a wide range of first and second-order linear differential equations and systems.

- **Graphical Interpretation:** Emphasize the geometric interpretation of solutions, fixed points, and stability using phase diagrams.

- **Economic Modeling:** Clearly demonstrate how differential equations can be used to model continuous-time dynamic economic processes.

- **Connecting to Difference Equations:** Highlight the parallels and differences between difference and differential equations in modeling economic dynamics.

Continuous Classroom Evaluation:

- **Class Participation:** Encourage active participation in solving equations, interpreting phase diagrams, and discussing economic applications.

- **Short Quizzes:** Conduct brief quizzes on definitions, solution methods, and stability concepts.

- **Problem Sets:** Assign regular problem sets covering first and second-order differential equations, systems of equations, and stability analysis.

- **Phase Diagram Analysis:** Ask students to analyze the stability of given differential equations or systems using phase diagrams.

- **Model Formulation and Analysis:** Ask students to formulate simple dynamic economic models as differential equations and analyze their stability.

By following this unit-wise structure, you can provide a comprehensive understanding of dynamic mathematical methods used in economics. Emphasizing the connections between the mathematical techniques and their applications in various areas of microeconomics and macroeconomics will be crucial for student learning.

Econometrics (I)

Unit 1: Nature and Scope of Econometrics (3 Lecture Hours)

Lesson Procedure:

- **Lecture 1:** Introduction to Econometrics:

  - Define econometrics and its role in bridging economic theory and real-world data.

  - Explain the distinction between an economic model (theoretical relationship) and an econometric model (statistical formulation of that relationship). Use simple economic examples (e.g., demand function) to illustrate.

- **Lecture 2:** Stochastic Relations and Random Disturbance:

  - Introduce the concept of a stochastic (probabilistic) relationship in contrast to deterministic relationships in pure economic theory.

  - Explain the role and sources of the random disturbance (error term) in an econometric model (e.g., omitted variables, measurement errors, unpredictable human behavior). Emphasize that this is what makes econometrics statistical.

- **Lecture 3:** Applications of Econometrics:

  o Discuss the wide range of applications of econometrics in different branches of social science, particularly economics (e.g., demand and supply analysis, forecasting, policy evaluation, testing economic theories in macroeconomics, microeconomics, finance, labor economics, etc.). Provide specific examples relevant to India.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage student participation by asking for examples of economic relationships and how they might be studied empirically.

- **Conceptual Explanation:** Focus on building a strong conceptual understanding of the nature and purpose of econometrics.

- **Real-World Relevance:** Emphasize the practical applications of econometrics in addressing real-world economic questions.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student engagement in discussions and their ability to relate economic theory to empirical analysis.

- **Short Answer Questions:** Ask students to define econometrics, differentiate between economic and econometric models, and explain the role of the error term.

Unit 2: Classical Linear Regression Model (SLRM and MLRM with two regressors) (27 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Introduction to Linear Regression:

  o Introduce the concept of a population regression function (PRF) as the true relationship between the dependent and independent variables in the population.

  o Introduce the simple linear regression model (SLRM) and the multiple linear regression model (MLRM) with two regressors as attempts to estimate the PRF using sample data.

  o Explain the concept of the sample regression function (SRF) as the estimated relationship based on a given sample.

- **Lectures 4-7:** Classical Assumptions of the Linear Regression Model (Basic Interpretation):

  o State and provide a basic interpretation of each of the classical assumptions for both SLRM and MLRM (e.g., linearity, randomness of the sample, zero mean of the error term, homoscedasticity, no autocorrelation, no multicollinearity for MLRM, error term follows a normal distribution for

inference). Emphasize the importance of these assumptions for the properties of the estimators.

- **Lectures 8-12:** Estimation by Ordinary Least Squares (OLS):

    o Explain the principle of Ordinary Least Squares (OLS) as a method for estimating the parameters of SLRM and MLRM by minimizing the sum of squared residuals.

    o Derive the OLS estimators for the intercept and slope in SLRM (step-by-step).

    o State the OLS estimators for the intercept and slopes in MLRM with two regressors (without detailed derivation, focus on the intuition).

- **Lectures 13-17:** Properties of Least Squares Estimators in SLRM - Gauss-Markov Theorem:

    o Discuss the properties of the OLS estimators in SLRM: unbiasedness, efficiency (minimum variance).

    o State and explain the Gauss-Markov theorem, highlighting that under the classical assumptions, the OLS estimators are the Best Linear Unbiased Estimators (BLUE).

- **Lectures 18-22:** Testing of Hypotheses in SLRM and MLRM:

    o Introduce the concepts of null and alternative hypotheses in the context of regression coefficients.

    o Explain how to perform a single hypothesis test for an individual regression coefficient (t-test) in both SLRM and MLRM, including setting up hypotheses, calculating the test statistic, determining the critical value or p-value, and making a decision.

    o Explain how to perform a joint hypothesis test for multiple regression coefficients (F-test) in MLRM, including setting up hypotheses, calculating the test statistic, determining the critical value or p-value, and making a decision.

- **Lectures 23-25:** Goodness of Fit and Analysis of Variance (ANOVA):

    o Explain the concept of goodness of fit and how it is measured by the coefficient of determination (R-squared) in SLRM and MLRM. Discuss its interpretation (proportion of the total variation in the dependent variable explained by the regressors).

    o Explain adjusted R-squared and why it is preferred in MLRM.

    o Introduce the F-statistic as another measure of overall goodness of fit in MLRM and its relationship to R-squared.

- o Briefly introduce the basic principles of Analysis of Variance (ANOVA) in the context of regression, showing how the F-statistic is derived from the partitioning of the total sum of squares.

- **Lecture 26:** Economic Interpretation of Regression Results:

  - o Emphasize the importance of interpreting regression coefficients in the context of the underlying economic theory.

  - o Discuss the distinction between statistical significance (based on hypothesis testing) and economic importance (based on the magnitude and practical relevance of the coefficients).

- **Lecture 27:** Simple, Partial, and Multiple Correlation:

  - o Define and explain simple correlation (measuring the linear association between two variables) in the context of SLRM.

  - o Define and explain partial correlation (measuring the linear association between two variables after controlling for the effect of one or more other variables) in the context of MLRM. Explain its interpretation.

  - o Define and explain multiple correlation (measuring the linear association between the dependent variable and all the independent variables together) in the context of MLRM. Explain its relationship to R-squared.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage active student participation in derivations, problem-solving, and interpreting results.

- **Mathematical Derivations:** Provide step-by-step derivations of OLS estimators and test statistics.

- **Numerical Examples:** Use carefully chosen numerical examples to illustrate the concepts of estimation, hypothesis testing, and goodness of fit.

- **Statistical Software Demonstrations (Optional but Recommended):** If possible, introduce students to basic commands in statistical software (e.g., R, Python with statsmodels, Stata) to estimate regression models and interpret the output. This can greatly enhance understanding.

- **Economic Scenarios:** Frame examples and problems within realistic economic scenarios to emphasize the practical application of the CLRM.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student engagement in discussions and their ability to interpret regression concepts.

- **Problem Sets:** Assign regular problem sets requiring students to perform OLS estimation (manually for simple cases, using software for more complex ones), conduct hypothesis tests, and interpret regression results.

- **Short Quizzes:** Conduct brief quizzes on the classical assumptions, OLS principles, and basic concepts of hypothesis testing and goodness of fit.

- **Mid-Term Exam:** Cover the concepts of SLRM and MLRM, OLS estimation, properties of estimators, and hypothesis testing.

Unit 3: Qualitative (Dummy) Independent Variables (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-4:** Intercept Dummy Variables:

  - Introduce the concept of qualitative (categorical) independent variables and the use of dummy variables (binary variables taking values 0 or 1) to include them in a regression model.

  - Explain how to create intercept dummy variables to capture differences in the intercept term across different categories (e.g., gender, region, policy regime).

  - Focus on the interpretation of the coefficients of intercept dummy variables (the difference in the intercept for the category represented by the dummy compared to the base category). Provide economic examples.

- **Lectures 5-8:** Slope Dummy Variables:

  - Explain how to create slope dummy variables by interacting a quantitative independent variable with a dummy variable.

  - Explain that slope dummies allow the slope of the regression line to differ across different categories.

  - Focus on the interpretation of the coefficients of slope dummy variables (the difference in the slope for the category represented by the interaction term compared to the base category). Provide economic examples.

- **Lectures 9-10:** Forecasting (for two-variable model only):

  - Introduce the concept of forecasting using a regression model.

  - Differentiate between ex-post forecasts (forecasting within the sample period) and ex-ante forecasts (forecasting outside the sample period).

  - Explain how to calculate a point forecast using the estimated regression equation for a given value of the independent variable (for a two-variable model).

  - Introduce the concept of forecast error (the difference between the actual value and the forecasted value) and discuss potential sources of forecast error.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to think about economic situations where qualitative factors might influence the relationship between variables.

- **Numerical Examples:** Use numerical examples to demonstrate how to include and interpret dummy variables in regression models.

- **Graphical Interpretation:** Illustrate how intercept and slope dummies affect the regression line graphically (parallel shifts for intercept dummies, changes in slope for slope dummies).

- **Real-World Applications:** Discuss examples of using dummy variables in economic research (e.g., the impact of a policy change, gender wage differentials).

- **Statistical Software Demonstrations (Optional):** Show how to include and interpret dummy variables in regression output from statistical software.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student understanding of how to incorporate qualitative variables into regression models.

- **Problem Sets:** Assign problems requiring students to specify regression models with dummy variables and interpret the coefficients.

- **Short Quizzes:** Conduct quizzes focusing on the interpretation of intercept and slope dummy coefficients.

- **Interpretation Exercises:** Provide regression output with dummy variables and ask students to provide economic interpretations.

Unit 4: Violations of Classical Assumptions (5 Lecture Hours)

Lesson Procedure:

- **Lectures 1:** Multicollinearity:

  - Define multicollinearity as a high degree of linear correlation among the independent variables in a multiple regression model.

  - Explain the consequences of multicollinearity on OLS estimators (large standard errors, inflated variances, difficulty in precisely estimating individual coefficients, but OLS estimators remain BLUE).

  - Discuss methods for detecting multicollinearity, focusing on the Variance Inflationary Factor (VIF) and its interpretation (rule of thumb for high VIF).

  - Briefly mention possible remedies for multicollinearity (e.g., increasing sample size, dropping one of the collinear variables, transforming variables).

- **Lectures 2-3:** Heteroscedasticity:

  - Define heteroscedasticity as the variance of the error term being non-constant across observations.

- o Explain the consequences of heteroscedasticity on OLS estimators (OLS estimators remain unbiased and consistent, but they are no longer BLUE, and standard errors are biased, leading to invalid hypothesis tests).

- o Discuss methods for detecting heteroscedasticity, focusing on the Breusch-Pagan or Lagrange Multiplier (LM) test (conceptual explanation of the test procedure).

- o Briefly mention possible remedies for heteroscedasticity (e.g., using robust standard errors, transforming the dependent variable, Weighted Least Squares).

- **Lecture 4-5:** Autocorrelation:

  - o Define autocorrelation (or serial correlation) as a correlation between the error terms across different observations (often in time series data).

  - o Explain the consequences of autocorrelation on OLS estimators (OLS estimators remain unbiased and consistent, but they are no longer BLUE, and standard errors are biased, leading to invalid hypothesis tests).

  - o Discuss methods for detecting autocorrelation, focusing on the Durbin-Watson (DW) test and its interpretation (range of the statistic and decision rules).

  - o Briefly mention possible remedies for autocorrelation (e.g., using Newey-West standard errors, transforming the model, using time series models).

Classroom Teaching Method:

- **Conceptual Explanation:** Focus on understanding the nature of each violation and its implications for the validity of OLS inference.

- **Intuitive Explanations of Detection Tests:** Provide intuitive explanations of the logic behind the detection tests without delving into complex mathematical derivations.

- **Emphasis on Consequences and Remedies:** Highlight the practical consequences of these violations and the general approaches to address them.

- **Real-World Relevance:** Discuss situations in economic data where these violations are likely to occur (e.g., time series data for autocorrelation, cross-sectional data with varying scales for heteroscedasticity).

Continuous Classroom Evaluation:

- **Class Participation:** Assess understanding of the implications of violating classical assumptions.

- **Short Answer Questions:** Ask students to define multicollinearity, heteroscedasticity, and autocorrelation and explain their consequences.

- **Interpretation Exercises:** Provide scenarios and ask students to identify potential violations and suggest appropriate detection methods.

By following this unit-wise structure, you can provide a comprehensive introduction to the fundamentals of econometrics, covering the basic principles of linear regression and the importance of the classical assumptions. Emphasizing conceptual understanding, practical applications, and the ability to interpret regression results will be key to student success in this course. Integrating statistical software demonstrations whenever feasible will significantly enhance their learning experience.

Economic History of India (1857-1947)

Unit 1: Colonial India: Background and Introduction (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Setting the Stage - Overview of the Colonial Economy:
    - Introduce the period of study (1857-1947) and its significance in shaping the Indian economy.
    - Provide a broad overview of the key features of the colonial economy: its integration into the global capitalist system, the dominance of British interests, the transformation of traditional economic structures, and the beginnings of modern economic institutions.
    - Discuss the different phases of colonial rule and their varying impacts on the Indian economy.

- **Lectures 4-7:** Macro Trends - National Income:
    - Introduce the challenges of estimating national income during the colonial period.
    - Discuss the pioneering work of scholars like Dadabhai Naoroji, V.K.R.V. Rao, and others in estimating national income.
    - Analyze the trends in national income and per capita income during the colonial era, highlighting periods of growth and stagnation.
    - Discuss the limitations and debates surrounding these estimates.

- **Lectures 8-10:** Macro Trends - Population and Occupational Structure:
    - Analyze the trends in population growth during the colonial period, including factors like birth rates, death rates, and the impact of famines and epidemics.
    - Examine the changes in the occupational structure of the Indian workforce, particularly the continued dominance of agriculture and the limited growth of the industrial sector.

o   Discuss the implications of these demographic and occupational trends for economic development.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to engage with the historical context and ask questions about the nature of colonial rule.

- **Primary Source Snippets:** Introduce short excerpts from primary sources (e.g., writings of colonial administrators, nationalist leaders, economic surveys) to provide firsthand perspectives.

- **Data Presentation and Interpretation:** Present basic historical data on national income, population, and occupational structure (in the form of tables and simple charts) and guide students in interpreting the trends.

- **Discussion of Historiographical Debates:** Briefly introduce key debates among historians regarding the impact of colonialism on the Indian economy.

- **Timeline Activities:** Create a timeline of significant events and policy changes during the colonial period.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student engagement in discussions and their understanding of the basic features of the colonial economy.

- **Short Answer Questions:** Ask students to define key terms (e.g., drain of wealth - introduced later but can be foreshadowed), identify major trends in national income and population, and discuss the challenges of historical data collection.

- **Brief Quizzes:** Conduct short quizzes on basic facts and figures related to the overview of the colonial economy.

Unit 2: Agriculture (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Agrarian Structure and Land Relations:

  o   Analyze the different land revenue systems introduced by the British (e.g., Permanent Settlement, Ryotwari Settlement, Mahalwari Settlement) and their impact on land ownership, peasant rights, and agricultural production.

  o   Discuss the emergence of new agrarian classes (e.g., zamindars, moneylenders) and changes in social relations in rural areas.

  o   Examine the impact of commercialization of agriculture on the agrarian structure.

- **Lectures 4-6:** Agricultural Markets and Institutions:

- o Discuss the development of agricultural markets under colonial rule, including the role of intermediaries and the integration of Indian agriculture into global commodity markets.

- o Analyze the role of credit institutions (formal and informal) in rural areas and the problem of rural indebtedness.

- o Examine the introduction of new agricultural technologies (irrigation, new seeds) and their limited adoption and impact.

- **Lectures 7-8:** Trends in Performance and Productivity:

  - o Analyze the trends in agricultural production and productivity during the colonial period, highlighting periods of growth and stagnation in different regions and crops.

  - o Discuss the factors influencing agricultural performance (e.g., land revenue policies, irrigation, technology, market access).

- **Lectures 9-10:** Famines:

  - o Examine the recurring famines in colonial India and their devastating impact on population and the economy.

  - o Analyze the causes of these famines, including drought, but also the role of colonial policies (e.g., grain trade, land revenue demands).

  - o Discuss the government's response to famines and its effectiveness.

Classroom Teaching Method:

- **Thematic Lectures:** Focus on specific aspects of agricultural transformation under colonial rule.

- **Case Studies:** Analyze specific regions or agricultural systems (e.g., indigo cultivation in Bengal, cotton cultivation in Bombay Presidency) to illustrate broader trends.

- **Map Work:** Use historical maps to show the distribution of different land revenue systems and famine-prone areas.

- **Discussion of Primary Sources:** Analyze excerpts from reports on land revenue settlements, agricultural surveys, and famine inquiries.

- **Comparative Analysis:** Compare agricultural developments in different regions of colonial India.

Continuous Classroom Evaluation:

- **Class Participation:** Encourage students to discuss the impact of colonial policies on agriculture and rural society.

- **Short Answer Questions:** Ask students to explain the features of different land revenue systems, discuss the role of moneylenders, and analyze the causes of famines.
- **Brief Essays:** Assign short essays on the impact of commercialization on Indian agriculture or the role of technology.

Unit 3: Railways and Industry (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Railways:
  - Discuss the introduction and expansion of the railway network in India under colonial rule.
  - Analyze the economic impact of railways, including its role in facilitating trade, resource extraction, and the movement of troops, as well as its limited impact on indigenous industrialization.
  - Discuss the financing and ownership of the railways.

- **Lectures 4-6:** The De-industrialisation Debate:
  - Introduce the debate surrounding de-industrialisation in colonial India.
  - Present the arguments for and against de-industrialisation, considering evidence related to the decline of traditional handicrafts and the growth of modern industries.
  - Discuss the different perspectives of scholars on this issue.

- **Lectures 7-8:** Evolution of Entrepreneurial and Industrial Structure:
  - Analyze the emergence of Indian entrepreneurial groups and the development of modern industries (e.g., textiles, jute, iron and steel).
  - Discuss the regional concentration of industries and the nature of industrial ownership and control.

- **Lecture 9:** Nature of Industrialisation in the Inter-War Period:
  - Examine the trends in industrial growth during the inter-war period (1919-1939), considering the impact of World War I, the Great Depression, and the rise of nationalist economic thought.

- **Lecture 10:** Constraints to Industrial Breakthrough, Labour Relations:
  - Discuss the various constraints that hindered a major industrial breakthrough in colonial India (e.g., limited government support, competition from British industries, lack of capital and technology, discriminatory policies).
  - Briefly introduce the early development of labour relations and the emergence of trade unions in colonial India.

Classroom Teaching Method:

- **Thematic Lectures:** Focus on the development of infrastructure and the industrial sector.

- **Visual Aids:** Use historical maps showing the expansion of the railway network and the location of major industrial centers.

- **Discussion of Historiographical Debates:** Engage students in discussions about the de-industrialisation debate and the nature of colonial industrialization.

- **Analysis of Data:** Present basic data on railway mileage, industrial production, and employment.

- **Biographical Sketches:** Briefly discuss the contributions of key Indian entrepreneurs.

Continuous Classroom Evaluation:

- **Class Participation:** Encourage students to discuss the impact of railways and the debates surrounding industrialization.

- **Short Answer Questions:** Ask students to discuss the economic impact of railways, summarize the arguments in the de-industrialisation debate, and identify constraints to industrial growth.

- **Brief Essays:** Assign short essays on the role of railways in the colonial economy or the nature of Indian entrepreneurship.

Unit 4: Economy and State in the Imperial Context (15 Lecture Hours)

Lesson Procedure:

- **Lectures 1-4:** The Imperial Priorities and the Indian Economy:

  - Analyze how the economic policies of the British colonial state were primarily driven by imperial priorities (e.g., revenue extraction, facilitating British trade and investment, maintaining administrative control).

  - Discuss specific policies related to trade, industry, finance, and agriculture that reflected these priorities.

- **Lectures 5-8:** Drain of Wealth:

  - Introduce and critically examine the concept of the "drain of wealth" from India to Britain, as articulated by nationalist thinkers like Dadabhai Naoroji.

  - Discuss the different components of the drain (e.g., home charges, remittances, unequal trade) and the debates surrounding its magnitude and impact on India's economic development.

- **Lectures 9-12:** International Trade, Capital Flows and the Colonial Economy:

- o Analyze the changes and continuities in India's international trade patterns under colonial rule, including the shift in the composition of exports and imports and the dominance of trade with Britain.

- o Discuss the flows of capital into and out of India, including British investment and the limited opportunities for Indian capital accumulation.

- o Examine how India's integration into the global economy under colonialism shaped its economic structure and development trajectory.

- **Lectures 13-15:** Government and Fiscal Policy:

  - o Analyze the fiscal policies of the colonial government, including sources of revenue (land revenue, customs, excise) and patterns of expenditure (administration, military, infrastructure).

  - o Discuss the impact of these fiscal policies on different sections of Indian society and on economic development.

  - o Briefly touch upon the debates surrounding colonial fiscal management.

Classroom Teaching Method:

- **Analytical Lectures:** Encourage students to critically analyze the relationship between imperial policies and the Indian economy.

- **Primary Source Analysis:** Examine excerpts from government reports on trade, finance, and fiscal policy, as well as nationalist critiques of colonial economic policies.

- **Debates:** Organize debates on the "drain of wealth" or the overall impact of British rule on the Indian economy.

- **Comparative Studies:** Briefly compare India's experience with colonialism to that of other countries.

- **Policy Evaluation:** Discuss the intended and unintended consequences of specific colonial economic policies.

Continuous Classroom Evaluation:

- **Class Participation:** Encourage students to critically analyze the role of the state in the colonial economy.

- **Short Answer Questions:** Ask students to explain the concept of the "drain of wealth," discuss the key features of colonial trade, and analyze the priorities of the imperial state.

- **Essay Assignments:** Assign essays on the impact of colonial fiscal policy or a critical evaluation of the "drain of wealth" theory.

- **Source Analysis:** Ask students to analyze a primary source document related to colonial economic policy and discuss its significance.

By following this unit-wise structure, you can provide a comprehensive overview of the economic history of India during the colonial period. Emphasizing critical analysis, engagement with historical debates, and the use of primary and secondary sources will help students develop a nuanced understanding of this crucial period in India's economic past. Remember to encourage students to connect the historical developments with India's post-independence economic trajectory.

Public Finance

Unit 1: Core Concepts (15 Lecture Hours)

Lesson Procedure:

- **Lectures 1-5:** Public Goods and Externalities:

    o Introduce the characteristics of public goods (non-rivalry, non-excludability) with examples relevant to India (e.g., national defense, public parks, street lighting).

    o Explain why private markets fail to efficiently provide public goods, leading to under-provision. Discuss concepts like the free-rider problem.

    o Define externalities (positive and negative) with Indian examples (e.g., pollution from industries, benefits of vaccination, education).

    o Analyze how externalities lead to market failures (divergence between private and social costs/benefits).

    o Discuss the role of government in addressing externalities through various interventions (e.g., taxes, subsidies, regulations, property rights). Provide examples of environmental regulations or subsidies for renewable energy in India.

- **Lectures 6-9:** Public Revenue:

    o Define public revenue and its importance for financing government activities in India.

    o Explain the different sources of government revenue in India:

        ▪ Taxation: Discuss direct taxes (e.g., income tax, corporate tax, wealth tax) and indirect taxes (e.g., Goods and Services Tax - GST, excise duties, customs duties) with specific reference to the Indian tax structure.

        ▪ Fees: Explain fees charged for specific government services (e.g., registration fees, license fees).

        ▪ Other Non-tax Revenues: Discuss other sources like profits from public sector undertakings (PSUs), grants, and interest receipts in the Indian context.

- **Lectures 10-12:** Public Expenditure:

  - Define public expenditure and its role in achieving government objectives in India (e.g., social welfare, economic development, national security).

  - Discuss the allocation of public funds for various government activities in India, including:

    - Social Welfare: Education, healthcare, poverty alleviation programs (mention key schemes).

    - Infrastructure: Transportation (roads, railways, airports), energy, communication.

    - Defence.

    - General Administration.

  - Briefly touch upon different classifications of public expenditure (e.g., revenue vs. capital expenditure, plan vs. non-plan expenditure in the Indian context).

- **Lectures 13-14:** Public Debt:

  - Explain the concept of public debt (total amount owed by the government) in India.

  - Discuss the reasons for the emergence of public debt (e.g., financing deficits, infrastructure projects, economic crises).

  - Analyze the potential implications of public debt for the Indian economy (e.g., interest payments burden, crowding out, future tax burden).

  - Briefly introduce debt management strategies adopted by the Indian government.

- **Lecture 15:** Taxation: Progressive, Regressive and Proportional:

  - Define and differentiate between progressive, regressive, and proportional tax systems.

  - Provide examples of each type of tax, with reference to the Indian tax system where applicable (e.g., income tax as progressive, GST potentially regressive on essential goods for lower income groups).

  - Discuss the equity implications of each type of tax system.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to relate the concepts to real-world examples from the Indian economy and current affairs.

- **Case Studies:** Analyze specific examples of public goods provision, externalities, or tax policies in India.

- **Data Presentation and Interpretation:** Present basic data on government revenue, expenditure, and debt in India (from the Union Budget or RBI reports) and guide students in interpreting the trends.

- **Class Discussions:** Facilitate discussions on the role of government in addressing market failures and the challenges of public finance in India.

- **Visual Aids:** Use diagrams and charts to illustrate concepts like market failure, tax incidence, and the growth of public debt.

Continuous Classroom Evaluation:

- **Class Participation:** Assess the quality and frequency of student contributions to discussions and their ability to relate concepts to the Indian context.

- **Short Answer Questions:** Ask students to define key terms (e.g., public good, externality, fiscal deficit), identify sources of public revenue in India, and differentiate between types of taxes.

- **Brief Quizzes:** Conduct short quizzes on the characteristics of public goods, the impact of externalities, and the basics of the Indian fiscal system.

Unit 2: Basic Concepts of Public Finance Theories (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Benefit Principle:

  o Explain the Benefit Principle of taxation, which suggests that individuals should be taxed according to the benefits they receive from government services.

  o Discuss different interpretations and applications of the benefit principle (e.g., user charges, earmarked taxes).

  o Analyze the limitations and challenges of applying the benefit principle in practice, particularly for public goods. Provide examples from India where user charges are applied (e.g., tolls on highways).

- **Lectures 4-6:** Ability-to-Pay Principle:

  o Explain the Ability-to-Pay Principle of taxation, which suggests that individuals with a greater ability to pay (typically measured by income or wealth) should bear a larger share of the tax burden.

  o Discuss different measures of ability to pay and the concepts of horizontal equity (equal treatment of equals) and vertical equity (unequal treatment of unequals).

  o Analyze the arguments for and against progressive taxation based on the ability-to-pay principle in the context of India's income distribution.

- **Lectures 7-8:** Public Choice Theory (Basics):

- o Introduce the basic tenets of Public Choice Theory, which applies economic principles to the analysis of political behavior and government decision-making.

- o Discuss concepts like rational voter behavior, political competition, the role of special interest groups, and potential government failures (bureaucracy, rent-seeking). Provide simple examples from the Indian political landscape.

- **Lectures 9-10:** Fiscal Federalism:

  - o Explain the concept of fiscal federalism, which deals with the division of fiscal responsibilities and revenue-sharing between different levels of government (e.g., Union, State, Local) in a federal system like India.

  - o Discuss the rationale for fiscal decentralization and the challenges of achieving efficient and equitable fiscal relations between different levels of government in India. Briefly touch upon the role of the Finance Commission in India.

Classroom Teaching Method:

- **Conceptual Lectures:** Focus on explaining the underlying principles and their logical implications.

- **Thought Experiments:** Use thought experiments to illustrate the application and limitations of different principles of taxation.

- **Class Discussions:** Facilitate discussions on the fairness and efficiency of different tax systems and the role of political factors in fiscal decisions in India.

- **Case Studies (Brief):** Analyze specific policy debates in India through the lens of these theoretical principles (e.g., debates on tax reforms, revenue sharing between states).

Continuous Classroom Evaluation:

- **Class Participation:** Assess student engagement in discussions and their ability to apply the theoretical principles to real-world scenarios in India.

- **Short Answer Questions:** Ask students to explain the benefit principle, the ability-to-pay principle, and the basic ideas of public choice theory and fiscal federalism.

- **Comparative Analysis:** Ask students to compare and contrast the benefit and ability-to-pay principles.

Unit 3: Issues from Indian Public Finance (20 Lecture Hours)

Lesson Procedure:

- **Lectures 1-7:** Current Issues of India's Tax System:

- o Analyze the current structure of India's tax system (direct and indirect taxes) in detail, including recent reforms and challenges.

- o Discuss issues related to tax base broadening, tax evasion and avoidance, tax compliance, and the complexity of the tax system in India.

- o Focus on specific current debates and challenges related to GST implementation, corporate tax rates, personal income tax structure, and the taxation of digital economy.

- o Discuss the role of tax policy in promoting economic growth and equity in India.

- **Lectures 8-14:** Working of Monetary and Fiscal Policies in India:

  - o Explain the objectives and instruments of monetary policy in India, as implemented by the Reserve Bank of India (RBI) (e.g., repo rate, reverse repo rate, cash reserve ratio, statutory liquidity ratio, open market operations).

  - o Analyze the role of fiscal policy (government spending and taxation) in influencing aggregate demand and economic activity in India.

  - o Discuss the coordination and potential conflicts between monetary and fiscal policies in the Indian context.

  - o Analyze the effectiveness of monetary and fiscal policies in addressing macroeconomic challenges like inflation, unemployment, and economic slowdown in India, with reference to recent policy responses.

- **Lectures 15-20:** Analysis of Indian Budgetary System:

  - o Explain the process of budget preparation and approval in India (Union Budget).

  - o Analyze the key components of the Indian budget (revenue budget, capital budget, fiscal deficit, revenue deficit, primary deficit).

  - o Discuss the trends in government revenue and expenditure in recent Indian budgets.

  - o Analyze the challenges and issues related to fiscal deficits and debt sustainability in India.

  - o Briefly discuss the budgetary processes at the state level in India.

  - o Introduce concepts like budget deficits, financing of deficits, and their implications for the economy.

Classroom Teaching Method:

- **Lectures with Current Affairs Integration:** Continuously link the concepts to current developments in Indian public finance, referring to recent budgets, policy announcements by the government and RBI, and economic surveys.

- **Policy Analysis:** Analyze specific government policies related to taxation, expenditure, and debt management in India.

- **Guest Lectures (Optional):** Invite experts from government, RBI, or research institutions to share their insights on Indian public finance issues.

- **Student Presentations:** Assign students to research and present on specific current issues in Indian taxation or fiscal policy.

- **Analysis of Budget Documents:** Guide students in analyzing key figures and policy statements from the Union Budget documents.

- **Debates:** Organize debates on topical issues like the effectiveness of GST, the appropriate level of fiscal deficit, or the role of monetary policy in inflation control in India.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student engagement with current issues and their ability to analyze policy debates related to Indian public finance.

- **Essay Assignments:** Assign essays on current challenges in India's tax system, the effectiveness of monetary and fiscal policies, or the analysis of recent budget trends.

- **Presentations/Reports:** Evaluate the quality of student research and presentations on specific issues.

- **Analysis of Budget Data:** Provide excerpts from budget documents and ask students to interpret key figures and trends.

- **Policy Briefs:** Ask students to write short policy briefs on proposed changes in India's tax or fiscal policies.

By following this unit-wise structure, you can provide a comprehensive understanding of public finance principles and their application to the specific context of the Indian economy. Emphasizing current issues, policy analysis, and the ability to interpret budgetary data will be crucial for student learning and their understanding of the economic role of the government in India. Remember to encourage students to follow current economic developments in India.

International Economics (I)

Unit 1: Absolute and Comparative Advantages of Trade (7 Lecture Hours)

Lesson Procedure:

- **Lectures 1:** Adam Smith's Theory of Absolute Advantage:

    o Introduce the concept of international trade and its benefits.

- Explain Adam Smith's theory of absolute advantage: countries should specialize in and export goods in which they have an absolute cost advantage (lower cost of production).

- Illustrate with simple numerical examples involving two countries and two goods.

- Discuss the limitations of the absolute advantage theory in explaining trade patterns.

- **Lectures 2-3:** David Ricardo's Theory of Comparative Advantage:

  - Explain David Ricardo's theory of comparative advantage: countries should specialize in and export goods in which they have a lower opportunity cost of production, even if they have an absolute disadvantage in producing all goods.

  - Illustrate with numerical examples demonstrating how trade can be mutually beneficial even when one country is more productive in everything.

- **Lecture 4:** Arbitrage and the Basis of Trade:

  - Explain arbitrage as the simultaneous purchase and sale of an asset to profit from a difference in the price.

  - Show how arbitrage acts as the basis and direction of trade, driving prices towards equalization across countries.

  - Discuss fundamental sources of cross-country price differences, linking them to the concept of comparative advantage (differences in technology, factor endowments, tastes).

- **Lecture 5:** Externalities, Regulation, and Perverse Comparative Advantage:

  - Introduce the idea that externalities (positive or negative) and government regulations can influence the actual pattern of trade and potentially lead to a "perverse" comparative advantage where trade might not be welfare-improving if these factors are not accounted for. Provide examples relevant to environmental standards or labor regulations.

- **Lecture 6-7:** One Factor Economy and the Ricardian World:

  - Introduce a simple one-factor (labor) economy model.

  - Explain the concept of the Production Possibility Frontier (PPF) under constant costs in this model.

  - Introduce relative demand and relative supply curves to determine autarky relative prices.

  - Explain the terms of trade (TOT) and how trade occurs in the Ricardian world based on comparative advantage.

- o Illustrate the determination of the intermediate TOT and the concepts of complete versus incomplete specialization.

- o Show how complete specialization leads to gains from trade.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage student participation through discussions and working through numerical examples.

- **Numerical Illustrations:** Use numerous numerical examples to clearly demonstrate the concepts of absolute and comparative advantage and the gains from trade.

- **Graphical Representation:** Utilize simple graphs (PPFs, relative supply and demand) to illustrate the Ricardian model.

- **Real-World Connections:** Discuss real-world trade patterns and try to relate them to the theories of absolute and comparative advantage.

- **Critical Thinking:** Encourage students to think about the limitations and assumptions of these early trade theories.

Continuous Classroom Evaluation:

- **Class Participation:** Assess the quality and frequency of student contributions to discussions and problem-solving.

- **Short Quizzes:** Conduct brief quizzes on the definitions of absolute and comparative advantage and the basic mechanics of the Ricardian model.

- **Problem Sets:** Assign regular problem sets involving calculating opportunity costs, determining patterns of specialization, and analyzing gains from trade in Ricardian settings.

Unit 2: The Building Blocks of Trade Theory (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1:** Community Indifference Curves:

  - o Introduce the concept of community indifference curves as a way to represent the preferences of a nation as a whole.

  - o Discuss the justifications for using community indifference curves (simplification, aggregation).

  - o Explain the properties of community indifference curves (e.g., downward sloping, convex to the origin, higher curves represent higher welfare). Discuss the assumptions and limitations behind these properties, including the issue of aggregation of individual preferences.

- **Lectures 2-5:** Trade Indifference Curves and Offer Curves:

- o Explain the need for trade indifference curves to analyze international trade equilibrium.

- o Derive trade indifference curves from community indifference curves and the PPF.

- o Discuss the properties of the trade indifference map.

- o Define offer curves (reciprocal demand curves) and explain how they are derived from a country's PPF and trade indifference curves, showing the quantities a country is willing to export and import at different terms of trade.

- o Discuss the properties of offer curves (e.g., pass through the origin, shape reflecting production and consumption possibilities).

- **Lectures 6-8:** International Equilibrium and Terms of Trade:

  - o Explain how international equilibrium is determined by the intersection of the offer curves of the trading countries.

  - o Define the terms of trade (TOT) and discuss different ways to measure it (e.g., commodity terms of trade).

  - o Analyze the stability of the international equilibrium using offer curves. Introduce the Marshall-Lerner condition (without rigorous mathematical proof at this stage) as a condition for stable equilibrium in response to changes in exchange rates or terms of trade.

- **Lectures 9-10:** Gains from Trade (GFT) Theorem:

  - o State and illustrate the Gains from Trade (GFT) theorem using community indifference curves and the PPF, showing how trade allows a country to reach a higher level of welfare than in autarky.

  - o Explain the decomposition of the gains from trade into gains from exchange and gains from specialization.

  - o Discuss how the substitution possibilities in production and consumption influence the magnitude of the gains from trade.

Classroom Teaching Method:

- **Graphical Analysis:** Heavily rely on diagrams (community indifference curves, PPFs, trade indifference curves, offer curves) to illustrate the concepts and derive equilibrium.

- **Step-by-Step Derivations:** Guide students through the logical steps of deriving trade indifference curves and offer curves.

- **Conceptual Understanding:** Emphasize the underlying economic intuition behind the shapes and properties of these curves.

- **Comparison with Individual Choice:** Relate the concepts of community indifference curves to individual consumer theory.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student understanding of the graphical tools and their ability to explain the logic behind them.

- **Diagrammatic Exercises:** Ask students to draw and explain community indifference curves, trade indifference curves, and offer curves under different scenarios.

- **Short Answer Questions:** Test understanding of the properties of these curves and the determination of international equilibrium.

Unit 3: Factor Endowment and Trade (Heckscher-Ohlin-Samuelson Model) (15 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Heckscher-Ohlin (HO) Theorem:

    o Introduce the Heckscher-Ohlin (HO) model, which explains trade based on differences in relative factor endowments (labor, capital, land).

    o Explain the assumptions of the HO model (e.g., two countries, two goods, two factors, perfect competition, no transportation costs, identical technology).

    o Define and differentiate between price and physical definitions of relative factor abundance.

    o State the Heckscher-Ohlin (HO) theorem: a country will export the good whose production is relatively intensive in the factor with which the country is relatively well-endowed, and import the good whose production is relatively intensive in the factor with which the country is relatively poorly endowed.

- **Lectures 4-5:** Role of Homotheticity of Tastes:

    o Explain the concept of homothetic preferences and its role in ensuring a clear relationship between physical factor abundance and the pattern of trade under the physical definition of relative factor abundance.

    o Discuss what happens if tastes are not homothetic.

- **Lectures 6-7:** Factor Intensity Reversal and Invalidity of HO Theorem:

    o Explain the concept of factor intensity reversal: a situation where the ranking of goods by factor intensity changes at different factor price ratios.

    o Show how factor intensity reversal can lead to the invalidity of the HO theorem, as the predicted trade pattern might not hold. Discuss the conditions under which factor intensity reversal is more likely.

- **Lectures 8-9:** Factor Intensity Ranking and Stolper-Samuelson Theorem:

  - Explain how to determine factor intensity ranking of goods based on factor ratios in production.

  - State and explain the Stolper-Samuelson theorem: an increase in the relative price of a good will lead to an increase in the return to the factor used relatively intensively in the production of that good, and a decrease in the return to the other factor. Illustrate the implications for income distribution from trade.

- **Lectures 10-11:** Rybczynski Theorem:

  - State and explain the Rybczynski theorem: at constant commodity prices, an increase in the endowment of one factor will lead to a more than proportionate increase in the output of the good intensive in that factor and a decrease in the output of the other good. Discuss the implications for a country's production structure as it accumulates factors.

- **Lectures 12-13:** Factor Price Equalization Theorem:

  - State and explain the Factor Price Equalization (FPE) theorem: under the assumptions of the HO model, international trade will lead to the equalization of factor prices (wage rates and rental rates) across trading countries.

  - Discuss the conditions required for complete factor price equalization and the reasons why it is rarely observed in the real world (e.g., incomplete specialization, transportation costs, technological differences).

- **Lecture 14:** Incomplete Specialization, FPE, and Factor Intensity Reversal:

  - Discuss how incomplete specialization can still lead to factor price equalization under certain conditions.

  - Revisit the issue of factor intensity reversal and its implications for factor price equalization.

- **Lecture 15:** Empirical Studies - Leontief Paradox:

  - Introduce the Leontief Paradox: the finding by Wassily Leontief that the U.S., a capital-abundant country, seemed to export labor-intensive goods and import capital-intensive goods, contradicting the predictions of the HO theorem.

  - Discuss possible explanations for the Leontief Paradox (e.g., differences in technology, aggregation of factors, human capital, natural resources).

Classroom Teaching Method:

- **Logical Deduction:** Emphasize the logical deductions and relationships within the HO model and its related theorems.

- **Graphical Analysis:** Use diagrams (Edgeworth box for production, PPFs with factor intensity bias) to illustrate the concepts.

- **Mathematical Intuition:** Provide intuitive explanations for the mathematical relationships in the theorems without necessarily requiring formal proofs at this stage.

- **Critical Evaluation:** Encourage students to critically evaluate the assumptions and empirical validity of the HO model.

Continuous Classroom Evaluation:

- **Class Participation:** Assess understanding of the core concepts and the logic behind the theorems.

- **Conceptual Questions:** Ask questions that test the understanding of the relationships between factor endowments, factor prices, commodity prices, and trade patterns.

- **Problem Sets:** Assign problems involving determining trade patterns based on factor endowments and analyzing the effects of changes in factor endowments or commodity prices using the HO framework and its theorems.

Unit 4: Trade Policy (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-4:** Partial Equilibrium Analysis of Trade Policy:

  o Introduce the concept of trade policy and its instruments (tariffs, quotas, subsidies, voluntary export restraints - VERs).

  o Analyze the partial equilibrium effects of a tariff on imports in a small country (price increase, reduction in domestic consumption, increase in domestic production, government revenue, consumer surplus loss, producer surplus gain, deadweight loss). Use supply and demand diagrams.

  o Analyze the partial equilibrium effects of a quota on imports (quantity restriction, potential for price increase, quota rents).

  o Compare and contrast tariffs and quotas, discussing the conditions under which they might be equivalent or non-equivalent (e.g., under perfect competition vs. monopoly). Explain the monopoly effects of a quota.

  o Analyze the partial equilibrium effects of a subsidy on exports (price received by exporters increases, potential increase in exports, cost to the government, welfare effects).

  o Analyze the partial equilibrium effects of a Voluntary Export Restraint (VER) (quantity restriction imposed by the exporting country at the request of the importing country, quota rents typically accrue to the exporter).

- **Lectures 5-8:** General Equilibrium Analysis of Trade Policy:

  - Distinguish between the effects of trade policy in a small economy (price taker in world markets) and a large economy (can affect world prices).

  - Analyze the welfare effects of a tariff on a small country using offer curves (movement along the foreign offer curve, reduction in welfare).

  - Analyze the welfare effects of a tariff on a large country using offer curves (tariff-ridden offer curve shifts the equilibrium, potential for welfare gain or loss depending on the terms of trade effect).

  - Introduce the concept of a tariff war (retaliatory tariffs by trading partners) and its potential negative consequences.

- **Lectures 9-10:** Optimum Tariff and Metzler's Paradox:

  - Define and explain the concept of the optimum tariff for a large economy (the tariff rate that maximizes a country's welfare by improving its terms of trade). Show how it relates to the elasticity of the foreign offer curve.

  - Introduce Metzler's Paradox: a theoretical possibility where the imposition of a tariff by a large country could lead to a fall in the domestic price of the imported good if the foreign offer curve is sufficiently elastic. Explain the conditions under which this paradox might occur.

Classroom Teaching Method:

- **Graphical Analysis:** Heavily rely on partial equilibrium (supply and demand) and general equilibrium (offer curve) diagrams to illustrate the effects of trade policy.

- **Welfare Analysis:** Emphasize the analysis of consumer surplus, producer surplus, government revenue, and deadweight losses to evaluate the welfare effects of different trade policies.

- **Real-World Policy Debates:** Connect the theoretical analysis to real-world trade policy debates (e.g., tariffs on specific goods, import quotas, export subsidies).

- **Discussion of Political Economy:** Briefly discuss the political economy factors that influence the adoption of trade policies.

Continuous Classroom Evaluation:

- **Class Participation:** Assess understanding of the effects of different trade policy instruments.

- **Diagrammatic Exercises:** Ask students to draw and explain the welfare effects of tariffs, quotas, and subsidies in partial and general equilibrium.

- **Problem Sets:** Assign problems involving calculating the welfare effects of trade policies under different scenarios.

- **Short Answer Questions:** Test understanding of concepts like optimum tariff and Metzler's Paradox.

By following this unit-wise structure, you can provide a comprehensive introduction to the core theories and policy issues in international economics. Emphasizing the underlying logic, using graphical and numerical illustrations, and connecting the theory to real-world examples, particularly those relevant to India's trade and economic policies, will enhance student learning.

Unit 5: Balance of Payments and Exchange Rates (3 Lecture Hours)

Lesson Procedure:

- **Lecture 1: Balance of Payments Accounts:**

  - Introduction: Briefly introduce the concept of the Balance of Payments (BoP) as a systematic record of all economic transactions between the residents of a country and the rest of the world over a period of time. Emphasize its importance for understanding a nation's international economic position.

  - Main Components: Detail the main accounts within the BoP:

    - Current Account: Explain its components (trade in goods, trade in services, primary income, secondary income). Provide examples of transactions under each component relevant to India.

    - Capital Account: Explain its components (capital transfers, acquisition/disposal of non-produced, non-financial assets). Provide examples.

    - Financial Account: Explain its components (direct investment, portfolio investment, other investment, reserve assets). Provide examples of inflows and outflows.

  - Accounting Principles: Explain the double-entry bookkeeping system used in BoP accounting. Credits and debits should be clearly defined.

  - BoP Equilibrium and Disequilibrium: Discuss the concept of BoP equilibrium (BoP = 0) and disequilibrium (surplus or deficit). Briefly touch upon the balancing mechanisms.

- **Lecture 2: Autonomous and Accommodating Transactions:**

  - Review of BoP: Briefly recap the structure of the BoP from the previous lecture.

  - Autonomous Transactions: Define autonomous transactions as those undertaken for profit maximization or economic gain, independent of the country's BoP situation. Provide examples (exports, imports, foreign direct investment).

  - Accommodating Transactions: Define accommodating transactions as those undertaken by the government or central bank to correct BoP disequilibrium. Examples include:

- ▪ Official reserve transactions.

- ▪ Borrowing from the IMF.

- o Distinguishing Between the Two: Emphasize the key difference: motive. Autonomous transactions are "above the line" (independent), while accommodating transactions are "below the line" (induced by imbalances).

- **Lecture 3: Basic Concepts of Fixed and Flexible Exchange Rates:**

  - o Introduction to Exchange Rates: Define the exchange rate as the price of one currency in terms of another. Explain its role in international trade and finance.

  - o Fixed Exchange Rate Systems:

    - ▪ Definition: Explain that in a fixed exchange rate system, the government or central bank sets and maintains a fixed exchange rate.

    - ▪ Mechanism: Describe how governments intervene in the foreign exchange market to maintain the peg (buying or selling their currency).

    - ▪ Advantages: Stability, reduced exchange rate risk.

    - ▪ Disadvantages: Loss of monetary policy independence, need for large foreign exchange reserves.

  - o Flexible (Floating) Exchange Rate Systems:

    - ▪ Definition: Explain that in a flexible exchange rate system, the exchange rate is determined by market forces of supply and demand.

    - ▪ Mechanism: Describe how changes in demand and supply for a currency affect its exchange rate.

    - ▪ Advantages: Monetary policy independence, automatic adjustment to trade imbalances.

    - ▪ Disadvantages: Volatility, exchange rate risk.

Classroom Teaching Method:

- **Interactive Lectures:** Use a combination of lectures, discussions, and real-world examples to keep students engaged.

- **Visual Aids:** Utilize charts, graphs, and diagrams to illustrate BoP accounts, exchange rate fluctuations, and the effects of different policies.

- **Case Studies:** Analyze real-world examples of countries with different exchange rate regimes or BoP crises.

- **Problem-Solving:** Incorporate numerical problems related to BoP accounting and exchange rate calculations.

- **Current Events:** Relate the concepts to current economic events and news.

Continuous Classroom Evaluation:

- **Regular Questioning:** Ask questions throughout the lectures to gauge student understanding.

- **Short Quizzes:** Conduct brief quizzes at the end of each lecture to assess comprehension of key concepts.

- **Class Discussions:** Encourage student participation and discussion.

- **Assignments:** Assign short assignments that require students to apply the concepts learned (e.g., analyze a country's BoP data, compare fixed vs. flexible exchange rate systems).

- **Mid-Term Exam:** Include questions on these topics in the mid-term exam.

Environmental & Resource Economics (I)

Unit 1: Environment, Ecology, and Economy (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** What is Environmental Economics?

    o Define environmental economics as the application of economic principles to the study of how environmental resources are managed and allocated.

    o Differentiate it from ecological economics and resource economics.

    o Discuss the scope and importance of environmental economics in addressing environmental challenges in India (e.g., pollution, resource depletion, climate change).

    o Introduce the fundamental questions addressed by environmental economics: What are the environmental problems? What are their causes? What are the consequences? How can we address them?

- **Lectures 4-7:** Interlinkages between the Economy and Environment - Circular Economy:

    o Explain the flow of resources and pollutants between the economy and the environment using a simple model.

    o Contrast the traditional linear "take-make-dispose" model with the concept of a circular economy.

    o Discuss the principles of a circular economy (e.g., reduce, reuse, recycle) and their relevance for sustainable development in India. Highlight

examples of circular economy initiatives in India (e.g., waste management, industrial symbiosis).

- o Analyze the economic and environmental benefits of transitioning towards a circular economy.

- **Lectures 8-10:** Elements of Environmental Degradation:

  - o Identify and discuss the key elements of environmental degradation in India:

    - ▪ Air pollution (urban and rural, sources, health impacts).

    - ▪ Water pollution (river pollution, groundwater contamination, sources, impacts on agriculture and health).

    - ▪ Land degradation (deforestation, soil erosion, desertification, causes and consequences).

    - ▪ Loss of biodiversity (causes, importance, conservation efforts in India).

    - ▪ Climate change (impacts on India - agriculture, water resources, extreme events).

  - o Briefly touch upon the ecological principles underlying these environmental problems.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to share their observations and understanding of local environmental issues in India.

- **Case Studies:** Use short case studies of environmental degradation in India (e.g., Ganga pollution, deforestation in a specific region, impact of plastic waste).

- **Visual Aids:** Utilize photographs, videos, and news articles to illustrate environmental problems in India.

- **Class Discussions:** Facilitate discussions on the causes and consequences of environmental degradation and the need for sustainable practices.

- **Brainstorming Sessions:** Engage students in brainstorming potential solutions to local environmental problems.

Continuous Classroom Evaluation:

- **Class Participation:** Assess the quality and frequency of student contributions to discussions and their ability to relate concepts to the Indian context.

- **Short Answer Questions:** Ask students to define environmental economics, explain the concept of a circular economy, and identify key elements of environmental degradation in India.

- **Brief Quizzes:** Conduct short quizzes on the interlinkages between the economy and the environment.

Unit 2: Efficiency and Market Failure (8 Lecture Hours)

Lesson Procedure:

- **Lectures 1-4:** Externalities, Public Goods/Bads, and Market Failure:

    o Define externalities (positive and negative) with detailed Indian examples (e.g., pollution from a factory affecting a nearby community - negative; a beekeeper's bees pollinating a neighbor's crops - positive).

    o Explain how externalities lead to a divergence between private and social costs/benefits and result in market inefficiency (over- or under-production).

    o Define public goods (non-rivalrous and non-excludable) with Indian examples (e.g., national defense, public parks, clean air).

    o Explain the free-rider problem associated with public goods and why private markets fail to provide them efficiently.

    o Introduce the concept of public bads (e.g., pollution, noise) and their characteristics.

    o Explain how externalities and public goods/bads represent market failures, where the market mechanism fails to allocate resources efficiently from a societal perspective.

- **Lectures 5-8:** Property Rights and the Coase Theorem:

    o Discuss the importance of well-defined and enforced property rights for efficient resource allocation.

    o Explain how the absence or ambiguity of property rights can lead to externalities and environmental degradation (e.g., open access resources like common grazing lands or fisheries in India).

    o Introduce the Coase Theorem: under certain conditions (well-defined property rights, zero transaction costs, full information), private bargaining between affected parties can lead to an efficient resolution of externalities, regardless of the initial allocation of property rights.

    o Discuss the limitations of the Coase Theorem in real-world scenarios, particularly concerning environmental problems (e.g., high transaction costs, large number of affected parties, difficulty in assigning property rights to environmental resources like clean air or water).

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to provide their own examples of externalities and public goods/bads in their local areas.

- **Graphical Analysis:** Use supply and demand diagrams to illustrate the welfare loss due to externalities and the impact of government interventions.

- **Case Studies (Brief):** Analyze brief case studies illustrating the Coase Theorem or the challenges of applying it to environmental problems in India.

- **Role-Playing (Optional):** Conduct a simple role-playing exercise to demonstrate the bargaining process under the Coase Theorem.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student engagement in discussions and their ability to apply the concepts of externalities and public goods to real-world situations.

- **Short Answer Questions:** Ask students to define externalities, public goods, and market failure, and explain the core idea of the Coase Theorem and its limitations.

- **Problem Sets:** Assign simple problems involving identifying externalities and analyzing their impact on market equilibrium.

Unit 3: Environmental Regulations and the Economics of Environmental Policies (12 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** History and The Design of Environmental Regulations:

  o Briefly overview the history of environmental regulations in India and globally.

  o Discuss the rationale for government intervention in environmental issues.

  o Introduce the key considerations in designing environmental regulations: setting targets, choosing instruments, considering costs and benefits, and ensuring equity.

- **Lectures 3-4:** Monitoring and Enforcement:

  o Explain the importance of monitoring environmental quality and emissions for the effectiveness of regulations.

  o Discuss different methods of monitoring (e.g., direct measurement, self-reporting).

  o Analyze the challenges of monitoring and enforcement in India, including resource constraints and institutional capacity.

  o Discuss the role of regulatory agencies and penalties in ensuring compliance.

- **Lectures 5-7:** Pigouvian Fees:

  o Explain the concept of Pigouvian fees (taxes or charges levied on activities that generate negative externalities) as a market-based approach to internalizing externalities.

- o Discuss the theory of setting the optimal Pigouvian fee equal to the marginal external cost.

- o Analyze the application of Pigouvian fees to a single polluter and multiple polluters.

- o Compare and contrast Pigouvian fees with subsidies for environmentally friendly activities. Discuss the advantages and disadvantages of each.

- **Lectures 8-10:** Regulating Pollution: Command and Control vs. Economic Incentives:

  - o Explain command-and-control (CAC) regulations (e.g., emission standards, technology mandates) and their characteristics. Discuss examples of CAC regulations in India (e.g., emission norms for vehicles and industries).

  - o Discuss the advantages (certainty of outcome) and disadvantages (cost-inefficiency, lack of flexibility) of CAC regulations.

  - o Explain economic incentive-based regulations (e.g., Pigouvian taxes, subsidies, tradable permits) and their characteristics.

  - o Discuss the advantages (cost-effectiveness, flexibility, innovation incentives) and disadvantages (uncertainty of outcome, monitoring challenges) of economic incentives.

- **Lectures 11-12:** Tradable Pollution Permits (Basic Concepts only):

  - o Introduce the basic concept of tradable pollution permits (cap-and-trade systems).

  - o Explain how a cap on total emissions is set, permits are allocated or auctioned, and firms can trade permits.

  - o Discuss the potential advantages of tradable permits in achieving pollution reduction targets cost-effectively.

  - o Briefly mention examples of existing or proposed cap-and-trade systems globally.

Classroom Teaching Method:

- **Policy-Oriented Lectures:** Focus on the design and implementation of environmental policies.

- **Comparative Analysis:** Compare and contrast different regulatory approaches (CAC vs. economic incentives).

- **Case Studies:** Analyze case studies of specific environmental regulations or policy instruments implemented in India or other countries.

- **Debates:** Organize debates on the merits and demerits of different regulatory approaches (e.g., carbon tax vs. cap-and-trade).

Continuous Classroom Evaluation:

- **Class Participation:** Assess student understanding of different environmental policy instruments and their effectiveness.

- **Short Answer Questions:** Ask students to define Pigouvian fees, explain the difference between CAC and economic incentives, and describe the basic features of tradable pollution permits.

- **Essay Assignments:** Assign short essays comparing the advantages and disadvantages of different regulatory approaches.

Unit 4: Measuring the Values of Environmental Costs and Benefits (15 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Concept of Total Economic Value:

  o Introduce the concept of Total Economic Value (TEV) as the sum of all values associated with an environmental resource.

  o Explain the components of TEV:

    ▪ User Value: Direct use value (e.g., recreation, fishing), indirect use value (e.g., ecosystem services like water purification).

    ▪ Non-User Value: Existence value (value from knowing a resource exists), bequest value (value of preserving for future generations), vicarious value (value from others' use).

  o Provide examples of each component of TEV related to environmental resources in India (e.g., value of forests for timber - direct use; value of wetlands for flood control - indirect use; value of the tiger for its existence - non-user).

- **Lectures 4-6:** Actual Market Based Valuation, Future Use Value, Bequest Value, Vicarious Value:

  o Discuss valuation methods based on actual markets:

    ▪ Market prices (for resources traded in markets).

    ▪ Productivity changes (impact of environmental change on output).

    ▪ Change in expenditure (defensive expenditures).

    ▪ Opportunity cost.

  o Explain the concept of future use value (option value) - the value of preserving a resource for potential future use.

  o Explain bequest value - the value individuals place on preserving environmental resources for future generations.

- o Explain vicarious value - the value individuals derive from the knowledge that others are enjoying or benefiting from an environmental resource.

- **Lectures 7-8:** Objective Standard Based Valuation:

  - o Discuss valuation based on objective standards, such as health-based or ecological thresholds. Explain how damage costs can be estimated based on exceeding these thresholds (e.g., cost of health impacts due to air pollution exceeding safe levels).

- **Lectures 9-15:** Subjective Preference Based Valuation:

  - o Introduce subjective preference-based valuation methods that attempt to elicit individuals' willingness to pay (WTP) or willingness to accept (WTA) for environmental changes.

  - o Revealed Preference Methods:

    - ▪ Travel Cost Method (TCM): Explain how the cost incurred by individuals to visit a recreational site (travel time, expenses) can be used to estimate the value they place on that site. Discuss the basic steps and limitations of TCM.

    - ▪ Hedonic Price Theory (HPT): Explain how environmental attributes (e.g., air quality, proximity to green spaces) are reflected in the prices of marketed goods, particularly real estate. Discuss how HPT can be used to estimate the implicit value of these environmental attributes.

  - o Stated Preference Method - Constructed Market:

    - ▪ Contingent Valuation Method (CVM): Explain how CVM uses surveys to directly ask individuals about their WTP or WTA for hypothetical changes in environmental quality. Discuss the design of CVM surveys, potential biases (e.g., hypothetical bias, strategic bias), and the challenges of this method.

Classroom Teaching Method:

- **Valuation-Focused Lectures:** Dedicate significant time to explaining the different valuation methods and their underlying logic.

- **Real-World Examples:** Use numerous real-world examples and case studies from India and other countries to illustrate the application of different valuation techniques.

- **Methodological Discussions:** Discuss the strengths and weaknesses, data requirements, and potential biases associated with each valuation method.

- **Critical Thinking:** Encourage students to critically evaluate the results of valuation studies and the ethical considerations involved in assigning monetary values to environmental resources.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student understanding of the different valuation methods and their applicability.

- **Short Answer Questions:** Ask students to define Total Economic Value and its components, explain the basic principles of TCM and HPT, and describe the Contingent Valuation Method.

- **Essay Assignments:** Assign essays comparing revealed and stated preference methods or discussing the challenges of valuing non-use values.

- **Case Study Analysis:** Ask students to analyze a brief case study of an environmental valuation study and discuss the method used and its findings.

By following this unit-wise structure, you can provide a comprehensive introduction to environmental and resource economics, covering the fundamental concepts, policy instruments, and valuation techniques. Emphasizing the Indian context through relevant examples and case studies will make the subject more engaging and relevant for students in India.

Public Economics (I)

Unit 1: Government in a Market Economy (6 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Revisiting Market Failure and Externalities:

    - Briefly review the concept of market failure, emphasizing situations where the free market fails to allocate resources efficiently.

    - Revisit the definition and types of externalities (positive and negative, production and consumption) with relevant Indian examples (e.g., industrial pollution, vaccination).

- **Lectures 3-4:** Public and Merit Goods:

    - Define and explain the characteristics of pure public goods (non-rivalry, non-excludability) with clear Indian examples (e.g., national defense, public parks, street lighting).

    - Introduce the concept of merit goods (goods that the government believes are beneficial for society, even if individuals may not fully appreciate their benefits) with Indian examples (e.g., education, healthcare). Discuss the rationale for government intervention in their provision.

- **Lectures 5-6:** Mixed Goods, Club Goods, Partial Public Goods, and Government Functions:

    - Define and provide examples of mixed goods (partially rivalrous or excludable), club goods (excludable but non-rivalrous up to a point - e.g.,

membership-based clubs, toll roads with low congestion), and partial public goods (exhibit public good characteristics to a limited extent).

- o Discuss the four main functions of government intervention in a market economy:

    - ▪ Allocation: Correcting market failures and providing public and merit goods.

    - ▪ Distribution: Addressing income inequality and ensuring a fair distribution of resources (mention relevant Indian social welfare programs).

    - ▪ Stabilization: Maintaining macroeconomic stability (full employment, price stability, economic growth) – briefly touch upon fiscal and monetary policy tools used in India.

    - ▪ Regulatory: Setting rules and regulations to govern economic activity and protect consumers and the environment (mention examples of regulatory bodies in India).

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to provide their own examples of market failures, public goods, and government interventions in the Indian economy.

- **Case Studies (Brief):** Discuss short case studies illustrating market failures and government responses in India.

- **Class Discussions:** Facilitate discussions on the appropriate role and scope of government intervention in different sectors of the Indian economy.

- **Visual Aids:** Use diagrams to illustrate market failures and the impact of government interventions.

Continuous Classroom Evaluation:

- **Class Participation:** Assess the quality and frequency of student contributions to discussions and their ability to relate concepts to the Indian context.

- **Short Answer Questions:** Ask students to define key terms (e.g., public good, externality, merit good) and explain the different functions of government in a market economy.

Unit 2: Choice and Public Economics (12 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Characteristics of Pure Public Goods and Distinction from Private Goods:

- o Deepen the understanding of the two key characteristics of pure public goods (non-rivalry and non-excludability) with detailed explanations and examples.

- o Clearly distinguish pure public goods from pure private goods (rivalrous and excludable) and discuss goods that fall along the continuum between these two extremes.

- **Lectures 4-6:** Market Failure in the Case of Pure Public Goods:

  - o Explain in detail why the free market fails to provide the optimal quantity of pure public goods due to the free-rider problem.

  - o Discuss the challenges of determining the aggregate demand for public goods.

- **Lectures 7-9:** Optimal Provision of Public Goods - Public Provision:

  - o Discuss the rationale for public provision of public goods as a potential solution to market failure.

  - o Analyze the challenges associated with public provision, such as determining the optimal level of provision and addressing diverse preferences.

- **Lectures 10-12:** Samuelson Model and Lindahl Equilibrium:

  - o Introduce the Samuelson model for the optimal provision of public goods, emphasizing the condition where the sum of the marginal rates of substitution (MRS) across all individuals equals the marginal rate of transformation (MRT). Explain the theoretical efficiency of this condition.

  - o Explain the concept of Lindahl equilibrium as a theoretical mechanism for achieving the optimal provision of public goods by assigning personalized prices (Lindahl prices) to each individual based on their willingness to pay. Discuss the practical difficulties and informational requirements of implementing Lindahl pricing.

Classroom Teaching Method:

- **Analytical Lectures:** Focus on the theoretical underpinnings of public goods provision and the models used to analyze it.

- **Graphical Analysis:** Utilize diagrams to illustrate the Samuelson condition and the concept of Lindahl equilibrium.

- **Thought Experiments:** Use thought experiments to explore the free-rider problem and the challenges of preference revelation for public goods.

- **Mathematical Intuition:** Provide intuitive explanations for the economic logic behind the Samuelson rule.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student understanding of the theoretical models and their ability to explain the concepts.

- **Short Answer Questions:** Ask students to explain the free-rider problem, state the Samuelson condition, and describe the concept of Lindahl equilibrium.

- **Problem Sets (Conceptual):** Assign conceptual problems related to the optimal provision of public goods.

Unit 3: The Revenue and Expenditure of the Government (15 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Classification of Taxes and Canons of Taxation:

  - Explain different ways to classify taxes (e.g., direct vs. indirect, ad valorem vs. specific, progressive vs. regressive vs. proportional) with relevant examples from the Indian tax system (e.g., income tax as direct and progressive, GST as indirect).

  - Discuss Adam Smith's canons of taxation (equity, certainty, convenience, economy) and their relevance in the context of modern tax systems in India.

- **Lectures 4-7:** Principles of Taxation:

  - Explain the Benefit Principle (taxation based on benefits received from government services) and its limitations. Discuss its applicability in certain areas in India (e.g., user charges for some public services).

  - Explain the Ability to Pay Principle (taxation based on the capacity to bear the burden) and its implications for progressive taxation. Discuss different measures of ability to pay.

  - Explain the Equal Sacrifice Principle (taxation designed to impose equal sacrifice on taxpayers), including different interpretations (equal absolute sacrifice, equal proportional sacrifice, equal marginal sacrifice).

- **Lectures 8-10:** Incidence and Burden of Taxation:

  - Define tax incidence (who ultimately bears the burden of a tax) and distinguish it from statutory incidence (who is legally obligated to pay the tax).

  - Analyze the incidence of different types of taxes (e.g., excise tax, sales tax, corporate tax) under different market conditions (elasticity of demand and supply). Use simple diagrams to illustrate. Discuss the incidence of GST in India.

- **Lectures 11-12:** Effects of Taxation on Work Efforts, Risk-Bearing, and Savings:

- Discuss the potential effects of income taxation on individuals' decisions regarding work effort (substitution and income effects, potential for disincentives).

- Analyze how taxation might affect individuals' willingness to take risks (e.g., capital gains tax).

- Discuss the impact of taxation on savings decisions (substitution and income effects, impact of taxes on interest income).

- **Lecture 13:** The Laffer Curve:

  - Introduce the Laffer curve, which illustrates the theoretical relationship between tax rates and tax revenue, suggesting that beyond a certain point, higher tax rates may lead to lower tax revenue. Discuss its theoretical basis and empirical relevance, particularly in the Indian context.

- **Lecture 14:** Comparison between Direct and Indirect Taxes:

  - Compare and contrast direct taxes (e.g., income tax, wealth tax) and indirect taxes (e.g., GST, excise duties) in terms of their impact on equity, efficiency, administrative costs, and revenue generation in India. Discuss the income and substitution effects of each.

- **Lecture 15:** Optimal Taxation:

  - Introduce the basic principles of optimal taxation, which aims to design a tax system that minimizes deadweight losses for a given level of revenue. Briefly discuss Ramsey pricing and the inverse elasticity rule as introductory ideas.

Classroom Teaching Method:

- **Analytical Lectures:** Focus on the theoretical principles of taxation and their economic effects.

- **Graphical Analysis:** Utilize supply and demand diagrams to illustrate tax incidence and the Laffer curve.

- **Real-World Examples:** Relate the concepts to the Indian tax system and current tax policy debates.

- **Case Studies (Brief):** Analyze the incidence of specific taxes in India.

- **Mathematical Intuition:** Provide intuitive explanations for the concepts of optimal taxation.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student understanding of different tax principles and their implications for the Indian economy.

- **Short Answer Questions:** Ask students to classify different types of taxes, explain the canons of taxation, and discuss the principles of tax incidence.

- **Problem Sets (Conceptual):** Assign conceptual problems related to tax incidence and the effects of taxation.

Unit 4: Public Finance (12 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Meaning and Classification of Public Expenditure:

    o Define public expenditure and discuss different ways to classify it (e.g., revenue vs. capital expenditure, plan vs. non-plan expenditure in the Indian context, developmental vs. non-developmental expenditure).

    o Explain the significance of these classifications for understanding the nature and impact of government spending in India.

- **Lectures 4-6:** Government Budget and its Types:

    o Explain the structure of the government budget in India (Union Budget).

    o Define and differentiate between key budgetary concepts:

        ▪ Revenue Deficit: Excess of revenue expenditure over revenue receipts.

        ▪ Fiscal Deficit: Excess of total expenditure over total receipts (excluding borrowings).

        ▪ Primary Deficit: Fiscal deficit minus interest payments.

        ▪ Budget Deficit (less commonly used now in India, but explain as total expenditure exceeding total receipts).

    o Discuss the significance of these deficits as indicators of the government's fiscal health in India.

- **Lectures 7-9:** Meaning of Public Debt and Effects of Public Debt:

    o Define public debt (total outstanding borrowings of the government) in India.

    o Discuss the various effects of public debt on the economy (e.g., burden of interest payments, potential for crowding out private investment, intergenerational burden, impact on inflation and economic growth).

- **Lecture 10:** Domar's Model of Public Debt:

    o Introduce Domar's model, which analyzes the conditions under which the debt-to-GDP ratio stabilizes over time, relating it to the growth rate of the economy and the primary deficit. Explain the basic logic and implications of the model for India's debt sustainability.

- **Lecture 11:** Ricardian Equivalence:

- Explain the Ricardian Equivalence proposition, which suggests that government financing decisions (taxation vs. borrowing) may have no effect on aggregate demand and national saving under certain assumptions (rational expectations, perfect capital markets, intergenerational altruism). Discuss the theoretical arguments and the empirical evidence against Ricardian Equivalence, particularly in the context of India.

- **Lecture 12:** Fiscal Federalism and Concepts of Tax Devolution:

  - Briefly revisit the concept of fiscal federalism in India (division of fiscal powers and responsibilities between the Union and State governments).

  - Explain the concept of tax devolution – the sharing of tax revenues between the Union and the States as recommended by the Finance Commission in India. Briefly discuss the principles and mechanisms of tax devolution in India.

  - Mention other aspects of fiscal federalism like grants-in-aid.

Classroom Teaching Method:

- **Descriptive and Analytical Lectures:** Explain the concepts and analyze their implications for the Indian economy.

- **Analysis of Budget Data:** Use real data from the Indian Union Budget to illustrate the concepts of deficits and debt.

- **Discussion of Policy Issues:** Facilitate discussions on the challenges of fiscal management and debt sustainability in India.

- **Model Explanation:** Explain the basic logic and implications of Domar's model and Ricardian Equivalence.

Continuous Classroom Evaluation:

- **Class Participation:** Assess student understanding of government budgeting and public debt in India.

- **Short Answer Questions:** Ask students to define different types of budget deficits, explain the effects of public debt, and describe the basic principles of tax devolution.

- **Problem Sets (Applied):** Assign simple problems involving calculating budget deficits and analyzing debt-to-GDP ratios (using hypothetical or real Indian data).

By following this unit-wise structure, you can provide a comprehensive introduction to the core concepts and theories of public economics, with a specific focus on their relevance and application to the Indian economy. Emphasizing current issues, policy debates, and the analysis of Indian fiscal data will enhance student learning and their understanding of the role of the government in India's economic development.

Rural Development

Unit 1: Understanding Rural India (7 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Basic Elements of Rural Development:

    o   Introduce the concept of rural development as a multi-dimensional process encompassing economic, social, cultural, and political aspects.

    o   Discuss the key elements of rural development, such as poverty reduction, infrastructure development, education and health improvements, empowerment, and environmental sustainability, specifically in the Indian context.

- **Lectures 3:** Growth versus Development:

    o   Clearly differentiate between economic growth (increase in output) and economic development (improvement in overall well-being, including quality of life, access to opportunities, and social indicators).

    o   Emphasize why rural development goes beyond just agricultural growth in India.

- **Lectures 4:** Why Rural Development:

    o   Discuss the importance and necessity of rural development for India, considering the large rural population, its contribution to the national economy (especially agriculture), and the prevalence of poverty and underdevelopment in rural areas.

    o   Highlight the linkages between rural and urban development.

- **Lectures 5-6:** Rising Expectations and Development:

    o   Analyze how rising aspirations and expectations of rural populations in India (due to increased awareness, media exposure, etc.) necessitate accelerated and inclusive rural development efforts.

    o   Discuss the potential for social unrest and migration if these expectations are not met.

- **Lecture 7:** Development and Change:

    o   Explore the concept of development as a process of change, involving transformations in economic structures, social institutions, and cultural practices in rural India.

    o   Discuss the challenges and resistances often associated with development-induced change.

Classroom Teaching Method:

- **Interactive Lectures:** Encourage students to share their understanding and observations about rural India and the challenges it faces.

- **Brainstorming Sessions:** Initiate discussions on the basic elements of rural development and the differences between growth and development.

- **Real-Life Examples:** Use anecdotal evidence and real-life examples from rural India to illustrate the concepts.

- **Short Video Clips:** Show short documentaries or news reports highlighting rural issues and development initiatives in India.

- **Group Discussions:** Divide students into groups to discuss the "why" of rural development from different perspectives.

Continuous Classroom Evaluation:

- **Class Participation:** Assess the quality and frequency of student contributions to discussions and their understanding of basic concepts.

- **Short Answer Questions:** Ask students to define rural development, differentiate between growth and development, and explain the importance of rural development for India.

Unit 2: Rural Economy of India (8 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Size and Structure of the Rural Economy:

  - Present statistical data on the size of the rural population in India and its share in the national population.

  - Analyze the resource base of the rural economy, including land, water, forests, and livestock. Discuss the challenges related to resource degradation and management.

- **Lectures 3-4:** The Characteristics of the Rural Sector:

  - Discuss the key characteristics of the rural sector in India, such as the dominance of agriculture, dependence on monsoon, prevalence of informal employment, lower levels of education and health, infrastructure deficits, and social stratification.

- **Lectures 5:** The Role of the Agricultural Subsector:

  - Analyze the crucial role of agriculture in the rural economy in terms of employment, income generation, food security, and its linkages with other sectors. Discuss the challenges facing the agricultural subsector in India (e.g., low productivity, land fragmentation, market access).

- **Lectures 6:** The Role of the Non-agricultural Subsector:

- Highlight the growing importance of the non-agricultural subsector (e.g., rural industries, services, small businesses) in diversifying rural livelihoods and reducing dependence on agriculture. Discuss the potential and challenges for its growth in India.

- **Lectures 7-8:** Challenges and Opportunities:

  o Summarize the major challenges facing the rural economy of India (e.g., poverty, inequality, unemployment, lack of infrastructure, environmental degradation).

  o Discuss the opportunities for rural development in India, such as its demographic dividend, potential for agricultural diversification, growth of the non-farm sector, and government focus on rural development.

Classroom Teaching Method:

- **Data Presentation and Interpretation:** Present relevant statistical data on the rural economy of India (e.g., population distribution, sectoral contribution, employment patterns) and guide students in interpreting the trends.

- **Comparative Analysis:** Compare the characteristics of the rural and urban economies of India.

- **Sector-Specific Discussions:** Hold focused discussions on the challenges and opportunities in the agricultural and non-agricultural subsectors.

- **Guest Lectures (Optional):** Invite experts working in rural development or agriculture to share their perspectives.

Continuous Classroom Evaluation:

- **Class Participation:** Encourage students to analyze the structure and characteristics of the Indian rural economy.

- **Short Answer Questions:** Ask students to describe the key characteristics of the rural sector, discuss the role of agriculture and non-agriculture, and identify major challenges.

Unit 3: Measures of Rural Development (8 Lecture Hours)

Lesson Procedure:

- **Lectures 1-2:** Measures of Level of Rural Development: PQLI & HDI:

  o Introduce the Physical Quality of Life Index (PQLI) as a composite measure of development focusing on basic human needs (life expectancy, infant mortality, literacy). Discuss its components and limitations.

  o Introduce the Human Development Index (HDI) as a broader measure of development encompassing health, education, and standard of living. Discuss its components and limitations, and its relevance for measuring rural development in India.

- **Lectures 3-4:** Measures of Income Distribution: Lorenz Curve & Gini Coefficient:

  o Explain the concept of income inequality in rural India.

  o Introduce the Lorenz curve as a graphical representation of income distribution and how it deviates from perfect equality.

  o Explain the Gini coefficient as a numerical measure of income inequality derived from the Lorenz curve (ranging from 0 to 1). Discuss its interpretation and its application to measuring rural income disparities in India.

- **Lecture 5:** Measures of Development Simplified:

  o Discuss the use of simpler, single indicators (e.g., literacy rate, access to sanitation, infant mortality rate) to assess specific aspects of rural development. Highlight their advantages and disadvantages.

- **Lectures 6-8:** Concepts and Measures of Rural Poverty:

  o Define rural poverty and discuss the criteria used to identify the rural poor in India (e.g., income/consumption levels, multidimensional poverty).

  o Explain different measures of rural poverty:

    ▪ Headcount Ratio: Percentage of the rural population below the poverty line.

    ▪ Poverty Gap: Average distance of the poor from the poverty line.

    ▪ Squared Poverty Gap: Gives more weight to the poorest of the poor.

  o Discuss the challenges in accurately measuring rural poverty in India.

Classroom Teaching Method:

- **Conceptual Explanation:** Clearly explain the concepts and formulas for each measure.

- **Graphical Representation:** Use graphs to illustrate the Lorenz curve and the interpretation of the Gini coefficient.

- **Data Interpretation:** Present data on PQLI, HDI, Gini coefficient, and poverty measures for rural India and discuss the trends and implications.

- **Comparative Analysis:** Compare these measures across different states or regions of rural India.

Continuous Classroom Evaluation:

- **Class Participation:** Encourage students to discuss the strengths and weaknesses of different development measures.

- **Short Answer Questions:** Ask students to define PQLI, HDI, Lorenz curve, Gini coefficient, and different poverty measures.

- **Numerical Exercises (Simple):** Assign simple exercises to calculate the Gini coefficient from given income data or interpret poverty statistics.

Unit 4: Rural Governance and Institutions (10 Lecture Hours)

Lesson Procedure:

- **Lectures 1-4:** Panchayati Raj Institutions (PRIs) and their Role:

  - Discuss the structure and functions of Panchayati Raj Institutions (at the Gram Panchayat, Panchayat Samiti, and Zilla Parishad levels) in India, as mandated by the 73rd Constitutional Amendment Act.

  - Analyze the role of PRIs in local governance, planning, implementation of development programs, and promoting people's participation in rural development.

  - Discuss the challenges and limitations faced by PRIs in India (e.g., lack of adequate funds and powers, issues of capacity building, social inequalities).

- **Lectures 5-6:** Rural Credit, NABARD, RRB:

  - Discuss the importance of rural credit for agricultural and non-agricultural activities.

  - Analyze the role of formal credit institutions like NABARD (National Bank for Agriculture and Rural Development) in providing refinance and promoting rural credit.

  - Discuss the functioning and objectives of Regional Rural Banks (RRBs) in extending credit to rural populations.

  - Highlight the challenges of rural credit delivery in India (e.g., high transaction costs, loan defaults, limited reach).

- **Lectures 7-8:** Self-Help Groups (SHGs) and Microfinance:

  - Explain the concept of Self-Help Groups (SHGs) and their role in empowering rural women and providing access to microfinance.

  - Discuss the functioning of the SHG-Bank Linkage Programme in India.

  - Analyze the impact of SHGs and microfinance on poverty reduction and women's empowerment in rural areas. Discuss the challenges and sustainability of microfinance.

- **Lectures 9-10:** Role of NGOs in Rural Development:

  - Discuss the diverse roles played by Non-Governmental Organizations (NGOs) in rural development in India, including advocacy, awareness creation, service delivery (education, health, livelihoods), and community mobilization.

- o Analyze the strengths and limitations of NGOs as development actors and their relationship with government agencies and local communities.

Classroom Teaching Method:

- **Descriptive Lectures:** Provide detailed information on the structure and functions of rural governance and institutions.

- **Case Studies:** Analyze case studies of successful Panchayats, SHGs, or NGO interventions in rural India.

- **Guest Lectures (Optional):** Invite representatives from PRIs, banks, SHGs, or NGOs to share their experiences.

- **Group Discussions:** Discuss the effectiveness of different institutions in promoting rural development.

Continuous Classroom Evaluation:

- **Class Participation:** Encourage students to discuss the roles and effectiveness of different rural institutions.

- **Short Answer Questions:** Ask students to explain the structure of PRIs, the role of NABARD and RRBs, the concept of SHGs, and the contributions of NGOs.

- **Brief Research Assignments:** Ask students to research and write short notes on specific rural development institutions in their local areas.

Unit 5: Selected Government Programmes and Rural Development (12 Lecture Hours)

Lesson Procedure:

- **Lectures 1-3:** Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA):

  - o Explain the objectives, features, and implementation mechanisms of MGNREGA.

  - o Analyze its impact on rural employment, income generation, asset creation, and social empowerment in India.

  - o Discuss the challenges and criticisms of MGNREGA.

- **Lectures 4-5:** Pradhan Mantri Awas Yojana-Gramin (PMAY-G):

  - o Explain the objectives and features of PMAY-G, aimed at providing affordable housing to rural poor.

  - o Discuss its progress, challenges in implementation, and impact on rural livelihoods and well-being.

- **Lecture 6:** Mid-Day Meal Scheme (MDM):

- o Explain the objectives and implementation of the Mid-Day Meal Scheme in rural schools.

- o Analyze its impact on school enrollment, attendance, nutrition, and social equity in rural areas.

- **Lectures 7-8:** National Rural Livelihoods Mission (NRLM) (Aajeevika):

  - o Explain the objectives and strategies of NRLM, focusing on promoting self-employment and skill development through SHGs and other community-based organizations.

  - o Discuss its approach to poverty reduction and livelihood enhancement in rural India.

- **Lectures 9-10:** National Rural Health Mission (NRHM) (now National Health Mission - NHM):

  - o Explain the objectives and key interventions of NRHM in improving rural healthcare infrastructure and access to health services.

  - o Discuss its impact on rural health indicators and the challenges in achieving universal healthcare in rural India.

- **Lectures 11-12:** Pradhan Mantri Gram Sadak Yojana (PMGSY):

  - o Explain the objectives and features of PMGSY, focused on providing all-weather road connectivity to unconnected rural habitations.

  - o Analyze its impact on rural connectivity, economic activities, and access to services.

Classroom Teaching Method:

- **Programme-Specific Lectures:** Dedicate lectures to explaining the objectives, features, and impact of each selected government program.

- **Policy Analysis:** Analyze the design, implementation, and effectiveness of these programs.

- **Case Studies:** Discuss case studies or success stories related to the implementation of these programs in different parts of rural India.

- **Guest Lectures (Optional):** Invite government officials or practitioners involved in the implementation of these programs.

- **Review of Official Documents:** Refer to official guidelines and evaluation reports of these programs.

Continuous Classroom Evaluation:

- **Class Participation:** Encourage students to discuss the effectiveness and challenges of government programs.

- **Short Answer Questions:** Ask students to explain the objectives and key features of each program.

- **Programme Analysis:** Ask students to analyze the strengths and weaknesses of specific government programs.

- **Brief Research Assignments:** Ask students to research the impact of a specific program in a particular rural area.

By following this unit-wise structure, you can provide a comprehensive understanding of rural development in India, covering its conceptual foundations, the structure of the rural economy, measures of development, the role of institutions, and key government interventions. Emphasizing the Indian context through relevant examples, data, and policy discussions will be crucial for student learning.