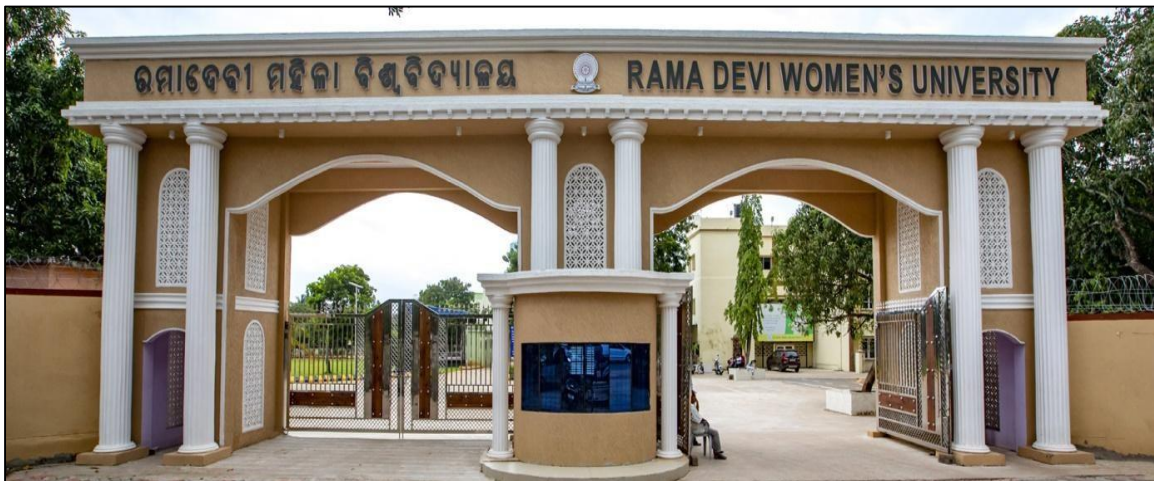


DEPARTMENT OF ECONOMICS

SYLLABUS OF UG PROGRAMME (B.A.)



RAMA DEVI WOMEN'S UNIVERSITY
Vidya Vihar, Bhubaneswar-751022, Odisha
Website: <https://rdwu.ac.in>

Department of Economics

Syllabus for U.G. in Economics



Rama Devi Women's University

VIDYA VIHAR, BHUBANESWAR-751022

**STATE MODEL SYLLABUS FOR UNDER
GRADUATE
COURSE IN ECONOMICS
(Bachelor of Arts Examination)**

**UNDER
CHOICE BASED CREDIT SYSTEM**

Footmark
25-04-23

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W. S. S.
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P. R.
25-4-2023

B. S. S.
25.4.2023

A. S. S.
25/4/23

Biplab Kumar gupta
25/4/23

Smohant
25/04/23
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Course structure of UG Economics Honours

Semester	Course	Course Name	Credits	Total marks
I	AECC-I	AECC-I	04	100
	C-I	Introductory Microeconomics	06	100
	C-II	Mathematical Methods for Economics I	06	100
	GE-I	Indian Economy	06	100
			22	
II	AECC-II	AECC-II	04	100
	C-III	Introductory Macroeconomics	06	100
	C-IV	Mathematical Methods for Economics II	06	100
	GE-II	Indian Economy II	06	100
			22	
III	C-V	Microeconomics I	06	100
	C-VI	Macroeconomics I	06	100
	C-VII	Statistical Methods for Economics	06	100
	GE-III	Introductory Microeconomics	06	100
	SEC-I	SEC-I	04	100
			28	
IV	C-VIII	Microeconomics II	06	100
	C-IX	Macroeconomics II	06	100
	C-X	Research Methodology	06	100

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Pratibha
25.04.23

Utkar
25/4/23

Pratik
25/4/23

Devi
25-4-2023

Smaharika
25/4/23

Pratibha
25.4.2023

	GE-IV	Introductory Macroeconomics	06	100
	SECC-II	SECC-II	04	100
			28	
Semester	Course	Course Name	Credits	Total marks
V	C-XI	Indian Economy I	06	100
	C-XII	Development Economics I	06	100
	DSE-I	1. Economic History of India (1857-1947) or 2. Public Economics	06	100
	DSE-II	1. Introductory Econometrics or 2. Odisha Economy or 3. Money and Banking	06	100
			24	
VI	C-XIII	Indian Economy II	06	100
	C-XIV	Development Economics II	06	100
	DSE-III	1. Environmental Economics or 2. History of Economic Thought	06	100
	DSE-IV	1. International Economics or 2. Agricultural Economics or 3. Project/Dissertation	06	100

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Prof. Anil
25.04.23

U. B. Das
25/4/23

Dr. S. K. Mishra
25/4/23

Dr. De
25-4-2023

Dr. Anil
25/4/23

Smruti Ranjan
25/04/2023

Dr. Mahab
25.4.2023

U.G. Economics Program
Rama Devi Women's University

Program Outcomes (POs):

PO1: Develop critical thinking among students.

PO2: Equip students for effective communication.

PO3: Prepare students for social interaction to elicit views of others, mediate disagreements and help reach conclusions in group settings.

PO4: Create awareness among students to demonstrate empathetic social concern and equity centered national development, and the ability to act with an informed awareness of issues and participate in civic life through volunteering.

PO5: Equip students to recognize different value systems including their own, understand the moral dimensions of their decisions, and accept responsibility for them.

PO6: Making students understand the issues of environmental contexts and sustainable development.

PO7: Provide students with the opportunity to pursue courses that emphasize quantitative and theoretical aspects of Economics.

PO8: To provide students with the opportunity to focus on applied and policy issues in Economics.

PO9: Provide students with basic training relating to econometric estimation of economic relationships using statistical software packages.

PO10: Equip students with ability to think rationally, analyze situations and solve problems adequately.

Program Specific Outcomes (PSOs):

PSO1: Enhancing ability to understand economic theories and functioning of basic microeconomic and macroeconomic systems.

PSO2: Acquaint students with basic statistical and mathematical skills to solve real economic problems.

PSO3: Delineate the developmental policies designed for developed and developing economics. The course also acquaints with the measurement of development with the help of theories along with the conceptual issues of poverty and inequalities.

PSO4: This course emphasizes on environmental problems emerging from economic development.

PSO5: Acquaint students with basic issues of Indian economy and learn the basic concept of monetary analysis and financial marketing in Indian financial markets. This course reviews major trends in economic indicators and policy debates in India in the post-Independence period.

Semester I

Core Course- C-I: Introductory Microeconomics

Course Outcomes (Cos):

After reading this paper, students should have:

CO1: This will help to explain what economics is, why it is important, how economists use economic models. Also after studying the paper they are able to understand how production and consumption decisions are taken.

CO2: It will help in understanding the behaviour of individuals and small organizations in making decisions on the allocation of limited resources.

CO3: It will result in equipping the students in a rigorous and comprehensive manner with the various aspects of consumer behaviour and demand analysis, production theory and behaviour of costs, the theory of traditional markets and equilibrium of firm in modern non-profit maximizing framework.

CO4: It will help to understand the different input market structure, the determinants of labour and capital, and equilibrium in input market. Also helps to understand the nature of different market structure. It uses the concepts of consumer, producer and total surplus to explain why markets typically lead to efficient outcomes.

CO5: It will result in understanding the micro and macro theories of distribution, welfare economics, general equilibrium in closed and open systems and analysis of economic behaviour under uncertainty.

Syllabus

Unit I: Exploring the Subject Matter of Economics, Markets and Welfare

The Ten Principles of Economics: How people make decisions; Working of the economy as a whole; Thinking Like an Economist: The economist as Scientist – The scientific method: Observation, Theory and more observation; Role of Assumptions; Economic Models; Why economists disagree; Graphs in Economics

The Market Forces; Markets and Competition; The Demand and Supply curves – Market vs

Individual curves, Shifts in Demand and Supply Curves; Market Equilibrium and changes there in; Price Elasticity of Demand – determinants and computation; Income and Cross Elasticity of Demand; The Price Elasticity of Supply – determinants and computation; Consumer and Producer Surplus.

Unit II: Theory of Consumer Choice

The Budget Constraint; Preferences – representing preferences with indifference curves; Properties of Indifference Curves; Two extreme examples of indifference curves; Optimization – Equilibrium; Change in equilibrium due to changes in income, changes in price; Income and Substitution Effect; Derivation of Demand Curve; Three applications – Demand for Giffen goods, Wages and Labour Supply, Interest rate and Household saving.

Unit III: The Firm and Market Structures

Cost concepts; Production and Costs; The various measures of cost – Fixed and Variable cost,

Average and Marginal cost; Cost curves and their shapes; Costs in the short run and in the long run; Economies and diseconomies of scale. Firms in Competitive Markets – What is a competitive market; Profit maximization and the competitive firm's supply curve; The marginal cost curve and the firm's supply decision; Firm's short-run decision to shut down; Firm's long-run decision to exit or enter a market; The supply curve in a competitive market – short run and long run.

Unit IV: The Input Markets

The Demand for Labour – The production function and the marginal product of labour; Value of the marginal product of labour and demand for labour; Shifts in labour demand curve; The supply of labour – the trade-off between work and leisure; Shifts in the labour supply curve; Equilibrium in the Labour Market; Other factors of production: Land and Capital; Linkages among factors of production.

Text Book:

- Principles of Economics, Gregory N Mankiw, 6e Cengage Learning India Private Limited, New Delhi

Reference Book:

- Karl E. Case and Ray C. Fair (2007): *Principles of Economics*, 8th Edition, Pearson Education Inc.
- Pindyck, Robert and Daniel Rubinfeld (2018): *Microeconomics*, 9th Edition, Pearson Education Inc

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	5	5	4	4	4	5	5	4	5
CO2	5	4	5	4	5	5	4	5	4	5
CO3	5	4	5	5	5	5	4	4	4	5
CO4	5	4	4	4	2	2	5	4	4	5
CO5	5	5	4	5	5	5	5	4	4	5

Core Course- C-II: Mathematical Methods for Economics I

Course Outcomes (Cos):

After reading this paper, students should:

CO1: Have ability to understand the concepts of sets, functions, graphs, the number system, continuous functions and their graphs.

CO2: Have developed analytical ability of economic variables using differentiation method.

CO3: Have enhanced knowledge on application of derivatives to elasticity and demand analysis.

CO4: Be able to understand the detailed study of determinants and matrix algebra.

CO5: Have enhanced ability to apply mathematical skills learnt earlier to build and test models in economics and related fields.

Syllabus

Unit I: Preliminaries and Functions of one Real Variable

Sets and set operations; Cartesian product; relations; functions and their properties; Number systems

Types of Functions- constant, polynomial, rational, exponential, logarithmic; Graphs and graphs of functions; Limit and Continuity of functions; Limit theorems.

Unit II: Derivative of a Function

Rate of change and derivative; Derivative and slope of a curve; Continuity and differentiability of a function; Rules of differentiation for a function of one variable; Application- Relationship between total, average and marginal functions.

Unit III: Functions of two or more Independent Variables

Partial differentiation techniques; Geometric interpretation of partial derivatives; Partial derivatives in Economics; Elasticity of a function – demand and cost elasticity, cross and partial elasticity.

Unit IV: Matrices and Determinants

Matrices: concept, types, matrix algebra, transpose, inverse, rank; Determinants: concept, properties, solving problems using properties of determinants, solution to a system of equations - Cramer's rule and matrix inversion method.

Text Book:

- A.C. Chiang and K. Wainwright (2005): *Fundamental Methods of Mathematical Economics*, McGraw Hill International Edition.

Reference Book:

- K. Sydsaeter and P. J. Hammond (2002): *Mathematics for Economic Analysis*. Pearson Educational Asia

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	2	2	2	2	2	5	4	4	4
CO2	2	2	2	2	2	2	5	5	5	4
CO3	2	2	2	2	2	2	5	5	5	4
CO4	2	2	2	2	2	2	5	5	5	4
CO5	2	2	2	2	2	2	5	5	5	4

General Elective- GE-I: Indian Economy

Course Outcomes (Cos):

After reading this paper, students should:

CO1: Have insights into India's economic development since colonial period, The era of planning under different regimes – achievements and failures, critical understanding of economic reforms, the resultant structural changes and regional variations.

CO2: Be aware about India's demographic issues, education and health.

CO3: Be equipped with knowledge on trends in GDP, per capita GDP, poverty and inequality and their impact on growth and unemployment, Policy perspectives in growth and distribution.

CO4: Be able to study the changes in sector composition of economic growth since independence.

CO5: Be able to understand and analyse economic reforms in India.

Syllabus

Unit I: Introduction to Indian Economy and Current Challenges

Colonialism & British Rule: Exploitation and under-development in India; Basic features of

India Economy; Indian Economy as a developing economy; Demographic trends in India - Size and growth of population, Occupational structure, Sex composition, Age structure and demographic dividend; Causes of population growth and population policy; The problem of unemployment and recent policies for employment generation; The problem of inequality in income distribution and its causes, Policies to address inequality

Unit II: Indian Agriculture

Role of Agriculture in Indian Economy; Cause of low productivity, Green Revolution and Land Reforms, Agricultural Finance-Sources and Problems; Agricultural Marketing in India.

Unit III: Industrial Development in India

Role of Industrialization in Indian Economy; Small Scale & Cottage Industries: Meaning, Role, Problems and Remedies; Industrial Policies of 1948, 1956, 1977 and 1991; Problems of Industrial Development in India; Industrial Sickness.

Unit IV: Service Sector in India

Growth & Contribution to GDP; Composition and relative importance of service sector; Factors determining growth of the sector; ICT and IT – Spread and Policy; Sustainability of services led growth.

Text Book:

- Misra, S. K. and Puri V. K. Indian Economy — Its Development Experience. Himalaya Publishing House, Mumbai

Reference Book

- Dutt R. and Sundharam K. P. M. *Indian Economy*. S. Chand & Company

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	2	5	2	2	4	2	4	2	4
CO2	5	2	5	4	2	2	2	5	2	4
CO3	5	2	5	5	2	4	2	4	2	2
CO4	5	2	5	2	2	2	2	5	2	2
CO5	5	2	5	4	2	4	2	4	2	4

Semester II

Core Course- C-III: Introductory Macroeconomics

Course Outcomes (Cos):

After reading this paper, students should have:

CO1: Develop an understanding of the interrelationships among the various macroeconomic variables and the way they impact upon the working of the economy as a whole, thereby determining the course of the economy.

CO2: Explain the concepts of Macroeconomics and its interrelations with Microeconomics.

CO3: Associate the current economic phenomenon with existing theory and put their views on contemporary economic issues.

CO4: Apply the principle of Macroeconomics in explaining the behaviour of Macroeconomic variables at national as well as global level.

CO5: Student would be able discuss scope and importance of Macroeconomics, Circular flow of aggregate income and expenditure, the measurement of national product, Short run economic fluctuations and The Keynesian Principle of Effective Demand.

Syllabus

Unit I: Basic Concepts in Macroeconomics

Macro vs. Micro Economics; Limitations of Macroeconomics; Stock and Flow variables, Equilibrium and Disequilibrium, Partial and General Equilibrium Statics – Comparative Statics and Dynamics; National Income Concepts – GDP, GNP, NDP and NNP at market price, factor cost, real and nominal; Disposable personal Income.

Unit II: Measurement of Macroeconomic Variables

Output, Income and Expenditure Approaches; Difficulties of Estimating National Income; National Income Identities in a simple 2-sector economy and with government and foreign trade sectors; Circular Flows of Income in 2, 3 and 4-sector economies; National Income and Economic Welfare; Green Accounting.

Unit III: Money and Changes in its Value

Evolution and Functions of Money, Quantity Theory of Money – Cash Transactions, Cash Balances and Keynesian Approaches, Value of Money and Index Number of Prices

Inflation – Meaning, Causes, and Anti-Inflationary Measures; Classical, Keynesian, Monetarist and Modern Theories of Inflation, Inflationary Gap, Deflation- Meaning, Causes, and Anti-Deflationary Measures, Depression and Stagflation; Inflation vs. Deflation.

Unit IV: Determination of National Income

The Classical Approach - Say’s Law, Theory of Determination of Income and Employment with and without saving and Investment; Basics of Aggregate Demand and Aggregate Supply and Consumption-Saving– Investment Functions, The Keynesian Approach– Basics of Aggregate Demand and Aggregate Supply and Consumption, Saving, Investment Functions; The Principle of Effective Demand; Income Determination in a Simple 2-Sector Model; Changes in Aggregate Demand and Income- The Simple Investment Multiplier

Text Book:

- N. Gregory Mankiw (2010): *Macroeconomics*, 7th edition, Cengage Learning India Private Limited, New Delhi

Reference Book:

- Richard T. Froyen (2005): *Macroeconomics*, 2nd Edition, Pearson Education Asia, New Delhi

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	4	5	4	4	4	5	5	4	5
CO2	5	5	4	4	4	5	4	4	2	4
CO3	5	4	4	5	5	5	4	5	5	5
CO4	4	4	5	5	4	4	4	5	4	5
CO5	5	5	5	4	4	4	5	5	4	5

Core Course- C-IV: Mathematical Methods for Economics II

Course Outcomes (Cos):

After reading this paper, students should:

CO1: Be able to understand input-output analysis and have the capacity to determine the equilibrium industry output.

CO2: Have understood characterizations, properties and applications of convex sets and convex functions.

CO3: Be able to solve optimization with equality and inequality constraints.

CO4: Have knowledge on application of differential calculus and integration for studying economic relationships.

CO5: Develop understanding of the general equilibrium through the mathematical framework of input-output analysis technique.

Syllabus

Unit I: Linear models:

Input- Output Model: Basic concepts and structure of Leontief's open and static Input-Output model; Solution for equilibrium output in a three industry model; The closed model.

Unit II: Second and Higher Order Derivatives and Integration:

Technique of higher order differentiation; Interpretation of second derivative; Second order derivative and curvature of a function; Concavity and convexity of functions; Points of inflection, Derivative of Implicit Function; Higher Order Partial Derivative.

Indefinite Integrals; Rules of Integration; Techniques of Integration: Substitution Rule, Integration by parts, and Partial Fractions; Definite Integral – Area Interpretation.

Unit III: Single and Multivariable Optimization:

Optimum values and extreme values; Relative maximum and minimum; Necessary versus sufficient conditions - First and Second derivative tests (using Hessian Determinants); Economic applications thereof, First and second order condition for extrema of multivariable functions; Convex functions and convex sets.

Unit IV: Optimization with Equality Constraints:

Effects of a constraint; Finding stationary value – Lagrange-Multiplier method (Two variable single constraint case only): First and second order condition; The Bordered Hessian determinant.

Text Book:

- C. Chiang and K. Wainwright (2005): *Fundamental Methods of Mathematical Economics*, McGraw Hill International Edition.

Reference Book:

- K. Sydsaeter and P. J. Hammond (2002): *Mathematics for Economic Analysis*. Pearson Educational Asia

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	2	2	2	2	2	2	5	4	4	2
CO2	2	2	2	2	2	2	4	4	2	2
CO3	2	2	2	2	2	2	4	4	4	2
CO4	2	2	2	2	2	2	5	5	4	2
CO5	2	2	2	2	2	2	5	5	4	2

General Elective- GE-II: Indian Economy II

Course Outcomes (Cos):

CO1: This will help to explain the importance of external sector in India, nation's performance by evaluating export and import and the role of different international organisation in achieving the objective of growth and development.

CO2: It may help to know the role and importance of financial markets, the policy of monetary institutions which will help to bring macroeconomic stability.

CO3: This would help to know the role of public authority in a developing nation, and how the authority can bring more welfare by experiencing the trade-off between equity and efficiency.

CO4: This will help to give a clear picture of contemporary issues that the economy is facing and the way forward.

CO5: It will help in developing the conceptual framework of government policies and programmes.

Syllabus

Unit I: External Sector in India

Trends, Composition & Direction in exports from and imports of India; Problems of Balance of Payment: Causes of deficit in BOP & measures to correct it; Trade Policy- Export Promotion Vs Import Substitution; Foreign Trade Policy of India; WTO and India.

Unit II: Financial Markets in India

Commercial Banking in India- Nationalization of Banks; Lead bank scheme and branch expansion; RBI - Functions, Monetary Policy; Development Banking- IFCI, IDBI, SIDBI and NABARD

Unit III: Indian Public Finance

Public Expenditure-Growth and Composition, Causes of Growth of Public Expenditure in India: Tax Revenue of Central and State Governments; Concept of VAT; Deficit Financing in India; Revenue, Budget, Fiscal and Primary Deficits; Purpose and Effects of Deficit Financing; India's Fiscal Policy-Objectives.

Unit IV: Current Challenges Facing Indian Economy

Inflation – Causes, Consequences and Anti-inflationary Policy; Poverty – Poverty line and Estimates, Major Poverty Alleviation Programmes; Environmental Degradation – Growth and Environment; Population Growth and Environment; Environment Policy; Economic Reforms, Globalization, Macroeconomic Stabilization, Structural Reforms, and their impact on the Indian Economy; Foreign capital and MNCs-Role and consequences.

Text Book:

- Misra, S. K. and Puri V. K. Indian Economy — Its Development Experience. Himalaya Publishing House, Mumbai.

Reference Book

- Dutt R. and Sundharam K. P. M. Indian Economy. S. Chand & Company Ltd., New Delhi.
- Basu, Kaushik (2016): An Economist in the Real World: The Art of Policy Making in India, Penguin.

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	4	5	5	5	4	4	4	5	4	4
CO2	4	5	4	5	4	4	5	5	4	4
CO3	4	5	5	5	4	4	4	5	5	5
CO4	5	4	4	5	5	5	5	5	4	5
CO5	5	5	5	5	5	4	4	5	5	5

Semester III

Core Course- C-V: Microeconomics I

Course Outcomes (Cos):

After reading this paper, students should have:

CO1: Ability to read and work with graphs.

CO2: Knowledge on workings of the market economy.

CO3: Basic understanding of individual consumer agents and their decision making behaviour.

CO4: Basic understanding of producer behaviour, cost concepts, and optimum output.

CO5: Basic ideas and tools of microeconomics which will be used throughout the other courses of the degree programme.

Syllabus

Unit I: Consumer Theory I

Preferences and Utility, Axioms of Rational Choice, Utility, Trades and Substitutions, Indifference curves; Mathematics of Indifference curves, Utility functions for specific preferences, the many good case; Utility Maximization and choice: the 2-good case (graphical analysis), the n-good case, Indirect utility function, the Lump sum principle, Expenditure minimization, properties of expenditure function.

Unit II: Consumer Theory II

The Income and Substitution Effects: Demand function, changes in income, changes in a goods price- Direct and Indirect Approaches (Slutsky), the Individual's Demand Curve, Compensated (Hicksian) demand curves and functions, demand elasticity, Consumer Surplus, Demand relationships among goods, the 2-good case, substitutes and complements, Net (Hicksian) substitutes, and Complements, Substitutability with many goods.

Unit III: Production Theory and Costs

Production Functions: Marginal productivity, Production with One Variable Input (labour) and with Two-Variable Inputs, Isoquant Maps and the Rate of Technical Substitution, Returns to Scale, Elasticity of Substitution, Some Simple Production Functions: Linear, Fixed Proportions, CobbDouglas; Technical Progress.

Definition of Cost and its properties, Cost minimizing input choices (Optimization principles, Expansion Path), Cost Functions and Shift in Cost Curves, Long-Run versus Short-Run Cost Curves.

Unit IV: Profit Maximization

The Nature and Behavior of Firms, Marginal Revenue – Relationship between Average and marginal revenue, Short-Run Supply by a Price-Taking Firm, Profit Functions and its Properties, Profit maximization – General conditions, Input demands.

Text Book:

- C. Snyder and W. Nicholson (2012): Microeconomic Theory: Basic Principles and Extensions, 11th Edition, Cengage Learning, Delhi, India.

Reference Books:

- H. R. Varian (2010): Intermediate Microeconomics: A Modern Approach, 8th Edition, W.W. Norton and Company/Affiliated East-West Press (India). The workbook by Varian and Bergstrom may be used for problems.

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	4	2	2	2	4	5	4	2	5
CO2	4	4	2	2	2	4	4	4	2	4
CO3	4	2	2	2	2	2	4	4	2	4
CO4	4	2	2	2	2	4	4	4	2	4
CO5	4	2	2	2	2	2	4	4	2	4

Core Course- C-VI: Macroeconomics I**Course Outcomes (Cos):**

After reading this paper, students should have:

CO1: This unit would help students in critically understanding various consumption and investment theories and their implication in economic policy making.

CO2: This unit familiarizes students with various theoretical approaches to money demand. It also conceptually delineates various methods use in the estimation of money supply.

CO3: This unit unravels major policy debates in macroeconomic policy making by providing both theoretical and conceptual understanding in determining the role of fiscal and monetary policies.

CO4: It acquaints students with one of the pressing macroeconomic policy issues of time, i.e., trade-off between unemployment and inflation targeting by providing critical understanding of the existing theoretical and empirical debates.

Syllabus**Unit I: Consumption and Investment**

Consumption – Income Relationship, Propensities to Consume and the Fundamental Psychological Law of Consumption; Implications of Keynesian Consumption Function;

Factors Influencing Consumption Function; Measures to Raise Consumption Function; Absolute, Relative, Permanent and Life – Cycle Hypotheses

Autonomous and Induced Investment, Residential and Inventory Investment, Determinants of Business Fixed Investment, Decision to Invest and MEC, Accelerator and MEI, Theories of Investment.

Unit II: Demand for and Supply of Money

Demand for Money – Classical, Neoclassical and Keynesian Approaches, The Keynesian Liquidity Trap and its Implications, Supply of Money, The Theory of Money Supply Determination and Money Multiplier, Measures of Money Supply in India.

Unit III: Aggregate Demand and Aggregate Supply

Derivation of Aggregate Demand and Aggregate Supply Curves in the IS-LM Framework; Nature and Shape of IS and LM curves; Interaction of IS and LM curves and Determination of Employment, Output, Prices and Investment; Changes in IS and LM curves and their Implications for Equilibrium.

Unit IV: Inflation, Unemployment and Expectations, and Trade Cycles

Inflation – Unemployment Trade off and the Phillips Curve – Short run and Long run Analysis; Adaptive and Rational Expectations; The Policy Ineffectiveness Debate; Meaning and Characteristics of Trade Cycles; Hawtrey’s Monetary Theory, Hayek’s Over-investment Theory and Keynes’ views on Trade Cycles.

Text Book:

- N. Gregory Mankiw (2010): *Macroeconomics*, 7th edition, Cengage Learning India Private Limited, New Delhi.

Reference Book:

- Richard T. Froyen (2005): *Macroeconomics*, 2nd Edition, Pearson Education Asia, NewDelhi.

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	4	4	4	4	5	5	5	4	5
CO2	5	4	4	4	4	4	5	5	4	5
CO3	5	4	4	4	4	4	5	5	4	5
CO4	5	4	4	4	4	4	5	5	4	5

Core Course- C-VII: Statistical Methods for Economics

Course Outcomes (Cos):

After reading this paper, students should have:

CO1: This course will help the students to understand the issues regarding data collection, processing organizing and presentation and the issues involved therein.

CO2: Students will understand the basic concepts of descriptive and inferential statistics.

CO3: It will help students to understand situations radically and solve them

CO4: Students will be able to get a complete idea of any economic theory or principle with its analytical framework.

CO5: Students will be able to enhance their ability to examine any existing fundamental theory through statistical methods.

Syllabus

Unit I: Data Collection and Measures of Central Tendency and Dispersion

Basic concepts: population and sample, parameter and statistics; Data Collection: primary and secondary data, methods of collection of primary data; Presentation of Data: frequency distribution; cumulative frequency; graphic and diagrammatic representation of data; Measures of Central Tendency: mean, median, mode, geometric mean, harmonic mean, their relative merits and demerits; Measures of Dispersion: absolute and relative - range, mean deviation, standard deviation, coefficient of variation, quartile deviation, their merits and demerits; Measures of skewness and kurtosis.

Unit II: Correlation and Regression Analysis

Correlation: scatter diagram, sample correlation coefficient - Karl Pearson's correlation coefficient and its properties, probable error of correlation coefficient, Spearman's rank correlation coefficient. Two variable linear regression analysis - estimation of regression lines (Least square method) and regression coefficients - their interpretation and properties, standard error of estimate.

Unit III: Time Series and Index Number

Time Series: definition and components, measurement of trend- free hand method, methods of semi-average, moving average and method of least squares (equations of first and second degree only), measurement of seasonal component; Index Numbers: Concept, price relative, quantity relative and value relative; Laspeyer's and Fisher's index, family budget method, problems in construction and limitations of index numbers, test for ideal index number.

Unit IV: Probability Theory and Sampling

Probability: Basic concepts, addition and multiplication rules, conditional probability; Meaning of Sampling, Types of Sampling: Probability Sampling versus Non-Probability

Sampling; Simple Random Sampling and its selection, Systematic Sampling, Multi-stage Sampling, Quota Sampling; Error: Sampling and Non-sampling.

Text books:

- S. C. Gupta (2017): *Fundamentals of Statistics*, Himalaya Publishing House, Delhi

Reference Book:

- Murray R. Spiegel (2017): *Theory & Problems of Statistics*, Schaum’s publishing Series.

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	2	2	2	2	2	5	5	5	4
CO2	4	4	4	2	4	2	5	5	5	4
CO3	4	4	4	4	4	4	4	4	5	5
CO4	5	4	2	4	2	4	4	5	5	4
CO5	4	2	2	2	4	4	5	5	5	4

Semester IV

Core Course- C-VIII: Microeconomics II

Course Outcomes (Cos):

After reading this paper, students should:

CO1: Be able to understand the principles of microeconomics, the decision making of firms and the functioning of the market.

CO2: Be able to understand basic microeconomic analysis to study different market structures.

CO3: Have knowledge of decision-making process of firms in different kinds of markets.

CO4: Be able to understand various game theoretic models on Oligopoly such as Cournot, Bertrand, Stackelberg, Cartel and Price Leadership.

CO5: Be able to understand the basic concepts of general equilibrium, efficiency and welfare.

Syllabus

Unit I: Firm Supply and Equilibrium

Market Environments; Pure competition; Supply decision of a competitive firm and Exceptions; Inverse Supply Function; Profits and Producer's Surplus; Long Run Supply Curve of a Firm; Long Run Average Costs; Short Run and Long Run Industry Supply; Industry Equilibrium in Short and Long Run; Meaning of Zero Profits; Economic Rent.

Unit II: General Equilibrium, Efficiency and Welfare

The Edgeworth Box; Trade; Pareto Efficient Allocations; Existence of equilibrium and efficiency; The Welfare Theorems and their implications; The Firm; Production and the Welfare Theorems; Production possibilities, comparative advantage and Pareto efficiency.

Unit III: Market Imperfections: Monopoly and Oligopoly

Barriers to Entry, Profit Maximization and Output Choice, Monopoly and resource Allocation, Monopoly, Product Quality and Durability, Price Discrimination, Second Degree Price Discrimination through Price Schedules, Regulation of Monopoly, Dynamic Views of Monopoly. Monopolistic competition; Price output determination; excess capacity under monopolistic competition.

Unit IV: Game Theory

The Payoff Matrix of a Game; Nash Equilibrium; Mixed Strategies ;The Prisoner's Dilemma; Repeated Games; Enforcing a cartel; Sequential Games; A Game of entry deterrence.

Oligopoly – Choosing a strategy; Quantity and price leadership; Simultaneous Quantity Setting; Example of Cournot Equilibrium; Simultaneous Price Setting; Collusion.

Text Book:

- H. R. Varian (2010): Intermediate Microeconomics: A Modern Approach, 8th Edition, W.W. Norton and Company/Affiliated East-West Press (India). The workbook by Varian and Bergstrom may be used for problems.

Reference Book:

- C. Snyder and W. Nicholson (2012): Microeconomic Theory: Basic Principles and Extensions, 11th Edition, Cengage Learning, Delhi, India.
- Pindyck, Robert and Daniel Rubinfeld (2018): Microeconomics, 9th Edition, Pearson Education Inc.

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	4	2	4	2	2	4	4	4	2	5
CO2	4	4	4	2	2	4	5	4	2	5
CO3	5	4	4	2	2	4	2	4	2	5
CO4	4	4	4	2	2	4	4	4	2	5
CO5	4	2	4	2	2	4	5	5	2	5

Core Course- C-IX: Macroeconomics-II

Course Outcomes (Cos):

After reading this paper, students should have:

CO1: Provides a critical understanding of one of the most accepted economic growth models of our time – the Solow Model. It also extends the model by factoring in endogenous variables in explaining the ongoing growth trajectories across the world.

CO2: This unit familiarizes students with open economy macroeconomics and the policy debates therein. It critically deals with the various exchange rate regimes and the appropriateness of policy making in resolving the international balance of payment differences.

CO3: This unit exposes students with major theoretical contestation in macroeconomics. It helps students to develop critical insights into the Classical and Keynesian debates on employment and output determination.

CO4: Provides theoretical perspective into Monetarist School and New Classical School. It emphasises role of expectation in devising appropriate monetary policy frameworks for economic stabilisation.

Syllabus

Unit I: Modeling Economic Growth

Accumulation of Capital in the basic Solow Model; supply and demand for goods, growth in the capital stock and the steady state, Golden rule level of capital: Comparing steady states, transition to the golden rule steady state with too much and too little capital, Population Growth, Technological Progress- Solow version, Beyond Solow Model and Endogenous Growth.

Unit II: Open Economy and Macroeconomic Policy

Balance of payments- concept; meaning of equilibrium and disequilibrium in balance of payments; Determination of foreign exchange rate- the balance of payments theory; Fixed versus flexible exchange rates; Short-run open economy model- the basic Mundell-Fleming model; Macroeconomic Policies – Fiscal policy, Crowding –out and Crowding – in; Monetary policy and instruments, the Transmission Mechanism; Effectiveness of macroeconomic policies in open and closed economies.

Unit III: Classical and Keynesian Macroeconomics Thoughts

Keynes verses classics: Classical macroeconomics, Employment and output determination, Say's law, the quantity theory of money, Keynes's General theory: Keynes's main propositions; analysis of the labour market, Keynes's critique of Say's law and Quantity theory of money, the orthodox Keynesian school, underemployment equilibrium in the Keynesian model, the Phillips curve and orthodox Keynesian school.

Unit IV: Monetarist and New Classical Macroeconomic Thoughts

The orthodox monetarist school, the Quantity Theory of Money approach, the expectations augmented Phillips curve analysis, the orthodox monetarist school and stabilization policy.

New Classical Economics: The influence of Robert e Lucas Jr, the structure of new classical models: the Rational Expectations hypothesis; and policy implications.

Text Book:

- N. Gregory Mankiw (2010): *Macroeconomics*, 7th edition, Cengage Learning India Private Limited, New Delhi

Reference Book:

- Brian Snowdon and Howard R Vane (2005): *Modern Macroeconomics: Its Origins, Development and Current State*, Edward Elgar

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	4	4	5	4	4	5	5	5	5
CO2	5	4	4	5	4	4	5	5	5	5
CO3	5	4	4	5	4	4	5	5	5	5
CO4	5	4	4	5	4	4	5	5	5	5

Note: Highly related=3: Moderate=2: Low=1

Core Course- C-X: Research Methodology

Course Outcomes (Cos):

CO1: This would elaborate the meaning, scope of research, how quality research can be carried out and the possible outcome of research.

CO2: This will help to find out what the research problem is, process to define a research problem and how the problem can be addressed in a better way.

CO3: This will help to define the techniques related to research and also explain the technical

difficulties that a researcher may face throughout the research period.

CO4: This would help to develop skills in qualitative and quantitative data analysis and presentation.

CO5: It would also develop advanced critical thinking skills and demonstrate enhanced writing skills.

Syllabus

Unit I: Basics of Research

Introduction to Research: Meaning, Objectives, Motivation, Types, Approaches, Significance, Research Process, Criteria of Good Research; Qualities of a Good Researcher, Research as a Career.

Unit II: Research Problem

Defining the Research Problem: What is a Research Problem? Selecting the Problem, Necessity of Defining the Problem, Technique Involved in Defining a Problem; Research Design: Meaning, Need, Features of a Good Design, Important Concepts Relating to Research Design, Different Research Designs, Basic Principles of Experimental Designs.

Unit III: Issues in Research

Measurement in Research, Measurement Scales, Sources of Error in Measurement, Tests of Sound Measurement, Techniques of Measurement Tools, Scaling and Important Scaling Technique Research Ethics: codes and ethics, permissions to research, responsibilities, confidentiality, feedback, participatory research; Research Proposal and literature review: research proposal, review of literature, levels of analysis, using the library and internet, abstracting, word processing, plagiarism, Concept of IPR.

Unit IV: Actions in Research

English in report writing: words, sentences, paragraph, writing style; The Report: improving quality, sections, drawing conclusions, evaluation checklists, persistence; Common Citation Styles

Text Book:

- Kothari, C. R. (2004): Research Methodology: Methods and Techniques, New Age International Private Limited Publishers, New Delhi.

Reference Books:

- Guthrie, G. (2010): Basic Research Methods, Sage Publications India Private Limited, New Delhi.

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	5	5	5	5	2	4	5	4	5
CO2	5	5	5	5	5	5	5	5	4	5
CO3	5	4	5	5	5	2	5	4	5	4
CO4	4	5	5	4	4	4	5	5	5	5
CO5	2	4	5	4	5	4	5	4	4	4

Semester-V

Core Course- C-XI: Indian Economy I

Course Outcomes (Cos):

After reading this paper, students should have:

CO1: It will result in comprehensive understanding of Indian Economy. It will help in developing the conceptual framework of govt policies and programmes.

CO2: It will acquaint students with latest data and will enhance analytical skills.

CO3: The course will help in sharpening the analytical thinking of the student.

CO4: After studying the structure aspects of Indian Economy, students will be exposed to economic reforms in India and problems of Indian economy.

CO5: It will highlight an integrated approach to the functioning aspects of the Indian economy keeping in view the scope for alternative approaches.

Syllabus

Unit I: Basic Characteristics of Indian Economy as a Developing Economy

Indian Economy in the Pre-British Period; The Structure and Organization of Villages and Towns; Industries and Handicrafts in Pre-British India; Colonialism; Economic Consequences of British Rule; Decline of Handicrafts and Progressive Ruralization; The Land System and Commercialization of Agriculture; Industrial Transition; Colonial Exploitation and Impacts –

Underdevelopment; Colonization and Modernization; State Policies and Economic Underdevelopment; The Current State of Indian Economy

Unit II: Population and Human Development

Population Growth and Economic Development – size, growth and future of population; Causes of rapid population growth; Population and economic development; Population policy; Demographic issues– Sex and Age Composition of population; Demographic Dividend; Urbanization and Migration; Human Resource Development – Indicators and importance of Human Resource Development; Education policy; Health and nutrition.

Unit III: National Income in India – The Growth Story and Current Challenges

Trends in national and per capita income; Changes in sectoral composition of national income; Regional disparities in Growth and Income; Savings and Investment and Economic Growth – The Linkage; Poverty – Estimation and Trends, Poverty Alleviation Programs– MGNREGA, NRLM, SJSRY; Inequality –Measures and trends in India; Unemployment– Nature, Estimates, Trends, Causes and Employment Policy.

Unit IV: Economic Planning in India

Rationale, Features, Objectives, Strategies, Achievements and Assessment of Planning in India; Eleventh Five Year Plan– Objectives, Targets and Achievements; Twelfth Five Year Plan – Vision and Strategy; From Planning to NITI– Transforming India’s Development Agenda.

Text Book:

- Misra, S. K. and Puri V. K. Indian Economy — Its Development Experience. Himalaya Publishing House, Mumbai

Reference Books:

- Dutt R. and Sundharam K. P. M. *Indian Economy*. S. Chand & Company Ltd., New Delhi.
 - Indian Economy Datt and Sundharam, GauravDatt and AshwaniMahajan, S Chand Publications, 7th Revised Edition
 - Indian Economy Since Independence, ed by Uma Kapila, Academic Foundation, Revised Nineteenth Edition 2008-09
 - Government of India (Current Year): Economic Survey, Ministry of Finance, New Delhi
- Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	4	4	2	2	2	5	5	4	4
CO2	4	2	2	2	4	4	5	5	5	4
CO3	5	4	2	4	4	4	5	5	5	4
CO4	4	4	2	4	2	4	5	5	4	4
CO5	4	4	4	4	4	5	5	5	4	4

Core Course- C-XII: Development Economics-I

Course Outcomes (Cos):

After reading this paper, students should have:

CO1: This unit aims to provide a holistic perspective on the question of ‘development’ by contrasting it to the conventional growth centric economics. It also familiarises students with various measurements that are used in assessing development outcomes.

CO2: This unit informs students about historicity of development thinking. It helps to critically understand various theoretical advances – starting from the Classical to the Solow – in development economics and their strength in explaining current economic phenomenon.

CO3: Critically engages students to help comprehending major policy debates on the question of poverty and inequality. This unit also provides a detailed understanding about the role of agricultural and industrial sectors in economic development.

CO4: Helps students to appreciate the role of institutions, both formal and informal, in economic development. Critically, it delineates the role of culture, market and state in explaining economic disparities across the nations.

Syllabus

Unit I: Study of Economic Development

Development Economics as subject; economic growth and economic development; Characteristics of underdeveloped countries – vicious cycle of poverty and cumulative causation; obstacles to economic development; measures of economic development – national and per capita income, basic needs approach, capabilities approach, three core values of development, PQLI, HDI, HPI, MDPI, GDI; capital formation and economic development.

Unit II: Theories of Economic Growth and Development

Classical theory, Marxian theory; Schumpeterian theory; Rostow’s stages of economic growth; Solow model and convergence with population growth and technical progress.

Unit III: Poverty, Inequality, Agriculture, Industry and Development

Measuring poverty: Head Count Ratio, Poverty Gap Ratio, Squared Poverty Ratio, FGT Ratio; Measuring Inequality – Lorenz curve and Kuznets’ inverted U hypothesis; Growth, poverty and inequality; Policy options – some basic considerations.

Agriculture, Industry and Economic Development: Role of agriculture; Transforming traditional agriculture; Barriers to agricultural development; Role of industrialization; Interdependence between agriculture and industries – A model of complementarities between

agriculture and industry; terms of trade between agriculture and industry; functioning of markets in agrarian societies; interlinked agrarian markets.

Unit IV: Institutions and Economic Development:

Role of institutions in economic development; Characteristics of good institutions and quality of institutions; The pre-requisites of a sound institutional structure; Different measures of institutions – aggregate governance index, property rights and risk of expropriation; The role of democracy in economic development; Role of markets and market failure; Institutional and cultural requirements for operation of effective private markets; Market facilitating conditions; Limitations of markets in LDCs; Corruption and economic development – tackling the problem of corruption.

Text book:

- Todaro, Michael P and Stephen C Smith (2006): *Economic Development*, 8th Edition, Pearson

Reference Books:

- Debraj Ray (2009): *Development Economics*, Oxford University Press.
- Thirlwall, A P (2011): *Economics of Development*, 9th Edition, Palgrave Macmillan

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	4	5	5	5	5	5	5	4	5
CO2	5	4	5	5	5	5	5	5	4	5
CO3	5	4	5	5	5	5	5	5	4	5
CO4	5	4	5	5	5	5	5	5	4	5

DSE-I: Economic History of India (1857-1947)

Course Outcomes (Cos):

After reading this paper, students should have:

CO1: Familiarises students with colonial history of India and how it shaped various economic indicators such as national income, population growth and occupational structure. This unit helps students in comprehend the colonial legacy of India.

CO2: This unit critically deals with the agricultural sector in colonial India. It provides nuanced understanding of prevailing agrarian structure in the country – land relation, agricultural markets and institutions. It also discusses the reasons behind low agricultural productivity in India.

CO3: Critically engages students with the de-industrialisation debate during the colonial rule in India. This unit provides students a comprehensive understanding about the evolution of new industrial structure, especially, during inter-war period; and how it shaped the labour relation in India.

CO4: Helps students to comprehend the political economy of imperialism and its impact on Indian economy at large. This unit discusses the role of imperialism on wealth, international trade, capital flows and fiscal policy in India.

Syllabus

Unit I: Introduction: Colonial India: Background and Introduction and Macro trends

Overview of colonial economy, National Income; population; occupational structure.

Unit II: Agriculture

Agrarian structure and land relations; agricultural markets and institutions – credit, commerce and technology; trends in performance and productivity; famines.

Unit III: Railways and Industry

Railways; the de-industrialization debate; evolution of entrepreneurial and industrial structure; nature of industrialization in the interwar period; constraints to industrial breakthrough; labor relations.

Unit IV: Economy and State in the Imperial Context

The imperial priorities and the Indian economy; drain of wealth; international trade, capital flows and the colonial economy – changes and continuities; government and fiscal policy.

Text Book:

- Tirthankar Roy, *The Economic History of India 1857-1947*, Oxford University Press, 3rd edition, 2011.

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	4	5	5	5	5	5	5	4	5
CO2	5	4	5	5	5	5	5	5	4	5
CO3	5	4	5	5	5	5	5	5	4	5
CO4	5	4	5	5	5	5	5	5	4	5

Discipline Specific Elective-I: Public Economics

Course Outcomes (COs):

On completion of this course, the students will be able to

CO1: It provides a wider scope to students for studying the implications of macroeconomic policies on the Economy.

CO2: It will help to examine the rationale for government intervention in a market economy, the assessment of public policy, and the impact of government expenditures and taxation on the economy and the citizen.

CO3: It provides a framework about the role of Government sector in providing public goods for welfare.

CO4: It will create familiarity with the micro and macro aspects of public expenditure. An understanding of the mechanics of government budget. Familiarity with the different aspects of fiscal federalism, acquaintance with the technique of cost-benefit analysis for project appraisal, understanding of various aspects of fiscal policy and debt management.

CO5: It will help in understanding and analyzing the impact of public policy on the allocation of resources and the distribution of income in the economy and also analysis of public expenditures, taxation, budgetary procedures, stabilization instruments, debt issues.

Syllabus

Unit I: Introduction to Public Finance and Public Budgets

Public Finance: meaning and scope, distinction between public and private finance; public good versus private good; Principle of maximum social advantage; Market failure and role of government; Public Budget: kinds of budget, economic and functional classification of the budget; Balanced and unbalanced budget; Balanced budget multiplier; Budget as an instrument of economic policy.

Unit II: Public Expenditure

Meaning, classification, principles, canons and effects, causes of growth of public expenditure, Wagner's law of increasing state activities, Peacock-Wiseman hypotheses.

Unit III: Public Revenue

Sources of Public Revenue; Taxation - meaning, canons and classification of taxes, impact and incidence of taxes, division of tax burden, the benefit and ability to pay approaches, taxable capacity, effects of taxation, characteristics of a good tax system, major trends in tax revenue of central and state governments in India.

Unit IV: Public Debt

Sources, effects, debt burden – Classical/ Ricardian views, Keynesian and post-Keynesian views; shifting - intergenerational equity, methods of debt redemption, debt management, tax versus debt.

Text Books:

- J. Hindriks and G. Myles (2006): *Intermediate Public Economics*, MIT Press.

Reference Book:

- R. A. Musgrave and P. B. Musgrave(1989): *Public Finance in Theory and Practices*. McGraw Hill
- Bhatia H L (2018): *Public Finance*. Vikas Publishing House.

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	5	4	5	4	4	4	5	4	5
CO2	5	5	4	5	4	5	5	5	4	4
CO3	5	4	5	4	5	5	4	5	4	5
CO4	5	5	4	5	5	4	5	5	4	5
CO5	5	5	4	4	4	4	5	5	4	5

Note: Highly related=3: Moderate=2: Low=1

DSE-II: Introductory Econometrics**Course Outcomes (Cos):**

After reading this paper, students should have:

CO1: This course introduces students to the econometric methods used to conduct empirical analysis in Economics.

CO2: Econometric methods will prove particularly useful for understanding the interrelationships in the economic variables.

CO3: Students will learn the use of econometrics with greater precision and establishing such relationships.

CO4: The course is designed to provide the students with the basic quantitative techniques needed to undertake applied research projects.

CO5: Students will learn to estimate linear models using ordinary least squares and make inferences about population parameters.

Syllabus

Unit I: Introduction

Definition, Nature and scope of econometrics; Theoretical Probability Distributions: Binomial, Poisson and Normal distributions: their properties

Theory of Estimation: Estimation of parameters; properties of estimators – small sample and asymptotic properties; point and interval estimation.

Unit II: Hypothesis Testing

Testing of hypotheses: defining statistical hypotheses; Simple and composite hypotheses; Null and alternative hypothesis; Type I and Type II errors, Critical region; Neyman-Pearson lemma; Power of a test; Test statistics: z, chi square, t and F.

Unit III: Linear Regression Analysis

Two variable linear regression model – Assumptions; Least square estimates, Variance and covariance between Least square estimates; BLUE properties; Standard errors of estimates; Co-efficient of determination; Inference in a two variable linear regression model; ANOVA; Forecasting. Introduction to multiple regression models.

Unit IV: Violation of Classical Assumptions

Heteroscedasticity, Multicollinearity and Auto-correlation: Meaning, consequences, tests and remedies.

Text Book:

- Gujarati, D & Sangeetha (2007); “Basic Econometrics”, McGraw Hill Book Co.

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	4	2	2	4	4	5	5	5	5
CO2	4	2	2	2	4	4	5	5	5	5
CO3	4	2	2	4	4	4	5	5	5	5
CO4	4	2	2	2	4	4	5	5	5	5
CO5	4	2	4	4	4	4	5	5	5	5

Note: Highly related=3: Moderate=2: Low=1

DSE-II: Odisha Economy

Course Outcomes (Cos):

After reading this paper, students should have:

CO1: Increasing the ability of the students to understand the policies and issues of the Odisha Economy via establishing a linkage between theory and policy.

CO2: Improving the thinking-based abilities of the students on various socio-economic problems of the state and to carry out effective research.

CO3: Enabling the students to prepare for various competitive examinations based on the information of the state economy.

CO4: Developing the understanding of the students about various concepts and dynamics of Odisha economy.

CO5: Enhancing the moral, social and ethical values of the students in regard to identifying socio-economic issues for future research.

Unit I: Odisha Economy before 1947

Orissa's Economy in the Nineteenth Century: Benevolence or Exploitation, Forces of Nature, Animal Power, The Company Steps in, Public Works and Public Health, Education, Disintegration of Village Economy, New Social Environment, Changing Position of Social Classes, The Moneylenders, The Borrowers, Money-flows from Village to Metropolis, Pauperization of Peasantry, The Wage Earners, Demographic Changes, Profiting from Rural Adversity; Diarchy in 1919 and Separation of Provincial Finances from Central Government in 1937; Emergence of Federal Finance (Ref.: Das 1976a and 1976b, GoO 2016).

Unit II: Macro Economy of Odisha

A macro glance of Odisha economy: aggregate income, broad sectoral decomposition, performance of districts, employment, child labor and bonded labor, employment programmes, consumption expenditure, cost of living; Odisha State public finances (Chapter 14 and 15 of Ref 1; & Chapter 2 and 9 of Ref 2).

Unit III: Agriculture, Industry, Infrastructure and Environment in Odisha

Agriculture: land ownership and land tenure, agricultural wages and rural unemployment, production and productivity of major crops, agricultural inputs, agricultural policy; Animal Husbandry; Fisheries (Chapter 1 to 3 of Ref 1; & Chapter 3 of Ref 2) Industry: Investment, industrial policy, and the growth of large industries, mining and quarrying; Construction; tertiary sector: tourism, transport and power; Water Resources, Forest Resources (Chapter 4 to 8 of Ref 1; & Chapter 4 & 5 of Ref 2).

Unit IV: Social Sector in Odisha

Poverty: income poverty and inequality; health sector: outcomes, infrastructure, finance, public health, NRHM; education: Literacy, Primary education, secondary education, higher education, SSA; human development (Chapter 9 to 13 of Ref 1; & Chapter 7 & 8 of Ref 2).

Text Book:

- Nayak, P., Panda, S. C., Pattanaik, P. K. (2016): *The Economy of Odisha: A Profile*, Oxford University Press, New Delhi.

Reference Book:

- GoO (Latest): *Odisha Economic Survey*, Planning and Convergence Department, Directorate of Economics and Statistics, Government of Odisha, Bhubaneswar.
- GoO (2004): *Human Development Report 2004 Orissa*, Planning and Coordination Department, Government of Odisha, Bhubaneswar.
- GoO (2018): *80 Years Odisha Budget: Commemorative Volume*, Department of Finance, Bhubaneswar.

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	5	4	2	5	4	2	4	4	5
CO2	5	4	2	4	4	4	4	5	2	4
CO3	4	5	5	5	4	2	5	4	5	2
CO4	2	4	4	4	4	4	4	5	4	4
CO5	4	5	5	4	5	4	4	2	4	4

DSE-II: Money and Banking

Course Outcomes (Cos):

After reading this paper, students should have:

CO1: Enhancing the ability of the students to establish the linkage between banking theory and practice.

CO2: Improving the analytical skill of the students relating to the functioning of the money and banking system.

CO3: Nurturing the research-oriented ability of the students relating to financial issues.

CO4: Improving the understanding of the students about various concepts and dynamics of banking system.

CO5: Enhancing the moral and ethical values of the students about banking structure and financial institutions.

Syllabus

Unit I: Money

Money: Meaning, functions and classification; Gresham's law; Monetary standards: Metallic and paper systems of note issue; Value of money: (Uses and limitations of index number); Construction of price index number – its limitations.

Unit II: Quantity theory of money

Quantity theory of money - Cash transaction approach, cash balance approach, Keynesian approach; Inflation: meaning, types, causes – demand pull and cost push, effects, measures to control inflation, Trade-off between inflation and unemployment; Stagflation and deflation: meaning; Phillip's curve.

Unit III: Banking

Banking: meaning and types; Commercial banks: evolution, functions, the process of credit creation and its limitations, liabilities and assets of banks; A critical appraisal of the progress of commercial banking in India after nationalization; Recent reforms in banking sector in India.

Unit IV: Central Bank

Central Bank: Functions, Quantitative and qualitative methods of credit control - bank rate policy, open market operations, variable reserve ratio and selective methods; Relative efficacy of quantitative and qualitative methods of credit control.

Reserve Bank of India: Role and functions; Repo rate and reverse repo rate; Components of money supply in India; Objectives and limitations of monetary policy with special reference to India

Text Book:

- Paul R.R. (2017) Money Banking and Public Finance, Kalyani Publishers

Reference Book:

- Reserve Bank of India – The Reserve Bank of India, functions and working, Bombay, 1983.

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	4	5	4	5	4	4	5	4	4	4
CO2	4	4	5	4	5	2	4	5	5	4
CO3	5	4	2	5	4	5	2	4	4	5
CO4	2	5	4	4	4	4	5	4	5	2
CO5	4	2	4	5	5	4	4	2	4	4

Semester VI

Core Course- C-XIII: Indian Economy II**Course Outcomes (Cos):**

After reading this paper, students should have:

CO1: Student will be able to understand the relevance of agriculture, industry and service sector in shaping Indian economy.

CO2: This paper helps students to get knowledge about the factors which help in better performance of agriculture, industry and service sector; and the policies made for these three sectors.

CO3: Students will learn about the role, composition and direction of foreign trade, Balance of Payments (BOPs) and Trade policies in India.

CO4: This course is designed to provide the knowledge about the role of environment and climate change on Indian economy and the policies for the improvement of environment in India.

CO5: Finally, it facilitates students to learn the development pattern adopted in India and evaluate its impact on economic development in India.

Syllabus**Unit I: Agricultural Development in India**

Indian Agriculture: nature, importance, trends in agricultural production and productivity, factors determining production, land reforms, new agricultural strategies and green revolution,

rural credit; Agricultural marketing and warehousing.

Unit II: Industrial Development in India

Trends in industrial output and productivities; Industrial Policies of 1948, 1956, 1977 and 1991; Industrial Licensing Policies – MRTP Act, FERA and FEMA; Growth and problems of SSIs, Industrial sickness; Industrial finance; Industrial labour.

Unit III: Tertiary Sector, HRD and the External Sector

Tertiary Sector: growth and contribution of service sector to GDP of India, share of services in employment; Human development – concept, evolution, measurement; HRD: indication, importance, education in India, Indian educational policy; Health and Nutrition.

Foreign Trade: role, composition and direction of India's foreign trade, trends of export and import in India, export promotion versus import substitution; Balance of Payments of India; India's Trade Policies; Foreign Capital – FDI, Aid and MNCs.

Unit IV: Indian Economy and Environment

Environmental Policies in India: The Environment (Protection) Act 1986, The Environment (Protection) Rules 1986, The National Forest Policy 1988, Policy statement for Abatement of Pollution 1992, National Conservation Strategy and Policy Statement on Environment and Development 1992, The National Environment Appellate Authority Act 1997, National Environmental Policy 2006; Global deal with Climate Change: Introduction, Intergovernmental Panel for Climate Change (IPCC), Impact of Climate Change on India, Global Response on Climate Change, Possible Role of India.

Text Book:

- Misra, S. K. and Puri V. K. *Indian Economy — Its Development Experience*. Himalaya Publishing House, Mumbai

Reference Books:

- Dutt R. and Sundharam K. P. M. *Indian Economy*. S. Chand & Company Ltd., New Delhi.
- *Indian Economy* Datt and Sundharam, Gaurav Datt and Ashwani Mahajan, S Chand Publications, 7th Revised Edition
- *Indian Economy Since Independence*, ed by Uma Kapila, Academic Foundation, Revised Nineteenth Edition 2008-09
- Government of India (Current Year): *Economic Survey*, Ministry of Finance, New Delhi

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	4	4	5	5	4	4	5	2	4
CO2	4	4	4	4	2	4	4	5	2	4
CO3	4	4	4	4	2	2	4	5	2	4
CO4	5	4	4	4	5	5	4	5	5	5
CO5	4	4	4	5	4	4	4	5	4	5

Core Course- C-XIV: Development Economics-II

Course Outcomes (Cos):

After reading this paper, students should have:

CO1: Familiarises students with various concepts used in demography. It critically deliberates the issues surrounding population, migration and development.

CO2: This unit critically deals with the various reasons behind international dualism in economic development. It evaluates the role of international exchanges on unequal development across centre and periphery.

CO3: Critically engages students with the basic issues of environment and economic development. It also helps comprehend the critical role of sustainable development in enabling overall progress human civilisation.

CO4: Helps students to comprehend the role of international trade in economic development. It provides critical insights into various trade policy debates. Moreover, it also sheds light upon the unabated role of financial capital in determining global economic development.

Syllabus

Unit I: Population and Development

Demographic concepts: birth and death rates, age structure, fertility and its determinants, the Malthusian population trap and the microeconomic household theory of fertility; costs and benefits of population growth and the model of low level equilibrium trap; rural-urban migration – the Harris Todaro migration model and policy implications.

Unit II: Dualism and Economic Development

Dualism – geographic, social and technological; the theory of cumulative causation (Myrdal); the regional inequalities in the context of economic development; the inverted U relationship; international inequality and the centre periphery thesis; dependency, exploitation and unequal exchange; the dualistic development thesis and its implications.

Unit III: Environment and Development

Basic issues of environment and development – Development and environment inter-linkage; Poverty, environmental degradation and externalities; common property resources, renewable and non-renewable resources; concept of sustainable development; basics of climate change.

Unit IV: International Trade and Economic Development and Financing Economic Development

Trade and economic development; export led growth; terms of trade and economic growth – the Prebisch Singer Hypothesis; trade strategies for development – import substitution vs. export promotion; international commodity agreements; trade vs aid.

Saving, capital formation and economic development; financial sector and economic development; taxation, public borrowing and economic development; inflation, foreign finance, investment and foreign aid – controversies and opportunities.

Text Book:

- Todaro, Michael P and Stephen C Smith (2006): *Economic Development*, 8th Edition, Pearson

Reference Book:

- Thirlwall, A P (2011): *Economics of Development*, 9th Edition, Palgrave Macmillan. Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	4	5	5	5	5	5	5	4	5
CO2	5	4	5	5	5	5	5	5	4	5
CO3	5	4	5	5	5	5	5	5	4	5
CO4	5	4	5	5	5	5	5	5	4	5

DSE III: Environmental Economics

Course Outcomes (Cos):

CO1: It would help to know the relevance of environmental economics for a developing nation, contemporary issues related to environment, and different environmental laws and protocols.

CO2: It will explain how externalities, public goods etc. can cause a problem to the environment and how the society can tackle the major issues through different theoretical approaches.

CO3: It would also help to assess different scientific methods used to measure the environmental damages.

CO4: This will help the student to bring a logical views of command and market based economy.

CO5: It will help to examine issues in the contemporary environmental discourse from an economists’ point of view.

Syllabus

Unit I: Economy and Environment

Nature and Scope of Environmental Economics- Environment and Economy interaction; Environment as a public good- Serious environmental problems of Developing Countries – Air pollution, water pollution and deforestation.

Global environmental problems, trade and environment, International Cooperation for Environmental Protections, Montreal and other protocols.

Unit II: The Economics of Pollution and Climate change

Pollution as externality, The market Approach to optimal pollution, Property rights and market bargain theorems, Coase theorem; Pigouvian Taxation, Subsidies and optimal pollution; Climate change – concept, causes, effects and management.

Unit III: Valuation of Environmental Damage

Methods and difficulties of environmental valuation, Economic value, Use value, Option value, Existence value; Direct and Indirect Valuation of Environmental Goods: The hedonic price approach, Contingent valuation, Travel cost approach.

Unit IV: Natural Resources and Sustainable Development

Natural resources- Renewable and exhaustible; Tragedy of commons, People's Participation in the management of common property resources; Sustainable Development Concepts, Sustainability rules, Indicators of sustainability, Solow/Hartwick, Natural capital stock, Safe Minimum Standard.

Text Book:

- Bhattacharya, R. N. (2002): Environmental Economics: An Indian Perspectives, OUP, New Delhi

Reference Book:

- Kolstad, C.D (1999); Environmental Economics Oxford University Press, New Delhi

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	4	5	4	5	4	5	5	4	4	5
CO2	5	5	4	5	5	5	5	5	4	5
CO3	5	5	5	4	4	5	5	5	5	4
CO4	5	5	4	5	5	5	4	5	5	5
CO5	5	5	5	5	4	5	4	5	4	5

DSE-IV: History of Economic Thought

Course Outcomes (Cos):

After reading this paper, students should have:

CO1: Familiarises students with the antecedent of economic thoughts in the world – beginning from the Mercantilism to Ricardian Theory. This unit helps students understand the contribution of Classical Political Economy to the development of economic theory.

CO2: This unit critically exposes students to the major debates between Classical political economist and Marx’s analysis of economic system. It provides an insight into Malthusian population theory, Marxian political economy and Mill’s utilitarian approach to economic analysis.

CO3: Critically engages students with the major economic contribution of Marginalist school – starting from Jevons to Marshal. Moreover, students will be acquainted with the major theoretical differences between Keynesian Economics and Neo-Classical Economics on determination on income, employment and interest rate in the economic system.

CO4: The last unit helps students acknowledge the major contribution of Indian economic thinkers to the economics science. The relevance of Kautilya’s Arthasashtra is discussed along

the modern economic thinkers such as Naroji and Gandhi. Moreover, it also helps students to critically compare Indian economic thoughts with the western economic thought.

Syllabus

UNIT I: Introduction and Early Economic Thought

Mercantilism-main characteristics, Thomas Mur's views; Physiocracy- main features, Tableau Economique, taxation; Early Classicism: Adam Smith- Theory of Value, Division of labour, capital accumulation, distribution, views on trade and economic progress; David Ricardo-theory of value, theory of rent, distribution, ideas on international trade and development.

UNIT II: Classicism Vs Marxism

Thomas Malthus- population theory, glut theory; Karl Marx-dynamic of social change, theory of value, surplus value, theory of profit, crisis of capitalism, Johns Stuart Mill- ideas on value, distribution, views as a synthesizer.

UNIT III: The Marginalists' Revolution

Economic ideas of Jevons, Walras and Menger, Bohm-Bowerk, Wicksell ; Marshall – Role of time element in price determination, ideas on consumer surplus, Marshal as a synthesizer.

UNIT IV: Indian Economic Thought

Main themes of Kautilya's Arthasashtra; Modern Economic Ideas: Dada Bhai Naoroji, M.K. Gandhi, village swaraj, non-violence, machines and labour, cottage industries; Comparison of Indian Economic thought with western Economic thought.

Text Book

- Gide, Charles and Rist, Charles (1973): A History of Economic Doctrines, Oxford University Press.
- Dasgupta, A K (1986): Epochs of Economic Theory, Oxford University Press, New Delhi.

Reference Book:

- O'Brien, D P (1975): Classical Economists, Oxford, Clarendon Press.
- Ekelund, Robert B. and Robert F. Hebert (1990): A History of Economic Theory and Method, third edition, New York: McGraw Hill.
- Henry W. Spiegel (1991): The Growth of Economic Thought, 3rd ed. Durham: Duke University Press.
- Tom Bottomore (1980): Dictionary of Marxist Thought, Basic Blackwell Publishers.
- Roll, Eric, History of Economic Thought, Faber and Faber Ltd.
- L N Rangarajan (1992): Kautilya: The Arthasastra, edited, rearranged, translated and introduced; Penguin books, New Delhi.

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	4	5	5	5	5	5	5	4	5
CO2	5	4	5	5	5	5	5	5	4	5
CO3	5	4	5	5	5	5	5	5	4	5
CO4	5	4	5	5	5	5	5	5	4	5

Note: Highly related=3: Moderate=2: Low=1

DSE IV: International Economics

Course Outcomes (Cos):

CO1: This will help to analyse the importance of international trade for an economy by illustrating different trade theories.

CO2: This will help to analyse the economic relationships, issues, opportunities among different nations.

CO3: It would help to enlarge the understanding of current trade policies of different international institutions/organisations and how they help to facilitate the objective of globalisation.

CO4: This would help to know the meaning, construction of indices through which student can be able to evaluate financial position of different countries.

CO5: This help students to enlarge the idea of various mechanics/approaches which would help to correct the poor financial position of a nation globally.

Syllabus

UNIT I: Importance of Trade and Trade Theories

Importance of the study of International Economics; Inter-regional and international trade; Theories of Trade-absolute advantage (Adam Smith), comparative advantage (David Ricardo) and opportunity cost (Haberler); Heckscher-Ohlin theory of trade— its main features, assumptions and limitations (Leontief Paradox) Factor Price Equalization theorem.

UNIT II: Trade Policy and International Economic Institutions

Concepts of terms of trade and their importance; Doctrine of reciprocal demand – Offer curve technique; Gains from trade ;Trade as an Engine of Growth and Concept of immiserizing growth, Tariffs and quotas – their impact in partial equilibrium analysis; General Equilibrium

analysis of tariff and the concept of optimum tariff, Functions of IMF (Conditional Clause), Role of IMF in international liquidity, Reforms for the emergence of international monetary system; World Bank and WTO; Their achievements and failures; Their Role from the point of view of India.

UNIT III: Exchange Rate

Concept and Types of Exchange Rate (bilateral vs. trade-weighted exchange rate, cross exchange rate, spot, forward, futures), Demand for and Supply of foreign exchange, Exchange Rate Determination: Mint Parity Theory, Purchasing-Power Parity Theory, Fixed versus Flexible exchange rate.

UNIT IV: Balance of Trade and Payments

Concepts and components of balance of trade and balance of payments; Disequilibrium in balance of payments; Various measures to correct deficit in BOPs (Expenditure switching and expenditure reducing policies, Direct control), Depreciation Vs. Devaluation; Elasticity approach to devaluation, foreign trade multiplier- Concept and implications.

Text Book:

- Mannur H. G (Recent Edition) *International Economics*, Vikash Publishing

Reference Books:

- Salvatore Dominick, *International Economics*, Wiley India.
- Sodersten Bo and Reed J, *International Economics*, McMillan Publisher

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	4	4	5	5	4	4	5	4	4
CO2	5	5	4	5	5	5	4	4	4	5
CO3	4	5	5	5	4	4	4	5	5	4
CO4	4	4	5	4	4	2	5	5	4	4
CO5	4	5	5	4	4	5	5	5	5	4

DSE-IV: Agricultural Economics

Course Outcomes (Cos):

After reading this paper, students should have:

CO1: Increasing the ability of the students to understand the importance of agricultural economics via establish a linkage between theory, policy and practice.

CO2: Developing the analytical thinking of the students on various issues and policy of agricultural economics.

CO3: Prepare students for pursuing research and innovation in various contemporary issues of agricultural economics at national and international level.

CO4: Improving the understanding of the students with ability to think rationally, analyze situations and solve problems adequately.

CO5: Enhancing the moral, social and ethical values of the students in regard to identifying socio-economic issues for future research on agricultural economics.

Syllabus

UNIT I: Agriculture and Economic Growth

Role of Agriculture in Economic Development, sectoral changes and agriculture, agriculture in rural development, farm and non-farm employment issues, inter-linkages between agriculture and industry; empirical evidence of inter-dependence between agriculture and industry; Schultz's hypothesis on traditional agriculture – its criticisms; Mechanization of Indian Agriculture; Case for and against farm mechanization; Green revolution and trends of mechanization in India.

UNIT II: Agricultural Price and Marketing

Agricultural price policy for a developing economy – objectives and effectiveness of agricultural price policy, elements of agricultural price policy, features of an ideal agricultural price policy, agricultural price policy in India and public distribution system

Agricultural marketing – need and criteria for assessing efficiency, agricultural marketing system in India, development of a national agricultural marketing platform.

UNIT III: Risk and Uncertainty in Agriculture

Difference between risk and uncertainty, types of uncertainty in agriculture, measures for mitigating risk and uncertainty in agriculture, new agricultural insurance scheme of India Rural credit in India, importance and estimates, agencies for rural credit, review of progress of institutional finance in rural India since independence.

UNIT IV: Agriculture in India

Agriculture in Indian Planning, Globalization and Indian agriculture, Case for and against privatization of agriculture, WTO and India's trade in agricultural commodities.

Text Book

- Sony, R. N. (2006), Leading Issues in Agricultural Economics, Vishal Publishing, Jalandhar.

Reference Book:

- Sadhu, A N and A Singh (2008), Fundamentals of Agricultural Economics, Himalaya Publishing House, Mumbai.

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	4	5	4	2	5	4	2	4	4	5
CO2	5	4	4	4	4	2	4	4	5	4
CO3	4	5	4	5	5	5	5	4	5	2
CO4	5	4	4	2	4	4	4	5	4	5
CO5	4	5	5	5	5	4	4	2	4	4

DSE-IV: Project/Dissertation

Course Outcomes (COs):

After reading this paper, students should:

CO1: Have knowledge and skills to plan, and engage in, an independent and sustained critical investigation and evaluation of a chosen research topic relevant to economy, environment and society.

CO2: Have knowledge and skills to systematically identify relevant theory and concepts, relate these to appropriate methodologies and evidence, apply appropriate techniques and draw appropriate conclusions.

CO3: Have knowledge and skills to appropriately apply qualitative and/or quantitative evaluation processes to original data.

CO4: Have knowledge and skills to understand and apply ethical standards of conduct in the collection and evaluation of data and other resources.

CO5: Have knowledge and skills to communicate research concepts and contexts clearly and effectively both in writing and orally.

The project is intended to establish the connection between Economics as confined to the text books and class rooms and Economics at play in the ground. It is expected to give an empirical content to the subject. Economics is defined as the study of mankind in the ordinary business of life. It studies individual as well as group behavior.

Project work at the undergraduate level is an in-depth study on a topic chosen by the student. The objective of the project work for the students at undergraduate level is to expose students to the social and real-world contexts in which the subjects taught in the classroom have applications. Therefore, the topic must be related to the field of study the student is enrolled. It is undertaken with the guidance of a faculty supervisor, and involves a prolonged period of investigation and writing. The supervisor is supposed to help the student and mentor him/her throughout, from selection of the topic to submission of the project report.

The project output will be a project report written on the topic, chosen by the student and approved by the guide, in about 10000 words.

The process of project preparation typically comprises of an investigation of a particular topic, based on the application of philosophical and theoretical knowledge available in the already existing scientific literature and other published sources of information. The student may use already available data (texts, documents, artworks or existing data sets) or she may go for collection of data from the field. The final report should ideally have the following sections.

- (1) Abstract (in about 500 words) containing a summary of the entire report.
- (2) Introduction of the topic, arguments for choosing such a topic and the key investigation propositions.
- (3) A review of the existing knowledge on the topic
- (4) Information on the data and data treatment tools used in the study
- (5) An analysis of data and findings
- (6) Conclusions
- (7) References

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	5	5	5	4	5	5	2	4	5
CO2	5	4	5	4	5	2	4	4	2	5
CO3	5	5	5	2	5	4	5	5	4	5
CO4	5	2	4	2	4	5	5	5	5	5
CO5	5	2	4	2	4	5	5	5	5	5

AECC – I: Environmental studies and disaster management

COURSE OUTCOME (COs)

After completion of the course the students shall be able to:

1. Students understand about problems of environmental pollution and Impact of pollution on human and ecosystem and control measures.
2. Students will learn about increase in population growth and understand the issues of use of resources in proper manner leading to sustainable development.
3. Learn about causes and impacts of Disasters and Case studies of National and Global disasters and risk reduction approaches of Disasters with safety issues in mitigating Industrial disasters.

Basic idea about the mode of transmission and course of some communicable and non-communicable diseases and knowledge on the Importance and methods of prevention of epidemics and pandemics

Unit-I: Environment

The Environment: The Atmosphere, Lithosphere, Hydrosphere, Biosphere (01 period)

Ecosystem: Energy flow in the ecosystem (01 period)

Biogeochemical Cycle: Water Cycle, Carbon Cycle, Nitrogen Cycle (02 periods)

Pollution: Water Pollution, Air Pollution, Soil Pollution, Radiation Pollution, Industrial Pollution, Light Pollution, Sound Pollution (05 periods)

Environmental Laws (Water Act 1974, Air Act 1981, The Wildlife Protection Act 1972, The Environment Protection Act 1986), The Forest Conservation Act 1980 (04 periods)

Unit-II: Climate Change & Sustainable Development

Population Ecology: Individuals, Species, Population, Community (01 period)

Human Population Growth, Population Control Methods (01 period)

Urbanization and its effect on society (01 period)

Climate Change: Causes, effect, Global Warming, Carbon footprint and environmental protection (05 periods)

Steps taken towards sustainable development: Ban of single-use plastics, Automobile Scrapping Policy, Promotion of Electrical Vehicles (03 periods)

Brief idea on Sustainable Development Goals (SDGs), Agenda 21 of Rio Earth Summit (02 periods)

Unit-III: Disaster Management

Disaster Management: Types of disasters (Natural and Man-made) and their causes and effect) (02 periods)

Vulnerability Assessment and Risk Analysis: Vulnerability to various disasters (Flood, Cyclone, Earthquake, Heat waves and Lightning) (02 periods)

Institutional Framework: Institutional arrangements for disaster management (National Disaster Management Authority (NDMA), State Disaster Management Authority (SDMA), District Disaster Management Authority (DDMA), National Disaster Response Force (NDRF) and Odisha Disaster Rapid Action Force (ODRAF) (02 periods)

Preparedness Measures: Disaster Management Cycle, Early Warning System, Pre-Disaster and Post-Disaster Preparedness, Strengthening of SDMA and DDMA, Community Preparedness, Stakeholder participation, Corporate Social Responsibility (CSR) (05 periods)

Survival Skills: Survival skills adopted during and after disaster (Flood,

Unit-IV: Public Health Management

Brief idea on Epidemics and Pandemics (01 period)

Non-communicable diseases with special reference to Cardiovascular diseases, Cancer, Diabetes, Hypertension and Obesity and their prevention (02 periods) Communicable diseases with special reference to Covid-19, Flu, Hepatitis, AIDS and Tuberculosis and their transmission (02 periods)

Dynamics of Disease Transmission: Mode of transmission (Direct/Indirect), Events after infection: Immunity (Active vs. Passive, Innate vs. Acquired, Herd Immunity), Incubation Period (02 periods) **Prevention of Epidemics/Pandemics Diseases:** Preventing Measures (Quarantine, Sanitization, Personal Protective measures such as Hand washing and use of protective devices, Vaccination); Control Measures (Surveillance, Isolation, Contact Tracing) (03 Periods)

Life Style management (Diet, Physical Exercise, Yoga and sleeping habit) (02 periods)

Role of Different Sectors in Managing Health Disaster: Role of Government (Centre and State), Community, Civil Society, Student mass, NGOs (01 period)

Books Recommended:

1. Asthana DK and Asthana M: A Text Book of Environmental Studies, S. Chand, New Delhi
2. Bharucha E: A Text Book of Environmental Studies, New Delhi:UGC
3. Dash MC and Mishra PC: Man and Environment, McMillan,London
4. Disaster Management and Mitigation Plan,2013 of Dept. of Health & Family Welfare, Govt. of Odisha*
5. Mishra DD: Fundamental Concepts in Environmental Studies, S. Chand, New Delhi
6. National Policy on Disaster Management,2009*
7. National Disaster Management Plan,2019*
8. Odum EP: Fundamentals of Ecology, Natraj Publications

9. State Disaster Management Plan, 2019 of Government of Odisha* Standard Operating Procedure (SOP) issued by Govt. of India and Govt. Of Odisha on Public Health Managements in the websites: www.mohfw.gov.in and health.odisha.gov.in*
10. The Disaster Management Act, 2005 of Government of India* [Note: Star (*) marked References, published by the State as well as Central Government are available in the open sources]

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	5	5	5	4	5	5	2	4	5
CO2	5	4	5	4	5	2	4	4	2	5
CO3	5	5	5	2	5	4	5	5	4	5
CO4	5	2	4	2	4	5	5	5	5	5
CO5	5	5	5	5	4	5	5	2	4	5

Ability Enhancement Compulsory Course (AECC)-II: ଯାତ୍ରାଗାୟାତ୍ରାଗମନୀକ ମୋଡ଼ୁ ଭାଷା – ଓଡ଼ିଆ

Course Outcomes:

After reading this paper the students will be able to;

CO1: Students of all departments of the University can easily present their theoretical knowledge in Odia by studying Odia Grammar and Communication skills in the course AECC-II

CO2: Students of Science, Social Science and Humanities can fluently discuss their discipline specific learnings and ideas, research findings in their mother tongue (ODIA).

CO3: Though we receive higher education in various subjects through various medium of instruction, it is always more convenient to express oneself in one's mother tongue ODIA. It is an enriching experience for both the knowledge giver and the receiver.

CO4: Odia language is essential for Professionals like a doctor, scientist or educator to become intelligible as well as amiable for others.

Syllabus

ପାଠ୍ୟ-୧ | **Course – 1** : ଯାତ୍ରାଗାୟାତ୍ରା ଅନୁବିଧି, ରୀତି ଓ ମାଧ୍ୟମ

୧ମ ଏକକ : ଯାତ୍ରାଗାୟାତ୍ରା ପରିଭାଷା, ଅନୁବିଧି, ପରିସର ଓ ପ୍ରକାରଯତ୍ନ

୨ୟ ଏକକ : ସାକ୍ଷାତକାର, ଭାଷଣ କଳା

୩ୟ ଏକକ : ସମ୍ପାଦକ ପରିଭାଷା, ପରିସର ଓ ସମ୍ପାଦ ପୁସ୍ତକ

୪ର୍ଥ ଏକକ : ଓଡ଼ିଆ ଭାଷାର ବର୍ଣ୍ଣମାଳା, ବର୍ଣ୍ଣାଣ୍ଡର ନିରାକରଣ । (ବନ୍ଦନ ଛୁଟି - ସାଦୃଶ୍ୟଜନିତ ଅଣ୍ଡ, ଲିଙ୍ଗଗତ ଅଣ୍ଡ, ସମ୍ବନ୍ଧ ଅଣ୍ଡ, ସମାସଗତ ଅଣ୍ଡ, ବଚନ ଓ ବିଭକ୍ତିଗତ ଅଣ୍ଡ

ଠି, ବାକୟ ବିଧିଜନିତ ଅଟନ୍ତି,

ସମାପ୍ତବାଧକ ଶକାଶକ୍ଷ ଠି, ପ୍ରତୟୟ ଜନିତ ଅଟନ୍ତି ଠି, ଶବ୍ଦ ସଂଯୋଗାତ୍ମକ ଓ ସ୍ଵରସଙ୍ଗିତ ଅଟନ୍ତି

ସହୋତ୍ତକ ଗୁଣସତ୍ତା (ଘୋତ୍ତ-୧ | Course – 1)

୧. କ ମାତ୍ତୁ ଭାଷା (ଓଡ଼ିଆ) ସାମଲ ବିରଞ୍ଚି ନାରାୟଣ, ଯଗର, କଟକ ।
ଯୋଗାତ୍ତାତ୍ତା ସତ୍ତନାରାୟଣ ବ୍କ
ମଲ

୨. ସଂଯୋଗ ଅନୁବିଧି, ସମତାପ କୁମାର ତ୍ରିପାଠୀ, ନାଳନ୍ଦା, କଟକ
୩. ଭାଷଣ କଳା ଓ ଅନନ୍ୟ ପ୍ରସଙ୍ଗ - କୃଷ୍ଣଚନ୍ଦ୍ର ପ୍ରଧାନ, ସତ୍ୟନାରାୟଣ ବୁକ୍ ଷଟ୍ଟର, କଟକ
୪. ପ୍ରାୟୋଗିକ ଓଡ଼ିଆ ଭାଷା – ଓଡ଼ିଶା ରାଜ୍ୟପାଠ୍ୟ ପୁସ୍ତକ ପ୍ରଣୟନ ଓ ପ୍ରକାଶନ ସଂସ୍ଥା, ଭୁବନେଶ୍ୱର
୫. ନୂତନ ଯୁଗର ସଂସ୍କୃତି, ନୀଳାଦ୍ରୁ ଷଣ୍ଢ ହରିଚନ୍ଦ୍ର, ପି.ସି.ଆର ପବ୍ଲିକେସନ୍, ଭୁବନେଶ୍ୱର
୬. ସବସାର ବ୍ୟାକରଣ - ନାରାୟଣ ମହାପାତ୍ର ଓ ଶ୍ରୀଧର ଦାସ, ନୟାଗଡ଼ ଷଟ୍ଟର ଷଟ୍ଟର ଷଟ୍ଟର, କଟକ

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	5	5	5	4	5	5	2	4	5
CO2	5	4	5	4	5	2	4	4	2	5
CO3	5	5	5	2	5	4	5	5	4	5
CO4	5	2	4	2	4	5	5	5	5	5

Ability Enhancement Compulsory Course (AECC) II: MIL – Alternative English Course Outcomes

After completion of the course the students shall be able to:

CO 1: demonstrate high-level proficiency in writing and speaking English

CO 2: employ effectively the language of their discipline

CO 3: develop skills in organizing and expressing ideas and viewpoints with clarity and coherence in writing and speech

CO 4: formulate and defend original arguments

CO 5: enumerate skills in narration, description, and argumentation

CO 6: ascertain insight into different cultures

CO7: gain good knowledge that includes understanding recent developments in language and literature

CO 8: to develop an acumen for a better understanding of the diversity of human experiences

CO 9: acquire an openness to new ideas, perspectives, and ways of thinking

CO 10: enhance literary and critical thinking

Syllabus

Introduction: The paper is focused upon developing one fundamental skills of Language learning; reading which needs a thorough rethink and revision. In order to build a strong base

for acquisition of the communication skills, suitable reading content is selected from diverse areas in prose form. This would boost the learner's competence in expressive and comprehension skills. The well researched language exercises in the form of usage, vocabulary and grammar is the other area that should attract the teacher and learner to work out for giving decent shape to the mastery of English language.

UNIT 1: Short Story

1. Jim Corbett-The Fight between Leopards
2. Dash Benhur- The Bicycle
3. Dinanath Pathy- George V High School
4. Alexander Baron- The Man who knew too much
5. Will f Jenkins- Uneasy Homecoming

UNIT 2: Prose

1. Mahatma Gandhi- The way to Equal Distribution
2. S Radhakrishnan- A Call to Youth
3. C V Raman-Water- The Elixir of Life
4. Harold Nicolson- An Educated Person
5. Claire Needell Hollander- No Learning without Feeling

UNIT 3:

1. Comprehension of a passage and answering the questions

UNIT 4:

1. Language exercises-test of vocabulary, usage and grammar

Text Books

All Stories and Prose pieces

Reference Books

1. The JJ'idening Arc: A Selection of Prose and Stories, Ed. A R Parhi, S Decpika, P Jani, Kitab Bhavan, Bhubaneswar.
2. A Communicative Grammar of English, Geoffrey Leech.
3. A University Grammar of English. Randolph Quirk and Sidney Greenbaum
4. Developing Reading Skills. F. Grellet. Cambridge: Cambridge University Press, 1981. UG Honours/Pass Syllabus in English

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	4	5	4	4	4	2	2	2	2	4
CO2	4	5	4	4	4	2	2	2	2	4
CO3	4	5	4	4	4	2	2	2	2	4
CO4	4	5	4	4	4	2	2	2	2	4
CO5	4	5	4	4	4	2	2	2	2	4
CO6	4	5	4	4	4	2	2	2	2	4
CO7	4	5	4	4	4	2	2	2	2	4
CO8	4	5	4	4	4	2	2	2	2	4
CO9	4	5	4	4	4	2	2	2	2	4
CO10	4	5	4	4	4	2	2	2	2	4

Ability Enhancement Compulsory Course (AECC) II: MIL – Hindi

Course Outcomes:

After reading this paper the students will be able to;

CO1: Students of all departments of the University can easily present their theoretical knowledge in Hindi by studying Hindi Grammar and Communication skills in the course AECC-II.

CO2: Students of Science, Social Science and Humanities can fluently discuss their discipline specific learnings and ideas, research findings in Hindi.

CO3: Though we receive higher education in various subjects through various medium of instruction, it is always more convenient to express oneself in national language Hindi. It is an enriching experience for both the knowledge giver and the receiver.

CO4: Hindi language is essential for Professionals like a doctor, scientist or educator to become intelligible as well as amiable for others.

Syllabus

UNIT-1

कव

1. कबीर – साखी - 1 से 10

2. तुलसी - वनयपविका - पद 1 और 2
3. प्रसाद - मधुमय देश
4. वनराला - वकिष्पुक
5. अज्जेय - वरिवशमा

UNIT-II

गद

1. रामचन्द्र शुक्ल- उत्साह
2. ज़ारी प्रसाद वविदी- कृ टन
3. (रिशंकर परसाई -सदाचार का ताबीज

UNIT-III

शब्द ज्ञान

1. शब्द शुद्धि
2. वाक्य शुद्धि
3. पयायवाची शब्द
4. ववलोम शब्द

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	5	5	5	5	4	5	5	2	4	5
CO2	5	4	5	4	5	2	4	4	2	5
CO3	5	5	5	2	5	4	5	5	4	5
CO4	5	2	4	2	4	5	5	5	5	5

Skill Enhancement Course (SEC-I): Communicative English

Course Outcomes:

After completion of the course the students shall be able to:

CO 1: enhance their ability to build and enrich their communication skills

CO 2: be able to build up the four primary skills in students in the academic as well as in the wider domains of use like public offices.

CO 3: acquire analytical and comprehension reading skills

CO 4: identify basic principles of communication

CO 5: build speaking and listening skills

CO 6: learn beyond the conventional syllabus and be prepared to meet challenges while seeking a job

CO 7 be able to synthesize knowledge and use it creatively to better understand and improvise themselves

CO 8: be able to communicate effectively through written reports, presentations, and discussions

CO 9: develop a neutral accent and improve general standard of pronunciation

CO 10: speak globally intelligible English

Syllabus

Introduction: This paper intends to build up the four primary skills in students in the academic as well as in the wider domains of use like public offices. The books recommended only provide guidelines for what to teach, and the list is in no way exhaustive. Teachers must be free and resourceful enough to collect teaching materials on their own, and even use newspaper clippings as teaching materials.

This is an activity-based, goal-oriented, functional course in English Communication, which aims to make the students able and efficient communicators by helping them to be self-reflexive about English. This course has a pre-defined context of being supportive and complementary to the core courses in various disciplines. Therefore, unlike most other courses in English Communication on offer, it does not seek to build facile fluency that passes off as communicative competence. Rather, it intends to equip the students with the relevant skills of presentation and expression needed in the academic as well as in the professional domains of communicative use. While reading skills exercises are meant to promote the acquisition of analytical and comprehension skills, writing skills exercises are centered on sentence construction, paragraph development and précis writing. Teachers must be free and flexible enough in relation to teaching materials, using newspaper clippings, non-conventional and multimedia resources in the classroom. There is ample scope to build the speaking and listening skills of students in the way the course is planned with an emphasis on interactive learning and articulation.

UNIT 1: Introduction

1. What is communication?
2. Types of communication (Horizontal, Vertical, Interpersonal, Grapevine),
3. Uses of Communication, Inter-cultural communication, Communication today
4. Distinct features of Indenisation, alternative texts of language learning, global English and English in the print and electronic media in India.

UNIT 2: The Four Skills and Prospect of new material in language learning

1. listening-Passive and active, Speaking effective, intelligibility and clarity.
2. Methods and techniques of reading such as skimming, scanning and searching for information, reading to understand the literal, metaphorical and suggested meaning.
3. Identifying the tone (admirable, accusatory, Ironical, sympathetic, evasive, indecisive, ambiguous, neutral etc.) of the writer and view-points.
4. Cohesive and Coherent writing.

UNIT 3: Grammatical and Composition Skills

1. Doing exercises like filling in the blanks, correcting errors, choosing correct forms out of alternative choices, joining clauses, rewriting sentences as directed, and replacing indicated sections with single words / opposites / synonyms, choosing to use correct punctuation marks, getting to understand and use formal and informal styles, learning to understand the usages of officialise, sexism, racism, jargon.
2. Learning to understand information structure of the sentence such as topic-focus relationship; strategies of schematization, postponement, emphasis, structural compression (deletion of redundant parts, nominalization, cleft and pseudo-cleft sentences, elliptical structures etc.), Logical Connectors between sentences, Methods of developing a paragraph, structure of an essay and methods of developing an essay

UNIT 4: Exercises in Written Communication

1. Precise writing
2. Note taking skills
3. Writing reports
4. Guidelines and essentials of official correspondence for making enquiries, complaints and replies.
5. Making representations; writing letters of application for jobs; writing CV, writing letters to the editor and social appeals in the form of letters/pamphlets.

Reference Books:

1. Ways of Reading: Advanced reading Skills for Students of English Literature. Martin Montgomery et al. London: Routledge, 2007.
2. Applying (communication Theory)' /Or Professional Life: A Practical Introduction. Dainton and Zelle, <http://tsime.uz.ac.zw/claroline/backends/download.php?url—>
3. Literature and the art of Communication, Cambridge University Press.
4. Orient Black Swan (writing and granular exercises at the end of lessons are recommended) From Remapping An AnthologyUOr Degree Classes.

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	4	3	2	2	2	1	1	1	1	2
CO2	4	3	2	2	2	1	1	1	1	2
CO3	4	3	2	2	2	1	1	1	1	2
CO4	4	3	2	2	2	1	1	1	1	2
CO5	4	3	2	2	2	1	1	1	1	2
CO6	4	3	2	2	2	1	1	1	1	2
CO7	4	3	2	2	2	1	1	1	1	2
CO8	4	3	2	2	2	1	1	1	1	2
CO9	4	3	2	2	2	1	1	1	1	2
CO10	4	3	2	2	2	1	1	1	1	2

Skill Enhancement Course (SEC-I): Quantitative Aptitude, Data Interpretation & Logical Reasoning

Course Outcomes:

I. Quantitative Aptitude & Data Interpretation

After completion of the course the students shall be able to:

- a) Use their logical thinking and analytical abilities to solve Quantitative aptitude questions from company specific and other competitive tests.
- b) Solve questions related to Time and distance and time and work etc. from company specific and other competitive tests.
- c) Understand and solve puzzle related questions from specific and other competitive tests.
- d) Solve questions related to permutation & combinations and probabilities from company specific and other competitive tests.

II. Logical Reasoning

After completion of the course the students shall be able to:

- a) Detect errors of grammar and usage in a given sentence/text and rectify them by making appropriate changes.
- b) Solve questions based on critical reasoning.
- c) Analyze reading passages and quickly find out the correct responses to questions asked by using reading skills like skimming, scanning, reading between the lines, etc.
- d) To use idiomatic expressions in writing and speaking and to solve questions based on them.

Syllabus

I. Quantitative Aptitude & Data Interpretation

Unit – 1: Whole numbers, Integers, Rational and irrational numbers, Fractions, Square roots and Cube roots, Surds and Indices, Problems on Numbers, Divisibility, Steps of Long Division Method for Finding Square Roots.

Unit -2: Basic concepts, Different formulae of Percentage, Profit and Loss, Discount, Simple interest, Ratio and Proportion, Mixture.

Unit- 3: Time and Work, Pipes and Cisterns, Basic concepts of Time, Distance and Speed; relationship among them.

Unit – 4: Concept of Angles, Different Polygons like triangles, rectangle, square, right-angled triangle, Pythagorean Theorem, Perimeter and Area of Triangles, Rectangles, Circles.

Unit – 5: Raw and Grouped Data, Bar Graphs, Pie charts, Mean, Median and Mode, Events and Sample Space, Probability.

II. Logical reasoning

Unit - 1: Analogy basing on kinds of relationships, Simple Analogy; Pattern and Series of Numbers, Letters, Figures. Coding-Decoding of Numbers, Letters, Symbols (Figures), Blood relations.

Unit – 2: Logical Statements – Two premise argument, More than two premise argument using connectives.

Unit -3: Venn Diagrams, Mirror Images, Problems on Cubes and Dices.

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	4	2	2	2	2	2	5	2	4	4
CO2	4	2	2	2	2	2	5	2	4	4
CO3	4	2	2	2	2	2	5	2	4	4
CO4	4	2	2	2	2	2	5	2	4	4
CO5	4	2	2	2	2	2	5	2	4	4
CO6	4	2	2	2	2	2	5	2	4	4
CO7	4	2	2	2	2	2	5	2	4	4
CO8	4	2	2	2	2	2	5	2	4	4

ETHICS AND VALUES

Course Outcomes:

After completing the course students will be able to:

1. Have changes in their perceptions and practices towards women
2. Develop proper attitude towards women and value their work and contribution
3. Come forward to challenge the unethical treatments against women
4. End gender-based hierarchy and hegemony, remove the feeling that women are counter to men and bring about a complementarity among the hitherto existing gender binary
5. Be pioneer in creating a gender equal society where the well-being, happiness and security of the women will be well protected & contributing towards a better and happier society.

Mapping of Course Outcomes with the Program Outcomes

CO/PO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	4	4	4	2	4	2	2	2	2	4
CO2	5	4	4	5	5	2	2	2	2	4
CO3	4	2	5	5	5	2	2	2	2	4
CO4	4	2	5	5	5	2	2	2	2	4
CO5	4	2	5	5	5	2	2	2	2	4