

SEMESTER-I

Credits-4 ECC-101 MICRO ECONOMIC ANALYSIS-I

ECE- 101.1 Demand Analysis

Theories of demand: Axiomatic Assumptions of Preference Ordering; Utility Function and its related concepts; Indifference Curve Analysis-Consumers Equilibrium; Marshallian and Hicksian Demand Functions; Slutsky Equation and Decomposition of Price Effect into Substitution Effect and Income Effect; Duality in Consumptions- Indirect Utility Function and Indirect Expenditure Function; Revealed Preference Hypothesis; Lancaster's Characteristics of Goods Approach; Consumer's Choice under Risk and Uncertainty.

ECE-101.2 Theory of Production and Costs

Production function and its related concepts; Short-run and Long-run laws of Production; Homogeneous Production Function and Returns to Scale; Producer's equilibrium and Optimal Choice of Inputs; Constrained and Unconstrained Profit Maximisation; Production Functions- Specification and features of Cobb-Douglas and CES Production Functions; Duality in Production- Derivation of Supply and Cost Functions from Production Function; Cost Function- Traditional and Modern Theories of Cost.

ECE-101.3 Price and Output Determination under Monopoly and Monopolistic Market Structures

Price and Output Determination under different Market Structures: Monopoly- Short-run and Long-run Equilibrium, Monopoly Power, Control and Regulation; Discriminating Monopolist; Monopolistic Competition- Short-run and Long-run Equilibrium.

ECE-101.4 Price and Output Determination under Duopoly and Oligopoly Market

Non-price Competition; Price and Output Determination under Non-collusive and Collusive Duopoly and Oligopoly: Non-collusive Models- Cournot, Stackelberg and Kinked Demand Curve Models; Collusive Models- Cartels and Mergers, Market Share, Price Leadership Models; Game Theoretic Approach to Duopoly.



SEMESTER-I

Credits-4 ECC-102 MACRO ECONOMIC ANALYSIS-I

ECE- 102.1 National Income Accounts and Social Welfare

Different systems of national income accounting: Social accounting, Input-output accounting, Flow of funds accounting and Balance of Payments accounting; United Nations System of National Accounts (NSA); National income and social welfare, Measure of Economic Welfare (MEW).

ECE- 102.2 Consumption Function

Keynes Psychological Law of Consumption, Implication of the law, Short-run and Long-run Consumption Function consumption function, Empirical evidence on consumption function;; Income-Consumption relationship; Absolute Income, Relative Income, Life-Cycle and Permanent Income Hypotheses.

ECE-102.3 Investment Function

Investment Multiplier, Theories of Investment and Accelerator; Super Multiplier, Influence of policy measures on investment.

ECE-102.4 Demand for Money

Classical approach to demand for money, Quantity theory approach, Fisher's equation, Cambridge quantity theory, Keynes's liquidity preference approach; transaction, precautionary and speculative demand for money, aggregate demand for money; Neo-classical and Keynesian views on interest.



SEMESTER-I

Credits-4 ECC-103 Quantitative Methods and Computer Applications-I (Statistical Methods)

ECC- 103.1 Probability and Theoretical Distribution

Deterministic and non-deterministic experiments, various types of events, classical and empirical definitions of Probability- Law of Addition and Multiplication, conditional probability and concept of interdependence. Bay's theorem and its applications, Elementary concept of random variable, Probability mass and density functions, Expectations, moments and moment generating functions; Properties of Binomial, Poison and Normal distributions.

ECC-103.2 Sampling and Estimation Theory

Basic concept of sampling- Universe and Sample, Theory of Sampling Distribution and Standard Error. Random and non-random sampling, simple random stratified random and P.S.S. sampling point estimation and Interval Estimation, Desirable Properties of an estimator.

ECC- 103.3 Correlation and Regression analysis

Correlation- Simple, partial and multiple correlation (applications only); Multiple regression, partial regression coefficient, Estimation of regression coefficients in a multiple regression model; Standard error of regression coefficients, Goodness of fit of a regression model.

ECC- 103.4 A Testing of hypothesis and Computer Application

Null and alternative, Type-1 and Type-2 Errors, Goodness of fit, Confidence intervals and level of significance, Hypothesis testing based on z, t, Chi square and F tests Test relating attributes, computer application in Economics: Basic applications of Microsoft Office-Excel, MS Word and Power Point, Application in Tabulation, Frequency Distribution, Correlation and Regression Analysis.



SEMESTER-I

Credits-4

ECC- 104 Public Economics-I

ECC- 104.1 Public Expenditure and public debt

Public Expenditure- Hypotheses: Wagner's law of increasing state activities, Peacock-Wiseman Hypothesis, pure theory of public expenditure; Structure, growth and effect of public expenditure; Evaluation of public investment; Social cost-benefit analysis- Project evaluation, Estimation of costs, discount rate, Public Debt- Sources, effects, burden and its management.

ECC-104.2 Fiscal policy and budget

Fiscal policy- Objectives of Fiscal policy, Neutral & compensatory and functional finance, Fiscal policy for stabilization- automatic and discretionary stabilization; inter-dependence of fiscal and monetary policies, The Public Budgets- Kinds of Budgets, Zero-base budgeting, Different concepts of budget deficit, Budgetary deficits and its implications, Balanced budget multiplier.

ECC- 104.3 Theories of Public Revenue

Public Revenue- Different Approaches to the division of tax burden, Incidence and effects of taxation, Elasticity of buoyancy; Taxable capacity; Benefit and ability to pay approaches; Theory of optimal taxation.

ECC- 104.4 Indian Public Finance

Indian tax system, Trends in revenue and expenditure of the Central and State Government; Major taxes in India: base of taxes, direct and indirect taxes, taxation of agriculture, expenditure tax, Reforms in direct and indirect taxes, taxes on services, Non-tax revenue of the Centre, State and local bodies; Analysis of the Union and State Government Budget, Trends in public debt, Fiscal crisis and fiscal sector reforms in India; Reports of Finance Commissions in India.



SEMESTER-I

Credits-4 ECC-105 Indian Economic Policy

ECC- 105.1 Basic Economic Indicators of Indian Economy

Basic economic indicators- National income of different sectors; Poverty, unemployment, migration and inequality; Objectives and priorities of planning; Five Year Plans; New Economic Policy since 1991.

ECC- 105.2 The Agricultural Sectors

Agricultural strategy- land relation and land reforms; Rural credit; Role of irrigation and fertilizer, Agricultural marketing; Prices of agricultural produce; New agricultural policy, Strategy of industrial development; Problem of location; Problems of large and small scale industries; New industrial policy and liberalisation; Sources of industrial finances.

ECC- 105.3 Money and Banking

Organisation of Indian money and capital markets; Reserve Bank of India; Supply of Money; Inflation and analysis of price behaviour; Monetary policy; Interest rate policy; Finance sector reforms ; Working of SEBI.

ECC- 105.4 Foreign Trade, Foreign Capital and MNCs

Structure and direction of foreign trade; Foreign trade policies and reforms; Balance of payments; Trends and issues; Exchange rate policy; Foreign exchange reserves and growth; Foreign capital and MNCs; Changing patterns of Foreign Direct Investments; Globalisation and its impact.



SEMESTER-II

Credits-4

ECC-201 MICRO ECONOMIC ANALYSIS-II

ECC- 201.1 Managerial and Behavioural Theories of the Firm

Critical Evaluation of Marginal Analysis: Representative Model of Average Cost and Full Cost Pricing; Baumol's Theory of Sales Revenue Maximisation; Bain's Limiting Price Theory; Morris and William's Static Managerial Model of the Firm.

ECC- 201.2 Neo-classical Approach and Factor Pricing

Neo-classical Approach- Marginal Productivity Theory; Euler's Theorem and Product Exhaustion; Factor Pricing in Perfect and Imperfect Markets.

ECC- 201.3 General Equilibrium Analysis

General Equilibrium Analysis- Existence, Stability and Uniqueness of Equilibrium, Walrasian System, Efficiency of General Equilibrium in Exchange, Production and Competitive Markets.

ECC- 201.4 Welfare Economics

Pigovian Welfare Economics; Pareto Optimality Conditions; Compensation Principle, Bergson-Samuelson's Social Welfare Function; Theory of Second Best; Arrow's Impossibility Theorem; The Theory of Social Choice.



SEMESTER-II

Credits-4 ECC-202 MACRO ECONOMIC ANALYSIS-II

ECC- 202.1 The IS-LM and Post-Keynesian approaches

The IS-LM model; extension of IS-LM model with labour market and flexible price; General equilibrium of product and money market; Post-Keynesian approaches to demand for money; Patinkin and the Real Balance Effect; Friedman and the modern quantity theory; Monetarism and Fiscalism.

ECC- 202.2 Supply of money

Components and determinants of money supply; Factors influencing changes in money supply; Financial Intermediation, Growth and role of Non-Banking Financial Intermediaries (NBFIs) and Regional Rural Banks, Distinction between Banks and NBFIs; RBI approach to money supply; High powered money and money multiplier.

ECC- 202.3 Theory of Inflation

Inflation: Theory of Inflation; Structuralist approach to Inflation; Philips curve analysis, Short-run and long-run Philips curve, Tobin's modified Philips curve; Policies to control inflation.

ECC- 202.4 Theories of Business Cycles

Business Cycles: Theories of Business Cycles- Schumpeter, Kaldor, Samuelson and Hicks; Macro-economic equilibrium- relative roles of monetary fiscal policies.



SEMESTER-II

ECC-203 QUANTITATIVE METHODS AND COMPUTER APPLICATIONS-II

Credits-4 (Mathematical Methods)

ECC- 203.1 Functions and Derivatives in Economics

Function and types of Functions and their Applications in Economics; Simple Derivative Function and Differential (both first and second order) and their applications in Economics; Partial Derivatives, Total Derivative and Total Differential and their applications in Economics; Unconstrained and Constrained Optimization of multivariate functions and their application in simple economic problems.

ECC- 203.2 Vectors, Matrices and Determinants

Vectors: Vectors and types of Vectors, Geometrical interpretation Vectors operations; Linear dependence and independence of Vectors, Basis and dimension of Vectors space;

Matrix: Concept of Matrix and types of Matrices, Operations on matrices, Matrix inversion and rank of a Matrix, Concept of quadratic forms, Eigen roots and Eigen vectors of matrices.

Determinants and its properties. Simple application of vectors, matrices and determinants- solution of simultaneous equations.

ECC- 203.3 Integration, Differential and Difference Equations

Integration and its geometrical interpretation, Methods of integration, Application of integration- Consumer's Surplus and Producer's Surplus; Differential equations- Solution of first order and second order difference equations, Stability conditions and their simple applications in economics.

ECC- 203.4 Elementary Operations Research and Computer Application

Linear programming- formulation of linear programming and it's graphical method of solution, input-output analysis- determination of equilibrium level of outputs, prices and employment; Game Theory- Concept of Game, solution of Game with saddle point and mixed strategies and value of a game.

Computer Applications: Use of statistical packages (S.P.S.S.) in frequency distribution, correlation and regression analysis, ANOVA, Time Series Tests.



SEMESTER-II

Credits-4 ECC-204 PUBLIC ECONOMICS-II

ECC- 204.1 Role of Public Sector

Role of Government in organized society; Changing perspectives of government in a mixed economy, public and private sector cooperation and competition, Government as an agent for economic planning and development; Government as a tool of operationalising the planning process, private goods, public goods and merit goods.

ECC- 204.2 Preference Revelation for Public Goods

Market failure: Imperfections decreasing costs, externalities, Public goods; Private and public mechanism for allocating resources; Problems for allocating resources; Problems of preference revelation and aggregation of preferences; An economic theory of democracy, Role of bureaucracy.

ECC- 204.3 Rationale for Public Policy

Allocation of resources- Theory of public goods, Voluntary exchange models, Impossibility of decentralized provision of public goods; contributions of Lindahl and Johansen; Samuelson; Demand revealing schemes for public goods- Tiebout model, Theory of club goods, Stabilization policy- Keynesian case for stabilization policy. Uncertainty and expectations, failure of Intertemporal markets, Liquidity preference, social goals, poverty alleviation, Provision of infrastructural facilities, Removing distributional inequalities and regional imbalances.

ECC- 204.4 Fiscal Federalism

Fiscal Federalism: Principles of multi-unit finance; Fiscal federalism in India. Vertical and horizontal imbalance. Assignment of function and sources of revenue, constitutional provisions, finance commission and planning commission, devolution of resources and grants. Theory of grants. Resource transfer from Union to States- Criteria for transfer of resources; Centre- State financial relations in India. Problems of State's resources and indebtedness, transfer of resources from union and states to local bodies.



SEMESTER-II

Credits-4 ECC-205 RESEARCH METHODOLOGY

ECC-205.I Meaning and Scope of Social Research

Meaning- Objectives and characteristics of research, types of research, Main steps in research- selection of research problem- sources, formulation of a research problem.

ECC-205.II Formulation of Research Design

Research design- Meaning, types of research design. Characteristics of good research design. Significance of research design.

ECC-205.III Hypothesis and Sampling

Hypothesis- Meaning, sources, types, formulation and significance. Null hypothesis and alternate hypothesis, characteristics of good hypothesis, testing of the hypothesis. Chi-square test.

Sampling: Methods of sampling- advantages and limitations; Sampling and non-sampling errors.

ECC-205.IV Data Collection and Processing and Report writing

Sources of data- Techniques of data collection- Questionnaire- Interview schedule, case study method, Data processing- Editing- Classification- Coding and tabulation.

Requirements and mechanics of report writing- Precautions in report writing, Bibliography, Role of computers in research



SEMESTER-III

Credits-4 ECC-301 INTERNATIONAL TRADE AND FINANCE -I

ECC- 301.1 Theory of International Trade- I

The pure theory of international trade- Theories of Absolute advantage, Comparative Advantage and Opportunity Costs; Empirical Testing of classical Theory; Trade equilibrium under constant, increasing and diminishing cost conditions, and imperfect competition.

ECC-301.2 Theory of International Trade- II

Heckscher- Ohlin theory of trade, Leontief paradox, Theorem of factor price equalization, Stolper- Samuelson theorem, Rybczynski theorem, Kravis and Linder theorem of trade, Technological change and international trade.

ECC-301.3 Gains from Trade

Gains from Trade: their measurement and distribution; Concept of terms of trade, their uses and limitations; Hypothesis of secular deterioration of terms of trade, its empirical relevance and policy implications for less developed countries; Terms of trade and income distribution; Trade as an engine of economic growth; Concept and policy implications of immiserising growth .

ECC-301.4 Interventions in Trade

Theory of interventions: Tariffs, Quotas and Non- tariff barriers; Effects of tariffs under partial and general equilibrium perspectives; Tariff and income distribution; Optimum tariff; Types of regional economic integration; Theory of customs union: Viner's partial equilibrium approach to welfare effects of customs union; General equilibrium analysis of customs union- Lipsey model and Vanek model; Empirical findings and dynamic considerations of custom union and free trade area.



SEMESTER-III

Credits-4 ECC-302 ECONOMICS OF SOCIAL SECTOR AND ENVIRONMENT -I

ECC- 302.1 Economics of Environment Policy

Environmental externalities and market inefficiency- Environmental taxes and subsidies; Marketable pollution permit; Deposit refund system; Coase's property rights and bargaining solution; Command and control approach; Comparison of regulations and markets-based instruments; Global environmental externalities; Climate change and carbon tax; Trade and environment.

ECC- 302.2 Environmental and Natural Resource Policies in India

Mechanism for environmental regulation in India; Environmental laws and their implementation; Policy instruments for controlling water and air pollution; Forest policy; People's participation in the management of common and forest lands; Joint Forest Management; Social forestry- rationale and benefit.

ECC- 302.3 Economics of Education

Education as an instrument of for economic growth; Human capital vs. Physical capital; Demand for education- private and social demand; Cost of education, wastage and stagnation benefits of education- direct and indirect benefits, private and social benefits.

ECC- 302.4 Economics of Health

Health dimension of development; Determinants of health- poverty, malnutrition and environmental issues. Economic dimensions of health care- Demand and supply of health care; The concept of Burden of Disease; Institutional issues in health care delivery in India.



SEMESTER-III

Core Elective (Group A)

Credits-4 ECE-303 COMPUTER APPLICATION IN ECONOMIC ANALYSIS

Semester Theory: 40, Internal: 10, Practical: 50
(Marks: ~~ES-50~~ and ~~PE-30~~) *BGM*

ECE- 303.1 Introduction to Computer and Operating Systems

Computer Organisation; Central Processing Unit; Types of Memory; Input and Output devices; Classification of computers; Programming languages; Operating System- DOS and Windows; Data Representation and the number systems: decimal, binary, octal and hexadecimal.

ECE- 303.2 Computer for Office Automation

Spread sheet- Concept and use of spread sheet, Structure of a spread sheet, Spread in –built functions, Chart feature of a spread sheet, Operation and use of MS-Excel and Lotus Smart-suite.

ECE- 303.3 Statistical Data Processing Techniques-I

Statistical Package handling and command description; Statistical Package for Social Science (SPSS); Basic statistical and econometric functions and their analysis- Analysis of Regression, Analysis of Correlation.

ECE- 303.4 Statistical Data Processing Techniques-II

Analysis of Variance (ANOVA), Analysis of Covariance (ANCOVA), Linear Programming; Time Series Trend Analysis; Input-output Analysis, Game theory- Saddle-point and Mixed strategy solutions.



SEMESTER-III

Core Elective (Group B)

Credits-4 ECE-304 FINANCIAL INSTITUTIONS AND MARKETS -I

ECE- 304.1 Nature and Role of Financial System

Money and finance- Money and Near-money- Financial intermediation and financial intermediaries-The structure of the financial system- Functions of the financial sector- Indicator of financial development- Equilibrium in Financial markets- Financial system and economic development- Criteria to evaluate assets.

Risk and financial assets, types of risk return on assets, risk-return trade off- valuation of securities.

ECE- 304.2 Structure of Interest Rates

Theories of interest rate determination- Level of interest rates- Long period and short period rates- Term structure of interest rates- Spread between lending and deposit rates- Administered interest rates- Appropriate interest rate policy.

ECE- 304.3 The Central Bank and Monetary Policy

Functions of central bank- the aims and objectives of the monetary policy in developed and developing countries- Instruments of monetary policy- proliferation of banking and non-bank financial intermediaries- Effectiveness of monetary policy- Credit creation and its control.

ECE- 304.4 The Commercial Banks and Development Banks

Profitability and efficiency of banks; Development banks- Role and functions; Investment banking and merchant banking;

Financial sector reforms in India.



SEMESTER-III

Choice based Credit Transfer (CBCT)

Credits-4 EAE-305 AGRICULTURAL ECONOMICS

EAE- 305.1 Agriculture and Economic Development

Nature and Scope of Agricultural and Rural Economics; Agricultural Production and Productivity; Cropping Pattern Shift, Resource Use and Efficiency; Factor Combination and Resource Substitution; Traditional Agriculture and its Modernisation; Role of Agriculture in Economic Development; Interdependence between Agriculture and Industry- some empirical evidence; Models of interaction between Agriculture and the rest of the Economy; Agricultural Development, Poverty and Environment.

EAE- 305.2 Land Reforms and Labour Market

Rural labour supply; Interlocking of factor markets; Mobility of labour and segmentation in labour markets; Marginalisation of Rural Labour; Nature, Extent and Trends in Rural Unemployment; Agricultural Wages in India; Male-female Wage Differences; Non-agricultural Rural Employment-Trends and Determinants, Principles of Land Utilisation; Land Distribution- Structure and Trends; Land Values and Rent; Land Tenures and Farming Systems-Peasant, Capitalist, Collective and State Farming; Tenancy and Crop Sharing-Forms, Incidents and Effects; Land Reform Measures and Performances; Problems of Marginal and Small Farmers.

EAE- 305.3 Rural Finance and Cooperation in India

Role of Capital and Rural Credit; Organised and Unorganised Capital Market; Rural Savings and Capital Formation; Characteristics and Sources of Rural Credit- Institutional and Non-institutional; Reorganisation of Rural Credit- Cooperatives, Commercial Banks, Regional Rural Banks, Role of NABARD, Cooperative Movement; Genesis and Growth of Cooperative Sector; Agricultural Cooperation in India; Problems and Prospects of Cooperative Institutions.

EAE- 305.4 Agricultural Marketing and Prices

Marketing and State Policy; Agricultural Markets and Marketing Efficiency- Marketing Functions and Costs; Market Structure and Imperfections; Regulated Markets; Marketed and Marketable Surplus; Behaviour of Agricultural Process- Cobweb Model; Price and Income Stability; State Policy with respect to Agricultural Marketing; Warehousing; Prices; Taxation and Crop Insurance; Terms of Trade between Agricultural and Non-agricultural Prices; Need for State Intervention; Objectives of Agricultural Price Policy- Instruments and Evaluation; Food Security in India and Public Distribution System; WTO and Indian Agriculture.



SEMESTER-IV

Credits-4 ECC- 401 INTERNATIONAL TRADE AND FINANCE- II

ECC- 401.1 Balance of Payments

Meaning and components of balance of payments; Equilibrium and disequilibrium in the balance of payments; Devaluation and balance of payments adjustment; Foreign trade multiplier with and without foreign repercussions and determination of national income and output.

ECC- 401.2 Approaches for Balance of Payment Adjustments

Absorption, Payments and Monetary approaches for adjustment in the balance of payments; Expenditure- reducing and expenditure- switching policies for balance of payment adjustment;

Approaches for achieving internal and external equilibrium simultaneously: The Swan model and Mundell- Fleming model; Relative merits and demerits of fixed and flexible exchange rates in the context of growth and development in developing countries.

ECC- 401.3 International Economic Co-operation

Regionalism- EU, rationale and progress of SAARC/SAPTA and ASEAN region; problems and prospects of forming customs union in Asia; Multilateralism- UNCTAD, NIEO, GATT/WTO; Optimum Currency Areas; International financial institutions- IMF and World Bank; Need, adequacy and determinants of international liquidity; Conditionality clause of IMF from the point of view of India.

ECC- 401.4 Trade Policies and India

Trade Problems and Trade Policies in India during the last five decades; Recent changes in the direction and composition of trade and their implications; Rationale and impact of trade reforms since 1991 on balance of payments, employment and growth; Instruments of export promotion; Recent import and export policies, and agenda for the future.



SEMESTER-IV

Credits-4 ECC- 402 ECONOMICS OF SOCIAL SECTOR AND ENVIRONMENT - II

ECC- 402.1 Measurement of Environmental Values

Need of environmental valuation; Total economic value – Use values, Option values, and non-use values; Valuation methods: methods based on observed market behaviour– Hedonic pricing method and Travel cost method (house hold production function models); Methods based on response to hypothetical markets – Contingent valuation method; Environmental values and cost benefit analysis; Choice of discount rate.

ECC- 402.2 Economics of Non-renewable Natural Resources Management

Types of natural resources; Concern for natural resource scarcity; Theory of optimal extraction of non-renewable (exhaustible) resources - extraction under perfectly competitive and monopolistic markets.

ECC- 402.3 Economics of Renewable Natural Resources Management

Theory of optimal use of renewable resources – Biological growth process, Harvesting under private property and open access conditions; Approach for common property resources .

ECC- 402.4 Environment and Development

Environment and development trade-off; The Environmental Kuznets Curve hypothesis and its limitations; Sustainable development: Weak and strong sustainability; Rules and indicators of sustainable development; Integrated environmental and economic accounting; measurement of environmentally – corrected GDP



SEMESTER-IV

Credits-4 ECC- 403 ECONOMICS OF GROWTH AND DEVELOPMENT

ECC- 403.1 Approaches to Development– I

Economic Growth versus Economic Development; Partial theories of growth and development -- Vicious circles of poverty, Circular causation; Development theories – Classical, Marx and Schumpeter's theories of development; Unlimited supply of labour; Big push; Balanced and unbalanced growth.

ECC- 403.2 Approaches to Development –II

Critical minimum efforts thesis; Low-income equilibrium trap; Forward and backward linkage; Dualism – Technical, behavioural and social; Ranis & Fei model; Dependency theory of development.

ECC- 403.3 Economic Growth

Economic Growth versus Economic Development; Exogenous Growth Models- Harrod and Domar growth model and its instability in equilibrium; Solow Model: Meade's Steady State Growth Model; Kaldor's Model; Production Function approach to the determinants of growth; Technical Progress- Hicks, Harrod and Solow neutrality; Endogenous growth- Role of education, research and knowledge in economic growth; Romer's Endogenous Growth Model.

ECC- 403.4 Investment Techniques

Investment criteria and choice of technique- Capital Turnover Criterion, SMP Criterion, Marginal Per Capita Reinvestment Criterion, Labour versus capital intensive techniques;



SEMESTER-IV

405 Core Elective (Group-A)

Credits-4

ECE-404 DISSERTATION

Objective of this subject is to make the students know the basic concepts in research and preparation of research and project work in Economics. This paper helps the students to develop the ability to apply theoretical and practical tools, techniques to solve real life problems related to industry, research laboratory and institutions and pursue further research in future in higher studies such as M.Phil., and Ph.D. after completion of project work, the student will be able to:

1. Identify problem in a system.
2. Review literature related to a problem.
3. Evaluation of research problem.
4. Collect materials and know methods.
5. Data analysis.
6. Develop the ability to communicate effectively.

In lieu of the core elective course ECE- 404 (Dissertation) the students have to undertake project work under the guidance of a guide provided to them from among the faculty members of the department. First of all they have to write a project proposal to the department. After approval of the project proposal by the department the students have to do research with the help of primary data and/or secondary data. They have to write a project report and submit it to the department within the stipulated time.

Project is an independent investigation and own work of the student. It is a way of applying the knowledge gained through the various courses to the issues and concerns of day to day events in the economy. It is mandatory to submit a typed and bound copy of the project report. The length of the project work may be between 8000-10000 words (50-60 pages). It must be written in English.

The dissertation is of four credits. This paper has no mid-Sem. examination. The content of the dissertation has 50 marks, 30 marks for seminar presentation and 20 marks for Viva.

SEMESTER-IV

Core Elective (Group-B)

Credits-4 ECE-⁴⁰⁴~~405~~ FINANCIAL INSTITUTIONS AND MARKETS - II

ECE- 405.1 Non-Bank Financial Intermediaries

Definition and types of Non-Bank Financial Intermediaries: their growth and impact on India's economic development, Measures taken to control their operations.

ECE- 405.2 Financial Markets

Role and structure of money market and capital market- Call money market, Treasury bill market, Commercial bill market including commercial paper and certificate of deposits, discount market.

ECE- 405.3 Securities and Derivatives Markets

Government securities market- Markets for derivatives: features and options and other derivatives; types, uses and pricing of derivatives- Primary and secondary market for securities;

SEBI: Its impact on the working of capital market in India; IRDA and its role in financial markets.

ECE- 405.4 International Financial Markets

Reforms in International monetary system for developing countries- Lending operations of world bank and its affiliates- Working of IDA and IFC; The growth of regional financial institutions; Asian Development Bank and its lending activities; Asian Development Bank and India; Euro-Dollar and Euro-Currency markets; their developmental role and regulation at the International level.

REFERENCES

ECC-101 & ECC-201 MICRO ECONOMIC ANALYSIS

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2. Koutsoyiannis, A. (1979); Modern Microeconomics, Mac Millan Press, London.
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ECC-102 & ECC-202 MACRO ECONOMIC ANALYSIS

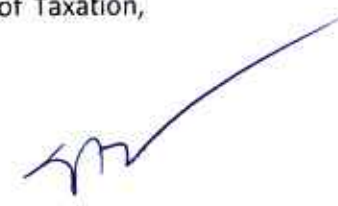
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ECC-103 & ECC-203 QUANTITATIVE METHODS AND COMPUTER APPLICATIONS

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2. Baumol, W. J. (1984); Economic Theory and Operational Analysis, Englewood Cliffs, New Jersey.
3. Chiang, A.C. (1986); Fundamental Methods of Mathematical Economics, Mc Graw Hill, New York. Handry, A. T. (1999); Operations Research, Prentice Hall of India, New Delhi.
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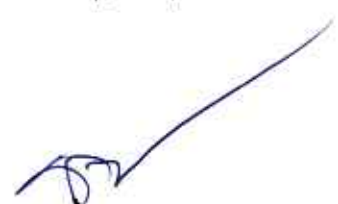
ECC-104 & ECC-204 PUBLIC ECONOMICS

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 3. Barman, K. (1986); Public Debt Management in India, Uppal Publishing House, New Delhi.
 4. Buchanan, J.A. (1970); The Public Finances; Richard D. Irwin, Homewood.
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ECC-105 NDIAN ECONOMIC POLICY

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2. Carbough, R.J. (1999), International Trade, international Thompson Publishing, New York.
3. Chacholiades, M. (1990); International Trade: Theory and Policy, Mc Graw Hill, Khogakusha, Japan.
4. Dunn, R.M. and J.H. Mutti (2000); International Economics, Routledge, London.
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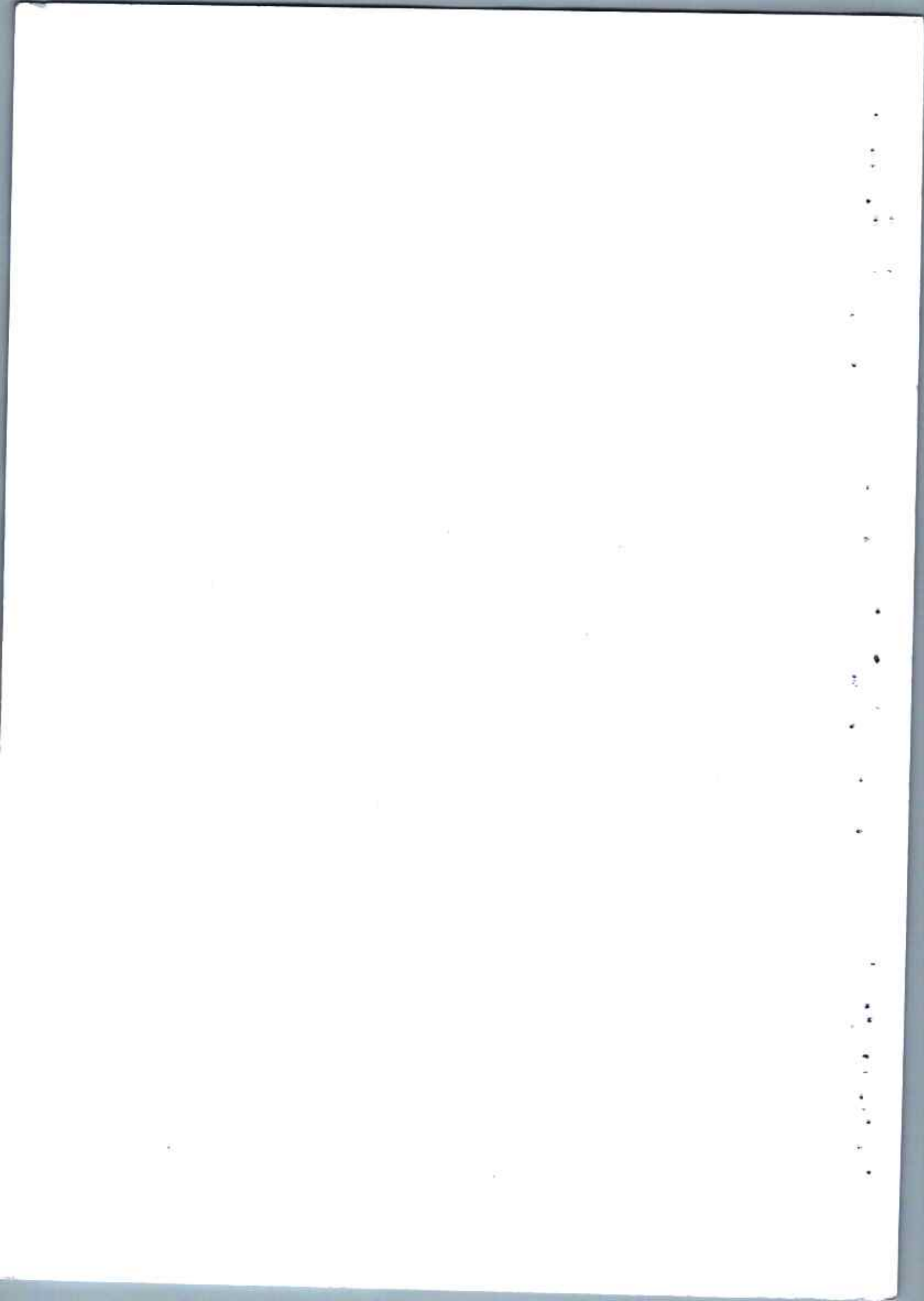


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ECC-302 & ECC- 402 ECONOMICS OF SOCIAL SECTOR AND ENVIRONMENT

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3. Meire, G.M. (1995); Leading Issues in Economic Development, (6th Edition), Oxford University Press, New Delhi.
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	GENDER			403 A and 403 B, or 404 A and 404 B and 405 taken together
ENG –CE 404 A	SPECIAL PAPER : TRANSLATION Vol. II	100	4	
ENG –CE 404 B		100	4	
ENG –CE 405	DISSERTATION	100	4	

SEMESTER ONE Paper I

PAPER	PAPER CODE	TITLE	MARKS	CREDITS
I	ENG-CC 101	DRAMA: TRAGEDY	80	04
Unit		Topic		
I		Doctor Faustus: Marlowe	16+4=20	1
II		Hamlet: William Shakespeare	16+4=20	1
III		Oedipus Rex: Sophocles	16+4=20	1
IV		The Duchess Of Malfi: Webster	16+4=20	1

PAPER- II

PAPER	PAPER CODE	TITLE	MARKS	CREDITS
II	ENG-CC 102	DRAMA: COMEDY AND ROMANCE	80	04
Unit		Topic		
I		Tempest: William Shakespeare	16+4=20	1
II		Volpone or The Fox : Ben Jonson	16+4=20	1

III		The Way of the World : Congreve	16+4=20	1
IV		Frogs : Aristophanes	16+4=20	1

PAPER- III

PAPER	PAPER CODE	TITLE	MARKS	CREDITS
III	ENG-CC 103	PRE-ROMANTIC POETRY	80	04
Unit		Topic		
I		The General Prologue to Centerbury Tales : Chaucer	16+4=20	1
II		Paradise Lost Book I & II : Milton	16+4=20	1
III		Rape of the Lock : Alexander Pope	16+4=20	1
V		<u>Selected Poems</u> : John Donne and other Metaphysical Poets <i>Poems to be taught:</i> DONNE: "The Sunne Rising", "The Good Morrow ", " Valediction: Forbidding Mourning ", " Batter my Heart ", and " Thou Hast Made Me" <u>POEMS</u> Marvel: " To His Coy Mistress" Herbert: " The Gifts of God" Crashaw: "Wishes for the Supposed Mistress" Vaughn: "The Retreat"	16+4=20	1

PAPER- IV

PAPER	PAPER CODE	TITLE	MARKS	CREDITS
IV	ENG-CC 104	ROMANTIC AND VICTORIAN POETRY	80	04

BNS

Unit		Topics		
I		The Prelude, Book I & II : Wordsworth	16+4=20	1
II		Selected Odes of John Keats: "Ode to a Nightingale" "Ode to Psyche" "Ode on a Grecian Urn", "Ode to Autumn" and "Ode on Melancholy".	16+4=20	1
III		Adonais : Shelly	16+4=20	1
IV		Tennyson: In Memoriam* : Sections to be taught: "The Prologue", Sections I, II, B, VII, IX, XX, XXI, XV, XXVII, XXXI, XXXVII, XLI, XL, L, LVI, LV, LXXIII, XCV and "The Epilogue."	16+4=20	1

Paper V

PAPER	Paper code	Title	Marks	Credits
V	ENG-CC 105	LINGUISTICS	80	4
		Details		
Unit		Topic	Marks	Credits
I		Definition of Language, Language Change, Variation and Classification.	L. Q= 12 (12X1) S.Q.= 12 (4X3)	1
II		Phonetics: i. Classification of Speech Sounds, ii. Vowels and Consonants,	L. Q= 12 (12X1) S.Q.= 12 (4X3)	1

		Problem Sounds for Indian Speakers, <i>iii.</i> Syllable structure, <i>iv.</i> Phonemes and Allophones, <i>v.</i> Supra-segmental features-		
		Stress, Rhythm, Intonation.		
III		<u>Morphology</u> : Morphemes, Allomorphs, Word Formation, Derivation and Inflection, Borrowing and Coinage.	L. Q= 08 (8X1) S.Q.= 08 (4X2)	1
IV		<u>Syntax and Semantics</u> : Word, Phrase, Sentence. Synonymy, Antonymy, Hyponymy, Ambiguity, Compound words and meanings.	L. Q= 08 (8X1) S.Q.= 08 (4X2)	1

**Semester TWO:
Paper VI**

PAPER	Paper code	Title	Marks	Credits
VI	ENG -CC 201	PRE-MODERN CRITICISM	80	4
		Details		
Unit		Topic	Marks	Credits
I		Aristotle: <i>Poetics</i>	16+4=20	1
II		Johnson: <i>A Preface to Shakespeare</i>	16+4=20	1
III		Wordsworth: "Preface to Lyrical Ballads"	16+4=20	1
IV		Arnold: "The Study of Poetry"	16+4=20	1

Paper VII

PAPER	Paper code	Title	Marks	Credits
VII	ENG	MODERN CRITICISM AND THEORY	80	4

Page

	-CC 202			
		Details		
Unit		Topic	Marks	Credits
I		Eliot: Two essays: "Tradition and Individual Talent", and "Hamlet".	16+4=2 0	1
II		Jacques Derrida: "Structure, Sign and Play in the Discourse of the Human Sciences"	16+4=2 0	1
III		Roman Jakobson : " The Metaphoric and Metonymic Poles".	16+4=2 0	1
IV		Roland Barthes: "Death of the Author"	16+4=2 0	1

PAPER- VIII

PAPER	Paper code	Title	Marks	Credits
VIII	ENG -CC 203	FICTION AND NON-FICTIONAL PROSE	80	4
		Details		
Unit		Topic	Marks	Credits
I		Dickens: <i>Great Expectations</i>	16+4=2 0	1
II		Hardy: <i>Tess of the D'Urbervilles</i>	16+4=2 0	1
III		Fielding: <i>Tom Jones</i>	16+4=2 0	1
IV		Bacon: Selected Essays Essays Prescribed for study: 1.Of Truth, 2.Of Adversity, 3.Of Parents and Children Bertrand Russell: <i>Unpopular Essays</i> - 1. The Future of Mankind, 2. On Being Modern-minded Charles Lamb: <i>Essays of Elia</i> - 1.	16+4=2 0	1

		The Praise of Chimney Sweepers, 2.A Bachelor's Complaint of the Behaviour of Married People		
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Paper IX

PAPER	Paper code	Title	Marks	Credits
IX	ENG -CC 204	MODERN NOVEL	80	4
		Details		
Unit		Topic	Marks	Credits
I		Forster: <i>A Passage to India</i>	16+4=20	1
II		Joyce: <i>A Portrait of the Artist as a Young Man</i>	16+4=20	1
III		Lawrence: <i>The Rainbow</i>	16+4=20	1
IV		William Golding: <i>Lord of the Flies</i>	16+4=20	1

Paper X

PAPER	Paper code	Title	Marks	Credits
X	ENG -CC 205	ENGLISH LANGUAGE TEACHING (ELT)	80	4
		Details		
Unit		Topic	Marks	Credits
I		Curriculum and Syllabus: <i>i.</i> Syllabus- Diagnosis and Design. <i>ii.</i> Instructional Material. <i>iii.</i> Method of Teaching. <i>iv.</i> Evaluation.	L. Q= 12 (12X1) S.Q.= 12 (4X3)	1

II		Teaching of Skills and Text types I: <i>i.</i> Listening. <i>ii.</i> Speaking.	L. Q= 12 (12X1) S.Q.= 12 (4X3)	1
III		Teaching of Skills and Text types II: <i>i.</i> Reading. <i>ii.</i> Writing Teaching – Prose, Poetry, Novels.	L. Q= 08 (8X1) S.Q.= 08 (4X2)	1
IV		Classroom Situation and Teacher Development. <i>i.</i> Teaching in Difficult situations. <i>ii.</i> Designing the Classroom-Learner centred, Smart classrooms. <i>iii.</i> Teacher Development/ Training	L. Q= 08 (8X1) S.Q.= 08 (4X2)	1

Semester Three

Paper XI

PAPER	Paper code	Title	Marks	Credits
XI	ENG -CC 301	MODERN POETRY	80	4
Unit		Topic	Marks	Credits
I		W.B.Yeats: Selected Poems The following poems are to be studied: "The Song of Wandering Aengus", "Among School children", "Wild Swans at Coole," "A Prayer for my Daughter", "Easter 1916", "The Second Coming", "Sailing to Byzantium", "The Tower", "Byzantium" and "Leda and the	16+4=20	1

		Swan".		
II		T.S. Eliot: <i>The Waste Land</i>	16+4=2 0	1
III		Women poets of the Twentieth Century: A Background study of feminism Eavan Boland: Witness, My country in Darkness Sylvia Plath: Family Reunion, Dialogue between Ghost and Priest, Virginia Woolf: Daddy, Kindness Sarojini Naidu: In the Bazaars of Hyderabad, In Salutation to the Eternal Peace	16+4=2 0	1
IV		Tagore: <i>Gitanjali</i>	16+4=2 0	1

Paper XII

PAPER	Paper code	Title	Marks	Credits
XII	ENG -CC 302	MODERN DRAMA	80	4
		Details		
Unit		Topic	Marks	Credits
I		Osborne: <i>Look Back in Anger</i>	16+4=2 0	1
II		Beckett: <i>Waiting for Godot</i>	16+4=2 0	1
III		Shaw: <i>Man and Superman</i>	16+4=2 0	1
IV		Anton Chekov: <i>The Cherry Orchard</i>	16+4=2 0	1

SPECIAL PAPER PROGRAMMES (CORE ELECTIVES)

Each special paper programme shall be in FOUR papers, each carrying 100 marks. As specified in the consolidated chart of the courses above, Two papers shall be devoted to each special paper programme under Semester Three and the rest two in Semester Four.

THREE SPECIAL PAPER PROGRAMMES are available to the students: namely (i) American Literature (ii) Translation Studies and (iii) Creative Writing.

I: American Literature SPECIAL PAPER PROGRAMME (Total Marks: 400 / 16 Credits)

The students will be ordinarily taught the American Literature SPECIAL PAPER PROGRAMME under which they will study FOUR theory papers each carrying 100 marks as specified below:

Semester III

Paper XIII(AL)

American Literature: SPECIAL PAPER PROGRAMME

Paper	Paper code	Title	Marks	Credits
XIII(AL)	ENG-C E 303 (SP-AL)	SPECIAL PAPER AMERICAN LITERATURE I: Poetry and Philosophy	80	04
		Details		
Unit		Topic	Marks	Credits
I		Emerson: "The American Scholar", "Self reliance", "The Oversoul"	16+4=20	1
II		Selected Poems of Robert Frost:	16+4=20	1

		"The Silken Tent," "Moving," "Mending Wall," "After Apple Picking," "The Road not Taken," "Birches," "Stopping by woods on a snowy Evening," "The gift Outright," "West-running Brook,"	0	
III		Whitman: " Song of Myself " (from <i>Leaves of Grass</i>)	16+4=2 0	1
IV		Thoreau: <i>Walden</i>	16+4=2 0	1

OR

Paper XIV(AL)

Paper	Paper code	Title	Marks	Credits
XIV(AL)	ENG-CE 304 (SP-AL)	SPECIAL PAPER : AMERICAN LITERATURE II: Novel	80	04
		Details		
Unit		Topic	Marks	Credits
I		Hawthorne: <i>The Scarlet Letter</i>	16+4=2 0	1
II		Twain: <i>Huckleberry Finn</i>	16+4=2 0	1
III		Hemingway: <i>A Farewell to Arms</i>	16+4=2 0	1
IV		Melville: <i>Moby Dick</i>	16+4=2 0	1

N.B. : Paper no. XV shall be studied by the students of the

Department, choosing it from the Allied Elective Courses offered by other Departments.

Likewise, Paper no. XV shall be studied by the students of other Departments, choosing it from the two CBCT papers stated above other Departments.

PAPER -XV

ENG- CE – 305 SPECIAL PAPER PAPER: TRANSLATION Vol. I

(Total Marks: 100)

Under this programme a student shall prepare TWO volumes of translation of certain literary work(s) of established Odia poets/dramatists/novelists/short story/autobiography writer(s) into English in a minimum of 10,000 words under the supervision of a subject expert from among the members of the faculty.

However, only candidates with proven ability shall be encouraged to opt for the Translation Studies SPECIAL PAPER PROGRAMME subject to following conditions:

- a. The candidate qualifies in a rigorous selection process including a written test followed by a viva voce test conducted by the Head of the Department which should be unanimously approved by the Staff Council of the Department.
- b. Even after a student qualifies in the tests conducted, a subject expert should be willing to supervise him on the texts of his choice.
- c. As on the date of application for this special paper programme, the student must have published in standard literary journals with ISSN no. translation of Odia literary works into English to the tune of at least 2,000 words.

ENG- CE- 306 SPECIAL PAPER PAPER: TRANSLATION Vol. I

Under this programme a student shall prepare TWO volumes of translation of certain literary work(s) of established Odia poets/dramatists/novelists/short story/autobiography writer(s) into English in a minimum of 10,000 words under the supervision of a subject expert from among the members of the faculty.

However, only candidates with proven ability shall be encouraged to opt for the Translation Studies SPECIAL PAPER PROGRAMME subject to following conditions:

- a. The candidate qualifies in a rigorous selection process including a written test followed by a viva voce test conducted by the Head of the Department which should be unanimously approved by the Staff Council of the Department.
- b. Even after a student qualifies in the tests conducted, a subject expert should be willing to supervise him on the texts of his choice.
- c. As on the date of application for this special paper programme, the student must have published in standard literary journals with ISSN no. translation of Odia literary works into English to the tune of at least 2,000 words.

PAPERS TO BE OUTSOURCED FOR THE STUDENTS OF OTHER DEPARTMENTS UNDER CBCT SCHEME

This paper is meant for the students of other Departments under the Choice Based Credit Transfer Scheme

paper	Paper code	Title	Marks	Credits
ENG – CTBT 1	ENG-AE 307	READING LITERATURE	80	04
		Details		
		Topic	Marks	Credits

I		John Osborne: <i>Look Back in Anger</i>	16+4=2 0	1
II		R.K.Narayan: <i>Guide</i>	16+4=2 0	1
III		Tagore: <i>Gitanjali</i>	16+4=2 0	1
IV		Critical Appreciation of an unknown poem	16+4=2 0	1

OR

Paper	Paper code	Title	Marks	Credits
ENG – CTBT II	ENG-AE 308	PROFESSIONAL WRITING	80	04
		Details		
		Topic	Marks	Credits
I		Feature Writing	16+4=2 0	1
II		Report Writing/Proposal writing	16+4=2 0	1
III		i. Content Writing ii. Precis Writing	16+4=2 0	1
IV		i. Noting and Drafting ii. Editing	16+4=2 0	1

SEMESTER IV
(CORE COURSES)

Paper XVI

paper	Paper code	Title	Marks	Credits
XVI	ENG-CC 401	CONTEMPORARY WORLD NOVEL	80	04
		Details		

PDE

		Topic	Marks	Credits
I		Arundhati Roy: <i>The God of Small Things</i>	16+4=2 0	1
II		Chinua Achebe: <i>Things Fall Apart</i>	16+4=2 0	1
III		Ken Kessey: <i>One Flew over the Cuckoo's Nest</i>	16+4=2 0	1
IV		Orhan Pamuk: <i>Snow</i>	16+4=2 0	1

Paper XVII

Paper	Paper code	Title	Marks	Credits
XVII	ENG-CC 402	COMMONWEALTH LITERATURE	80	04
		Details		
		Topic	Marks	Credits
I		Fakir Mohan Senapati: <i>Six Acres and a Third</i>	16+4=2 0	1
II		Bapsi Sidwa: <i>Ice Candy Man</i>	16+4=2 0	1
III		Tehmima Anam: <i>The Good Muslim</i>	16+4=2 0	1
IV		J.M. Coetzee: <i>Summertime</i>	16+4=20	1

PAPER- XVIII (A) (AL)

paper	Paper code	Title	Marks	Credits
XVIII (A) (AL)	ENG-CE-403(A) (SP-AL)	SPECIAL PAPER : AMERICAN LITERATURE III: Drama	80	04
		Details		
		Topic	Marks	Credit

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I		Eugene O' Neill : <i>Desire Under the Elms</i>	16+4=20	1
II		A Miller: <i>Death of a Salesman</i>	16+4=20	1
III		Tennessee Williams: <i>A Streetcar Named Desire</i>	16+4=20	1
IV		Sam Shepard: <i>Curse of the Starving Class</i>	16+4=20	1

PAPER- XVIII (B) (AL)

paper	Paper code	Title	Marks	Credits
XVIII (B) (AL)	ENG-CE 403(B) (SP-AL)	SPECIAL PAPER : AMERICAN LITERATURE IV: RACE AND GENDER	80	04
		Details		
		Topic	Marks	Credits
I		Ellison: <i>The Invisible man</i>	16+4=20	1
II		Zora Neale Hurston: <i>Their Eyes are Watching God</i>	16+4=20	1
III		Toni Morrison: <i>Sula</i>	16+4=20	1
IV		Alice Walker: <i>The Color Purple</i>	16+4=20	1

PAPER- XIX (A)

ENG- CE – 404(A) SPECIAL PAPER PAPER: TRANSLATION Vol. II

(Total Marks: 100)

Under this programme a student shall prepare TWO volumes of translation of certain literary work(s) of established Odia poets/dramatists/novelists/short story/autobiography writer(s) into

English in a minimum of 10,000 words under the supervision of a subject expert from among the members of the faculty.

However, only candidates with proven ability shall be encouraged to opt for the Translation Studies SPECIAL PAPER PROGRAMME subject to following conditions:

- a. The candidate qualifies in a rigorous selection process including a written test followed by a viva voce test conducted by the Head of the Department which should be unanimously approved by the Staff Council of the Department.
- b. Even after a student qualifies in the tests conducted, a subject expert should be willing to supervise him on the texts of his choice.
- c. As on the date of application for this special paper programme, the student must have published in standard literary journals with ISSN no. translation of Odia literary works into English to the tune of at least 2,000 words.

PAPER- XIX (B)

ENG- CE- 404(B) SPECIAL PAPER PAPER: TRANSLATION Vol. II

(Total Marks: 100)

Under this programme a student shall prepare TWO volumes of translation of certain literary work(s) of established Odia poets/dramatists/novelists/short story/autobiography writer(s) into English in a minimum of 10,000 words under the supervision of a subject expert from among the members of the faculty. However, only candidates with proven ability shall be encouraged to opt for the Translation Studies SPECIAL PAPER PROGRAMME subject to following conditions:

- a. The candidate qualifies in a rigorous selection process including a written test followed by a viva voce test conducted by the Head of the Department which should be unanimously approved by the Staff Council of the Department.
- b. Even after a student qualifies in the tests conducted, a subject expert should be willing to supervise him on the texts of his choice.

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c. As on the date of application for this special paper programme, the student must have published in standard literary journals with ISSN no. translation of Odia literary works into English to the tune of at least 2,000 words.

PAPER- XX

paper	Paper code	Title	Marks	Credits
XX	ENG-CC 405	DISSERTATION	80	04
		Details		
		Topic	Marks	Credits
I		DISSERTATION Each student will prepare a dissertation in about 4000 words(approx.) on a topic of literary and critical interest under the supervision of a teacher [A presentation carrying 20 marks on the same topic shall be considered towards Mid-sem Exam]	80	4
II				
III				
IV				

-----THE END-----

Approved
 18/7/18
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			Total Credits	20	
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FIRST SEMESTER

PSC-101: Western Political Thinkers: Ancient and Medieval

Unit-I

Plato - Ideal State, Theory of Justice, Communism.

Aristotle – Nature and Purpose of State, Constitutional: Classifications, Revolution, and Slavery.

Unit-II

Machiavelli- Child of Renaissance, Religion, Ethics and Politics.

Montesquieu- Liberty, Separation of Powers.

Unit-III

Hobbes- Theory of Social Contract, Absolute Sovereignty.

Locke- Individual and Community, Theory of Natural Rights, Social Contract, Political Obligation.

Unit-IV

Rousseau- Origin of Inequality, General Will, Civil Liberty.

Suggested Readings

1. Aristotle, The Politics, Translated Ernest Barker, Oxford University Press, 1998 edn.
2. Hobbes, Thomas, The Leviathan, Amherst New York, Prometheus Books, 1988.
3. Pocock J.G.A., The Machiavellian Moment, Princeton, N.S. Princeton University Press, 1975.
4. Raphael D.D. Hobbes: Morals and Politics, Great Britain, Cambridge University Press, 1977.
5. Jones W.T., Master of Political Thought, OUP, 1975.
6. Sabine G.H. A History of Political Theory UP 1973.
7. Strans Leo and Corpsey, Joseph, History of Political Philosophy, Chicago, 1987.
8. Popper, Karl, The Open Society and Its Enemies.

dm

PSC 102 Modern Political Theory

Unit-I

Political Theory: Meaning, Scope and Significance.

Approaches: Traditional, Behaviouralism, Post-Behaviouralism, Liberal and Marxist.

Unit-II

Basic Concepts: Law, Liberty, Equality & Justice .

Unit-III

Communication Theory- Karl W. Deutsch, Decision Making Theory.

Group Theory.

Unit-IV

ISMS

Communism, Feminism, Nationalism & Internationalism.

Suggested Readings:

1. Dhal Robert, Modern Political Analysis
2. S.P. Verma, Modern Political Theory, Vikas Publication, New Delhi.
3. Easton David, A Systems Analysis of Political Life, University Chicago, 1979.
4. Lucian Pye, Aspects of Political Development Bhill Academic Publisher.
5. Madan Gopala Gandhi, Modern Political Theory.
6. Madan Gopala Gandhi, Modern Political Analysis, Oxford and IBH(1981)
7. James C Charlesworth(ed.) Contemporary Political Analysis (Free Press), New York(1967)
8. O.P. Gauba an introduction to Political Theory.
9. J.C. Johari, Contemporary Political Theory, Sterling, New Delhi(1987).

PSC-103: PUBLIC ADMINISTRATION: CONCEPTS AND ISSUES

Unit-I

Meaning, Nature, Scope and Significance of Public Administration

Approaches to the Study of Public Administration, New Public Administration.

Unit-II

Theories of Organisation: Scientific Management Theory: Frederick Winslow Taylor,

Human Relations: Elton Mayo, Ecological: Fred Riggs, System Approaches: open/closed systems

Unit-III *NKM*

Leadership: Types and Styles of Leadership

Theories of Motivations: Maslow, M. C. Gregor, Herzberg's.

Personnel Administration: Recruitment, Training.

Unit-IV

Major Issues in Administration: Public Policy, Relationship between Permanent Executive and Political Executive, Employee-employer relationships.

Suggested Readings:

1. Agarwal, D.V., Human Relations and Organisation Behaviour(New Delhi,1988)
2. Avasthi, Amareswar and Maheswari, S.R., Public Administration (Agra, 1986)
3. Bhattacharya, Mohit, Public Administration(Calcutta, 1981)
4. Dimmock, M.E. and Dimmock, G.V., Public Administration(New York, 1975)
5. Goel, S.L., Advanced Public Administration(New Delhi, 1994)
6. Maheswari, S.R., Theories and Concepts in Public Administration(New Delhi, 1991)
7. Mehta, Prayag, Bureaucracy, Organisational Behaviour and Development (Sage, 1989)
8. Rao, Shankar, Public Administration and Management (New Delhi, 1991).
9. Sharma, R.D., Advanced Public Administration (New Delhi, 1990).
10. Simon Herbert, Administrative Behaviour (London,1976).



PSC-104: INTERNATIONAL POLITICS: THEORIES AND CONCEPTS

Unit-I

Contending Theories and Approaches to the Study of International Relations: Idealism, Realism, Neo Realism, Kaplan's System Theory, Decision Making Theory.

Unit-II

Marxian Approach and Dependency Theory.

Unit-III

- i. Cold War & Neo Cold War: Meaning Causes, History and End of cold war.
- ii. Changes and emerging Trends in Post Cold War.

Unit-IV

India's Foreign Policy: Features.

India's Relation with USA, China, Pakistan.

Suggested Readings:

1. Bandhopadhyay, J., General Thoery of International Relations, Allied Publishers, New Delhi.
2. Baral JK., International Politics: Dynamics and Dimensions, South Asian Publishers, New Delhi, 1987.
3. Burchill S and A. Linklator, Theories of International Relations, Martin Press, New York, 1966.
4. Bull Headley, The Anarchical Society: A Study of Order in World Politics (New York, 1977).
5. Holsti, K.J. International Politics: A Framework of Analysis, Prentice Hall.
6. Doghery, J.E. and R.L. Falzgraff Jr., Contending Theories of International Relations, J.B. Lippincott Co, 1971, New York.
7. Kumar, Mahendra, Theoretical Aspects of International Politics, Shivalal Aggarwal & Co, Agra, 1967.
8. Morgenthau, Hans J, Politics among Nations: The struggle for Power and Peace, New York, 1985
9. Jackson, R. And George Sorensen, Introduction to International Relations: Theories and Approaches, OUP, 2003
10. Basu, Rumki, International Politics: Concepts, Theories and Issues, Sage Text, New Delhi, 2014
11. Keohane, Robert After Hegemony, Princeton, 1984.
12. Vandana, A, Theory of International Politics, Vikas Publishing House, Pvt. Ltd. 1998.

PSC-105: FEDERALISM IN INDIA

Unit-I:

- a. Federal in form Unitary in Spirit
- b. Genesis and Reorganisation of States
- c. Constitutional status of States in Indian Political System, Politics of secession, autonomy and accommodation.

Unit-II:

Areas of Conflict in Centre-State Relations:

Constitutional Features, Administrative, Financial and Legislative Relations.

Unit-III:

New institutional mechanisms for Cooperative Federalism

- a) National Development Council
- b) Financial Commission
- c) Niti Ayog

Unit-IV: NKM

Challenges to Indian Federalism

Recommendation of Sakaria Commission.

Suggested Readings:

1. Arora, B. (1995) 'Adapting Federalism to India: Multi-level and Asymmetrical Innovations'.
2. Arora, B and Verney, D.(eds) *Multiple Identities in a Single State: Indian Federalism in Comparative Perspective*, Delhi: Konark, pp, 71-104.
3. Dhavan, R and Saxena, R. (2006) 'The Republic of India', in Le Roy, K., Saunders, and
4. Kincaid, J. (eds) *A Global Dialogue on Federalism*. Montreal: Queen's University Press Marwah, V, (1995) 'Use and Abuse of Emergency Powers: The Indian Experience', in Arora.
5. Sinha, A (2004) 'The changing Political Economy of Federalism in India: A Historical Institutional Approach' in *India Review*, 3(1):pp 25-63.
6. *The Constitution of India*, Bare Act with Short Notes (2011) New Delhi: Universal.



SECOND SEMESTER

PSC-201: Modern Western Political Thinkers

Unit-I

J. Bentham: Jurisprudence, Principles of Morals and Legislation, Utilitarianism,

J.S. Mill: Liberty, Revision of Utilitarianism

Unit-II

Hegel; Dialectical Idealism and State

Karl Marx: Dialectical Materialism, Surplus Value, Class Struggle, Revolution

Unit-III

T.H. Green: Radical Individualism

John Rawls: Liberty, Justice and State

Unit-IV

Mao: Concept of Continuous Revolution: New Democracy

Gramsci: Power and Hegemony

Suggested Readings:

1. Avineri Shlomo, Hegel's Theory of the Modern State, Cambridge, Cambridge University Press, 1972.
2. Bluhm, W.T. Theories of Political Systems: Classics of Ancient and Modern Political Thought, Pruntice Hall, New Delhi, 1981.
3. Coker, F.W., Recent Political Thought
4. Duner, John, Western Political Theory in the Face of the future.
5. Marx, Karl, "Economic and Philosophical Manuscripts 1844. Translated by Lloyd G. Easton and Kurt H. Guddat in Kark Selections edited by Allen W. Wood, New York, Macmillan, 1988 pp 40-79.
6. Marx, Karl, Capital Volume 1 Moscow Progress, 1977.
7. Dunning, William, A History of Political Theories Allahabad, 1996.
8. Einstin, William, Modern Political Thought Oxford and IBM, 1974.

PSC-202: Comparative Politics

Unit-I

Comparative Politics: Nature and Scope

Major Approaches to the Comparative Politics: Traditional, Structural – Functional, Systems, Marxist.

Unit-II

Constitutionalism: Development of the Concept, types of Constitutional Systems, Functions and Capacity of Constitution.

Political Change and Nation Building.

Unit-III

Relations between Centre and Units: Impact of Political, Cultural, Economic and Legislature Factors.

Politics of Representation and Participations, Political Parties.

Unit-IV

Public Policy: Nature of the Policy – Making Process, Legislature and Judiciary.

Suggested Readings:

1. Almond. G. A and Powell G.B. Comparative Politics Boston, 1978.
2. Almond G. A and Tames S. Coleman, The Politics of Developing Areas(Princeton, 1970)
3. Blondel J., Comparative Governments (London, 1969).
4. Blondel J And Powell G.B. Comparative Politics: A development Approach.
5. Bottomore T.B., Elites and Society, Penguin, 1985.
6. S.P. Verma, Modern Political Theory, Vikas Publishing, Third Print 1996.
7. S.N. Kay, Comparative Politics.
8. Apter. Darid, Harry Eckstein (eds.) Comparative Politics, Subject Publication, 2003.



PSC-203: NEW SOCIAL AND POLITICAL MOVEMENTS IN INDIA

Unit-I

Social and Political Movements in India: Background, History and Debate

Unit-II

Political Movements: Theories and Ideologies.

Regional Movements in India: Jharkhand and Gorkhaland Movement in West Bengal.

Unit-III

Peasant's Movements: Genesis and Growth

Women's Movements: Gender Justice and Empowerment

Unit-IV

Tribal Movements: Issues and Dynamics

Environmental Movements: Chipko Movement, Silent Valley Movement & Narmada Bachao Movement.

Suggested Readings:

1. Basu, Amrita (edited): The Challenge of Local Feminism: Women's Movement in Global Perspective, New Delhi, 1999.
2. Shah Ghanshyam: Social Movements and the State, Sage Publications, New Delhi, 2002.
3. Shah Ghanshyam: Social Movements in India: A Review of the Literature, Sage Publications, New Delhi, 1990.
4. Mohanty Manoranjan (ed): Caste, Class and Gender, Sage Publications, New Delhi, 2004.
5. Oommen, T.K., (ed): Social Movements (Vol I and Vol II) OUP, New Delhi, 2010.
6. Singh, K.S.,: Tribal Movement in India
7. Gail, Omvedt: Reinventing Revolution: New Social Movements and the Socialist, 1993.
8. Wilkinson Paul: Social Movements.
9. Rao, M.S.A., Social Movements in India, New Delhi, Manohar, 1981.
10. Desai, Neera (ed.), Decade of Women's Movement in India, Bombay Himalaya Publishing House, 1988.



PSC-204: ISSUES IN INTERNATIONAL RELATIONS

UNIT-I

Functionalism and Neo-Functionalism

International Regime Analysis

UNIT-II

Cold War, End of Cold War, Uni-Polarity

American Hegemony

Post Cold War World Order

UNIT-III

Non-alignment: Evolution and Trends

Democratic Peace Theory

United Nations: Changing Role and its Reform.

UNIT-IV

Contemporary Global Concerns

Environmental Issue, Human Right, International Terrorism.

Humanitarian Interaction.

Suggested Readings:

1. Mitrany, David (1948) The Functional Approach to World Organisation: International Affairs, 24(3), 350-363.
2. Mary Farrell, Bjorn Hettne and Luk Van Lagenhoe, Global Politics of Regionalism: Theory and Practice, London, Pluto Press.
3. Calvocoressi, Peter, World Politics since 1945, New York, 1982.
4. Goodrich, L.M., 1974, UN in a Changing World, New York, Columbia University Press.
5. Annan, Kofi A., 2000, We the Peoples: The Role of UN in the 21st Century, New York; United Nations
6. Blackmore, R and A. Reddish (eds), 1996 Global Environmental Issues, London; Hodder and Stoughton.
7. Crenshaw, Martha and John Pimlott (eds), 1997, International Encyclopedia of World Terrorism, Armonk, NY: Sharpe Reference.
8. Pandey, Veena Puni, 1999 International Perspectives on Human Rights, New Delhi; Rohit Publications.
9. Dunne T and N.J. Wheeler (eds) 1999, Human Rights in Global Politics, Cambridge: Cambridge Univ. Press.
10. Bajpai, U.S.(ed), Nonalignment: Perspective and Prospects, New Delhi; 1983 E



PSC-205 INDIAN GOVERNMENT AND POLITICS

UNIT-I

Evolution of the Indian Constitution: Indian Nationalism, National Movement, and Constitution Development

UNIT-II

Basic Structure of Constitution: Constituent Assembly, Preamble, Fundamental Rights, Directive Principles of State Policy, Amendment Procedure.

UNIT-III

Governmental structure and Process in Centre: Executive: President and Prime Minister, Legislature: Parliament of India, Judiciary: Judicial Review and Judicial Activism.

UNIT-IV

Governmental structure and Process in States: Executive: Governor and Chief Minister, Legislature: Vidhan Sabha and Vidhan Parishad, Judiciary: High Court and Subordinate Courts.

Suggested Readings:

1. Austin Granville, 1972, The Indian Constitution: Cornerstone of a Nation, New Delhi, OUP.
2. Austin Granville, 1999, Working a Democratic Constitution: The Indian Experience, New Delhi, OUP.
3. Basu D.D., 1999, Introduction to the Constitution of India, Calcutta, Prentice Hall (latest edition)
4. Hasan Zoya, E. Shridharan and R. Sudarshan (eds.) 2002, India's Living Constitution, New Delhi, Permanent Black.
5. Kapur Devesh and Pratap Bhanu Mehta (eds.), 2005, Public Institutions in India, New Delhi, Sage.
6. Saez Lawrence, 2004, Federalism without a Center, new Delhi, Sage.
7. Sathe S.P., 2002, Judicial Activism, New Delhi, OUP.
8. Sharma Brij Kishor, 2002, Introduction to the Constitution of India, New Delhi, Prentice Hall



THIRD SEMESTER

PSC-301: Modern Indian Political Thinkers

Unit-I

Manu

Kautilya

Unit-II

Bal Gangadhar Tilak

Swami Vivekananda

Aurobindo Gosh

Unit-III

Mahatma Gandhi

B.R.Ambedkar

Raja Ram Mohan Roy

Unit-IV

Jawaharlal Nehru

M.N.Roy

Jay Prakash Narayan

Suggested Readings

1. Ambedkar B.R., Annihilation of caste (ed.) by Mulak Raj Anand, Arneld Pub, Delhi, 1979.
2. Appadorai.A., Political Thought in India, Karma, Delhi, 2002.
3. Gandhi M.K., Hind Swaraj, Navajeevan, Ahmadabad, 1984.
4. Mehta V.R. Foundations of Indian Political Thought, Manahor Publications, Delhi, 1992.
5. Naavane V.S., Modern Thought, Orient Longman, New Delhi, 1978.
6. Panther T. and Deutsch, K.L.,(ed.) Modern Indian Thought, Sage Pub, Delhi, 1986.
7. Baral J.K. Indian Political Tradition, Macmillan, 2004.
8. V.P. Verma, Modern Indian Political Thought, Lakshmi Narayan Agarwal, Agra, 1974.
9. Mohanty, Dushmanta, Indian Political Tradition, New Delhi, 1997.

PSC-302 INDIA'S FOREIGN POLICY

Unit-I

Evolution of India's Foreign Policy, Determinants, Making, Continuity and Change.

Unit-II

India and Major Powers: US, China and Russia.

Unit-III

India and Neighbours: Pakistan, Bangladesh, Nepal and Sri Lanka.

Unit-IV

India's Nuclear Policy

India's Economic Diplomacy

Suggested Readings:

1. Bandopadhyaya, J., 1980 Making of India's Foreign Policy, New Delhi, Allied Publications Pvt.Ltd.
2. Harsh V. Pant (ed), Indian Foreign Policy in Unipolar World, Routledge, Taylor and Francis Group, London, 2009.
3. Raja Mohan, C., Crossing the Rubicon: The Shaping of India's New Foreign Policy, Penguin Books, New Delhi, 2003.
4. Appadorai, A and Rajan M.S., 1985, India's Foreign Policy and Relations, South Asian Publishers, New Delhi, 1985.
5. Harshe, Rajan and Seethi, K.M (Eds), 2005, Engaging with the World: Critical Reflections on India's Foreign Policy, Orient Longman, New Delhi.
6. Ganguly, Sumit (Ed), 2010, India's Foreign Policy: Retrospect and Prospect, Oxford University Press, New Delhi.
7. Dutt, V.P(2000) India's Foreign Policy in a Changing World, Vikas, New Delhi, 2010.
8. Dixit, J.N. India's Foreign Policy and its Neighbours, Gyan Publishing House, New Delhi, 2001.
9. Mahanty J.N, 2004, A Study of Triangular Diplomacy: China, India and Soviet Union, Pathika Prakashan, Bhubaneswar.
10. Baral, J.K. Mohapatra J.K., and Mishra, S.P. "Rajiv Gandhi's China Diplomacy" International Studies (Sage), July-September, 1989.
11. Kapur, Ashok, 2001, Pokhran and beyond, "India's Nuclear Behavior, New Delhi, Oxford University Press.

PSC 303 DEVELOPMENT ADMINISTRATION IN INDIA

Unit-I

Introduction to Development Administration:

- a) Development Administration: Concept and Meaning
- b) Elements of Development Administration:
- c) Role of Development Administration in India since Independence

Unit-II

Development Administration and the political Process:

- a) Social, Political and cultural elements in the Development Process
- b) The Machinery of Development

Unit-III

Bureaucracy and Development Administration:

- a) The Changing Role of Bureaucracy
- b) The Specialist and Generalist Dichotomy in Democracy

Unit-IVth

New trends in people's Self Development and Empowerment:

- a) Patterns of Peoples Participation in Development
- b) Constitutional Provisions and Empowerment- Special Reference to 73rd and 74th amendment.

Suggested Readings:

1. Inamdar N.R., 1992 Development Administration in india, Rawat Publication.
2. Chatterjee S.K., 1981 Development Administration, Surjeet Publications.
3. Umapathy M., 1984 Development Administration Today, Manu Publishers, Mysore.
4. Sharma R.D., 1992 Development Administration Theory and practice, H.K. Publishers.
5. Arora, Ramesh K & Sangeeta Sharma (Ed): Comparative and Development Administration. Jaipur. Arihant, 1992 and Distributors,
6. Government for Agricultural Production, Dept. of Publication & Press, Osmania
7. Muttalib M.A., 1973, Development Administration in Rural University Hyderabad.



304 EEE
~~PSC-303(B)~~
304
PSC-303(B): FOREIGN POLICIES OF MAJOR POWERS

Unit-I

Foreign Policy Meaning and Determinants
An Overview of International Relations Since 1945
Major Approaches to the Study of Foreign Policy

Unit-II

US Foreign Policy
Major Determinants, From Isolations to Containment
US Foreign Policy during the Cold War
Post Cold War, Change and Continuity
9/11 and its impact on Foreign Policy: War on Terror

Unit-III

Foreign Policy of Soviet Union/Russia
Disintegration of the Soviet Union and the Emerging trends in Russian Foreign Policy
Russia's Strategic Significance Military and Economic
Reassertion in Russian Foreign Policy.

Unit-IV

China's Foreign Policy
Ideological Component, Mao's World View
Sino-Soviet Rift and Sino-American Détente
Post Cold War Period: China as a growing power and its reflection on its Foreign

Policy

Suggested Readings:

1. Roy C. Macridis (Ed) Foreign Policy in World Politics Englewood Cliffs; Prentice Hall, 1992.
2. John Spanier, American Foreign Policy since World War-II, New York, Praeger, 1975.
3. Joyce P. Kaufman (2006) A Concise History of US Foreign Policy, Oxford: Rowman and Littlefield.
4. Robert J. Art and Seyom Brown (2008), US Foreign Policy: The Search for a New Role, Michigan: Univ. Of Michigan Press.
5. Fareed Zakaria (2008) The Post American World, New Delhi, Penguin Books.
6. R.G. Sutter (1996) Shaping China's Future in World Affairs: The Role of the US, Boulder Coloradum Westview Press
7. F.S. Northedge (ed) Foreign Policies of the Powers.
8. Acharya Amitav, (2015) The End of American World Order, OUP, New Delhi.
9. Stuart Harris (2015) China's Foreign Policy
10. Jonathan Fenby (2015) Will China dominate the 21st Century?
11. Gilbert Rozman (2012) China's Foreign Policy: Who Makes it, and How is it made? Palgrave Mac Millan, New York.
12. David Shambaugh (ed) 2015, Tangled Titans: The United States and China.
13. Kapur (1981) The Awakening Giant: China's Ascension in World Politics, Sijthoff & Noordhoff International Publishers, Maryland.

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PSC-304 Indian Politics: Issues and Problems

Unit-I

Nation Building in India: Approaches, Debate and Political Culture in India

Unit-II

Challenges to National Integration: Casteism, Communication, Terrorism

Good Governance: Issues and Challenges.

Unit-III

Democracy in India: Party System, Pressure Groups, Politics of Defection,

Coalition Politics

Unit-IV

Politics of Regionalism in Politics: Sub-Regionalism, Creation of new States,

Politics of Special Category Status, Politics of Language.

Suggested Readings:

1. Bardhan Pranab, The Political Economy of Development in India, Blackwell 1984.
2. Brass, Paul, Caste, Faction and Party in Indian Politics, Chanakya, Delhi.
3. Frankal, Francine et.al(ed.) Transforming India: Social and Political Dynamics of Democracy, OUP, 2000.
4. Jalan bimal (ed) The Indian Economy: Problems and Prospect, Viking, Delhi, 1992.
5. Kothari Rajni, Caste in Indian Politics, Orient Longman
6. Roy, A.B. Society, Religious and Politics in India.
7. Rudolph. I and Rudolph S.H., The Mediocrity of Tradition: Political Development in India, Orient Longman.
8. Singh, G. And H.L.Sharma, Reservation Politics in India: Mandalization of Society.



FOURTH SEMESTER

PSC-401: POLITICAL THEORY

Unit-I

Political Theory: Nature, function, Significance, decline and resurgence.

People-State Interface: Political Obligation, Resistance

Unit-II

Key Concepts: Liberty, Justice, Rights

Unit-III

Contemporary Perspectives: Liberalism, Marxism, Feminism, Neo Liberalism, Neo Marxism.

Unit-IV

Decline of Communism and Emerging World Order: A Debate

Suggested Readings:

1. Berlin, Isaniah, Four Essays on Concepts of Liberty, Oxford, Oxford University Press, 1969.
2. Goodin, Robert E and Philip Pettit edited, A Companion to Contemporary Political
3. Goodin, Robert E and Philip Pettit edited Contemporary Political Philosophy, Oxford, Blackwell Publishers, 1997.
4. Gutman, Amy edited, Multiculturalism: Examining the Politics of Recognition, Princeton N.J, Princeton University Press, 1994.
5. Hampton, Jean, Political Philosophy: An Introduction, Delhi, Oxford University Press, 1998.
6. Harrison, Ross, Democracy, London, Routledge, 1993.
7. Miller, David and Larry Siedentop edited, The Nature of Political Theory, Oxford, Clarendon Press, 1983.
8. Adams Ian, 1993, Political Ideologies Today, Manchester, Manchester University Press
9. Graham Gordon, 1986, Politics in its Place-A Study of Six Ideologies, Oxford, Clarendon Press
10. Heywood Andrew, 1992, Political Ideologies, London, Macmillan



PSC 402 Political Sociology

Unit-I

Political Sociology: Definition and scope, origin and development.

Approaches to the study of Political Sociology

Unit-II

Political Culture

Political Socialisation.

Political Participation

Political Communication.

Unit-III

Leadership and Circulation of Elites.

Power, Authority and Legitimacy.

Unit-IV

Social Stratification and its bases.

Political Development and Modernization.

Suggested Readings:

1. Almond G and S. Verna. The civic culture (Prince tour, 1963).
2. Ashraf, Ali and L.M. Sharma, Political Sociology- A Nuo Grammar of Politics, Universities Press (Indian) Ltd. Hyderabad, 1998.
3. Das H.H. and B.C. Choudhury, Introduction to Political Sociology, Vikas: New Delhi, 2002.
4. Dourse, Ronert E. and Tohm A. Thughes, Political Sociology, London, 1972.
5. Mukhopadhyay A Political Sociology, K.P. Bagchi and Company, Calcutta, 1997.
6. Padhy K.S. Political Sociology, New Delhi, 1989.
7. Parry. G. Political Elites, London, 1969.
8. Pye L.W. Aspects of Political Development, Delhi, 1972.
9. Ru;sh M and P. Asthoff, An Introduction to Political Sociology, London, 1971.
10. Weiner, M and S. Mouting tow (eds)., Understanding Political Development (Boston, 1987).



PSC-403 (A): INDIA AND REGIONAL ORGANISATIONS

UNIT-I

Regionalism and Regional Organizations: Understanding the conceptual and theoretical aspects of Process of Regionalism.

Regional Organizations: Growth and Classification

Significance of Regional Organizations in India's Foreign Policy

UNIT-II

India and SAARC

SAARC: Genesis and growth, Issues and Concerns, Summit Diplomacy

India's Role in SAARC

UNIT-III

India and ASEAN

Background and Civilization Ties; Look East Policy of India

India's Priorities: Security, Energy and Trade.

UNIT-IV

India and BRICS:

Understanding BRICS: Origins, Agenda and Influence.

India-BRICS Engagement

New Development Bank and Impact of Brics on India's overall Strategic interests

Suggested Readings:

1. Olivia Stuenkel (2015) The BRICS and the future of Global Order, Lexington Press.
2. Uwe Becker, (2014), The BRICS and Emerging Economics in Comparative Perspectives: Political Economy Liberalisation and Institutional Change, Routledge, New York.
3. Bhabani Sen Gupta (1993) "SAARC Asian Prospect and Problems of Intra-regional Cooperation". South Asian Publishers, New Delhi.
4. Bhargava, K.K and Lama M.P (2008) SAARC, 2015: Expanding Horizons and Forging Cooperation in a Resurgent Asia, New Delhi.
5. Rama S Melkote, Regional Organisations: A Third World Perspectives, Sterling Publishers Pvt. Ltd., New Delhi, 1990.
6. BaldasGhosal (ed.) 1996, India and South East Asia: Challenges and Opportunities, Konark Publishers, New Delhi.
7. Frederic Grare and Amitabh Matoo, (ed.) 2001 India and ASEAN: The Politics of 'Look East' Policy, Manohar Publisher, New Delhi.
8. SudhirDevare (2005) India and South East Asia- Towards Security Convergence, Institute of South East Asian Studies, Singapore.
9. Fredrik Soderbaun and Timothy M. Shaw (eds) Theories of New Regionalism: A Palgrave Render, New York, Palgrave Macmillan
10. Dash Kishore C, 2008, Origin and Evolution of SAARC: Regionalism in South Asia, Negotiating Cooperation, Institutional Structures, New York, Rutlege.
11. RurnelDahiya and UdaiBhanu Singh, 2015, Realising the ASEAN-India Vision for Partnership and Prosperity, Pentagon Press, New Delhi.

Am

I-CEC-11
~~PSC-404~~ **PSC-404: Human Rights: Theories and Practices**

Unit-I

404-Abhi 13.12.19

The Idea of Human Rights: Evolution, Concepts, Nature and Theoretical Foundations.

Unit-II

International Protection of Human Rights: Civil, Political, Social and Economic Rights.

Unit-III

Collective Rights: Human Rights and Vulnerable Groups, Women, Children, Refugee, Caste, Tribals.

Unit-IV

Human Rights in India: Human Rights Commission, Organisations and Movements, Violation and Safeguards.

Suggested Readings:

1. Aston Philip, the United Nations and Human Rights- A Critical Appraisal, Oxford, 1995.
2. Basu, Durga Das: Human Rights in Constitutional Law, Practice Hall of India, New Delhi, 1994.
3. Bari Upendra (ed) The Right to be Human, Delhi, Lancer, 1987 Beetham, David edited, Politics and Human Rights Oxford Blackwell, 1995.
4. Desai, A.R. (ed) Violations of Democratic Rights in India, Popular Prakashan, Bombay, 1986.
5. Kothari and Sethi Harsh (eds) Rethinking Human Rights, Delhi, Lokayam, 1991, Saksena, K.P. edited, Human Rights: Fifty Years of India's Independence, Delhi, Gyan, 1999.

PSC-404: PROJECT WORK



FIRST SEMESTER

Core Course – 101

Paper – I

History of Ancients Societies and Civilization (World)

Full Mark: 100 (80 + 20)

Time : 3 hours

Unit-I

- i) **Ancient Egypt** - Geography, people, Political History, Society, Economy, Religion **20 Marks**
Cultural Development Contribution to Human Civilization.
- ii) **Mesopotamia** – Sumerian Civilization – Govt., Society, Economy Religion,
Contribution of the Sumerians.
- iii) **Babylonian Civilization**-Govt. Hamurabi's administration, Society Economy,
Religion etc.

Unit-II

- i) **Assyrian Civilization** – Government, Military Organization, Expansion of the **20 Marks**
Empire, contribution.
- ii) **Harappan Civilization**-Origin, Extent, Time and authors of the culture, Urban
Civilization, Town Planning, Society, Religion, Economic life, decline.
- iii) **China**-Geography, People, Society and Culture, Major Ruling Dynasties,
Contributions.

Unit-III

- i) **Greece** – Geography, Races, Early settlement, Athens, Sparta and other city states. **20 Marks**
Evolution of Democracy, Periclean Age, Peloponnesian War, Contributions.
- ii) **Rome** – Foundation of Rome, Roman Republic, class struggle, Expansion of the
Republic. The punic Wars, Decline of the Republic, Julius Caesar, Contributions.
- iii) **Persia** – Geography and people, Great Rulers, Culture Zoroastrianism,
Mithraism, Legacy of Persian Civilization.

Unit-IV

- i) **Hebrews**-Origin, Political History. The Hebrew Migration, Founding of Monarchy, **20 Marks**
Religious evolution, culture, Hebrew influence.
- ii) **Early Civilization of the American** – The Mayan and Aztec Civilization of
Mexico.
- iii) **The Incas of South America.**

Internal Assessment

20 Marks

Books for Reference

- | | | |
|--|---|------------------------------------|
| 1. J.E.Swain | - | A History of World Civilization |
| 2. Davies | - | Outline History of the World. |
| 3. Breastead | - | A History of the Ancient Egyptians |
| 4. H.G.Wells | - | A short History of the World. |
| 5. Dr. R. N. Chaudhury | - | Ancient and Medieval World |
| 6. E.M.Burns | - | Western Civilization |
| 7. S. N. Pal | - | Survey of World History |
| 8. Sinnigen and Boak | - | A History of Rome |
| 9. R. K. Majumdar &
A. N. Srivastav | - | History of World Civilizations |
| 10. N.S. Mittal | - | Ancient Civilization |
| 11. H.S. Baghela | - | Ancient Civilization |

FIRST SEMESTER

Core Course – 102

Paper – II

Practical History of Ancient Indian From 6th Century B.C. to 1206 A.D.

Full Mark: 100 (80 + 20)

Time : 3 hours

Unit-I

- i) Political condition of North India during 6th Century B.C.
- ii) Life and teachings of Vandhaman Mahavira.
- iii) Life and Teachings of Gautam the Buddha.

20 Marks

Unit-II

- i) Alexander's invasion of India and its effects.
- ii) **Maurya dynasty:**
 - a) Chandragupta Maurya – Achievements.
 - b) Ashoka – His Kalinga war of 261 B.C., Religious policy.
- iii) Downfall of the Maury Empire, Maury administration, Cultural development during the Mauryas.

20 Marks

Unit-III

- i) **Kushana Kingdom** : Kaniska, Military and Cultural Achievements.
- ii) **Gupta Empire:**
Achievements of Chandragupta-I, Chandragupta-II & Samudragupta.
- iii) Cultural activities during the Imperial Guptas : Society, Religion, Literature, Education, Science, Art & Architecture, Painting, Terracotta etc.

20 Marks

Unit-IV

- i) Downfall of the Gupta Empire, Gupta administration.
- ii) **Sangam Age** :- Contribution of South India to Art & Literature.
- iii) **Harasavardhan** : His achievements: Military & Cultural, Administration.
- iv) **Arab Invasion of Sindh.** Invasion of Muhammod Ghor of Ghor.

20 Marks

Internal Assessment

20 Marks

Books Recommended:

- 1) An Advanced History of India – Raychoudhury Majumadar and Dutta
- 2) Early History of India – N. N. Ghosh
- 3) Ancient India – Arun Bhattacharya
- 4) Ancient India – P. Maiti
- 5) Political History of Ancient India – H. C. Raychoudhury
- 6) Ancient India – K. L. Khurana
- 7) A short history of Muslim rule in India-Iswari Prasad.
- 8) Mediaval India – P. Maity
- 9) Mediaval India – V.D. Mahajan
- 10) Ancient India – V.D. Mahajan

FIRST SEMESTER

Core Course – 103

Paper – III

Social, Cultural and Economic History of Ancient India (From Pre-Historic Times to 1206 A.D.)

Full Mark: 100 (80 + 20)

Time : 3 hours

Unit-I

- i) Source of Ancient Indian History. Literary, Archaeological, Foreign Accounts, Folk Tales etc. **20 Marks**
- ii) Physical Features (Geographical Divisions) and Unity in Diversity.
- iii) Vedic period The Vedas, Political organization, Vedic Culture of Early and later period.

Unit-II

- i) Social Life in Ancient India-Varma, Ashramas, Samskaras Family, Marriage, Divorce, Caste system etc. Hindu social systems, Sati, Jauhar, Purda System. Untouchability and slavery etc. **20 Marks**
- ii) Position of Women in Ancient Indian Society.

Unit-III

- i) **Historic Age:** **20 Marks**
Economic Life in Ancient India during the historic period – Agriculture, Land Ownership Revenue, Taxation Land grants, Landed Aristocracy.
- ii) Trade and commerce Internal and External, Ports, Trade Routes, Trade Centres, Maritime Activities.
- iii) Coinage system during Ancient period.

Unit-IV

- i) Salient features and development of Hindu Art, Architecture, sculpture, painting. **20 Marks**
- ii) Development of Literature, language, education and science during the ancient period.
- iii) Cultural development during the Mauryas, Arthasastra.

Internal Assessment

20 Marks

Books Recommended:

- 1) R.C. Majumdar (Ed.) - History and culture of the Indian people.
(Bhartiya Vidya Bhavan Series Vols I, II, III)
- 2) N. Sengupta - Evaluation of Hindu Marriage.
- 3) S.C. Ray Chaudhury - Social cultural and Economic History of India
- 4) B. N. Lunia - Evolution of Indian Culture
- 5) D. D. Kosambi - The culture and civilization of Ancient India, an
Historical outline.
- 6) Percy Brown - Indian Architecture
- 7) A. L. Basham - Aspects of Ancient Indian Culture
- 8) R. S. Sharma - Indian Feudalism
- 9) A History of South India - K.A.N. Sastri
- 10) Indian Architecture (Islamic Period) - Percy Brown
- 11) Indian Sculpture - S.K. Saraswati
- 12) Socio-Economic History of Medieval India - K. N. Chitnis.
- 13) L. Prasad - India culture
- 14) B. Patra - New Horizon in History of Culture.
- 15) Manmath Padhy - Fairs, Festivals and Folk Culture of Odisha
- 16) Manmath Padhy - Tribal society and culture.
- 17) S.S. Samal - Radharanjan Gada O Dhamasalara Pratnatwika
vaibhava (Odia)

FIRST SEMESTER

Core Course - 104

Paper - IV

RISE OF MODERN WEST

Full Mark: 100 (80 + 20)

Time : 3 hours

Unit-I

- i) The English civil war and the Economic development in England.
- ii) The scientific Revolutions of the 16th and 17th Century A.D.
- iii) Transition from Feudalism to Capitalism.
- iv) The proletariat Revolution of 1917 in Russia : Causes and effects.

20 Marks

Unit-II

- i) **Renaissance** - Meaning, Causes, Spread of Renaissance in Europe, Humanism, Art, Literature, New ideas etc.
- ii) Geographical Discoveries and colonial expansion, causes, Course and early colonial voyages of Spain and Portugal, English colonial establishments, impact of the explorations.
- iii) **Reformation**-Meaning of Reformation, causes, Martin Luther and protestant movement in Germany. Reformation in England under Henry VIII and Elizabeth Tudor, Reformation in France and Switzerland.

20 Marks

Unit-III

- i) **Commercial Revolution** - Commercial Capitalism and mercantilism, Period of Mercantilism, Factors responsible for the birth of Mercantilism.
- ii) Rise of Enlightened Despots.
 - Louis XIV of France
 - Fredrick the Great of Prussia.
- iii) Peter the Great and Catharine of Russia
 - Maria Theresa and Joseph II of Austria.

20 Marks

Unit-IV

- i) Agrarian Revolution in England-Meaning, Factors, Effects etc.
- ii) Industrial Revolution in England-Causes, Major Inventions, Effects etc.
- iii) American war of Independence: Causes, Events & Effects.

20 Marks

Internal Assessment

20 Marks

Books Recommended:

1. C.J.H. Hayes - History of Modern Europe Vol. I & II
2. H.A.L. Fisher - A History of Europe
3. G. Barraclough - An introduction to contemporary History
4. Meenakshi Phukan - Rise of the Modern West
5. Andrews, Stuart - Sixteenth Century Europe
6. E- Lipson - Europe in the 19th & 20th Centuries
7. C.D. Hazen - Europe upto 1945
8. C.D.M. Ketelbey - A History of modern Times
9. L.C.B. Seaman - From Vienna to Versailles
10. The New Cambridge Modern History of Europe

FIRST SEMESTER

Core Course – 105

Paper – V

International Relations from - 1919 to 1939

Full Mark: 100 (80 + 20)

Time : 3 hours

Unit-I

- i) Cause of the World War-I
- ii) Paris peace conference
Treaty of Versailles – Provisions & Criticism
- iii) League of Nations – Origin, Organisation, Achievements and failure

20 Marks

Unit-II

- i) The Washington Conference
- ii) Problem of Reparation, Economic Crisis
- iii) The Quest for International Security
Geneva Protocol
Locarno Agreements
The Kellogg-Briand Pact

20 Marks

Unit-III

- i) Problem of Disarmament. Through the League and outside the League, conference and causes of failure.
- ii) Fascist Italy-Home and Foreign Policies of Benito Mussolini.
- iii) Nazi Germany-Home and foreign Policies of Adolf Hitler.

20 Marks

Unit-IV

- i) Causes of Russian Revolution – 1917
- ii) Achievements of Lenin and Stalin
- iii) Rise of Turkey-Mustafa Kamel Pasha-Domestic and Foreign Policies
- iv) Causes of the second World War.

20 Marks

Internal Assessment

20 Marks

Books Recommended:

1. The World since 191-Langsam
2. International Relations-Gathorne and Hardy.
3. International Relations between two World Wars – E.H.Carr.
4. International Relations – V.D. Mahajan
5. International Relations Since World War I – Asit Kumar Sen
6. International Relations – U. Sharma
7. Adhunka Viswa Itihasa (Odia) – Dr. S. S. Samal
8. Antarjatika Ghatanaivali (Odia) – Dr. S. S. Samal
9. World Since 1919 – A.C. Roy
10. International Relations – K. B. Keswani
11. International Relation – M. G. Gupta
12. The United Nations – Siddhartha Das
13. Dynamics of International Politics – Siddhartha Das

SECOND SEMESTER

Core Course – 201

Paper – VI

Political History of Mediaval India from 1206 A.D. to 1757 A.D.

Full Mark: 100 (80 + 20)

Time : 3 hours

Unit-I

- i) Sources of Medieval Indian History
- ii) Early rulers of Delhi sultanate : The slave Dynasty
Iltutmish and Balban – Achievements
- iii) **The Khalji Dynasty**
Ala-Ud-Din Khalji – Achievements and Policies:

20 Marks

Unit-II

- i) **The Tughlug Dynasty-**
Muhammad-bin-Tughluq and Firuz Shah Tughluq: Achievements and Policies.
- ii) **The Mughal Empire**
Babur-Conquest of India
Humayun – Achievements
- iii) Sher Shah – Achievements and administration

20 Marks

Unit-III

- i) Akbar-Achievements and Policies (Religious Policy and Rajput Policy)
- ii) Jahangir-Early career, Achievements, The role of Nurjahan in Mughal Administration.
- iii) Shahjahan – Achievements and Policies.

20 Marks

Unit-IV

- i) Aurangzeb-Achievements and policies (Religious policy, Rajput policy, Deccan policy)
- ii) Mughal Administration
- iii) Downfall of Mughal Empire causes
- iv) Shivaji Conquests and Administration

20 Marks

Internal Assessment

20 Marks

Book For Reference:

1. R.C. Majumdar (Ed) – History and Culture of the Indian People Vols. VI & VII.
2. R.C. Majumdar, H.C. – An Advanced History of India.
3. V. S. Smith – Oxford History of India.
4. M. Habib & K. A. Nizami – The Delhi Sultanate Vol. V K.A. Nizami – Some of aspects of Religion & Politics in India during the 13th Century.
5. K. A. Nizam – Some aspects of Religion & Politics in India during the 13th Century.
6. Lane Pole – Medieval India under Mohamadan Rule.
7. Jadunath Sarkar:
 - i) Studies in Mughul India
 - ii) Mughal Administration.
 - iii) History of Aurangzeb Vol – 5
 - iv) The Fall of the Mughul Empire Vols 4.
 - v) Shivaji & his Times.
8. Satish Chandra – Parties and Politics at the Mughul Court.
9. M. Alha Ali – The Mughul Nobility under Aurangzab.
10. R.C. Varma – Foreign Policy of the Great Mughuls.
11. H.N.Serwami – The Brahmins of the Deccan.
12. A. Krishna Swame – The Tamil Century under Vijayanagar.

SECOND SEMESTER

Core Course – 202

Paper – VII

Social, Cultural and Economic History of Medieval India

Full Mark: 100 (80 + 20)

Time : 3 hours

Unit-I

- i) Early Muslim Settlements, Rise of Islam and its impact.
- ii) Composition and stratification of the society, Rural urban relationship.
- iii) Position of Women.

20 Marks

Unit-II

- i) **Economic Aspects** – Agrarian Economy, Sources of Revenue, Nature and magnitude of taxation.
- ii) **Industries** – Cotton textiles, handicrafts, agro-based industries, metal technology and artisans.
- iii) **Trade and commerce** – State policies, internal and external trade, trade centres and posts, transport and communication

20 Marks

Unit-III

- i) **Bhakti Movement** : Cause of the rise of Bhakti Movement. Nath Panthis, Kabir, Santh tradition, Nanak, Dadu, Chaitanya, Tulsi Das, Namdev.
- ii) **Sufism** – Its origin, concept, Practices, Major Sufi orders Chisti order, Suhrawardi order etc.
- iii) **Impact of Bhaktism and Sufism.**

20 Marks

Unit-IV

- i) **Indo – Islamic Architecture** –Khalji, Tughluq, Sayyid and Lodi Period.
- ii) **Mughal Architecture** under Akbar, Jahangir, Shah Jahan, Aurangzeb and later Mughals.
- iii) **Painting** under the Mughals, Rajput painting, Deccan Painting

20 Marks

Internal Assessment

20 Marks

Books Reference:

- 1) An advanced study in the History of Medieval India – J. L. Mehta, Vols I, II & III.
- 2) Social, Cultural and Economic History of India – (Earliest Times of Preset Times) S. C. Roy Choudhury.
- 3) History of Medieval India – Satish Chandra.
- 4) The Agrarian System of Mughal India – Irgan Habib
- 5) Some aspects of North Indian Social life – P. N. Ojha
- 6) A History of South India – K.A. N. Sastri
- 7) Indian Architecture (Islamic Period) – Percy Brown
- 8) Trade and civilization in the Indian Ocean – Satish Chandra
- 9) Social Economic History of Medieval India – K. N. Chitnis
- 10) Manmath Padhy – Fairs, Festivals and Folk Culture of Odisha
- 11) Manmath Padhy – Tribal society and culture : Changes and Continuity.
- 12) S. S. Samal – Radhnagar Gada O Dhamaslara Pratnatatwika Vaibhava
- 13) S.S. Samal – Antiquities of Gandhamardhan Mountain of Orissa.

SECOND SEMESTER

Core Course : 203

Paper – VIII

HISTORY OF THE FREEDOM MOVEMENT IN INDIA (1885-1947)

Full Mark -100 (80+20)

Time : 3 hrs

Unit-I

- i) Emergence of Indian Nationalism 20 Marks
- ii) Foundation of the Indian National Congress, Moderate phase, Extremist phase and Revolutionary Nationalist Activities : The Ghadar Movement
- iii) Rise of Economic Nationalism : Swadeshi Movement

Unit-II

- i) Home Rule Movement 20 Marks
- ii) National Movement under Gandhi's Leadership : Gandhi's career & thought, Entry into politics, Experiments with Satyagraha in India, Methods of mass mobilization, Khilafat and non-co-operation movement, Role of Women
- iii) Swaraj Party : Formation Work Division, Evaluation of their work

Unit-III

- i) Civil disobedience movement, Role of women, Round Table conferences 20 Marks
- ii) The Indian Council Act – 1909
- iii) The Govt. of India Act – 1919 and 1935
- iv) Muslim league and Partition of India

Unit-IV

- i) Quit India Movement 20 Marks
- ii) Subas Chandra Bose and the Indian National Army- Royal Indian Naval Revolt
- iii) The Partition of India and Achievement of Independence

Internal Assessment

(20 Marks)

Book for Reference

1. A.R. Desai : Social Background of Indian Nationalism
2. Bipan Chandra : Nationalism and Colonialism in India
3. Bipan Chandra (Ed.): India's Struggle for Independence 1857-1947
4. Bipan Chandra : The Epic Struggle
5. Sumit Sarkar : Modern India (1885-1947)
6. B.L. Grover and S. Grover : A new look at modern Indian History
7. B.N. Pandey (Ed.) : Centenary History of Indian National Congress, 3 Vols
8. M.N. Das: Indian under Morley and Minto
9. A.R. Desai : Peasant Struggle in India
10. Bipan Chandra : Rise and Growth of Economic Nationalism in India
11. R.C. Dutt : Economic History of India 2 Vols
12. L. Prasad : India National Movement

SECOND SEMESTER
Core Course : 204
Paper – IX

HISTORY OF EUROPE FROM 1789 TO 1914

Full Mark -100 (80+20)

Time : 3 hrs

Unit-I

- i) The French Revolution causes
- ii) The Estate General, National Assembly making of the constitution
Legislative Assembly
National Convention, Directory
- iii) The consulate – Napoleon Bonaparte Reforms and Foreign policy
Early years of the Empire
The Empire at its height
Downfall of Napoleon : Causes

20 Marks

Unit-II

- i) Congress of Vienna
- ii) Era of Metternich and his system
- iii) Regime of Louis XVIII

20 Marks

Unit-III

- i) July Revolution – 1830 and Charles – X
- ii) February Revolution – 1848 and Louis Philippe
- iii) Second Republic and Founding of the Second Empire:
Napoleon III – domestic and Foreign Policy

20 Marks

Unit-IV

- i) Crimean War-Causes and Effects
- ii) Unification of Italy
- iii) Unification of Germany, Domestic & Foreign Policy of Bismarck
- iv) Alexander – II – Reforms

20 Marks

Internal Assessment

(20 Marks)

Book Recommended

1. A History of Modern Times : C.D.M. Ketelbey
2. Europe Since Napoleon : David Thosmson
3. Europe in the 19th and 20th century – Lipson
4. History ofModern Europe – C.D. Hazen
5. History of Europe – P.Maitai
6. Modern Europe : K.L. Khurana

SECOND SEMESTER

Core Course – 205

Paper – X

International Affairs (1939 A.D. – 2000 A.D.)

Full Mark -100 (80+20)

Time : 3 hrs

Unit-I

- i) United Nations Organisation – Formation, Structure, Objectives
- ii) Achievements and failure of the UNO
- iii) Post – war Revival of Japan :
Democratic & Socio – Economic Revival from 1945 to 1951
Progress of Japan from 1951 to 1970

20 Marks

Unit-II

The Cold War

- i) Meaning, Origin, Background Super Power Rivalry from 1945 to 1980 Progress and Redemtion
- ii) Regional Security and Alliances : Military NATO, CENTO, Waresaw Pact, ASEAN, SEATO.
- iii) Germany and the Cold War

20 Marks

Unit-III

- i) India in the world Politics
India Foreign Policy (From 1947 to 2000) – Salient Features
India and Pakistan (Simla Agreement)
- ii) India and Soviet Russia
India and United States of America
- iii) Emergence of India as a Nuclear State : Comprehensive
Tent Ban Treaty (CTBT) and India's Perception about it.

20 Marks

Unit-IV

- i) Prospects of Disarmament after the second world war
- ii) Non Aligned Movement (NAM), The Summits ; India and the NAM
- iii) Dawn of Democracy in Soviet Union Under Gorbachev.

20 Marks

Internal Assessment

(20 Marks)

Book For Reference

1. E.H.Carr : International Relations Between Two World Wars
2. M.G.Gupta : International Relations
3. W.C. Langsham : World Since 1919
4. D.C.Gupta : The League of Nations
5. E.H.Carr : The Russian Revolution from Lenin to Stalin
6. A.J.P. Taylor : The Origin of the Second World War
7. H.S. Morgenthau : Politics among Nations
8. B.William : Modern Africa
9. Harold M. Vinacke : A History of the Far East in Modern Times
10. Dr. S.S. Samal : Adhunik Viswa Itihas (Odia)
11. Dr.S.S. Samal : Antarjatika Ghatana (Odia)
12. Siddhartha Das : The United Nations
13. Siddhartha Das : Dynamics of International Politics
14. K.B. Keswani – International Relations in Modern World (1900-2000)

THIRD SEMESTER

Core Course : 301,

Paper – XI

Political History of Modern India from 1757 to 1885 A.D.

Full Mark -100 (80+20)

Time : 3 hrs

Unit-I

i) The Sources

20 Marks

ii) The Establishment of British Rule in India

Siraj-Ud-Daula and the Battle of Plassey Causes, Course and Importance

iii) Lord Clive – Early career and achievements,

Dual system of administration in Bengal under Clive.

Unit-II

i) Warren Hastings – Reforms

20 Marks

ii) Lord Cornwallis – Reforms, Permanent Settlement

iii) Lord Wellesley – Achievements : The Subsidiary Alliance

Unit-III

i) Anglo – Mysore and Anglo Maratha Relations

20 Marks

ii) William Bentinck Reforms

iii) Lord Dalhousie – Reforms, Doctrine of Lapse

iv) Revolt of 1857 – Causes and Consequences

Unit-IV

i) Administrative reorganization under the British Crown – 1858

20 Marks

ii) Lord Ripon – Reforms

iii) Lord Curzon – Reforms and Policies

iv) Socio- Religious Reform movement in the 19th Century : Role of Raja Ram

Mohan Roy and Dayananda Saraswati.

Internal Assessment

(20 Marks)

Book Reference

1. Text Book of Modern Indian History : Sarkar & Dutta
2. History of British Rule in India : P.E. Roberts
3. New Look at Modern Indian History : B.L. Grover & S. Grover
4. Advances History of India : Ray Choudhury, Majumdar & Dutta
5. Advanced Study in the History of Modern India Vol.: I and II G.S. Chhabra
6. Modern India L. Prasad
7. Modern India : K.L. Khurana
8. Modern India : V.D. Majumdar

THIRD SEMESTER

Paper – XII

Core Course - 302

Social, Cultural and Economic History of Modern India

(1757 A.D. to 1947 A.D.)

Full Mark -100 (80+20)

Time : 3 hrs

Unit-I

i) Understanding Modern India – Sources

20 Marks

Archival records, Private Papers, News Papers, Periodicals etc

ii) European traders in India Portuguese, Dutch, French and British. Their Settlements in India

Unit-II

i) Economic History during the colonial period Agrarian Policy, Land settlement, Zamindari system and Ryotwari system etc. Commercialisation of agriculture.

20 Marks

ii) Industry Rural Industry and Urban industry, Evolution of Modern Industry, Indigo, Tea, coffee, Jute, cotton textile, sugar industry etc. Coal mining Iron and steel, cement, paper and other heavy industry, destruction of traditional artisan industry.

iii) Transport development Railway system, Water transport, Road Transport, Air Transport, Impact on Indian economy.

Unit-III

i) Growth of Education: Role of the Christian Missionaries and Non-Missionary

20 Marks

British official, Macaulay's Minute, Wood's Despatch. Hunter commission, Lord Curzon and Education system, under him, Sadler commission, Hartog Committee, Wardha scheme of Basic Education, Sargeant plan of Education.

Unit-IV

i) Indian press under colonial rule-East India company and the Indian press; Period of Struggle between the press and govt Vernacular Press Act, 1878. Newspaper Act. 1908. Indian Press Act, 1910, and The Indian Press Act – 1931

20 Marks

ii) Emancipation of women : abolition of sati, Female infanticide

Internal Assessment

(20 Marks)

Books for Reference

1. S.S. Raychowdhury – Social Culture and Economic History India
2. B.L. Grover & S. Grover : A New look at Modern Indian History
3. Sumit Sarkar : M odern India
4. Tapan Raychowdhury (zEd) – Indian Economy in 19th Century
5. J. Krishna Murty (Ed) : Indian Economy in the 19th Century
6. Iswari Prasad : Indian in the Eighteenth Century
7. K.K. Dutta – Socio –Cultural Background of Modern India
8. S. Natarajan : The press in India
9. Majumdar Dutta, Raichowdhury – An advanced History of India
10. N.K. Sinha : Modern India

THIRD SEMESTER

Allied Course - I (A.E.-I)

CC-303

Research Methodology

Full Mark -100 (80+20)

Time : 3 hrs

Unit-I

- i) Sources of Indian History – Ancient and Medieval Periods
- ii) Sources of Indian History – Modern Period
- iii) Sources of Odisha History

20 Marks

Unit-II

Research Methodology

- i) Preliminary Operations – What is Research
- ii) Historical facts and evidences
- iii) Value of allied disciplines in Historical Interpretations

20 Marks

Unit-III

- i) Chronology and Dating
- ii) Analytical Operations
- iii) Synthetic Operations

20 Marks

Unit-IV

- i) Concluding Operations
- ii) Principles of Historical Imagination and Observation
- iii) Language and style of composition Presentation
- iv) A case study of Tribal museum of Koraput, the arrangement of specimens, personal contributions of public, Teachers and Students for its development.

20 Marks

Internal Assessment

(20 Marks)

Book for Reference

1. B. Sherk Ali History, Its theory and Method (Madras, 1978)
2. AIL, Rowse The use of History (London, 1963)
3. E.H. Carr What is History (London, 1951)
4. R.G. Collingwood The idea of History (London, 1972)
5. R.K. Majumdar & A.N. Srivastav Historiography – Method of History (Delhi - 1987)
6. K. Rajayan History in theory and Method (Madurai, 1982)
7. G.K. Clark Guide for Research Students working on Historical Subject (Cambridge , 1969)
8. P. Gardiner (ed.) Theories of History (Oxford, 1959)
9. H.E. Barnes A History of Historical writing (New York, 1963)
10. U. N. Ghoshal The Beginnings of Indian Historiography and other essays (Calcutta-1944)
11. B.N. Luniya Historians of Medieval India (Agra 1969)
12. R.C. Majumdar Historiography in Modern India (Bombay 1970)
13. V.S. Pathak Ancient Historians of India (Bombay, 1989)
14. Jagdish Narayan Sarkar History of History Writing in Medieval India

THIRD SEMESTER

Core Elective (C.E -I) CC-304

Special Paper - I

Political History of Odisha upto 1568 A.D

Full Mark -100 (80+20)

Time : 3 hrs

Unit-I

- i) Historical Geography of Odisha
- ii) Kallnga War of 261BC.-Causes and effects.
- iii) Mauryan administration in Kalinga.

20 Marks

Unit-II

- i) Kharavela-Career and Achievements
- ii) The Sailodbhabas : Origin and the Rulers
- iii) The Bhaumakaras :Origin, Genealogy, Sivakaradeva-I, Subhakaradeva-I, Sivakaradeva-II, Tribhuvana Mahadevi-I Prutvi Mahadevi, Gauri Mahadevi, Vakula Mahadevi and Dharma Mahadevi, Bhauma Administration.

20 Marks

Unit-III

- i) The Somavamsis :Achievements of Janmejaya I, Yayati I, Yayati II, and Udyotkesari, Somavamsi Administration.
- ii) The Later Gangas: Achievements of Chodaganga Deva, Ananga bhima Deva-III and Narasingha Deva-I
- iii) Ganga Administration

20 Marks

Unit-IV

- i) The Suryavamsis :Kapilendra Deva
- ii) Purustottama Deva and Prataparudra Deva
- iii) Suryavamsi Administration
- iv) Downfall of the Odisha Kingdom: Causes

20 Marks

Internal Assessment

(20 Marks)

Books For Reference :

1. History of Orissa-Dr, K.C.Panigrahi
2. Political and Cultural History of Orissa-Dr. Shishir Kumar Panda
3. A study of History of Orissa-Atul Chandra Pradhan
4. History of Orissa-Prabodh Kumar Mishra
5. History of Orissa- Vol.I-N.K.Sahu
6. The Gajapati Kings of Orissa-Pravat Mukharjee
7. The Rise and Fall of the Sailodbhavas-Dr. Sarat Chandra Behera
8. The Bhaumakaras of Orissa-Dr. Uma Kanta Subudhi
9. The Bhaumakaras, the Buddhist Kings of Orissa and their times-Biswarupa Das
10. History of Orissa-N.K. Sahu, P.K. Mishra, J.K. Sahu
11. The Somavamsi Kings of Orissa-Bina Kumari Sarma
12. Some Aspects of History and Culture of Orissa-A.K.Rath
13. Religious History of Orissa Ed.N.R.Patnaik
14. Economic History of Orissa Ed.N.R.Patnaik
15. Glimpses of Orissan Culture Ed.N.R.Patnaik
16. Antiquities of Gandharnardan Mountain of Odisha-Dr. S.S.Samal
17. Gandhamardan Parvatra Pratnatatwika Vaibhava-Dr. S.S.Samal
18. Radhanagar eham Dharmasalara Pratnatatwika Vaibhava-Dr. S.S.Samal
19. Antiquities of Radhanagar and Dharmasala Dr.S.S.Samal

THIRD SEMESTER

Core Elective - 2 (C.E.-2) CC-305
Special Paper - II

Political History of Odisha From 1568 A.D. to 1947 A.D.

Full Mark -100 (80+20)

Time : 3 hrs

Unit-I

- i) Odisha under the Afgans
- ii) Odisha under the Mughals
- iii) Odisha under the Marathas

20 Marks

Unit-II

- i) British Conquest of Odisha
- ii) Early British Administration (1804-1857)
- iii) Resistance Against the British in Odisha : Paik Rebellion, Ghumusar Rebellion, Sambalpur Rebellion

20 Marks

Unit-III

- i) Growth of Odia Nationalism : Factors
- ii) Utkala Sammilani (1903-1920)
- iii) Role of Madhusudan Das and Krushna Chandra Gajapati in the making of Odisha.
- iv) Contribution of Koraput in the freedom struggle.

20 Marks

Unit-IV

- i) Creation of the province of Odisha : Language Agitation, Amalgamation of Odia speaking territories.
- ii) Odisha in the nationalist movements : Non-cooperation, Civil Disobedience and Quit India.
- iii) Prajamandala Movement in Odisha : Dhenkanal, Nilgiri, Talcher, Ranpur
- iv) Role of Odia women in the freedom struggle

20 Marks

Internal Assessment

(20 Marks)

Book Reference

1. B.C. Ray
 - i) Orissa under the Mughuls
 - ii) Orissa under the Marathas
 - iii) Foundation of British Orissa
2. L.N. Rout
Socio-Economic life in Medieval Orissa 1568-1751
3. K.M. Patra
Orissa under the East India Company
4. J.K. Samal
 - i) Orissa under the British Crown
 - ii) History of Education in Orissa
 - iii) History of Modern Orissa
 - iv) Administrative History of Orissa
5. K.C. Jena
Ascending of British Raj in Orissa
6. P. Mukherjee
History of Orissa
7. P.K. Mishra
Political History of Orissa
8. Prasanna Kumar Mishra
Political Unrest in Orissa in the 19th Century
9. N.K. Jit
The Agrarian Life and the Economy of Orissa

FORTH SEMESTER

Core Course 401

Paper XIII

Historical Application in Tourism

Full Mark -100 (80+20)

Time : 3 hrs

Unit-I

- i) Understanding Tourism-Definitions, forms. Traveller and Tourist, Purpose of visit, means of transport, Tourism Accommodation. **20 Marks**
- ii) History of Tourism in India-Travel in Pre-Historic times, Travel in Middle Age, Development of Early and Modern Transportation system.
- iii) Organisation of Tourism-Role of the Government, Need for organisation, Factors, The National Tourist organisation, U.N. conference Recommendations, World Tourism organization, Pacific-Asia Travel Association.

Unit-II

Administration, Acquisition and arrangement of specimens

20 Marks

- i) Museum administration, Planning of Museum building, planning of museum gallery, principles of display, Lighting, Mode and ways of Acquisition of Museum specimens. Arrangement in museum
- ii) Documentation and Labels in Museum Need for Documentation Method of Documentation, safeguards of Records, Development of Computer based Documentation, Documentation of Ethnographic specimens, museum labels, Dioramas models and charts, museum photography
- iii) **Pilgrim Tourism- Tourism-Fairs and Festivals**
 - a) Car festival of Lord Jagannath , b) Onam ,c) Christmas ,d) Muharam
 - e) Nuakhai, f) Balijatra
 - g) Chaitra Purva in the sakti pithas of Rayagada with a special references to Maa Majjhighariani

Unit-III

- i) Tourism and promotion of Handicraft, performing Arts of Odisha:

20 Marks

- a) Pattachitra Painting and applique work of Pipli
- b) Handloom Textile of Odisha (Sambalpuri Pata) Pattachitra of Raghurajpur, Filegree work of Cuttack
- c) Handicraft made of clay, Stone, Wood, Bamboo, Silver, Ivory, Lacque etc.
- d) Pala, Daskathia, Chhau, Odissi, Gotipua, Mughal Tamasa, Vaunsarani, Sambalpuri dance, Tribal dance in Rayagada
- ii) **Historical Sites-Monuments and Museum: Regional**
 - a) The Odisha State Museum Bhubaneswar
 - b) Khandagiri and Udaygiri
 - c) Ratnagiri, Lalitgiri and Pushpagiri
 - d) Nrusingha Nath - Dist Bargarh
 - e) Hari Sankar - Dist - Bolangir
 - f) Jaugad - Dist Ganjam
 - g) Gupteswar - Dist Koraput
- iii) **Tourist Destinations : Historical Events**
 - a) Kalinga War
 - b) Jalianwallabag Massacre

- c) Includi Episode
- s) Iram Massacre
- e) Papadahandi Massacre – Dist Navarangpur

Unit-IV

i) Regional monuments-Evolution and Development of Odishan temple Architecture **20 Marks**

- Khakhara, Nagara and Pidha Temples:

Case study of some temples :

- a) Parsurameswar, b) Vaital, c) Mukteswar Lingaraj, d) Sun Temple at Konark
- e) Jagannath Temple at Puri and Rayagada.
- f) Nilakantheswar Siva Temple at Devagiri, Dist Rayagada.
- g) Pathaleswara temple at Paikapada, Rayagada.

ii) Guiding Aids and Skills-

- a) Guides and Escrots : Definition and Role of a Guide
- b) Guiding as a technique, leadership facual knowledge, personality, Communication skill, command in language etc.

iii) Profiling Foreign and Domestic Tourist

Internal Assessment

(20 Marks)

Book for Reference :

- | | |
|----------------------------|--|
| 1. A.L. Basham | Cultural Heritage of India |
| 2. Dharmaranjan & Seth | Tourism in India |
| 3. Sunita Chopra | Tourism Today |
| 4. Ratandeep Singh | Tourism Today |
| 5. Sobhita Panja | The Museums of India |
| 6. R.N. Kaul | The Dynamics of Tourism |
| 7. Saryu Doshi | Aspects of the Performing Arts of India |
| 8. J.C. Harley | The Art and Architecture of the Indian Sub-continent |
| 9. Percy Brown | Indian Architecture - Vol - I the Indian Buddhist and Hindu Period |
| 10. Percy Brown | Indian Architecture - Vol - II Islamic Period |
| 11. Michael M. Coltman | Introduction to Travel Tourism |
| 12. K.C. Panigrahy | Archaeological Remains of Bhubaneswar |
| 13. VidyaDahejia | Early Stone Temples of Orissa |
| 14. N.K. Sahu | Buddhism in Orissa |
| 15. National Book Trust | Festivals of India |
| 16. Utkala Pathaka Sansada | Odisara Parva Parvani (Odia) |
| 17. Dr. S.S. Samal | Antiquities of Gandhamardhan Maountain of Odisha |
| 18. Dr. S.S. Samal | Gandhamardhan Parvatara Pratnatatwika Vaibhava |
| 19. Dr. S.S Samal | Radhanagar ebam Dharmasalara Pratnatatwika Vaibhava |

FORTH SEMESTER

Core Course 402

Paper XIV

Historiography

Full Mark -100 (80+20)

Time : 3 hrs

Unit-I

- i) Nature and Scope of History 20 Marks
 - What is History
 - History as Science or Arts
- ii) Value and Subject matter of History
 - Historical Objectivity and Subjectivity in history, Historicism
- iii) Structure and form of History, Bias in History

Unit-II

- i) Historiography or Development of Historical Writings 20 Marks
 - Ancient Historiography - Herodotus, Thucydides, Cato the Censor, Livy, Cornelius
- ii) Medieval Historiography, Church Historiography, Augustine, Ibn Khaldun
- iii) Modern Historiography
 - Positive Historiography
 - Gibbon, Carlyle, Toynbee, Hegel
 - Vico, Comte, Ranke, Spengler

Unit-III

India Historiography

20 Marks

- i) Ancient Period
 - Indian Tradition of Historiography - Vedas, Puranas etc.
 - Jaina and Buddhist Historiography - Bana and Kalhana
- ii) Medieval Period
 - Alberuni, Abul Fazl, Amir Khusrau
- iii) Modern Period
 - Colonial Historians of India
 - Macauley, W.W. Hunter
 - R.G. Bhandarkar, K.P. Jayswal, H.C. Raychaudhury, Muhammad Habib

Unit-IV

- i) Odishan Historiography- A Sterling, R.D. Banerjee, N.K. Sahu, K.C. Panigrahi, S.N. Rajguru 20 Marks
- ii) Themes in Indian History (I) (Economic, Labour and Peasants, Varna, Jati, Janjati, Gender, religion etc.)
- iii) Themes in Indian History (II) (Art, Literature, Environment, Science etc.)

Internal Assessment

(20 Marks)

Book Reference

1. What is History – E.H. Carr
2. The Nature of History – A. Marwick
3. Idea of History R.G. Collingwood
4. Past and Prejudice – Romilla Thapar
5. A study of History – Arnold Toynbee
6. History : Its Theory and Method – B. Seikh Ali
7. History – Its Theory and Research Methodology – K.L. Khurana
8. Concepts & Methods of Historiography – K.L. Khurana
9. H.E. Banerji – A History of Historical Writing

FORTH SEMESTER

Core Course 403

Paper XV

History of Science and Technology in India

Full Mark -100 (80+20)

Time : 3 hrs

Unit-I

Science and Technology : The Beginning

20 Marks

- i) Sources of History of Science and technology in Ancient India
- ii) Origin and development of technology in pre-historic period : Beginning of agriculture and its impact on the growth of science and technology.
- iii) Science and technology during Vedic and Later Vedic times : Doctrine of five elements, Theory of Atomism

Unit-II

Development of Science and Technology in pre-Colonial India.

20 Marks

- i) Developments in astronomy : Contribution of Aryabhata, Varahamihira and Bhaskara - I
- ii) Development of Mathematics : Geometry, the Sulbha Sutra; Arithmetic and Algebra
- iii) Development of Medicine and Surgery ; Ayurveda : Charaka and Sushruta Samhitas

Unit-III

Science and Technology in Colonial India

20 Marks

- i) Early European Scientists in Colonial India : Surveyors; Botanists, Doctors under the company's service.
- ii) Indian Response to New Scientific Knowledge.
- iii) Pioneer Indian Scientists and their contributions - J.C. Bose, P.C. Ray, C.V. Raman

Unit-IV

i) Atomic Energy in India

20 Marks

ii) Nuclear Energy in India

iii) Space and Defense Research in India.

Internal Assessment

(20 Marks)

Book Reference

- Arnold Devid : Science, Technology and Medicine in Colonial India, The New Cambridge History of India Series, OUP, Cambridge, 1999
- A.K. Bag : Science and Civilization in India, Vol - I (Harappan Period, C-3000 B.C. - C. 1500 B.C.) Navrang Publications, New Delhi, 1985
- A.K. Bag (ed.) - History of Technology in India, Vol I, INSA, New Delhi, 1997
- A.K. Biswas - Science in India, Firma KL Mukhopadhyaya; Calcutta, 1967
- Ahsan Jan Qaisar- The Indian Response to European Technology and Culture (A.D. 1498-1707); Oxford University Press, Delhi 1982
- Ardhendu Sekhar Ray - Crafts and Technology in Ancient India; S.S. Publishers, Delhi, 1998
- B.R. Nanda (ed.) : Science and Technology in India, Vikas Publishing House Pvt. Ltd. New Delhi, 1977
- Debiprasad : History of Science and Technology in Ancient India, 3, Vols. Firma Chattopadhyaya : KLM Pvt. Ltd. , Calcutta, Vol I (1989), Vol .II (1991), Vol.III(1996)
- D.M. Bose et.al (ed) : A concise History of Science in India: INSA, New Delhi, 1971
- Anil Kumar : Medicine and the Raj Sage, delhi 1998
- Deepak Kumar : Disease and Medicine in India: A historical Overview
- Macleod, Ray & Deepak Kumar (eds) : Technology and The Raj. Sage, Delhi, 1995
- Deepak Kumar : Science and The Raj, Oxford University Press, Delhi - 1995
- Dharmpal : Indian Science and Technology in the Eighteenth Century - Some contemporary European Account, Impex India, Delhi 1971
- Deepal Kumar (ed) : Science and Empire : Essays in Indian Context, Anamika Prakashan Delhi, 1991
- H.C. Bhardwaj : Aspects of Ancient Indian Technology, Motilal Banarasi Dass, Delhi 1979
- Kenneth G. Zysk : Asceticism and Healing in Ancient India, Oxford University Press
- Priyavrat Sharma : History of Medicine in India, INSA, New Delhi, 1992.

FORTH SEMESTER

Core Elective (C.E -3) CC-404

Special Paper - III

Social, Cultural and Economic History of Odisha upto 1568 A.D.
Full Mark -100 (80+20) Time : 3 hrs

Unit-I

- i) Sources of Odisha History **20 Marks**
- ii) Social and Economic condition of Odisha upto 1568 A.D.
- iii) Religious condition of Odisha upto 1568 A.D.
- iv) Development of Education and literature upto 1568 A.D.

Unit-II

- i) Saivism in Odisha **20 Marks**
- ii) Saktism and the Tantra cult in Odisha
- iii) Vaishnavism in Odisha
- iv) Origin and Evolution of Jagannath Cult and the cat worship at Narasingha Nath and Harinankar.

Unit-III

- i) Salient feature of Odishan Art, Architecture, Sculpture, Painting, Rock Art, Temple Architecture etc. **20 Marks**
- ii) The Kosali and Kalingan Style of Architecture – Special Features and importance.
- iii) Jainism and Jaina Movements in Odisha upto 1568 A.D. (Art & Architecture)

Unit-IV

- i) Buddhism and Buddhist Movements in Odisha upto 1568 A.D. (Art & Architecture) **20 Marks**
- ii) The Art Architecture of Jagannath temple (Puri), Konark Temple, Lingaraj Temple, (BBSR).
- iii) Condition of Women during Ancient & Mediaval Period.

Internal Assessment

(20 Marks)

Book for Reference

1. P.K. Mishra & J.K. Samal (Ed) Comprehensive History and Culture of Orissa, Vol-II & III
2. N.K. Sahu Huddhism in Orissa
3. L.K. Panda Sharvism in Orissa
4. Collection & Selection of History of Orisssa, Vol - I
5. N.R. Pattnaik Cultural History of Orissa
6. A.K. Rath Some aspects of the History and Culture of Orissa
7. A.K. Rath Odishara Jaina Dharma Sanskruti
8. R.P. Mahapatra Jain Monuments of Odisha
9. S.K. Panda History of Odisha
10. Sahu, Mishra & Sahu History of Orissa
11. Dr. S.S.Samal Gandhamardan Parvatra Pratnatatwika Vaibhava
12. Dr. S.S.Samal Radhanagar ebam Dharmasalara Pratnatatwika Vaibhava
13. Dr. S.S.Samal Antiquities of Radhanagar and Dharmasala
14. Dr. S.S.Samal The Antiquities of Radhanagar and Dharmasala
15. K.C. Panigrahi History of Culture
16. R.L. Mitra Antiquites of Orissa Vol - 1 & 2
17. K.C. Panigrahi Archaeological Remains at Bhubaneswar
18. S.N. Rajguru History of Gangas Part - 1 & 2
19. R.P. Mahapatra Jaina Movements of Odkisha

FORTH SEMESTER

Core Elective (C.E - 4) CC-405

Special Paper - IV

Project Work & Viva Voce

1. Paper - IV(a)

Project Works

It will be based on highlighting the History of Rayagada and Koraput in Particular and History of Odisha in general.

50 Marks

2. Paper - IV(b)

Viva Voce.....

(Questions from subject will be of 70% and From G.K. 30%).

50 Marks

P. G. Dept. Of History

Spills
18/7/18

SP all
18.07.18

RL Santiago
18.7.18

Dr. B. Behera
18.7.18
(Dr. B. Behera)
Associate prof.

Detailed Syllabus

First Semester

Paper – CC 101

Partial Differential Equations and its Applications

Unit 1	Basic Concepts and Classifications of Second Order equation.
Unit 2	The Cauchy Problem, The Method of Separation of Variables
Unit 3	Eigenvalue Problems, Boundary Value Problems
Unit 4	Fourier Transforms and Laplace Transforms

Books Prescribed:

Linear Partial Differential Equations for Scientists and Engineers. Tyn Myint, U & Lokenath Debnath (Birkhauser Pub) 4th Edition. Chapters: 1(1.2-1.6) , 4, 5(5.1-5.7), 7,8,9,12(12.1-12.6, 12.8-12.11).

Paper – CC 102

Topology

Unit 1	Open Sets and Limit Points, Closed Sets and Closure, Bases and relative topologies
Unit 2	Connected Sets and Components, Compact and Countably Compact spaces, Continuous functions, Homeomorphism
Unit 3	T_0 and T_1 Spaces and sequences, Axioms of countability, T_2 Spaces , Regular and Normal Spaces, Completely Regular Spaces
Unit 4	Urysohn's Metrization Theorem, Finite products, product invariant properties, metric products, product topology.

Books Prescribed:

W.J Pervin, Foundations of General Topology, Academic press. Chapters: 3(3.1,3.2 and 3.4), 4(4.1 to 4.4), 5(5.1 to 5.3, 5.5 to 5.6), 8 (8.1 to 8.4) , 10(10.1 only)

Paper – CC 103

Algebra- I

Unit 1	Automorphisms, Cayley's Theorem, Permutation Groups, Another Counting Principle
Unit 2	Sylow's Theorems, More Ideals and Quotient Rings, The Field of Quotients of an integral domain. Euclidean Rings. A Particular Euclidean Ring.
Unit 3	Polynomial Rings, Polynomial Rings over the Rational field, Elementary Basic Concepts of Vector Spaces, Linear independence and Bases
Unit 4	Extension Fields, The transcendence of e , Roots of Polynomials, Construction with Straightedge and Compass, More about roots

Books Prescribed:

I.N. Herstein , Topics in Algebra. John Wiley and Sons, (2nd Edition) Chapters: 2(2.8 to 2.12), 3(3.5 to 3.10) , 4 (4.1, 4.2) 5(5.1 to 5.5)

K. B. Achary
28.7.18

Paper – CC 104

Elementary Complex Analysis-I

Unit 1	Complex Numbers
Unit 2	Complex Functions
Unit 3	Conformality and linear transformations
Unit 4	Complex Integration: Fundamental theorems, Cauchy's Integral formula, local properties of analytic functions, complex integration continued: general form of Cauchy's theorem.

Books Prescribed:

Lars V. Ahlfors, Complex Analysis, Third Edition, Mc Graw Hill ,Chapter 1,2,3(3.1-3.4) ,4 (Sections 1,2,3 & 4).

Paper – CC 105

Numerical Analysis and its Applications

Unit 1	Interpolation & Approximation : Introduction, Lagrange and Newton interpolation, Finite difference operators, Interpolating Polynomials using finite differences, Hermite Interpolation, Piecewise and Spline Interpolation
Unit 2	Interpolation & Approximation Continued: Bivariate Interpolation, Approximation, Least Square Approximation, Uniform Approximation, Rational Approximation, Choice of Method
Unit 3	Differentiation and Integration: Introduction, Numerical differentiation, Optimum Choice of step Length, Extrapolation Method, Partial Differentiation, Numerical integration, Methods based on interpolation, Methods based on undetermined coefficients, Composite Integration Methods , Romberg Integration, Double Integration.
Unit 4	Ordinary Differential Equation, Initial Value Problem : Introduction, Difference Equation, Ordinary Differential Equations, Numerical Methods, Single step methods, Stability Analysis of single step methods, Multi Step methods.

Books Prescribed:

M.K. Jain, S.R.K. Iyengar and R.K. Jain: Numerical Methods for Science and Engineering Computations (Fourth Edition) Chapters: 4,5 & 6.

K. B. Achary

Second Semester

Paper – CC 201

Abstract Measure

20+80

Unit 1	Introduction, Outer Measure, Measurable Sets and Lebesgue Measure, A non Measurable Set, Measurable Functions, Littlewood's Three Principle.
Unit 2	The Lebesgue Integral
Unit 3	Differentiation and Integration
Unit 4	The Classical Banach Spaces

Books Prescribed:

Real Analysis : H.L.Royden (Macmillan) Chapter: 3,4,5,6.

Paper – CC 202

Advanced Complex Analysis

20+80

Unit 1	Complex Integration and Calculus of Residues
Unit 2	Series and Product Development : Power Series Expansion , Partial Fraction and Factorisation
Unit 3	Entire Function, Riemann Zeta Function
Unit 4	Elliptic Functions: Simple Periodic Functions and Double Periodic functions, Elliptic Function, Weirstrass Theorem.

Books Prescribed:

Lars V. Ahlfors, Complex Analysis, Third Edition, Mc Graw Hill , Chapter: 4(Section 5), 5(Section 1 & 2), 6(Section 3&4) , 7(Section 1,2 &3) . .

Paper – CC 203

Algebra - II

20+80

Unit 1	Dual Spaces, Inner Product Spaces, The Elements of Galois Theory, Solvability of Radicals
Unit 2	The Algebra of Linear Transformation, Characteristic Roots, Matrices
Unit 3	Canonical Forms and Triangular Forms, Nilpotent Transformations, Jordan Forms.
Unit 4	Trace and Transpose, Determinants, Hermitian, Unitary and Normal Transformation

Books Prescribed:

I.N. Herstein : Topics in Algebra, John Wiley and Sons(2nd Edition) 2002, Chapters : 4(4.3-4.4) , 5(5.6-5.8) , 6(6.1-6.10)

K. S. Arun

Paper – CC 204

20+80

Mathematical Statistics

Unit 1	Elements of theory of Probability: Classical definition of Probability, Theorem on union of events, Conditional Probability: Theorem of Compound Probability, Independence of events, The Bayes Theorem, Statistical and Empirical definition of Probability, Geometric Probability, Axiomatic definition of probability, Conditional Probability (Axiomatic Definition)
Unit 2	Probability distribution on R : Random Variables, Probability distribution of a R. V. , Discrete and continuous R. V. Independent Random Variables, Lebesgue-Stieltjes Integrals, Integration of a Random Variable.
Unit 3	Some Characteristics of Probability Distribution: Expectation, Moments, Some inequalities Concerning Moments, Different Measures of central Tendency, Measures of Dispersion, Measures of Skewness and Kurtosis. Some probability Inequalities
Unit 4	Generating Functions: Probability Generating Function, Moment Generating Function, Factorial Generating Function, Cumulant Generating Function, Characteristic Function, Some discrete Distributions on R, : Discrete Uniform Distribution, The Bernoulli Distribution, The Binomial Distribution, The Hypergeometric Distribution, The Poisson Distribution, The Geometric Distribution, The negative Binomial Distribution. The power series Distribution.

Books Prescribed:

Parimal Mukhopadhyay, Mathematical Statistics, Chapter: 1,2,3,4& 5.

Paper – CC 205

C Programming Language

(Det) 10 + 40 (sem) + 50 (pract)

Unit 1	Arrays, Character Arrays and strings
Unit 2	User Defined function
Unit 3	Structure and Unions
Unit 4	Pointer, Dynamic Memory Allocation

Books Prescribed:

Programming in ANSI-C, E.Balaguruswamy (3rd Edition), Tata Mac Graw Hill, Chapter : 7,8(8.1-8.5),9,10,11.

K. B. Achary

Third Semester

Paper – CC 301

Functional Analysis

Unit 1	Normed Spaces, continuity of Linear Maps
Unit 2	Hahn- Banach Theorems, Banach Spaces
Unit 3	Uniform Boundedness Principle, Closed Graph And Open Mapping Theorems, Bounded Inverse Theorem.
Unit 4	Spectrum of Bounded Operator, Duals and Transposes.

Books Prescribed:

Functional Analysis : B.V. Limayee , New Age Publishser, 2nd Edition, Chapter: 5,6,7(Except Banach Limits),8, 9 (Except Divergence of Fourier Series of Continous Functions and Matrix Transformations and Summability Methods), 10, 11, 12(Upto Theorem 12.6) And 13(upto theorem 13.5).

Paper – CC 302

Number Theoritic Cryptography - I

Unit 1	Time Estimates for Doing Arithmetic, Divisibility and Euclidean Algorithm, Congruences. Some Applications to factoring.
Unit 2	Finite Fields, Quadratic residues and reciprocity.
Unit 3	Some simple Cryptosystems, Enciphering Matrices.
Unit 4	The idea of public key cryptography, RSA

Books Prescribed:

Neal Koblitz: A Course in number Theoritic Cryptography, Springer, Chapters 1,2,3,4(4.1 and 4.2)

Paper – CE 303

Ordinary Differential Equations

Unit 1	Basic Concepts and Linear Equations of the First order
Unit 2	Linear Differential Equations of Higher Order
Unit 3	System of Linear Differential Equations; Systems of First order equations, Existence and Uniqueness Theorem. Fundamental Matrix Non Homogeneous Linear Systems, Systems of Linear Differential Equations, Linear Systems with Constant Coefficients, Linear System with Periodic Coefficients.
Unit 4	Equations with Deviating Arguments, Existence and Uniqueness of Solutions.

Books Prescribed:

Ordinary Differential Equations (2nd Edition), S.G. Deo, V. Lakshmikantham , V. Raghavendra, Tata MC Graw Hill Publishing, Chapters: 1,2 (Except 2.10),4,5,11.

K. B. Achary

Paper – CE 304

Optimization Techniques –I

Unit 1	Integer Programming: Gomory's Algorithm for pure integer linear programs, Gomory's mixed integer- continuous variable algorithm, Branch and Bound methods
Unit 2	Kuhn- Tucker optimality conditions: some theorems , Kuhn Tucker first order necessary optimality conditions, Second Order optimality Condition, Lagranges Method.
Unit 3	Convex Programming Problem, Sufficiency of Kuhn-Tucker Conditions, Legrangian saddlepoint and duality, duality for convex programs.
Unit 4	Game Theory: Game Theory Problem, Two Person Zero sum Game, Finite Matrix game, Graphical Method for 2xN and Mx2 Matrix games. Some theorems, Dominance Principles.

Books Prescribed:

Mathematical Programming by N.S. Kambo. Chapters : 6 (6.4 to 6.6), 7 (7.1 and 7.4) , 8, 10.

Paper – AE 305

Mathematical Methods

Unit 1	Interpolation
Unit 2	Numerical integration
Unit 3	Mathematical Formulation, Graphical Solution and Simplex Method
Unit 4	Random Variable

Books Prescribed:

M.K. Jain, S.R.K lyengar and R.K.Jain : Numerical Methods for Science and Engineering Computations(4th Edition) New Age International Publisher, 2003. Chapters: 4.1 to 4.7, 5.6 to 5.11.

Operations Research : Kantiswarup, P.K.Gupta and Manmohan, S. Chand and Sons

G. Shanker Rao, Probability and Statistics for Science and Engineering, University Press, Chapter 2.1 to 2.15

Fourth Semester

Paper – CC 401

Graph Theory

Unit 1	Introduction to Graphs
Unit 2	Trees and Connectivity
Unit 3	Application of trees and connectivity
Unit 4	Euler Tours and Hamiltonian Cycles, Planar Graphs

Books Prescribed:

John Clark and D.A.Holton A First Look at Graph Theory, World Scientific and Allied Publisher, Chapter: 1,2(2.1 to 2.6),3(3.1 to 3.4), 5(5.1 to 5.3).

K. B. Achary

Paper – CC 405

Dissertation, Seminar and Viva Voce

Thesis: 50 Marks

Seminar: 30 Marks

Viva Voce: 20 Marks

Topic selected as per the direction of guide.

Guidelines:

The objective is to help the student to develop the ability to apply theoretical and practical tools and techniques to solve real life problems related to industry, research laboratory and institutions. After Completion of the dissertation the student should be able to :

1. Identify the problem in a system.
2. Review the literature relating to the problem.
3. Evaluation of Research Problem.
4. Collecting Materials and Methods
5. Data Collection and Analysis,
6. Develop the ability to communicate effectively.

General rules:

- Each student has to take up project work individually and one teacher can supervise maximum of 3 students.
- After identification of the topic and supervisor the students have to prepare a project proposal and submit it before the HOD for approval.
- After Completion of the project the student shall provide 3 copies of the project work along with soft copy in pdf format to the HOD before the commencement of the end semester examinations.
- The project report should contain the following chapters:
 - Introduction
 - Review of literature
 - Scope of Research Problem
 - Materials and methods
 - Result Discussion
 - Conclusion and suggestion
 - Bibliography
- Along with the project report the student should submit the approved project proposal and the originality certificate duly signed by the student and the supervisor.
- Certificate of originality : This is to certify that the project titled : _____ is an original work of the student and is being submitted in partial fulfilment for the award of M.Sc degree of Rayagada Autonomous College, Rayagada. This report has not been submitted earlier either to this college or any other institution for the fulfilment of the requirements of the course of study.

K. B. Achary

Paper - CC 402

Number Theoretic Cryptography - II

Unit 1	Discrete log, knapsack
Unit 2	Zero Knowledge protocol and oblivious transfer, pseudo primes
Unit 3	The rho method, Fermat factorization and factor bases
Unit 4	The continued fraction method, the quadratic sieve method

Books Prescribed:

Neal Koblitz, A Course on Number theoretic Cryptography. Springer, Chapter: 4(4.3 to 4.5), 8

Paper - CC 403

Fluid Dynamics

Unit 1	Fluid, viscosity, stress at a point, stress quadric, thermal conductivity, fundamental equations of the flow of viscous fluids. vorticity and circulation in a viscous incompressible fluid motion.
Unit 2	Dynamical similarity and inspection and dimensional analysis, physical importance of non-dimensional parameters, important non-dimensional co-efficients in the dynamics of viscous fluids.
Unit 3	Exact solutions of the Navier-Stokes equations, steady incompressible flow with constant fluid properties. Hagen-Poiseuille flow, Couette Flow, Jeffery-Hamel Flow, Homann flow, Hiemenz flow.
Unit 4	Steady incompressible flow with variable viscosity, Unsteady incompressible flow with constant fluid properties, Steady compressible flow, steady incompressible flow with fluid injection on the boundaries.

Books Prescribed:

Viscous Fluid Dynamics by J.L.Bansal, Oxford Publishing, Chapter: 1, 2, 3(excluding 3.5 to 3.7), 4.

Paper - CE 404

Discrete Mathematical Structure

Unit 1	Grammars and Language Discussion on Grammar, formulae and definition of a language, notations of syntax analysis, Partial Ordering, Partial Ordered set: Representation and associated Terminology, Recursive Functions, Sets and Predicates
Unit 2	Lattices as Partially ordered sets, Definition and Examples, Some properties of Lattices. Lattices as Algebraic systems. Sub Lattices, Direct Product and Homomorphism, Some special Lattices, Boolean Algebra, Definition and Examples, Sub- Algebra, Direct Product, Homomorphism.
Unit 3	Boolean Functions, Boolean forms, free Boolean algebra, Value of Boolean Expression and Boolean Functions, Representation and Minimization of Boolean functions, finite state machines, introductory sequential circuits, Equivalence of finite state Machines
Unit 4	Basic Concept of Graph Theory, Basic Definition, Paths, Reachability and Connectedness, Matrix Representation of Graphs, Trees

Books Prescribed:

Discrete Mathematical Structures with applications to Computer science by J. P. Tremblay, R. Manohar (Mc Graw Hill). Chapter 2 (2.3.8, 2.3.9, 2.6.1 to 2.6.2), 3(3.3.1 to 3.3.1), 4(4.1.1 to 4.1.5, 4.2.1, 4.2.2, 4.3.1, 4.3.2, 4.4.1, 4.4.2, 4.6.1, 4.6.2) 5(5.1.1 to 5.1.4)

K. V. Achy

Courses in Detail

1st Semester

Course No. PHY-101: Mathematical Methods in Physics Total Marks: 100
 End Sem: Theory – 80 marks, Mid-Sem: Theory- 20 marks

Unit-1

Complex Variables:

Analytic functions, Contour integrals, Laurent's series, the residue Theorem, evaluation of single and multivalued functions, branch points and branch cuts, Contour integratio involving branch point.

Unit-2

Tensors:

Introduction, Types of tensor, Invariant tensor, epsilon tensor, Pseudo tensor, The Algebra of tensor, Quotient law, Covariant derivative of tensor, Fundamental Tensor, Cartesian tensor, Christoffel symbol.

Unit-3

Group theory:

Definitions of groups, subgroups and classes, Cayley's theorem, Group representations, characters, irreducible representations of $SU(2)$ and $O(3)$ groups.

Unit-4

Special Function:

Legendere Polynomials, generating functions, Recurrence formulae, orthogonality properties of legendre's polynomial of 1st kind, Bessel generating function, Recurrence formulae, orthogonality properties of Bessel's polynomials, Fourier and Laplace transform.

Text books:

1. Mathematical Methods of Physics by Mathews and Walker (W. A. Benjamin Inc.)
2. Elements of Group Theory by A. W. Joshi (New Age International Publisher)
3. Matrices and Tensors in physics by A. W. Joshi (New Age International Publisher)
4. Mathematical Methods for Physicist by G. Arfken and H. Weber, Academic Press (Elsevier)

Reference Books:

1. Mathematical Physics by B. D. Gupta (Vikas Publishing House)
2. Mathematical Physics by P. K. Chattopadhyaya (New Age International)

Pravin

Course No. PHY-102

Classical mechanics

Total Marks: 100

End Sem: Theory – 80 marks, Mid-Sem: Theory- 20 marks

Unit-1**Kinematics of rigid body motion:**

Independent co-ordinates of a rigid body, Orthogonal transformations, Eulerian angles, infinitesimal rotations, rate of change of vector, Coriolis force, angular momentum and kinetic energy of motion about a point, inertial tensor and the moment of inertia, Eigen values of Inertial tensor and the principal axis transformation, methods of solving rigid body problems and Euler's equations of motion, torque free motion of a rigid body. Heavy symmetrical top with one point fixed.

Unit-2**Hamiltonian formulation:**

Calculus of Variations and Euler-Lagrange's Equation, Brachistochrone Problem, Hamilton's Principle, Extension of Hamilton's Principle to Nonholonomic Systems, Legendre Transformation and the Hamilton Equations of Motion, Physical Significance of Hamiltonian, Derivation of Hamilton's Equations of Motion from a Variational Principle, Routh's Procedure, Principle of Least Action

Unit-3**Canonical Transformations:**

Canonical Transformation, Types of Generating Function, conditions for canonical transformation, Integral Invariance of Poincare, Poisson Bracket, Poisson's Theorem, Lagrange Bracket, Poisson and Lagrange Brackets as Canonical Invariant, Infinitesimal Canonical transformation and Conservation Theorems, Liouville's Theorem

Hamilton Jacobi Theory:

Hamilton-Jacobi Equation for Hamilton's Principal Function, Harmonic Oscillator and Kepler problem by Hamilton-Jacobi Method, Action-Angle Variables for completely Separable System, Kepler Problem in Action-Angle Variables

Unit-4**Small Oscillation:**

Problem of Small Oscillations, Example of Two coupled Oscillator, General Theory of Small Oscillations, Normal Coordinates and Normal Modes of Vibration,

Text book:

1. Classical Mechanics- by H. Goldstein (Addison-Wesley)

Reference books:

1. Classical Mechanics by S. N. Biswas, Books and allied Publisher Ltd.
2. Classical Mechanics by J.C. Upadhyay, Himalaya Publishing House.
3. Classical Mechanics by Landau and Lifshitz (Butter Worth)

Dr. Anshu

Course No. PHY-103 Computer Programming and Numerical Analysis Total Marks: 100

End Sem: Theory – 80 marks, Mid-Sem: Theory- 20 marks

Unit-1

FORTRAN 77: Data types, expressions, statements, input and output commands, conditional and interactive constructs, character and data managements, array manipulations, subprogram, subroutine.

Unit-2

Fortran programs for problems like numerical integrations by trapezoidal and Simpson method, finding the root of an equation by Newton-Raphson method, finding prime numbers, Runge-Kutta method, interpolation sorting and similar other problems .

Unit-3

Numerical Analysis-1:

Solution of simultaneous linear equations, Gaussian elimination, Pivoting, Iterative Method, Matrix Inversion, Root of a transcendental equation by Newton- Rapson Method, Least square fitting.

Unit-4

Numerical Analysis-2: Eigen values and eigenvectors of matrices, power and Jacobi method, Finite Differences, Interpolation with equally Spaced and unevenly spaced points (Newton's and Lagrange's method), Forward and Backward Interpolation, Extrapolation, Numerical Integration by trapezoid and Simpson's rule, Solution of first and second order differential equation using Runge-Kutta method.

Text books:

1. Fundamentals of Computers by V. Rajaraman, Prentice Hall of India Ltd Publishers
2. Numerical Mathematical Analyses by J. B. Scarborough, Oxford and IBH Publishing Company.

Reference Books:

1. Numerical methods for engineering and scientific computation by M K Jain (Wiley Eastern)
2. Computer programming in Fortran-77 by V. Rajaraman, Prentice Hall of India Ltd Publishers.

Pravin

Course No. PHY-104 **Quantum Mechanics-I** Total Marks: 100

End Sem: Theory – 80 marks, Mid-Sem: Theory- 20 marks

Unit-1

General principles of Quantum Mechanics:

Linear vector space, Ket and Bra vectors, Scalar product of vectors and their properties, Dirac delta function, linear operators, Adjoint operators, Unitary Operators, Expectation values of dynamical variables and physical interpretation of Hermitian operators, Eigen values and eigen vectors, orthonormality of eigen vectors, probability interpretation, Degeneracy, Schmidt method of orthogonalisation,

Expansion theorem, Completeness and closure properties of the basis set, Coordinate and momentum representations, compatible and incompatible observables, Commutator algebra, uncertainty relation as a consequence of non-commutability, minimum uncertainty wave packet, Representations of Ket and Bra vectors and operators in matrix form, Unitary transformation of basis vectors and operators.

Unit-2

Quantum Dynamics:

Time evolution of quantum states, Time evolution operator and its properties, Schrödinger, Heisenberg and Interaction picture, Equations of motion, Operator method solution of Harmonic oscillator problem, Matrix representation and time evolution of creation and annihilation operators

Unit-3

Rotation and Orbital Angular Momentum:

Orbital angular momentum operators as generators of rotation, L_x , L_y , L_z and their Commutation relations, Raising and Lowering operators (L_+ and L_-), L_x , L_y , L_z and L^2 in spherical Polar coordinates, Eigen values and Eigen functions of L_z and L^2 (operator method), Matrix representation of L_x , L_y , L_z and L^2

Unit-4

Spin angular momentum:

Spin $\frac{1}{2}$ particles, Pauli spin matrices and their properties, Eigen values and Eigen functions, Spin and rotations.

Total angular momentum: Total angular momentum J , Eigen value problem of J_z and J^2 , Angular momentum matrices, Addition of angular momentum and C. G. coefficients for the states with (i) $j_1 = \frac{1}{2}$ and $j_2 = \frac{1}{2}$ (ii) $j_1 = 1$ and $j_2 = \frac{1}{2}$.

Text book:

1. Quantum Mechanics concepts and Applications by Nouredine Zettili, John Wiley and sons,

Reference books:

1. Quantum Mechanics by L. I. Schiff, International Student edition.
2. Quantum Mechanics by D. Griffith, Pearson Publishers.
3. Quantum Mechanics by S. Gasiorowicz, John Wiley edition.
4. Quantum Mechanics by Eugene Merzbacher, Wiley International Edition

Dr. D. D. D. D.

Course No. PHY-105 Computer Programming in Physics Total Marks: 100
(Laboratory work)

End Sem: Practical- 100 marks

1. Numerical integration by trapezoidal method
 2. Numerical integration by Simpson method
 3. Solution of first and second order differential equation by Runga Kutta Method
 4. Matrix addition, subtraction, multiplication and manipulation
 5. Matrix inversion
 6. Finding the roots of an equation by Newton-Rapson method
 7. Least square fitting of linear parameters
 8. Determination of prime numbers.
 9. To arrange a set of numbers in increasing or decreasing order
 10. Sum of A.P and G.P series, Sine and Cosine series
 11. Factorial of a number
 12. Evaluation of log and exponentials by summing of series
 13. Any other suitable experiments.
- Any other experiments that may be set up from time to time

Dr. Arun

2nd Semester

Course No. PHY-201 **Classical Electrodynamics** Total Marks: 100

End Sem: Theory – 80 marks, Mid-Sem: Theory- 20 marks

Unit-1

Wave equations for potentials, solution by Fourier analysis, Radiation field, Radiation energy, Hertz potential, Computation of radiation fields by Hertz method, electric dipole radiation, multi pole radiation

Unit-2

Field of a uniformly moving electron, Lienard-Wiechart potential, Fields of a charge in uniform motion, Direct solution of the wave equation, Convection potential, Virtual photon concept, Wave guides, Propagation of electromagnetic waves in rectangular wave guides

Unit-3

Radiation from an accelerated charge, Fields of an accelerated charge radiation at low velocity, Case of velocity parallel to acceleration, radiation from circular orbits, Radiation with no restrictions on the acceleration or velocity, Classical cross section for bremsstrahlung in a Coulomb field, Cherenkov radiation.

Unit-4

Radiation, scattering and dispersion, radiative damping of a charged harmonic oscillator, forced vibrations, scattering by an individual free electron, scattering by a bound electron, absorption of radiation by an oscillator, equilibrium between an oscillator and a radiation field, effect of a volume distribution of scatters, scattering from a volume distribution, Rayleigh scattering, the dispersion relation.

Text book:

1. Classical Electricity and Magnetism by W. K. H. Panofsky and M. Phillips (Addison-Wesley)

Reference books:

1. Classical Electrodynamics- J.D. Jackson, John Wiley and Sons.
2. Introduction to electrodynamics- D.J. Griffiths, Pearsons Publishers.

Dr. M. L. S.

Course No. PHY-202 Basic Nuclear Physics Total Marks: 100
End Sem: Theory – 80 marks, Mid-Sem: Theory- 20 marks

Unit-1

A. Brief Discussion of Nuclear Properties: Nuclear Radius, Nuclear Mass and Binding Energy, Angular Momentum, Parity and Symmetry, Magnetic Dipole Moment and Electric Quadrupole Moment.

B. Two Nucleons Bound State Problem: Central and non central force, the deuteron, tensor forces, magnetic moment and quadrupole moment of deuteron.

Unit-2

Nucleon Scattering Problem: n-p scattering at low energy, scattering cross section and scattering length, effective range theory.

Nuclear force: Meson theory of nuclear force, Yukawa interaction

Unit-3

Nuclear Reactions and nuclear energy: Nuclear reaction and resonances, Breit-Wigner formula for s-waves, compound nucleus. Liquid drop model, Bohr-Wheeler theory of fission, nuclear fusion

Unit-4

Nuclear Models: Single particle model of nucleus, magic numbers, spin-orbit coupling, angular moment and parities of nuclear ground states, magnetic moments and Schmidt lines, Collective model of Bohr and Mottelson.

Text Book:

1. Nuclear Physics by R.R. Roy and B.P. Nigam (John Wiley)

Reference Books:

1. Physics of the nucleus by M.A. Preston (Addison Wesley)

2. Nuclear Physics by S.S.M. Wong (Prentice Hall)

3. Introduction to Nuclear Physics by H. A. Enge (Addison Wesley)

Praveen

Course No. PHY-203 Basic Solid state physics Total Marks: 100

End Sem: Theory – 80 marks, Mid-Sem: Theory- 20 marks

Unit-1

Crystal Binding:

Crystals of inert gases, Ionic crystals, covalent crystals, Metals Lattice Dynamics-Vibrations of a mono atomic linear chain, Vibration of a diatomic linear chain, Dispersion relations, Acoustic and Optic modes, Long-wavelength limits

Unit-2

Specific heat of insulators:

Phonon heat Capacity, Debye model for density of states, Debye T^3 law, Einstein's theory of the specific heat Free Electron Fermi gas-Energy levels in one-dimension, Effect of temperature on the Fermi-Dirac distribution function, Free electron gas in three dimension, Heat Capacity of the electron gas, Electrical conductivity and Ohm's law, Motion in magnetic fields, Static magneto-conductivity tensor, Hall effect, Thermal conductivity of metals, Wiedemann- Franz law

Unit-3

Energy bands:

Nearly free electron model, origin of the energy gap, Bloch functions, Kronig-Penney model, Wave equation of electron in a periodic potential, restatement of Bloch theorem, solution of the central equation, approximate solution near a zone boundary, number of orbitals in a band, metals and insulators

Unit-4

Semiconductor crystals:

Band gap, Holes, effective mass, intrinsic carrier concentration, intrinsic mobility, impurity conductivity, donor states, acceptor states, thermal ionization of donors and acceptors. Defects -Classification of defects, Point defects- Schottky and Frenkel defects, Diffusion and ionic conductivity. Dielectrics-local electric field at an atom, Lorentz field, field of dipoles inside cavity, dielectric constant and polarisability-Claussius-Mossotti relation, Mechanisms of electronic ionic and orientational polarisability.

Text book:

1. Introduction to Solid State Physics by C. Kittel, 7th edition, (John-Wiley, 1996)

Reference books:

1. Introduction to the theory of Solid State Physics by J. D. Patterson (Addison- Wesley, 1971)
2. Solid State Physics by N. W. Ashcroft and N. D. Mermin , (Harcourt Asia PTE Ltd.)
3. Physics of Condensed Matter by Prasanta K. Misra (Academic Press, 2010) 13

Prasanta

Course No. PHY-204 **Quantum Mechanics-II** Total Marks: 100

End Sem: Theory – 80 marks, Mid-Sem: Theory- 20 marks

Unit-1

Motion in a spherically symmetric field: Hydrogen atom, Reduction to equivalent one body problem, radial equation, Energy eigen values and eigen functions, Degeneracy, Radial probability distribution, free-particle problem, Expression of plane waves in terms of spherical waves

Unit-2

Approximate methods: stationary perturbation theory, Rayleigh Schrodinger method for non-degenerate case, first and second order perturbation, anharmonic oscillator, general theory for the degenerate case, removal of degeneracy, linear Stark effect, normal Zeeman effect.

Variational method: Ground state of He atom.

Unit-3

Time-dependent perturbation theory: Transition probability, constant and harmonic perturbation, Fermi Golden rule.

W. K. B. method: connection formulas, Bohr-Sommerfeld quantization rule, Harmonic oscillator and cold emission.

Unit-4

Scattering amplitude and scattering cross section, Born approximation, application to Coulomb and screened Coulomb potentials,

Partial wave analysis for scattering, optical theorem, scattering from a hard sphere, resonant scattering from a square well potential,

Identical particles, Symmetric and antisymmetric wave function, Coulomb and exchange interactions

Text book:

1. Quantum Mechanics concepts and Applications by Nouredine Zettili, John Wiley and sons, Publications

Reference books:

1. Quantum Mechanics by L. I. Schiff, International Student edition
2. Quantum Mechanics by D. Griffith, Pearson Publishers
3. Quantum Mechanics by S. Gasiorowicz, John Wiley edition
4. Quantum Mechanics by Eugene Merzbacher, Wiley International Edition

Pravin

Course No. PHY-205

Optics (Laboratory work)

Total Marks: 100

End Sem: Practical- 100 marks

1. Experiments with optical bench :
 - Biprism
 - Straight edge and narrow wire
2. Experiments with spectrometer:
 - Single and Double split
3. Experiments with Michelson interferometer :
 - Determination of λ and α
 - Thickness of mica sheet
4. Fabry Perot interferometer
5. Polarization Experiments
 - Babinet compensator
 - Edsar-Butlerbands
 - Quarter wave plate
 - Mallus Law
 - Study of elliptical polarized light
6. Constant Deviation Spectrography
 - Calibration
 - Zeeman effect
7. Babinet Quartz Spectrography
8. Any other suitable experiments
 - Any other experiments that may be set up from time to time

Pravin

3rd Semester

Course No. PHY-301: **Relativistic Quantum Mechanics and Field theory** Total Marks: 100

End-Sem: Theory – 80 marks, Mid-Sem: Theory- 20 marks

Relativistic quantum mechanics:

Unit-1

Brief introduction to Relativistic quantum mechanics, Notations, Klein-Gordon equation and its drawbacks, Charge and current densities, Positive and negative energy states, Dirac's Hole theory, Free particle Dirac equation, Properties of the Dirac matrices, Continuity Equation, Spin of the electron,

Unit-2

Plain wave solutions of Dirac Equation, Normalization of the wave functions, Dirac equation in an electromagnetic field, its non-relativistic correspondence, magnetic moment, Dirac equation for a central potential, spin-orbit coupling, Covariant form of the Dirac equation, Proof of its Lorentz covariance, Properties of the gamma-matrices.

Field Theory:

Unit-3

Concept of fields, , Classical field equation, Noether's theorem and conservation laws, Gauge invariance and charge conservation , Creation, Annihilation and number operators.

Unit-4

Field Quantization: (a) neutral scalar meson field (b) charged scalar meson field (c) Dirac field,

Text Book:

1. Relativistic quantum field theory by J.D. Bjorken and S.D. Drell , Mc Graw-Hill Book Company

Reference Books:

1. Lectures on Quantum Field Theory, Ashok Das, (World Scientific Publishing Co. Pvt. Ltd).
2. Introduction to quantum field theory by P. Roman
3. Quantum Mechanics and Field Theory by B.K. Agarwal, Asia Publishing House.

Dr. Anshu

Course No. PHY-302 Electronics Total Marks: 100
End Sem: Theory – 80 marks, Mid-Sem: Theory- 20 marks

Unit-1

AMPLIFIERS:

Transistors, Two-port network analysis, transconductance model, Frequency response of linear amplifiers, RC and Transformer coupled amplifiers, gain bandwidth product, feedback amplifiers, effects of negative feedback, FET, MOSFET, Boot-strapping the FET

Unit-2

OSCILLATOR CIRCUITS:

Feedback criteria for oscillation, Nyquist criterion, Phase shift, Wien-Bridge oscillator, Crystal controlled oscillator.

Unit-3

OPERATIONAL AMPLIFIERS:

The differential amplifier, DC and AC signal analysis, integral amplifier, rejection of common mode signals, CMMR, The operational amplifier, input and output impedances, Application of operational Amplifiers, unit gain buffer, summing, integrating amplifier, Comparator, Operational amplifier as a differentiator

Unit-4

DIGITAL CIRCUITS:

Logic fundamentals, Boolean theorem, logic gates: AND, OR, NOT, NOR, NAND XOR, and EXNOR. - RTL, DTL and TTL logic, Flip-flop, RS-and JK-Flip flop, thevenin's theorem, A/D and D/A Convertors.

Text Book:

1. Electronic fundamental and application by J.D. Ryder, PHI, Learning Pvt Ltd.

References:

1. Foundation of electronics – Chattopadhyay, Rakshit, Saha and Purkait , New age International publisher
2. Electronics principles-Albert Malvino, Tata Mc Graw-Hill Edition
3. Modern Digital Electronics-R.P Jain, Tata Mc Graw-Hill Edition

Dr. Arun

Course No. PHY-303 **Condensed Matter and Materials Physics-1** Total Marks: 100

(Elective, Special Paper-1)

End Sem: Theory: 80 marks, Mid-Sem: Theory- 20 marks

Unit-1

Quantisation of lattice vibration:

Phonons, normal coordinate transformation, creation and annihilation operators
methods of band calculation-tight binding method, OPW and pseudo-potential methods.
Fermi surface-de Haas-van Alphen effect Transport theory-Boltzman equation, relaxation
time approximation, electrical conductivity and thermal conductivity.

Unit-2

Electron-electron interaction:

Hartree approximation, Hartree-Fock approximation, Hartree-Fock theory for jellium
Density functional theory-general formulation, Local Density approximation

Unit-3

Superconductivity:

Occurrence of superconductivity, Meissner effects, Type- I and II superconductors, energy gap,
Isotope effect, Theoretical survey: Thermodynamics of superconducting transition, London
Equations, coherence length, Qualitative ideas about the BCS theory, Single particle tunneling,
Josephson Effect

Unit-4

Advanced Superconductivity:

Electron-phonon interaction, Microscopic theory of superconductivity, Quasi
electrons, Cooper pairs, BCS theory, Ground State of superconducting electron gas,
elementary ideas of high T_c superconductors.

Text book:

1. Physics of Condensed Matter By Prasanta K.Misra (Academic Press, 2010)
2. Quantum Theory of Solid State by J.Callaway, Academic Press

Reference books:

1. Principles of the theory of solids, J.M.Ziman, Cambridge, University press
2. Solid State Physics By C. Kittel, John Wiley and sons, Ins Singapore.

Dr. D. K. Misra

Course No. PHY-304

ATOMIC AND MOLECULAR SPECTRA

Total Marks: 100

(Allied Course)

End Sem: Theory: 80 marks, Mid-Sem: Theory- 20 marks

UNIT-1**Atomic structure and Atomic spectra:**

Revision of Hydrogen atom; Bohr-Sommerfield Theory, quantum theory of hydrogen atom, wave functions, orbital and spin angular momentum, magnetic dipole moment, spin orbit interaction, fine structure, spectroscopic term and notation. Hydrogen fine structure. Spectrum of Helium

UNIT-2**Multi-electron atom:**

Hartrees' Central field approximation, atomic orbital and Hund's rule. L.S Coupling, Lande Interval Rule, Normal and Inverted Multiplets, Spectral terms and selection rules for multi-atoms in L-S Coupling, J.J Coupling, Selection rules

UNIT-3**Zeeman Effect:**

Normal AND Anomalous Zeeman effect, Explanations of Zeeman Effect in some transitions. Paschen-Bach Effect, Stark-Effect: Weak field and strong field Stark effect in hydrogen. Hyperfine structure and isotope effect, Nuclear spin and hyperfine structure.

UNIT-4**Molecular Spectra:**

Types of molecular spectra, Electronic spectra, Vibrational-Rotational spectra, molecule as a harmonic and non-harmonic oscillator, Pure Rotational Spectra, molecule as a rigid and non-rigid rotator. The Raman spectra and molecular structure

Text Book:

1. Introduction to atomic spectra by H. E. White
2. Atomic and Molecular spectra : Laser by Raj Kumar

Course No. PHY-305

Modern Physics (Laboratory Work)

Total Marks: 100

End-Sem: Practical– 100 marks

1. Determination of e/m by
 - I) Braun tube method
 - II) Magnetron Valve method
 3. Determination of Planck's constant (h) by Photo-electric effect methods
 4. Measurement of velocity of light by Lecher wire
 5. GM counter experiments:
 - I) Characteristics of the Geiger tube
 - II) Inverse Square Law.
 - III) Absorption coefficient of the Aluminium foil.
 6. Characteristics of Diode and Zener diode.
 7. Study of logic gates AND, OR, NOT, NAND, NOR, EXOR .
 8. Making AND, OR, NOT Gates using NAND Gates.
 9. Verification of Boolean Algebra.
 10. Verification of Dual nature.
 11. Characteristics of FET (Field Effect Transistor).
- Any other experiments that may be set up from time to time 22

Dr. Arun

4th Semester

Course No. PHY-401 Statistical Mechanics Total Marks: 100
 End Sem: Theory – 80 marks, Mid-Sem: Theory- 20 marks

Unit-1

Classical Statistical Mechanics:

Postulates of classical statistical mechanics, Liouville's theorem micro-canonical ensemble, derivation of thermodynamics, Equipartition theorem, Classical ideal gas, Gibb's paradox, canonical ensemble, energy fluctuation in canonical ensemble, Grand canonical ensemble, density fluctuation in grand canonical ensemble, equivalence of canonical and grand canonical ensemble.

Unit-2

Quantum Statistical Mechanics:

Postulates of quantum statistical mechanics, density matrix, Liouville's theorem, ensembles in quantum statistical mechanics, third law of thermodynamics, Ideal gases in micro-canonical and grand canonical ensembles. Particle in a box, Maxwell-Boltzman, Boltzman-Einstein and Fermi-Dirac distributions.

Unit-3

Fermi gas:

Equation of state of ideal Fermi gas, Theory of white dwarf stars, Pauli paramagnetism

Unit-4

Bose gas:

Ideal Bose gas, Photon, Planck's law, Bose-Einstein condensation.

Phase transition:

1st order and 2nd order phase transitions, Ising model (one dimensional)

Text Book:

1. Statistical Mechanics – K. Huang, Wiley India

Reference books:

1. Statistical Mechanics – Landau and Lifshitz, ButterWorth
2. Statistical Mechanics- R. K. Patheria, P.D. Beale 3rd Ed, ButterWorth
3. Fundamental statistical and thermal Physics- F. Reif, Tata Mc Graw-Hill Edition
4. Elementary statistical mechanics, C. Kittel, Dover Publications.

Dr. R. K. Patheria

Course No. PHY-402 Elementary particle physics Total Marks: 100

End Sem: Theory: 80 marks, Mid-Sem: Theory- 20 marks

Unit-1

Historical introduction to the Elementary Particles, Classification of elementary particles and their interactions: Photons, Leptons, Quarks, Mesons, Baryons. Lepton number, Baryon number, color quantum number, Strangeness quantum number

Unit-2

Charge independence of nuclear forces, Isospin, Test for isospin conservation, Associated Production of Strange particles, Gell-Mann Nishijima scheme, conservation laws in relation to particle reactions and decays.

Unit-3

Discrete Symmetry:

Parity (P) : Parity in quantum mechanics and Field theories, Test of Parity. Time reversal (T) : Time reversal in quantum mechanics and Field theories, Test of Time reversal Charge conjugation (C) : Additive quantum number, Charge conjugation in field theories, Test of Charge conjugation. CPT theorem and its consequences.

Unit-4

Unitary Symmetry: SU(2), SU(3), Concept of I-Spin, U-Spin, V-Spin, SU(3) Quark model, The Eight-fold way, Mesons and Baryons in the Octet representation. The Baryon Decouplets, Evidence of color, Baryon-meson coupling.

Text Book:

1. Introduction to Elementary Particles by D.Griffiths. Prentice Hall

Reference books:

2. Elementary particle physics by Gasiowicz
3. Modern Elementary Particle Physics by G.Kane, Addison-Wesley Publishing Company
4. Quarks and Leptons by F.Halzen and A.D.Martin, World Scientific Singapore

Course No. PHY-403 Condensed Matter and Materials Physics-2 Total Marks: 100
(Elective-Special Paper-2)

End-Sem: Theory: 80 marks, Mid-Sem: Theory- 20 marks

Unit-1

Optical properties:

Absorption, intraband and inter band transition, Absorption spectra of materials, Luminescence, Fluorescence, phosphorescence, Colour centres, Optical fibres (elementary ideas). Basic principles of Electron Spin Resonance, NMR and Lasers-principles, Induced absorption, Spontaneous Emission and stimulated Emission, Einstein A and B Coefficients, the Ruby laser, Helium-Neon Laser and Semiconducting Laser

Unit-2

Magnetism:

Langevin Diamagnetism and Van Vleck Paramagnetism, Paramagnet: Derivations of Curie law, Pauli paramagnetic susceptibility, Ferromagnetism: Curie point and the exchange interaction, Curie-Weiss law, Ferrimagnetic order, Curie temperature and susceptibility of ferrimagnets, Antiferromagnetic order, susceptibility below the Neel temperature

Unit-3

Advanced magnetism and materials:

Landau's theory of diamagnetic susceptibility, Spin waves and magnon specific heat, NMR Knight shift, Diluted magnetic and ferromagnetic semiconductors Spintronics-giant magneto Resistance (GMR), Mott's theory of spin-dependent scattering of electrons

Unit-4

Novel Materials:

Metallic nano clusters: Nano science and nano clusters, liquid drop model, size and surface volume ratio. Graphene: Graphene lattice, tight binding approximation, Dirac Fermions Elementary ideas about polymers, Characterisation of materials: Experimental diffraction methods, Bragg law, Laue conditions, Geometrical Structure factor and Atomic form factor, Non-crystalline materials-diffraction pattern, amorphous semiconductors, low energy excitations, heat capacity, thermal conductivity. Basic principles of Raman Effect in crystals and Mossbauer techniques

Text Book:

1. Physics of Condensed Matter-By Prasanta K.Misra (Academic Press, 2010)

References

2. C.Kittel-Introduction to Solid State Physics by C. Kittel, John Wiley and Sons, Inc. Singapore.
3. Solid state Physics by Aschcroft and Mermin, Harcourt Asia PTE. Ltd. (A Harcourt publishers International company)

Course No. PHY-404

**Condensed Matter and Materials Physics
(Elective-Special Paper) (Laboratory work)**

Total Marks: 100

End Sem: Practical— 100 marks

1. Determination of energy gap of a given semiconductor by four probe method
2. Determination of Hall constant of a sample and its identification
3. Determination of energy gap by p-n junction method
4. Study of dispersion relation of an electric analog of mono atomic linear chain
5. Study of dispersion relation of an electric analog of diatomic linear chain
6. Determination of specific heat of a given sample using a thermocouple
7. Determination of dielectric constant of a given sample by lecher wire method
8. Determination of B-H curve of a given ferromagnet

Any other experiments that may be set up from time to time

Course No. PHY-405 Project and Seminar Total Marks: 100

Project: 50 Marks Seminar: 50 Marks

Students will be assigned topics for project and seminar under the supervision of teachers of the department.

SEMESTER-I

PAPER-ML02

CELL BIOLOGY AND MICROBIOLOGY

Time: 3 Hours

Full Marks: 100 (20 + 80)

UNIT – I: CELL BIOLOGY

Ultra structure of Cell, Structure and function of Mitochondria, Chloroplast, ER, Golgi body, Centrosome and Lysosome.

Molecular organization, structure, functions of ribosomes.

Cell – Cell interaction, adhesion, Cell signaling.

Cytoskeleton: Micro tubule, Micro filaments, Intermediate filaments.

UNIT – II: CELL CYCLE

Mitosis, meiosis, DNA synthesis in Cell cycle,

Cell surface receptors G-protein coupled receptors.

Signal transduction pathway.

Secondary messengers.

Regulation of signaling pathway.

UNIT – III: MICROBIOLOGY

Virus: Status, nature and classification, Reproduction in Virus; lysogenic and lytic cycle.

Bacteria– Molecular organization, growth, nutrition, and reproduction in bacteria, Genetic Recombination: transformation, Conjugation & transduction.

Bacteriophage Genome, genetic recombination in other phages.

UNIT – IV: MICROBES IN INDUSTRY

A brief outline survey of other Microbes such as Protozoa, Mycoplasma, Slime molds, Actinomycetes, Yeasts and Cyanobacteria and their use in industry (fermentation, alcohol, antibiotics, vitamins, food production, organic acids, enzymes, steroid transformation, food preservation) and agriculture.

SEMESTER-I
PAPER-ML03
GENETICS AND EVOLUTION

Time: 3 Hours

Full Marks: 100 (20 + 80)

UNIT – I: GENETICS

Mendelism; Probability and pedigree analysis; Incomplete dominance and Co-dominance; Multiple alleles, lethal genes, Epistasis, Pleiotropy.
Recessive and Dominant traits, Penetrance and Expressivity, Polygenic inheritance;
Numericals; Neo-Mendelism
Linkage, Crossing over and Recombination.

UNIT-II: CYTOGENETICS

Structural chromosomal aberrations; Duplication, deletion, inversion, and translocation.
Numerical chromosomal aberration; Aneuploids (trisomics and monosomics)
Euploids (autopolyploids and allopolyploids) role of polyploids in speciation with reference to Triticum, Brassica.

UNIT – III: EXTRA CHROMOSOMAL INHERITANCE;

Chloroplast mutation: Variegation in Four-o'clock plant;
Mitochondrial mutations in yeast; maternal effects-shell coiling in snail;
Infective heredity- Kappa particles in *Paramecium*.

UNIT –IV: EVOLUTION AND POPULATION GENETICS

Fossils, Fossilisation and dating of fossils and some Indian fossils.
Patterns of evolution – Sequential evolution, convergent and Divergent evolution, Micro, Macro and Mega evolution.
Theory of Natural selection;
Molecular evolution, Synthetic theory of evolution.
Continental drift and Species distribution, Speciation.
Principles of population genetics and Hardy-Weinberg's Law.

Dr. Arundh

SEMESTER-I
PAPER-ML04 (PRACTICAL)
CELL BIOLOGY AND MICROBIOLOGY

Time: 6 Hours

Full Marks: 100

CELL BIOLOGY

Study of stages of mitosis and meiosis by squashing technique

Karyotype Analysis

Micrometry and measurement of Cell size

MICROBIOLOGY

Sterilization of glass ware

Preparation of culture media (LB)

Gram stain of bacteria

Streak plate culture of bacteria

SEMESTER-I
PAPER-ML05 (PRACTICAL)
(GENETICS AND EVOLUTION)

Time: 6 Hours

Full Marks: 100

GENETICS

Three point test cross

Study of Gene interaction (Concept Map and Problems)

Epistatic gene interactions (Complementary, Supplementary and Dominant-Recessive)

(9:7; 9:3:4, 9:7 & 15:1- To be elucidated and confirmed with help of coloured seeds)

EVOLUTION

Model/Photographs/Slides of Fossils and Missing Links

Study of Evolutionary Trends of selected species

SEMESTER-II
PAPER-ML06
ECOLOGY AND BIOSTATISTICS

Time: 3 Hours

Full Marks: 100 (20 + 80)

UNIT – I ECOLOGY:

Concept of Ecosystem (Emergent Properties, Biological levels of Organization, Structure, Classification of Ecosystems, Ecological energetics, Gaia hypothesis and Cybernetics).
Leibig's Law of Minimum and concept of limiting factors, Law of Tolerance.

UNIT – II POPULATION ECOLOGY:

Population characteristics, structure and dynamics.
Community Structure, Community dynamics, Ecological niche.

UNIT – III ENVIRONMENTAL CONCERNS:

Environmental Pollution: sources & control (Air Pollution, Water Pollution, Land Pollution, Noise pollution)
Green house effect, Ozone depletion, Global warming, climate change, Waste Management & Bioremediation,
Environmental Management and Auditing, EIA, Environmental Education and awareness.
Biodiversity: Types/Levels, Conservation strategies.

UNIT – IV BIOSTATISTICS:

Probability distribution (Normal, Binomial & Poisson).
Students 't' test
Analysis of variance ratio test (Two-way & Three-way).
Correlation and Regression analysis.
Goodness of fit and association analysis by chi-square test.

Dr. Saich

SEMESTER-II

PAPER-ML07

(MOLECULAR BIOLOGY, BIOTECHNIQUES)

Time: 3 Hours

Full Marks: 100 (20 + 80)

UNIT – I: MOLECULAR BIOLOGY-I

Nucleic acids: Components of DNA & RNA, Molecular models of DNA, Types of DNA, Types, Structure and functions of RNA.

Replication of dsDNA; [Prokaryotic: Rolling Circle and Θ model and Eukaryotic]

Transcription and Reverse transcription

Gene as recon, muton and cistron, split gene, jumping gene, and over-lapping gene concepts.

History, elucidation and properties of Genetic Code

Regulation of gene expression; Operon Concept, Negative and Positive regulations

UNIT – II: MOLECULAR BIOLOGY-II

Constitution of Eukaryotic genome, C-Value paradox, sequence components i.e., repetitive and non repetitive DNA sequence.

In vitro synthesis of DNA.

Methods of DNA hybridization and its application.

Sequencing of nucleic acids and proteins.

UNIT – III: BIOTECHNIQUES-I

Microscopy –Principles and types: Phase contrast Microscopy, Electron & Scanning Electron Microscopy and Fluorescence Microscopy.

Chromatography –Principles and types of Chromatography (Paper, Thin layer and Gas)

UNIT-IV: BIOTECHNIQUES-II

Centrifugation–General Principles and types of centrifugation

Spectrophotometry– Principle & Instrumentation for colorimetry, Spectrophotometry

Electrophoresis–Principles and types (Paper, SDS-PAGE, immuno electrophoresis).

SEMESTER-II
PAPER-ML08
BIOTECHNOLOGY

Time: 3 Hours

Full Marks: 100 (20 + 80)

UNIT - I: BIOTECHNOLOGY: CONCEPT AND HISTORY

Biotechnology: Old and Modern concepts, Interdisciplinary nature, Public perception of Biotechnology, Biotechnology and the Developing world.

Basic Tools of new Biotechnology:

- 1) Enzymes; Restriction enzymes; types and functions,
- 2) Extraction, Isolation and purification of RNA and genomic, organellar and plasmid DNA,
- 3) Amplification of DNA; PCR and Blotting techniques (Southern, Northern, Western, Dot and Slot)

UNIT - II: BIOTECHNOLOGY: TISSUE CULTURE

Plant micro and macro nutrients, vitamins and PGR (plant growth regulators)

Media for plant tissue culture.

Cell, tissue, organ, protoplast culture techniques.

UNIT - III: CLONING VECTORS AND STRATEGIES

Cloning Vectors: Types. Plasmid, Cosmid, Phagmid,

Vector construction – P_{BR} 322, Model Cloning experiments;

cDNA synthesis, Molecular Probes,

Recombinant DNA (Genetic Engineering) technology

Gene transfer technologies: Direct and Agro-bacterium mediated,

UNIT - IV: APPLICATION OF BIOTECHNOLOGY

Fermentation; Bioreactors, Antibiotics and enzyme technology

Hybridoma technology- Monoclonal antibodies,

Transgenic Plants and Animals

Forensic applications: DNA finger printing

Waste water and Sewage treatment, Bioremediation

Bio-safety, Bioethics



SEMESTER-II
PAPER-ML09 (PRACTICAL)
(ECOLOGY AND BIOSTATISTICS)

Time: 6 Hours

Full Marks: 100

ECOLOGY:

1. Species - Area curve
2. Frequency, Density and Abundance - Community study
3. Ecological anatomy (Selected Hydropytes and xerophytes; models/photographs of selected plant species)

BIOSTATISTICS:

1. Central Tendency - Measurement of mean, mode & median.
2. Measurement of dispersion
3. Students t-test
4. Chi² test

SEMESTER-II
PAPER-ML10 (PRACTICAL)
BIOTECHNIQUES, MOL. BIOLOGY & BIOTECHNOLOGY

Time: 6 Hours

Full Marks: 100

INSTRUMENTAL TECHNIQUES:

1. Spectrophotometer/Photo meter - Instrumentation and working principle
2. Centrifugation - Instrumentation and working principle
3. pH Meter - Instrumentation and working principle

MOL. BIOLOGY & BIOTECHNOLOGY :

1. Extraction and estimation of DNA & RNA
2. Estimation of protein content
3. Agarose Gel electrophoresis
4. Chromatography (Paper/TLC)

SEMESTER-III
PAPER-ML11 (PLANT SCIENCES)
PLANT MORPHOLOGY AND TAXONOMY

Time: 3 Hours

Full Marks: 100 (20 + 80)

UNIT – I: SALIENT FEATURES OF THALLOPHYTES

An outline classification of cryptogams up to order. Algae-Range of thallus structure and reproduction in Cyanophyta, Chlorophyta, Phaeophyta and Rhodophyta.

Fungi: Organisation of thallus structure and reproduction. Economic importance of Phycomycetes, Ascomycetes and Basidiomycetes. Degeneration of sexuality in Fungi.

Bryophytes - Evolution of gametophyte and sporophyte in Marchantiales, Evolution of sex organs in Bryophyta. Degeneration of Sporogenous tissues in Bryophyta.

UNIT – II: SALIENT FEATURES OF PTERIDOPHYTES

Pteridophyta-Origin of land plants, evolution of vascular tissues, Origin of Heterospory and its significance. Filicales as the most advanced group of Pteridophyta.

UNIT – III: SALIENT FEATURES OF GYMNASPERMS

Gymnosperms - Origin and outline classification upto order and Characteristic features, Cycadofilicales as intermediate group between Bryophytes and Pteridophytes, Cycadas as relic of ancient Gymnosperms, Phylogenetic position of Ginkgoales. Angiospermic characters of Gnetales, Palaeobotany-Geological era, process of fossilization. Fossil Gymnosperms of India.

UNIT – IV: SALIENT FEATURES AND TAXONOMY OF ANGIOSPERMS

Angiosperms - Origin and evolution of angiosperms. Different systems of classification upto order. International code of Nomenclature (ICN), Range of floral structure, affinities and phylogeny of Monocot and Dicots with special reference to Glumiflorae, Liliflorae, Scitaminae, Microspermae, Ranales, Malvales, Tubiflorae and Umbelliferae, Compositae(Asteraceae).



SEMESTER-III
PAPER-ML12 (PLANT SCIENCES)
PLANT PHYSIOLOGY

Time: 3 Hours

Full Marks: 100 (20 + 80)

UNIT - I: WATER RELATIONS

Water relations in plants: Concepts of water and solute potential;

Principles of Absorption of water, Ascent of sap

Transpiration: Stomatal movement mechanism, Mineral nutrition; Essential elements, hydroponics, aeroponics, absorption of elements, passive and active transport, Role of essential elements and deficiency symptoms

Translocation of organic materials in phloem

UNIT - II: SIGNAL TRANSDUCTION & SENSORS

Phytochromes and their Photo and Biochemical properties

Photophysiology of light induced responses

Signal transduction: overview, receptors

Mechanism, Sensor & regulatory systems

UNIT - III: PHOTOSYNTHESIS

Photosynthesis- Principles of light absorption in chloroplast, Organisation of light absorbing systems, mechanism of electron flow,

C₃, C₄ and CAM pathway for carbon reduction

Photorespiration.

UNIT-IV: STRESS PHYSIOLOGY

Plant response and mechanism to biotic and abiotic stress.

Water deficit and drought resistance

Salinity stress, metal toxicity, freezing and heat stress

Oxidative stress (ROS), antioxidants, antioxidant enzymes; catalase, peroxidase, super oxide dismutase, glutathione transferase and reductase.

Dr. Anshu

SEMESTER-III
PAPER-ML13 (PLANT SCIENCES)
PLANT METABOLISM

Time: 3 Hours

Full Marks: 100 (20 + 80)

UNIT - I: LIPID METABOLISM

Lipid metabolism: fatty acid biosynthesis, catabolism of lipids,
Oxidation of fatty acids.
Sulphur metabolism; uptake, transports & assimilation.

UNIT - II: NITROGEN METABOLISM:

Nitrogen metabolism - Bio-chemical metabolism of Nitrogen fixation in free living and Symbiotic associations, nitrogen cycle,
Mycorrhiza; Endo & Ectomycorhyzal association,

UNIT - III: RESPIRATION:

Respiration - Aerobic and Anaerobic respiration, Respiratory quotient,
Energetics of respiration; Electron Transport System, Action un-couplers, Cyanide resistant pathway,
HMP pathway.

UNIT - IV: BIOMOLECULE METABOLISM:

Biosynthesis of starch and sucrose, Synthesis of cell wall polysaccharides
Protein biosynthesis: components/factors of protein synthesis

D. D. D.

SEMESTER-III
PAPER-PS-ML14 (PRACTICAL)
(PLANT MORPHOLOGY, TAXONOMY)

Time :6 Hours

Full Marks: 100

MORPHOLOGY

1. Some Algal mixture separation.
2. Study and identification of some important Fungi.
3. Anatomical studies of Bryophyta
4. Anatomical studies of pterodophyta
5. Anatomical studies of Gymnosperm

[Slides/material /W.M, Stages of life cycle of species from item 1 to 5 above]

TAXONOMY

Floral characters & Identification of families:

1. Graminae, Cyperaceae, Ranunculaceae,
2. Umbelliferae, Malvaceae, Apocynaceae, Asteraceae

SEMESTER-III
PAPER-PS-ML15 (PRACTICAL)
(PLANT PHYSIOLOGY & METABOLISM)

Time : 6 Hours

Full Marks: 100

PHYSIOLOGY:

1. Osmotic potential - calculation using potato tuber & Rhoeo-discolor leaf.
2. Estimation of chlorophyll pigment in various leaf samples
3. Comparision of chlorophll and carotenoid content.
4. Stomatal Index / Stomatal frequency.

METABOLISM

Measuring Rate of Photosynthesis under different conditions by Wilmutt's Bubbler

1. Under different wavelengths of light (Blue, Red and Green)
2. Different concentrations of CO₂
3. Different Temperature
4. R.Q and ATP energy balance sheet; (only problems)

SEMESTER-III
PAPER-ML11 (ANIMAL SCIENCE)
BIOLOGY OF NON-CHORDATA

Time: 3 Hours

Full Marks: 100 (20 + 80)

Unit – I: Nonchordata

1. Locomotion in protozoa.
2. Reproduction in protozoa.
3. Parasitism in protozoa.
4. Reproduction in Porifera.
5. Polymorphism in Coelenterata.
6. Structure and affinities of Ctenophora.
7. Structure and affinities of Archiannelida.

Unit – II :Nonchordata

1. Helminth Parasites with special reference to man.
2. Metamerism in Annelida.
3. Vision in insects.
4. Larval forms in crustacea.
5. Respiration in Arthropoda.
6. Structure and affinities of peripatus.
7. Respiration in Mollusca.

Unit – III :Nonchordata

1. Larval forms in Echinodermata.
2. Water vascular system in Echinodermata.
3. Structure and affinities of Hemichordata.
4. Structure and affinities of Lobophorates.
5. Structure and affinities of brochiopods.
6. Structure and affinities of Gastrotricha.

Unit – IV: Economic Zoology

1. Apiculture
2. Sericulture
3. Lac culture
4. Pearl culture

Dr. S. S. S.

SEMESTER-III
PAPER-ML12 (ANIMAL SCIENCE)
BIOLOGY OF CHORDATA

Time: 3 Hours

Full Marks: 100 (20 + 80)

Unit – I:

1. Origin of Chordata.
2. Inter relationship of Cephalochordata and Urochordata.
3. Structure and affinities of Cyclostomata.
4. Distribution, structure and affinity of Dipnoi.
5. Origin of Tetrapoda.

Unit – II:

1. Structure & General account of Gymnophiona
2. Parental care in fishes
3. Parental care in amphibia
4. Structure & affinities of sphenodon

Unit – III:

1. Flight adaptations and perching mechanism in birds.
2. Dentition in mammals.
3. Comparative anatomy of Integument and
4. Jaw-suspensorium in Vertebrates

Unit – IV:

1. Mammal like reptiles
2. General account of prototheria
3. General account of metatheria
4. Adaptive radiation in mammals.

SEMESTER-III
PAPER-ML13 (ANIMAL SCIENCE)
ETHOLOGY AND DEVELOPMENT BIOLOGY

Time: 3 Hours

Full Marks: 100 (20 + 80)

Unit – I: ETHOLOGY

1. Instinct, Learning, types of learning, Neural mechanism of learning and learning in Vertebrates.
2. Biochemical approach to problem of memory.
3. Orientation and navigation in animals.
4. Migration behaviour in fishes and birds.
5. Reproductive behaviour in vertebrates (Courtship and Mating).
6. Biological clocks.
7. Social behaviour in insects and primates.

Unit – II: DEVELOPMENTAL BIOLOGY

1. Molecular events during fertilization.
2. Cleavage.
3. Morphogenic movements and mechanism of gastrulation.
4. Differentiation and differential gene activity.
5. Concept of organizer and embryonic induction.
6. Regeneration.

Unit – III: DEVELOPMENTAL BIOLOGY

1. Foetal membranes and their development..
2. Placentation
3. Development of notochord and Heart in chick.
4. Oestrous and Menstrual cycle
5. Birth control

Unit – IV: DEVELOPMENTAL BIOLOGY

1. Totipotency and tissue culture in animals.
2. Apoptosis: Mechanism of PCD, genetic control.
3. Cytological & Morphological abnormalities of cancer cell.
4. Infertility and Artificial insemination.
5. In vitro fertilisation

SEMESTER-III
PAPER-ML14 (PRACTICAL-AS)
(NON-CHORDATA & CHORDATA)

Time: 6 Hours

Full Marks: 100

Non-Chordata:

1. Nervous system of Pila
2. Nervous system of Sepia
3. Nervous system of Prawn

Chordata:

1. Arterial system of Calotes
2. Venous system of Calotes
3. Brain of Toad

SEMESTER-III
PAPER-ML15 (PRACTICAL-AS)
(DEVELOPMENT BIOLOGY AND ANIMAL PHYSIOLOGY)

Time: 6 Hours

Full Marks: 100

Development Biology:

1. Study of Blastula, gastrula of Frog
2. Tadpole larva of Frog
3. Study of 18hrs, 20hrs, 24hrs, 33hrs, 36hrs, 42hrs, and 48hrs chick embryo

Animal Physiology:

1. Test for carbohydrate
2. Test for Protein
3. Test for Fat
4. Action of salivary amylase on starch

SEMESTER-IV
PAPER-ML16 (PLANT SCIENCE)
(PLANT ANATOMY AND DEVELOPMENTAL BOTANY)

Time: 3 Hours

Full Marks: 100 (20 + 80)

UNIT – I: SECONDARY GROWTH

Secondary growth in Monocot and Dicot plants, Adaptive and Non-adaptive anomalous secondary growth in Monocots and Dicot (Stem & Roots); principles of arrangement of mechanical tissues.

UNIT – II: PHYTOGEOGRAPHY

Phyto-Geographical distribution of plants, isolation and isolating mechanisms, sympatric and allopatric populations.

UNIT – III: DEVELOPMENTAL BIOLOGY

Micro-sporogenesis, Mega-sporogenesis, types of Embryo Sacs, Fertilisation; Concept of Double Fertilisation & Triple Fusion; Endosporm, Types and development, Apomixis, Development of Dicot and Monocot embryos. Polyembryony,

UNIT – IV: GROWTH REGULATORS

Seed Germination, physiology of flowering photoperiodism, Senescence, Regulation of plant growth and Development – phytohormones, molecular mechanism of responses of plants to Auxins, Gibberellins, Cytokinins, ABA and Ethylene.

Dr. Anand

SEMESTER-IV
PAPER-ML17 (PLANT SCIENCES) PRACTICAL
(PLANT ANATOMY, DEVELOPMENTAL BOTANY)

Time: 6 Hours

Full Marks: 100

PLANT ANATOMY

1. Study abnormal secondary growth in-adaptive and Non-adaptive type Dicot Stem& Root (Slides)
2. Microscopic Preparations for the above groups
3. Study of abnormal secondary growth in-adaptive and non-adaptive types in Monocot stem and roots
4. Microscopic Preparations for the above groups

DEVELOPMENTAL BOTANY

1. Embryological slides
2. Anatomy of Anther of different stages of microsporogenesis
3. Pollen germination by hanging drop method
4. Pollen wall morphology

SEMESTER-IV
PAPER-ML16 (ANIMAL SCIENCE)
(ANIMAL PHYSIOLOGY, IMMUNOLOGY AND TAXONOMY)

Time: 3 Hours

Full Marks: 100 (20 + 80)

Unit – I: Animal Physiology

1. Digestion and absorption of food.
2. Cardiac cycle and its regulation.
3. Breathing and gaseous exchange; Transportation of gases,
4. Muscle contraction.
5. Mechanism of Nerve impulse conduction, synaptic transmission.
6. Physiology of excretion.

Unit – II: Immunology

1. Types of Immunity: Innate, acquired, passive, active, Humoral and Cell mediated immunity, specificity and memory
2. Lymphoid Organs: Origin, development and function
3. Immunoglobulins: Structure, distribution and function
4. Major Histocompatibility Complexes and their role in Antigen-Antibody recognition
5. Some common Human Immune-deficiency diseases

Unit – III: Taxonomy

1. History of Taxonomy.
2. Principles of classification and procedures in Taxonomy.
3. Species concept.
4. Concepts of chemotaxonomy, cytotaxonomy and Numerical Taxonomy.

Unit – IV : Taxonomy

1. Preservation and Identification of animals.
2. Ecology and physiology in taxonomy.
3. General Classification of Animal Kingdom.
4. Zoological nomenclature and its rules.

SEMESTER-IV
PAPER-ML17 (ANIMAL SCIENCE) PRACTICAL
(ANIMAL PHYSIOLOGY IMMUNOLOGY AND TAXONOMY)

Time: 6 Hours

Full Marks: 100

Animal Physiology

1. Estimation of Hb%
2. RBC count of man/any vertebrate
3. WBC count of man
4. Preparation of Haemin crystals
5. Determination of blood type (Blood group)
6. Caesin content of milk
7. O₂ uptake by insect.
8. Determination of Haematocrit value of blood.

Immunology and Taxonomy

1. Blood grouping by Immunotechniques.
2. Percepin test
3. Single immune diffusion test
4. Taxonomical features & phylogenetic study of some selected species.

SEMESTER-IV
(SPECIAL PAPER)

PAPER-ML18

(A) ENVIRONMENTAL BIOLOGY

Time: 3 Hours

Full Marks: 100 (20 + 80)

UNIT – I: STRESS PHYSIOLOGY ENVIRONMENTAL POLLUTION

1. Basic concepts of stress (Stress, Strain, Resistance, Tolerance and Avoidance, Incipient lethal level, Acclimation and acclimatization, Homeostasis.
2. Water deficit stress and adaptations of plants and animals to water deficit stress.
3. Water, air, soil and radioactive pollution (causes, effects and control)

UNIT – II: ECOLOGICAL PRODUCTIVITY

1. Primary Production and methods of measurement.
2. Secondary Production and Yield to man.
3. Ecological efficiencies and production in different regions of the world.

UNIT – III: CONSERVATION ECOLOGY

1. Natural habitat conservation in Orissa with special reference to Chilika, Bhitarkanika, Similipal, Mahendragiri.
2. Afforestations and forest management.
3. Wild life conservation.
4. Soil conservation.

UNIT – IV: ENVIRONMENTAL MANAGEMENT

1. Environmental monitoring and management.
2. Environment protection laws.
3. Environmental education and awareness.
4. Biological control of pests.
5. Sewage and solid waste management.
6. Treatment of effluents in distilleries and paper and pulp industries.

Shank

X

**SEMESTER-IV
(SPECIAL PAPER)
PAPER-ML18
(B) BIOTECHNOLOGY**

Time: 3 Hours

Full Marks: 100 (20 + 80)

UNIT – I : PRINCIPLES AND TOOLS BIOTECHNOLOGY:

Genetics, Molecular Biology and Modern Biotechnology-an interdisciplinary study, Techniques and tools: Restriction enzymes: Types and functions, Cloning Vectors for recombinant DNA (Plasmids, Phages, Cosmids), gene Library (BAC, YAC and MAC), Gene Cloning: Strategies, cloning in bacteria and eukaryotes; Basic PCR, anchored PCR and asymmetric PCR; DNA Polymorphism (RAPD, RFLP, AFLP, SSR), isolation of genes; sequencing of gene or a DNA segment: Maxim & Gilbert's, Sanger's method; gene synthesis mechanism, General Idea about OMICs (Genomics, Transcriptomics, Proteomics and Metabolomics)

UNIT – II: APPLIED BIOTECHNOLOGY:

Scope of animal cell culture, advantages and disadvantages, the gas phase for tissue culture, culture media for animal cells and tissues, culture procedures, maintenance of cultures - cell lines; cloning of cell lines; Gene transfection; targeted gene transfer; transgenic animals; Stem Cells: Culture and applications
Culture media and plant cell culture : Culture media and their constituents (MS, B5 and White's media, cell culture. propagation; soma clonal variation, production of haploids: anther culture, ovule culture, protoplasts isolation protoplast culture.

UNIT – III: INDUSTRIAL BIOTECHNOLOGY:

Engineering of macro molecules-basic outline of protein engineering, drug designing, Isolation and culturing of micro-organisms; production of organic compounds by microbial fermentation: Bioreactors

UNIT – IV: ENVIRONMENTAL BIOTECHNOLOGY:

Biotechnology in paper industry, pollution Control: Cleaner technologies, reducing environmental impact of industrial effluents, biosensors; Renewable sources of energy, Green energy and Bio-fuel, use of biotech tools for biodiversity conservation.

Paul

X

**SEMESTER-IV
(SPECIAL PAPER)
PAPER-ML18**

(C) BIOCHEMISTRY: MACROMOLECULAR STRUCTURE AND METABOLISM

Time: 3 Hours

Full Marks: 100 (20 + 80)

Unit – I:

Physical properties, chemical structure, isolation and purification of proteins, molecular and biological heterogeneity of proteins, (with special reference to hormones and iso-enzymes, structural collagen) and contractile protein. Classification and intracellular distribution of enzyme & proteins, metabolism of individual essential amino acids.

The mechanism of enzymatic analysis catalyzed reaction and the plausible models for reaction mechanism, substrate and product inhibition of enzyme action feedback modulation of the activity of kinetics of action. Regulation of enzyme synthesis in microbial organisation and critical estimation of the regular operon model control enzyme synthesis in higher organisms.

Unit – II

Chemical structure and biological significance of polysaccharides, starch, glycogen, inulin, dextrin, cellulose, hemicellulose, lignin, mucopolysaccharides and glycoproteins)

A general account of plant alkaloids and pigments, photosynthetic pigments anthocyanins and anthoxanthine biosynthesis and metabolism of auxins in plant structure) and classification of vitamins and hormones in animals and their roles in metabolism.

Unit –III :

path of carbon in photosynthesis, glycogen metabolism, glyoxalic shunt, uronic acid pathway, gluconeogenesis, fixation of carbon dioxide (in darkness) in plants, photorespiration in plants. Chemical structure and biological significations for phospholipids & glycolipids, lipoprotein and steroid metabolism (biosynthesis and degradation of phospholipids, sphingolipids and cholesterol).

The concept of free energy, high energy bonds and the key position of ATP, phosphorylation, mitochondria as a biological transducer mechanism of electron transport and oxidative phosphorylation; evolution of energy transforming mechanism, energy transduction in cell, characteristic features and types of transducer role of ATP in active transport

Unit – IV:

Thermodynamic equilibrium and metabolic control regulation of glycolysis and TCA cycle, basterut and krahtress effects, regulation of glycogen metabolism control of lipid metabolism in a cell and in the body (animal) regulation of nucleic acid merabolism inborn errors of metabolism, antibody and interferon, their synthesis. Molecular mechanism of hormone action with reference to epinephrine, insulin, thyroxine and plant auxins, biochemistry of senescence.

SEMESTER-IV
PAPER-ML19
(PRACTICAL)

Time: 6 Hours

Full Marks: 100

BIOTECHNOLOGY

SEMESTER-IV
PAPER-ML20
(SEMINAR PRESENTATION AND PROJECT REPORT)

Full Marks: 100

A) SEMINAR PRESENTATION (15 MIN)

(40)

1. Students are required to participate in weekly seminar activities and presentation of papers under guidance of a teacher.
2. The best presentation of each student will be evaluated by an external examiner on the date of exam.
3. Marks will be awarded on the basis of total performance in the whole semester by both External and Internal examiner.

B) PROJECT REPORT / FIELD STUDY REPORT

(60)

1. Each student is required to take up a small research project under the guidance of a teacher, to be completed within a period of 4 weeks and the report be submitted at the time of examination.

Or

The student prepare a scientific review of any current topic in biotechnology/ molecular biology/Environmental issues, under the guidance of a teacher and the report be submitted for evaluation.

Or

The student prepare a field study report on distribution of plants/ animal or vegetation of floristic aspects of a locality visited and report be submitted for evaluation.

Dyand

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2. Bhojwani, S.S. and Razdan, M.K., (1996). Plant Tissue Culture: Theory and Practice.
3. Glick, B.R., Pasternak, J.J. (2003). Molecular Biotechnology- Principles and Applications of recombinant DNA. Elsevier Science Amsterdam Netherlands. ASM Press, Washington.

ETHNOBOTANY

1. S.K. Jain, Manual of Ethnobotany, Scientific Publishers, Jodhpur, 1995.
2. S.K. Jain (ed.) Glimpses of Indian. Ethnobotany, Oxford and I B H, New Delhi – 1981
3. S.K. Jain (ed.) 1989. Methods and approaches in ethnobotany. Society of ethnobotanists, Lucknow, India.
4. Colton C.M. 1997. Ethnobotany – Principles and applications. John Wiley and sons – Chichester
5. Rama Rao, N and A.N. Henry (1996). The Ethnobotany of Eastern Ghats in Andhra Pradesh, India. Botanical Survey of India. Howrah.
6. Rajiv K. Sinha – Ethnobotany The Renaissance of Traditional Herbal Medicine – INA – SHREE Publishers, Jaipur-1996
7. Faulks, P.J. 1958. An introduction to Ethnobotany, Moredale pub. Ltd.

POST GRADUATE DEPARTMENT OF CHEMISTRY

Semester-I

<u>Paper No.</u>	<u>Subject</u>	<u>Marks</u>		<u>Credits</u>	<u>Page No.</u>
CHE-101	Basic Organic Chemistry-I	80+20	100	04	3
CHE-102	Basic Inorganic Chemistry	80+20	100	04	4
CHE-103	Basic Physical Chemistry-I	80+20	100	04	5
CHE-104	Physical Spectroscopy	80+20	100	04	6
CHE-105	Organic Practical		100	04	7

Semester-II

CHE-201	Basic Organic Chemistry -II	80+20	100	04	8
CHE-202	Advance Inorganic Chemistry	80+20	100	04	9
CHE-203	Basic Physical Chemistry - II	80+20	100	04	10
CHE-204	Organic Spectroscopy	80+20	100	04	11
CHE-205	Inorganic Practical		100	04	12

Semester -III

CHE-301	Advanced Organic Chemistry	80+20	100	04	13
CHE-302	Organic synthesis	80+20	100	04	14
CHE-303	Chemistry and Society	80+20	100	04	15
CHE-304	Chemistry and Environment	80+20	100	04	15
CHE-305	Physical Practical		100	04	16

Semester -IV

CHE-401	Advanced Physical Chemistry	80+20	100	04	18
CHE-402	Analytical Chemistry -II	80+20	100	04	19
CHE-403	Bio-inorganic and Supra molecular Chemistry	80+20	100	04	19
CHE-404	Project & Seminar		100	04	20
CHE-405	Analytical Practical		100	04	20

SEMESTER-I
Basic Organic Chemistry-I
Paper-CHE-101

Unit-I: Basic Concepts

Application of Inductive effect, Resonance and Hyper conjugation, Aromaticity in benzenoid and nonbenzenoid compounds, Huckel's rule, Addition Compounds: Crown ether complexes and cryptands, Inclusion complexes, Cyclodextrins, Catenanes and Rotaxanes.

Reaction intermediates: Classification, Structure, Stability, Generation and Fate of carbenes and free radicals.

Unit-II: Structure and reactivity

Types of reaction mechanisms, Thermodynamic and Kinetic requirements, Kinetic and thermodynamic control, Hammond's postulate, Curtin-Hammett principle, Potential energy diagram, Methods of determining mechanism, Isotope effect, Hard-soft concept of acid base, HSAB principle, Hammett equation, substituent and reaction constants, Taft equation.

Unit-III: Stereochemistry

Conformation of cycloalkanes and decalins. Effect of conformation on reactivity. Optical activity in absence of chiral carbon (biphenyls, allenes and spirans), Chirality due to helical shape, Asymmetric synthesis (Sharpless epoxidation, Noyori reduction), Racemic modification, Resolution of racemic modification, Absolute and relative configuration, R-S nomenclature, Optical purity, E-Z-notation.

Unit-IV: Aliphatic nucleophilic substitutions

SN₂ and SN₁ mechanisms, Ion pairs in SN₁- mechanisms, Mixed SN₂ and SN₁-mechanisms, SET mechanism, SN_i- mechanism, Nucleophilic substitution in allylic, vinylic and aliphatic trigonal carbon, Neighbouring group participation mechanism, Non-classical carbocation, Effect of structure of the substrate, attacking nucleophile, solvent and leaving group on reactivity of nucleophilic substitution.

Books recommended

1. Advanced Organic Chemistry: Reactions, Mechanism and Structure (McGraw-Hill) J. March. John Wiley and Sons.
2. Advanced organic chemistry by F.A.Carey and R.J.Saundberg, Plenum.
3. Organic reaction mechanism- Sunakar Panda
4. A guide book to mechanism in Organic chemistry (Orient-Longmans)- Peter Sykes
5. Organic reaction mechanism (Benjamin) R. Breslow
6. Mechanism and structure in Organic chemistry (Holt Reinh.) B. S. Gould.
7. Reaction mechanism in organic chemistry- S. M. Mukharji and S. P. Singh.
8. Stereochemistry of organic compounds) D. Nasipuri.
9. Organic chemistry by J. Clayden, N. Greeves, S. Warren and P. Wothers, Oxford University Press.

Basic Inorganic Chemistry

Paper-CHE-202

Unit-I: Covalent Bond

Qualitative discussion on valence bond theory-formation of hydrogen molecule, Qualitative discussion on molecular orbital theory, bonding and antibonding orbitals, energy distribution and stability, MO energy level diagrams of simple diatomic molecules like N_2 , O_2 , F_2 , CO and NO , Hybridisation and wave mechanical description for sp , sp^2 and sp^3 orbitals, qualitative idea about dsp^2 , dsp^3 and d^2sp^3 orbitals, VSEPR theory, shapes of simple molecules and ions, Linnet's double quartet theory and spectra of simple molecules.

Unit-II: Bonding in Co-ordination Compounds

Valence bond theory-strength and short coming, Crystal field theory-effect spin types, CFSE, Evidence for crystal stabilization energy in octahedral, tetrahedral, tetragonal, square pyramidal and square planar fields, Applications of Crystal Field Splitting, Molecular orbital theory (qualitative), MO energy level diagrams, Sigma-pi bonding and their importance in co-ordination compounds

Unit-III: Spectral and Magnetic Properties of Transition Metal Complexes

Spectroscopic ground states, Correlation and Orgel diagrams for transition metal complexes (d^1 - d^9 states), Charge transfer spectra, Elementary idea about magneto chemistry of metal complexes, Diamagnetism, Para magnetism, Temperature independent paramagnetism, Magnetic susceptibility and its measurement, Paramagnetism applied to metal complexes, Ferromagnetism Ferrimagnetism and Anti-ferromagnetism.

Unit-IV: Nuclear Chemistry

Radioactive decay and equilibrium, Artificial radioactivity, Disintegration by α -particle and neutron, Types of nuclear reaction: fission and fusion, Applications radio isotopes to physic chemical problems, Uses of radio isotopes for dating, medicine agriculture and industry.

Books recommended

1. *Advanced Inorganic Chemistry*: F. A. Cotton and G. Wilkinson, John Wiley.
2. *Inorganic Chemistry*: J. E. Huheey, E. A. Keiter, R. L. Keiter, Pearson Education.
3. *Inorganic Chemistry*: Missler and Tarr, Prentice Hall
4. *Inorganic Electronic Spectroscopy*: A. B. P. Lever, Elsevier.
5. *Magnetochemistry*: R. L. Carlin, Springer Verlag.
6. *Essential of Nuclear Chemistry*: H. J. Arnika, ACS.

Basic Physical Chemistry-I

Paper-CHE-103

Unit-I: Symmetry and group theory

Group, Subgroup and Classes, Symmetry elements and Symmetry operations, Relationship between orders of a finite group and its subgroup, Conjugacy relation and classes, symmetry Point group, Matrix representation of point groups and matrix representation for the E , C_n , σ_v , S_n , Nomenclature and symmetry classification of molecules, Irreducible representation and Orthogonality theorem, Standard reduction, Character table (C_{2v} , C_{3v} , C_{4v} , C_{2h} , D_2 , D_{2d}), Direct product.

Unit-II: Application of group Theory

Transformation properties of atomic orbitals, Hybridization scheme for σ -bonding (C_{3v} , C_{4v} , D_{3h} , T_d) projection operator, Symmetry adopted LCO, Hybrid orbital as linear combination of atomic orbitals, MO treatment of coordination compounds, σ -bonding in octahedral complexes, Formation of LCO, Formation of MO, Construction of MO diagram.

Unit-III: Quantum chemistry

Principle of superimposition, Angular momentum, Particle in one and three dimensional boxes, Hydrogen atom, Transformation of co-ordinate, Separation of variables, ϕ -equation, θ -equation, The radial equation, Shapes of s, p and d orbitals. Postulates of quantum mechanics, Simple harmonic oscillator, Rigid rotator, The variation theorem, Linear variation theorem, Linear variation principle, Perturbation theory (first order and nondegenerate), Application of various methods and perturbation theory to Helium atom, Huckel theory of conjugated systems.

Unit-IV: Computer for chemists

Computer programming in C: Elements of computer language, Constant and Variables, Operation and symbols, Expressions, Arithmetic assignment, Input and output, Conditional statement, Loops, Logical variables. C Programming in chemistry: Development of small computer codes involving simple formulae in chemistry such as vander Waal's equation, Radioactive decay constant, Rate constant.

Books recommended

1. K. Veera Reddy, *Symmetry and Spectroscopy of Molecules*, New Age International, Delhi
2. I.N. Levine, *Quantum Chemistry*, 5th edition (2000), Pearson Educ. Inc., New Delhi.
3. A.K. Chandra, *Introductory Quantum Chemistry*, 4th edition, Tata McGraw Hill, New Delhi.
4. L. Pauling and E. B. Wilson, *Introduction to Quantum Mechanics with Applications to Chemistry* (1935), McGraw Hill, New York.
5. R. K. Prasad, "Quantum Chemistry", Wiley.
6. F.A. Cotton, *Chemical Applications of Group Theory*, Wiley
7. Ramesh Kumari, *Computers and their Applications to Chemistry*, Narosa, New Delhi

Physical Spectroscopy

Paper-CHE-104

Unit-I: Electronic Spectroscopy

Atomic spectroscopy- Energies of atomic orbital, Spectra of hydrogen atom alkali metal atom.
Molecular spectroscopy- Energy levels, Vibrational progression and geometry of excited state, Frank-Condon principle. Electronic spectra of poly atomic molecule

UNIT-II: Vibrational Spectroscopy

Infra-red spectroscopy: Vibrational energy of diatomic molecules, zero point energy, force constant and bond strength, Morse potential energy diagram, vibrational-rotational spectroscopy, P,Q,R branches, break-down of Oppenheimer approximation, vibration of polyatomic molecules, Selection rules, Hot bands.

Raman Spectroscopy: Classical and quantum theories of Raman effect, Pure rotational, vibrational and rotational Raman spectra Selection rule, Mutual exclusion principle, Coherent anti Stoke's-Raman spectroscopy.

Unit-III

Microwave spectroscopy: Classification of molecules, Rigid rotator model, Intensities of spectral lines, Effect of isotopic substitution on transition frequencies, Non-rigid rotator, Stark effect, applications.

Photo electron spectroscopy: Basic principles, Photoelectric effect, Ionisation process, Koopmans's thermo photoelectron spectra of simple molecules, ESCA, Chemical information from ESCA, Auger electron spectroscopy.

Unit-IV

Electron spin resonance spectroscopy: Basic principles, Zero-field splitting and Kramer's degeneracy, Factors affecting the g value, Isotopic and anisotropic hyperfine coupling constant, Measurement techniques, Application.

Mossbauer spectroscopy: Basic principles, Spectral parameters and spectral display, Application of the techniques to study the bonding and structure of Fe^{2+} and Fe^{3+} compounds (structure of $\text{Fe}_3(\text{CO})_{12}$, Iron-sulfur proteins).

Books recommended

1. Fundamentals of molecular spectroscopy by C. N. Banwell, Tata McGraw Hill.
2. Physical chemistry by P. W. Atkins. ELBS. 1986
3. Introduction to molecular spectroscopy by G. M. Barrow.
4. Molecular spectroscopy by I. N. Levins, Wiley interscience.
5. Nuclear magnetic Resonance by J. D. Roberts, McGraw Hill.
6. Electron Spin Resonance, Elementary theory and practical applications by J. E. Wetz and J. R. Boulton, McGraw Hill.

General Organic Practical
PAPER-CHE-105

1. Identification of organic compounds having at least two functional group.
Submission of derivatives.
2. Synthesis of organic compounds:
 - I. Preparation of p- Nitroacetanilide.
 - II. Preparation of p- Nitroaniline.
 - III. Preparation of Ethylbenzoate.
 - IV. Preparation of m-Dinitrobenzene.
3. Estimation of
 - I. Acetyl group
 - II. Phenolic group
 - III. Keto group

Book recommended

Quantitative and Qualitative analysis By A.I. Vogel

SEMESTER -II

Organic Chemistry-II

Paper-CHE-201

Unit-I:

Aliphatic electrophilic substitutions: SE_1 , SE_2 and SE_i – mechanisms, Distinction in between SE_2 and SE_i , Electrophilic substitutions at allylic substrate. Effect of substrate structure, leaving group and solvent on reactivity.

Aromatic electrophilic substitutions: Arenium ion mechanism, π – complex mechanism, Orientation and reactivity, Ortho –para ratio, Ipso attack, Orientation of benzene with more than one substituent, Vilsmeier-Hack reaction. Gattermann – Koch reaction, Reimer-Tiemann reaction.

Unit-II:

Aromatic nucleophilic substitutions: $ArSN$ (Addition-Elimination) mechanism, Benzyne (Elimination-Addition) mechanism, SRN_1 – mechanism, Reactivity effect of substrate structure, leaving group, attacking nucleophile; Von-Richter rearrangement, Sommelet –Hauser rearrangement, Smiles rearrangement.

Free radical substitutions: Free radical reactions, Mechanism of free radical substitutions, Neighbouring group assistance in free radical reactions, Free radical substitutions at bridge head. Allylic halogenations, Coupling of alkynes, Arylation of aromatic compounds by diazonium salt, Hunsdiecker reaction, Kochi reaction, NBS, AIBN.

Unit -III:

Addition reaction: Electrophilic addition mechanism (syn and anti), Nucleophilic addition mechanism, Free radical addition mechanism, Addition to conjugated system, Orientation and reactivity, Hydroboration, Epoxidation, Sharpless asymmetric epoxidation, Michael addition.

Elimination reaction: E_2 , E_1 and E_{1cb} mechanism, Comparison in between E_2 , E_1 and E_{1cb} , Reactivity effect of substrate structure, Attacking reagent, Leaving group and Reaction medium. Pyrolytic elimination, Peterson elimination reaction, hydroalkoxy elimination.

Unit -IV:

Oxidation: Different oxidative processes, Oxidation of hydrocarbon, alkanes, aromatic ring, alcohol, α , β - diol, allylic and benzylic alcohols, aldehydes ketones, carboxylic acids, amines.

Oxidation with RuO_4 , Iodobenzene diacetate, $Tl(NO_3)_3$, PCC, PDC, SeO_2 .

Reduction: Different reductive processes, Reduction of alkenes, alkynes, aromatic rings, cycloalkanes, carbonyl compounds, aldehydes, ketones, acids and their derivatives, Hydrogenolysis.

Books recommended

1. Advanced organic chemistry (McGraw-Hill) J. March.
2. Advanced organic chemistry by F.A.carey and R.M.Saundberg
3. Organic reaction mechanism- Sunakar Panda

4. A guide book to mechanism in Organic chemistry (Orient-Longmens)- Peter Sykes
5. Organic reaction mechanism (Benjamin) R. Breslow
6. Mechanism and structure in Organic chemistry (Holt Reinh.)B. S. Gould.

Advance Inorganic Chemistry

Paper-CHE-202

Unit-I: Metal II-Complexes

Chemistry of metal carbonyls, Constitution of metal carbonyls: mononuclear, poly nuclear clusters with terminal and bridge carbon monoxide ligand units, Carbonylate anions, Carbonyl hydrides and Carbonyl halides. Metal nitrosyl and other types of metal nitric oxide complexes, Cyanonitrosyl complexes of metals, Brown ring compounds, dinitrogen complexes. Complexes of cyclohexadienyl molecules.

Unit-II: Rings, Cages and Metal Clusters

Inorganic catenation and hetero catenation, Inorganic ring: borazine, phosphorazine and their derivatives, Inorganic cages: borides and carbides, higher boranes, carboranes, metallaboranes and metallacarboranes, compounds with metal-metal multiple bonds

Unit-III: Metal-Ligand Equilibria in Solution

Stepwise and overall formation constants and their interaction, Trends in stepwise constants, Inert and labile complexes, Kinetic application of valence bond and crystal field theories, Kinetics of octahedral substitution, Factors affecting stability of metal complexes with reference to the nature of metal ion and ligand, Chelate effect and its thermodynamic origin, Determination of binary formation constants by potentiometric and spectrophotometric methods.

Unit-IV: Reaction Mechanism of Transition Metal Complexes

Acid hydrolysis, Factors affecting acid hydrolysis, Base hydrolysis, Conjugate base mechanism, Direct and indirect evidences in favour of conjugate mechanism, Anation reactions, Reactions without metal ligand bond cleavage, Substitution reactions in square planar complexes, Trans effect, Mechanism of one electron reactions, Outer-sphere type reactions, Cross reactions and Marcus-Hush theory, Inner sphere type reactions.

Books recommended

1. *Chemistry of the Elements*: N. N. B. Greenwood and A. Earnshaw, Pergamon.
2. *Mechanism of Inorganic Reactions*: F. Basalo and R. G. Pearson, Wiley Eastern publication 1967.
3. *Advanced Inorganic Chemistry*: F. A. Cotton and G. Wilkinson, Wiley Estern 1988.
4. *Inorganic Chemistry*: J. E. Huheey, E. A. Keiter, R. L. Keiter, Pearson Education.
5. *Advanced Inorganic Chemistry*: F. A. Cotton and G. Wilkinson, John Wiley

Physical Chemistry-II

Paper-CHE-203

Unit-I: Classical thermodynamics Brief resume of the concept of enthalpy, entropy, free energy and laws of thermodynamics, Partial molar properties, Chemical potential, Effect of temperature and pressure, Determination of partial molar properties by: (i) Direct Method, (ii) Apparent method, (iii) Method of intercept.

Concept of fugacity and its determination by (i) Graphical method, (ii) From equation of state (iii) Approximation method, Nernst heat theorem and its application to solid, Third law of thermodynamics, Experimental determination of entropy by third law.

Unit-II: Statistical thermodynamics

Thermodynamic probability and entropy, Maxwell-Boltzmann statistics, Partition function (translational, vibrational, rotational and electronic) for diatomic molecules, relationship between partition and thermodynamic function (internal energy, enthalpy, entropy and free energy), Calculation of equilibrium constant, Fermi-Dirac statistics, Bose-Einstein statistics, Distribution law and its application to metal.

Unit-III: Non-equilibrium thermodynamics

Thermodynamic criteria for non-equilibrium states, Entropy production and entropy flow, Transformation of the generalized fluxes and forces, Non-equilibrium stationary state, Microscopic reversibility, Onsager's reciprocity relation, Electrokinetic phenomena, Diffusion, Electric conduction.

Unit-IV: Chemical Dynamics

Collision theory of reaction rate, Activated complex theory, Arrhenius equation, Ionic reaction, Kinetic salt effect, Steady state kinetics, Photochemical reaction (Hydrogen-Bromine and Hydrogen-Chlorine reactions), Oscillatory reactions (Belousov-Zhabotinsky reaction), Homogeneous catalysis, General features of fast reaction, Study of fast reaction by flow method and relaxation method. Dynamics of Unimolecular reactions (Lindemann-Hinshelwood and Rice-Ramsperger-Kassel-Marcus theories)

Books recommended:

1. K.L. Kapoor, *Text book on Physical Chemistry*, Volume 2, Macmillan India Ltd. Delhi
2. P. W. Atkins, *Physical Chemistry*, 7th Edition, (2002) Oxford University Press, New York.
3. Andrew Maczek, *Statistical Thermodynamics*, (1998) Oxford University Press Inc., New York.
4. F.W. Billmeyer, Jr., *Text Book of Polymer Science*, 3rd Edition (1984), Wiley-Interscience, New York.
5. K. J. Laidler, *Chemical Kinetics*, Third Edition (1987), Harper & Row, New York.
6. P. W. Atkins, *Physical Chemistry*, Seventh Edition (2002), Oxford University Press, New York.
7. I.N. Levine, *Physical Chemistry*, 5th Edition (2002), Tata McGraw Hill Pub. Co. Ltd., New Delhi.
8. J. Raja Ram and J.C. Kuriacose, *Kinetics and Mechanism of Chemical Transformations* (1993), MacMillan Indian Ltd., New Delhi.

Applications of Spectroscopy

Paper-CHE-204

Unit-1: Ultraviolet and Visible spectroscopy

Various electronic transitions (185-800 nm), Beer-Lambert Law, Effect of solvent on electronic transitions, Ultraviolet bands for carbonyl compounds, unsaturated carbonyl compounds, dienes and conjugated dienes, Ultraviolet spectra of aromatic and heterocyclic compounds, Steric effect in biphenyls, Woodward rule (λ_{max}).

Unit -II: Infra-red spectroscopy

Infra-red spectroscopy :Instrumentation, Characteristics vibrational frequencies of simple organic molecules like alkene, alkyne, aromatic compounds, alcohols, phenol, amines, aldehydes, ketones, acids and acid derivatives, Effect of hydrogen bonding and Solvent effect on IR -spectra, Overtones and combination bands, Fermi resonance, FT-IR.

Unit-III

Nuclear Magnetic Resonance Spectroscopy

Basic principle, Chemical shift, Spin-spin interaction, Shielding mechanism, Chemical shift values and correlation to protons bonded to carbon and other nuclei, Chemical exchange, Effect of deuteration, Complex spin-spin interaction between two, three, four and five nuclei, Hindered rotation, Shift reagent, Nuclearoverhauser effect, AX,AB, AX₂ systems.

Carbon-13 NMR spectroscopy: General consideration, Chemical shift (aliphatic, olefinic, alkyne, aromatic, heteroaromatic, and carbonyl carbon), Coupling constant, Two dimension NMR spectroscopy: COSY, DEPT, INDEQUATE, HMBC, HMQC techniques.

Unit-IV: Mass Spectroscopy

Introduction, EI, ESI, CI, FD, MALDI and FAB, Factors affecting fragmentation, Ion analysis, Ion abundance fragmentation of organic compounds with common functional groups, Molecular ion peak, Metastable ions, Mc-Lafferty rearrangement, Nitrogen rule, High resolution mass spectrometry, Examples of mass spectra fragmentation for the determination of structure of simple organic molecules.

Books recommended

1. Instrumental Methods of analysis- Willard, Merrit, Dean and Settle.
2. Spectroscopic identification of organic compounds- R.M. Silverstein and G.C. Bassler
3. Spectroscopic methods in organic chemistry- D.H. Williams and I. Fleming
4. Absorption spectroscopy of organic molecules- V.M. Parikh
5. Applications of spectroscopic techniques in Organic chemistry- P.S. Kalsi

Inorganic Practical
Paper CHE-CC-410

1. Qualitative analysis of mixtures containing not less than six radicals (organic radicals should be excluded). Anyone of the following rare metal ions may be included.

a) V b) Mo c) W d) Ti

2. A) Volumetric analysis involving EDTA as reagent.

i) Determination of Ca^{2+} and Mg^{2+} in Dolomite.

ii) Determination of Nickel in Stainless steel.

OR

B) Complete analysis of:

i) Brass ii) Cement iii) chromo iron ore.

OR

C) Preparation of Hexamine Cobalt (III) chloride.

Book recommended

Quantitative and Qualitative analysis By A.I. Vogel

SEMESTER-III
Advanced Organic chemistry
Paper-CHE-301

Unit-I: Pericyclic Reactions

Molecular orbital symmetry, Frontier orbital of ethene, 1,3- Butadiene, 1,3,5-Hexatriene, Allyl system, Classification of pericyclic reaction, Woodward-Hoffmann method, Frontier molecular orbital theory approach.

Electrocyclic reactions: Dis and Con rotation, $4n$, $4n+2$ and allylic system, Explanation through correlation diagram and Huckel-Mobius approach, Cycloaddition reaction: $2+2$ and $4+2$ cycloaddition, 1,3-Dipolar cycloaddition, Cheletropic reactions, Sigmatropic rearrangements, Claisen Rearrangement, Cope rearrangement, 1,5-hydrogen shift, 1,7-hydrogen shift.

Unit-III: Organic Photochemistry

Electronic excitation, Fate of excited molecules (Jablonski diagram), Fluorescence, Phosphorescence, Photodissociation reactions: Norrish Type-I & II cleavage, Photo isomerisation, Photo-Fries rearrangement, Paterno-Buchi reaction, Barton reaction, Di-Pi methane rearrangement, Photochemistry of aromatic compounds, Photo-Oxidation of alkenes, Photochemistry of vision.

Unit-IV: Name reaction and molecular rearrangement

Chichibabin reaction, Claisen-Schmidt reaction, Bayer villager reaction, Hoffman reaction, Shapiro reaction, Stobbe condensation, Wittig reaction.

Beckmann rearrangement, Benzilic acid rearrangement, Pinacol-Pinacolone rearrangement, Wagner-Meerwein rearrangement, Dienone-Phenol rearrangement, Favorskii rearrangement, Lossen rearrangement, Neber rearrangement, Steven rearrangement, Benzidine rearrangement.

Unit-IV: Applications of Organometallic compounds

Metal atom functionality in Organometallic reactions: Carbocationic behaviour, Carbanionic behaviour, Free radical behaviour. Synthetic applications of organozinc, organocadmium, organolithium, organomercury and organocopper compounds

Books for Organic Chemistry

1. Organic reaction and mechanism- Sunakar Panda
2. A guide book to mechanism in Organic chemistry (Orient-Longmans)- Peter Sykes
3. Organic reaction mechanism (Benjamin) R. Breslow
4. Mechanism and structure in Organic chemistry (Holt Reinh.) B. S. Gould.
5. Organic chemistry (McGraw-Hill) Hendrikson, Cram and Hammond.
6. Basic principles of Organic chemistry (Benjamin) J. D. Roberts and M. C.
7. Stereochemistry of Carbon compounds. (McGraw-Hill) E. L. Eliel
8. Organic Stereochemistry (McGraw-Hill) by Hallas.
9. Organic reaction mechanism (McGraw-Hill) R. K. Bansal.
10. Organic chemistry- R. T. Morrison and R. N. Boyd, (Prentice Hall.)

11. Modern organic reactions(Benjamin) H. O. House.
12. Principle of organic synthesis- R.O.C. Norman and J. M. Coxon.(ELBS)
13. Reaction mechanism in organic chemistry- S. M. Mukharji and S. P. Singh.
14. Advanced organic chemistry (McGraw-Hill) J. March.

Organic synthesis

Paper-CHE-302

Unit-I Disconnection approach

Disconnection approach An introduction to Synthons and synthetic equivalents, disconnection approach, functional group interconversions. One group C-X and two group disconnections in 1,2,1,3-, 1,4- & 1,5- bifunctional compounds. Chemoselectivity, reversal of polarity, cyclisation reaction, amine synthesis.

Protecting Groups: Principle of protection of alcohol, amine, carbonyl and carboxyl groups.

Unit-II Retrosynthesis

Retro- synthesis of Alkene, acetylenes and aliphatic nitro Alcohols and carbonyl compounds, amines, the importance of the order of events in organic synthesis, chemoselectivity, regioselectivity. Diels Alder reaction, Michael addition and Robinson annulation. Retro-synthesis of aromatic Heterocycles and 3, 4, 5 and 6 membered carbocyclic and heterocyclic rings.

Unit-III Synthesis of Heterocyclic Compounds

Three membered and four membered Heterocycles- synthesis and reactions of aziridines, oxiranes, thiranes, azetidines, oxitanes and thietanes.

Synthesis and reactions of benzopyrroles, benzofurans and benzothiophenes.

Synthesis and reactions of pyriliun salts and pyrones and their comparison pyridinium and thiopyrylium salts and pyridones. Synthesis and reactions of coumarins, chromones.

Unit-IV Synthetic reagents

Complex metal hydrides, lithium dialkyl cuprate, lithium diisopropylamide (LDA)

Dicyclohexylcarbodiimide (DCC), Trimethyl silyl iodide, tributyltin hydride, peracids, lead tetra acetate, PPA, Diazomethane, ozone phase transfer catalyst, woodward-prevost hydroxylation, Barton and Shapiro reaction Hoffmann – Löffler-Freytag, Miyamura, Stille, Negishi, Kamada Peterson synthesis

Book recommended

1. S. Warren: Designing of organic synthesis
2. J. Fuhrhop & G. Penzlin.: Organic synthesis (2nd ed.)
3. Carruthers: some modern methods of organic synthesis.
4. H.O.House: modern synthetic reaction.
5. Fieser & Fieser : Reagent in organic synthesis
6. R.O.C.Norman: principle of organic synthesis
7. CAREY & Sundharg: Advanced organic Chemistry

8. P.E.REALAND: Organic synthesis
9. Bartan and Ollis : comprehensive organic Chemistry
10. Weber & Gokel : phase transfer catalyst in organic synthesis.
11. J. Robertson (OX): Protecting group chemistry

Chemistry and society

Paper-CHE-303

Unit-I Chemicals in food:

- a) Carbohydrates: Classification, sugar and non-sugar, Glucose, fructose, starch and cellulose. Importance of carbohydrates.
- b) Amino acids: Classification, essential and nonessential amino acids, Zwitter ion structure, polypeptides, proteins (classification and function).
- c) Lipids: Classification, oils and fats, metabolism of lipids.
- d) Vitamins: Classification, Nomenclature and disease caused by the deficiency of vitamins.

Unit-II Chemicals in Medicines:

Development of new drugs, different types of drugs, analgesics, antipyretics, antiseptics and antibiotics, broad spectrum antibiotics. Metals in medicines: Metal deficiency and disease, toxic effect of metals.

Unit-III Chemicals in Agriculture:

Fixation of Nitrogen, fertilisers, classification of fertilisers: nitrogenous, phosphorous and potassium fertiliser. Pesticides classification, insecticides, fungicides and rodenticides. Detrimental effects of pesticides (DDT, BHC, Parathion).

Unit-IV Chemicals in daily life:

General idea about soap, synthetic detergents and shampoo, preparation of soap and synthetic detergents. Advantage and disadvantage of synthetic detergent, cosmetics and perfumes. Plastic and its detrimental effects on environment.

Chemistry and Environment

Paper-CHE-304

Unit-I Environmental Processes

Environment and its classification, Factors influencing environment, Components of Environment; Environmental degradation, Biogeochemical cycles; Hydrological cycle, Gaseous cycles (Oxygen cycle, CO₂ cycle, Nitrogen cycle), Sedimentary cycles (Sulfur cycle, Phosphorous cycle)

Unit-II Natural Resources

Introduction on classification of resources; land resources, formation of soil, soil erosion, Water resources, Sources of fresh water, Uses of water, causes for the depletion of water resources; mineral resources, Forest resources, Deforestation, consequences of deforestation; affords to control

deforestation, Renewable and nonrenewable resources, Conventional and nonconventional energy resources

Unit-III Environmental pollution

Introduction, Pollutants, Types of pollutants, Classification of pollution, effects of pollution, Radiation pollution: sources, effect and control of radiation pollution, Thermal pollution: sources, effects and its control, Industrial pollution, Sewage and sewage treatment.

Unit-IV Air Pollution and its control

Atmosphere; structure and composition of atmosphere, Classification of air pollutants, Consequences of air pollution (Ozone layer depletion, Green house effect, Smog, Acid rain), Control of air pollution, air quality and standards.

Book recommended

1. Environment and Ecology By Dr. Sunakar Panda
2. Environmental Chemistry By A.K. De
3. Air Pollution by Wark & Werner
4. Environmental Pollution Control in Process Industries By S.P. Mahajan
5. Environmental Chemistry By B.K. Sharma & H.Kaur
6. Introduction to Air Pollution By P.K. Trivedi
7. Environmental Pollution Analysis By S.M. Khopkar
8. A Text Book of Environmental Pollution By D.D. Tyagi, M. Mehre
9. Environmental Pollution Engineering and Control By C.S. Rao

Physical Chemistry Practical Paper-CHE-305

F.M.-100

6 Hrs duration

1. Determination of surface excess of amyl alcohol
2. Determine the critical Micelle Concentration (CMC) of surfactant from the measurement of surface tension.
3. To determine the Molecular weight of a polymer from viscosity measurements.
4. To determine the Isoelectric point of gelatine and to find out the Intrinsic Viscosity at isoelectric point.
5. Determination of critical solution temperature (CST) of phenol-water system
6. A study of phase diagram of three-component liquid (ternary) system at room temperature: (Benzene-acetic acid-water system)
7. To determine the strength of HCL and acetic acid (AcOH) from the mixture of acids by strong alkali (NaOH) conductometrically.
8. Potentiometric titration of a weak acid (acetic acid) with caustic soda solution and determination of the dissociation constant of the acid using quinhydrone electrode at room temperature
9. To determine the energy of activation from the Kinetic measurement of hydrolysis of ester
10. Determination of rate constant of inversion of sucrose by polarimeter and also verification of the effect of catalyst on the rate constant.

11. First order rate kinetics for acid catalyzed hydrolysis of methyl acetate.
12. Second order rate kinetics for base catalyzed hydrolysis of ethyl acetate.

Book recommended

1. Physical Chemistry Practical by Saroj Kr Maity and Naba Kr Ghosh
2. Experimental Physical Chemistry by R.C. Das and B. Behera
3. Text book of Quantitative Inorganic Analysis by A.I. Vogel, ELBS (1978)
4. Experimental Physical chemistry by J B Yadav, Goel Pub. House, (1981)
5. Senior Practical Physical Chemistry by B. C. Kosla, Simla Printers New Delhi (1987).
6. Experimental Physical Chemistry by Daniel et al., McGraw Hill, New York (1962).
7. Practical Physical Chemistry by A.M James and P. E. Pritchard, Longman's Group Ltd (1968)

SEMESTER IV
Physical Chemistry-III
Paper-CHE-401

Unit-I Electrochemistry-I

Electrochemistry of solution: Ion-solvent interactions, Born Model, Ion-ion interactions: Debye-Huckel (ion-cloud), Bjerrum Model, Thermodynamics of electrified interface equations; Ion transport in solution: Debye Huckel-Onsager equation, Derivation of Butler-Volmer equation, Tafel plot.

Activity and activity coefficient, Ionic strength, Debye-Huckel limiting law and its verification, Degree of dissociation and its determination, Determination of activity coefficient by freezing point, Vapour pressure and solubility measurement, Ion association, Association constant, Determination of dissociation constant of electrolyte.

Unit-II Electrochemistry-II

Semiconductor interfaces, Theory of double layer at semiconductor, Electrolytic solution interfaces, Structure of double layer interfaces, Effect of light at semiconductor solution interface, Fuel cell, Corrosion: Homogeneous theory forms of corrosion, corrosion monitoring and prevention. Electromotive force, Measurement of EMF, Relationship between EMF and thermodynamics parameters (free energy change, enthalpy change and entropy change), Thermodynamics of reversible cells, Electrode potential in terms of osmotic pressure and solution pressure. Nernst equation relating electrode potential and concentration.

Unit-III Surface Chemistry

Adsorption, Surface tension, Capillary action, Pressure difference across curved surface (Laplace equation), Vapour pressure of droplets (Kelvin equation), Gibb's adsorption isotherm, Estimation of surface area (BET equation), Surface films on liquids (electrokinetic phenomenon), Catalytic activity at surfaces.

Micelles: Surface active agents, Classification, Micellization, Hydrophobic interaction, Critical micellar concentration (CMC), Factors affecting CMC of surfactants, Counter ion Binding to micelles. Thermodynamics of micellization, Phase separation and mass action models, Solubulisation, Microemulsion, Reverse micelles.

Unit-IV Solid state

Crystal systems and lattices, Miller planes, Crystal packing, Crystal defects; Bragg's Law, Ionic crystals, Band theory, Metals and semiconductors, Types of solid state reactions.

Books recommended

1. J.O'M. Bockris and A.K.N. Reddy, *Modern Electrochemistry*, Vol. 1 & 2A and 2 B, (1998) Plenum Press, New York.
2. Y. Moroi, *Micelles : Theoretical and Applied Aspects*, (1992) Plenum Press, New York.
3. F.W. Billmayer, Jr., *Text Book of Polymer Science*, 3rd Edition (1984), Wiley-Interscience, New York.

4. A.R. West, *Solid State Chemistry and its Applications*, (1984) John Wiley & Sons, Singapore.
5. C.N R. Rao and J. Gopalkrishnan, *New Directions in Solid State Chemistry*, (1997) Cambridge Univ. Press.
6. S. Glasstone, "Introduction to Electrochemistry" Affilised East West

Analytical Chemistry

Paper-CHE-402

Unit- Thermal methods of analysis

Thermo analytical methods: TGA, DTGA and DTA, Instrument, Instrumental and application to physical studies (reaction kinetics and information for the constitution of phase diagram), Analytical applications.

Unit-II Electrical methods of analysis

Voltametry and polarography: Dropping mercury electrode, Ilkovic equation, Current-potential curves, Reversible reactions, The residual current, Current maxima, Analytical applications, Amperometric titration using rotating platinum electrode, Cyclic voltammetry.

Unit-III Analysis of Food and Soil

Analysis of food: Moisture, ash, crude protein, fats and carbohydrates. Food adulteration-common adulterants in food, contamination of food stuffs. Microscopic examination of foods for adulterants. Pesticide analysis in food products, Thin layer chromatography for identification of chlorinated pesticides in food. Separation of pesticides by HPLC.
Analysis of soil: Moisture, pH, total nitrogen phosphorous, silica, lime, magnesia, manganese, sulphur and alkali salts.

Unit-IV

Analysis of Fuel and Drugs

Fuel analysis: Solid, liquid and gas. Liquid fuels-flash point, Aniline point, octane number and carbon residue. Gaseous fuels-producer gas and water gas-calorific value.

Drug analysis: Narcotics and dangerous drugs. Classification of drugs. Screening by gas and thin layer chromatography.

Analysis of data: Types of errors, determinate error, indeterminate error, minimisation of error, Accuracy and precession. Mean (Average Deviation), Standard deviation, Median, Methods of repeating analytical data, statistical evaluation of data, statistical analysis. Problems.

Bio-inorganic and Supramolecular Chemistry

Paper-CHE-403

Unit-I: Bioinorganic Chemistry of Alkali and Alkaline Earth Metals

Essential and trace elements in biological systems, structure and functions of biological membranes; mechanism of ion transport across membranes; sodium pump; ionophores; valinomycin and crown ether complexes of Na^+ and K^+ ; ATP and ADP; photosynthesis: chlorophyll a, PS I and PS II; role of calcium in muscle contraction, blood clotting mechanism and biological calcification.

Unit- II: Metalloproteins

Heme proteins and oxygen uptake, Structure and functions of haemoglobin, myoglobin, hemocyanin and hemerythrin, Iron-sulphur proteins: rubredoxin and ferredoxins, Nitrogenase, Bio-inorganic aspects of nitrogen fixation.

Unit- III: Metalloenzymes

Zinc enzymes – carboxypeptidase and carbonic anhydrase, Iron Enzymes – catalase peroxidase and cytochrome p-450, Copper enzymes – superoxide dismutase, Mg enzymes – vitamin B₁₂.

Unit IV: Supra molecular Chemistry

Molecular recognition: Spherical recognition, Recognition of anionic Substrate, Tetrahedral recognition, Co receptor molecules and multiple recognition, Binding and recognition of neutral molecules.

Supra molecular reactivity and catalysis.

Molecular assembly in supra molecular chemistry.

Supra molecular devices: Suitable binding, photochemical and electrochemical sensor wires.

Books Recommended:

1. *Principle of Biochemistry (Lehninger)*: D. L. Nelson and M. M. Cox, W. H. Freeman and company, New York.
2. *Fundamentals of Biochemistry*: D. Voet, J. G. Voet and C. W. Pratt; John Wiley and sons.
3. *Bioinorganic Chemistry*: Bertini, Gray, Lippard, Valentine, Viva Books Private Limited.
4. *Supramolecular Chemistry*: J. M. Lehn; VCH

Project and Seminar**Paper-CHE-404**

Each student has to work for at least 200 hours in a reputed research laboratory or industry on a specific project under the guidance of a Professor/Reader/lecturer or a Scientist. The research work will be submitted in the form of a dissertation within 15 days of last theory examination. The student has to present his work before an External examiner and an Internal examiner for evaluation.

Analytical Chemistry Practical**Paper-CHE-405**

3 Hrs duration

F.M.-100

1. To find out the dissociation constant of the given tribasic acid, i.e. phosphoric acid by treating it against NaOH using a pH Meter
2. Determination of hydrolytic constant (Kh) of ammonium chloride solution pH-metrically.
3. To estimate the iron content in the given ferrous ammonium sulphate solution by Colorimetry

4. To determine the composition and stability constant of Fe(III) -salicylic acid complex colorimetrically by Job's method of continuous variation.
5. To determine the Λ^0 and K_a of weak electrolyte at a definite temperature by Debye Huckel Onsagar equation.
6. To determine the stoichiometric ratio in the complexometric titration of $HgCl_2$ against potassium iodide conductometrically.
7. To determine the total cation concentration in natural water.
8. To estimate the amount of Na^+ ion in a given sample using ionisation resin column.
9. Potentiometric estimation of Mohr salt solution with standard potassium dichromate solution and also determination of formal potential (reduction) of ferric-ferrous system.
10. Determination of activity solubility product of silver chloride by emf measurement

Book recommended

1. Physical Chemistry Practical by Saroj Kr Maity and Naba Kr Ghosh
2. Experimental Physical Chemistry by R.C. Das and B. Behera
3. Text book of Quantitative Inorganic Analysis by A.I. Vogel, ELBS (1978)
4. Experimental Physical chemistry by J B Yadav, Goel Pub. House, (1981)
5. Senior Practical Physical Chemistry by B. C. Kosla, Simla Printers New Delhi (1987).
6. Experimental Physical Chemistry by Daniel et al., McGraw Hill, New York (1962).
7. Practical Physical Chemistry by A.M James and P. E. Pritchard, Longman's Group Ltd (1968)

18-7-18
 B. Behera
 28-7-18
 R. Saurabh

MC-CC-101 MANAGEMENT CONCEPT & ORGANISATIONAL BEHAVIOUR

Objective: The objective of this course is to help students understand the conceptual framework of management and Organizational Behaviour.

- UNIT-I Schools of Management Thoughts: Nature & Scope of Management, Traditional theories of management, Human behaviour and social system school; Decision theory school; Systems school; Contingency theory of management; functions of a manager.
- UNIT-II Managerial functions: Planning-concept, significance, types; organizing concept, principles, types of organizations, authority, responsibility, power, delegation, decentralization.
- UNIT-III Team Development: Leadership, Concept; Leadership styles; Theories -trait theory, behavioural theory, Fielder's contingency theory; Situational theory; Likert's four systems of leadership.
- UNIT-IV Motivation: Process of motivation; Theories of motivation: Maslow's need hierarchy theory, McGregor's Theory X & Y, McClelland's need theory, Victor Vroom's expectancy theory, Herzberg's two factor theory, Skinner's reinforcement theory.

References:

1. Michael, V. P: Organisational Behaviour & Managerial Effectiveness, S. Chand, New Delhi.
2. Hellreigel, Don John W Slocum Jr. and Richards W. Woodman: Organisational Behaviour, South Western College Publishing, Ohio.
3. Hersey, Poul, Kenneth H. Blanchard and Dewey E. Johnson: Management of Organisational Behaviour: Utilising Human Resource, Prentice Hall, New Delhi.
4. Aswathappa, K.; Organisational Behaviour, Himalaya Publishing House, Mumbai.
5. Koontz, Harold, Cyril O'Donnell and Heinz Weihrich: Essentials of Management, Tata McGraw-Hill, N. Delhi
6. Luthans Fred: Organisational Behaviour, McGrawHill, New York.
7. Newstrom, John W. and Keith Davis: Organisational Behaviour: Human Behaviour at work, TMH, N. Delhi
8. Robbins, Stephen P, and Mary Coulter: Management, Pearson Education, New Delhi.
9. Steers, Richards M. and J. Stewart Balck: Organisational Behaviour, Harper Collins College Publishers, NY.
10. Sukla, Madhukar: Understanding Organisations: Organisation Theory and practice in India, PH, New Delhi
11. Thom hill. -Managing Change". Pearson Education. New Delhi. Green Berg -Behaviour in Organisation".
12. Hall. -Organisation Structure, Process and outcomes-.
13. Terry, G.R.: Principles of Management
14. Drawker, Peter; Practice of Management
15. Prasad, L.M.; Principles and Practice of Management

S. V. Pradhan
04/08/2018

Objective: The objective of this course is to develop the ability to understand and scan business environment, analyze opportunities and take decisions under uncertainty.

- UNIT-I An Overview of Business Environment
Meaning, Nature and Characteristics of Modern Business. Meaning and Significance of Business Environment, Types of Environment: Internal and External, Micro and Macro. Environmental Analysis- Process, Benefits and Limitations.
- UNIT-II Economic Environment:
Nature of the Economy, Structure of the Economy, Economic Policies, Economic Conditions, Government Policies, Industrial Policy, Exim Policy, Public Sector, Private Sector, Industrial Sickness, Small Industries.
- UNIT-III Political and Legal Environment:
Government and Business, FERA and FEMA, Consumer Protection Act, Protection of Patents, Protection of Trade Marks. Competition Act
- UNIT-IV Socio-cultural Environment:
Business and Society, Nature and Impact of Culture on Business, Consumerism, Social Responsibilities of Business, Business Ethics, Social Audit.

References:

1. Cherunilam F., Business Environment : Texts and Cases (Himalaya)
2. Aswathappa K., Essentials of Business Environment (Himalaya)
3. Agrawal and Diwan, Business Environment (Excel)
4. Mishra & Puri, Economic Environment of Business (Himalaya)
5. Jain P.C., Government and Business Policy (Galgotia)
6. Ghosh B., Economic Environment of Business (Vikas)
7. Adhikary M., Economic Environment of Business (Sultan Chand)
8. F. Cherunilam, International Business Environment (Himalaya)

S. K. Pradhan
04/08/2018

Objective: The course aims at making the students learn the application of statistical tools and techniques for decision making

- UNIT-I Correlation & Regression Analysis: Two variable Cases, Multiple Correlation & Multiple Regression.
- UNIT-II Probability Theory – Probability – Classical, Relative and Subjective Probability, Addition and Multiplication Probability Models- Conditional Probability and Bayes Theorem.
- Probability Distributions, Binomial, Poisson and Normal Distribution, Their characteristics and Application.
- UNIT-III Data types, Data Collection and Analysis: Sampling, need, errors and methods of sampling , Probability and Non-probability Method, Sampling and Non sampling Errors, Law of Large Numbers and Central Limit Theorem, Sampling Distribution and their Characteristics.
- UNIT-IV Theory of Estimation and Testing of Hypotheses. Significance Test of Large Sample and Small Sample Test ; t-test, z- test and F- test, Non parametric Test:- Chi-square Test, Sign Test, Rank Sum Test, One Sample Runs Test, H or Kruskal Walls Test.

References:

1. S.P. Gupta, Statistical Methods, (Sultan Chand and Sons)
2. S.C. Gupta, Fundamentals of Statistics, (Himalaya Publishing House)
3. R.P. Hooda, Statistics for Business & Economics, (Macmillan)
4. D.N. Elhance , BeenaElhance and B.M. Aggarwal Business Statistics, (KitabMohal)
5. Heinz, Kohler, Statistics for Business & Economics, (Harper Collins)

S.K. Pradley
04/08/2018

ACCOUNTING FOR MANAGERIAL DECISIONS

Objective: The objective of this course is to acquaint students with the accounting concepts, tools and techniques for managerial decisions

- UNIT-I Financial Statement Analysis- Trend Analysis - Financial Ratio Analysis; Solvency Ratios, Leverage Ratios and Capital Structure Ratios – Fund Flow Statement.
- UNIT – II Marginal Costing and Break-even Analysis: Concept of marginal cost; cost-volume-profit analysis; Break-even analysis; Decisions regarding sales-mix, make or buy decisions and discontinuation of a product line.
- UNIT-III Budgeting: Definition of budget; Essential of budgeting; Types of Budgets- functional budget, cash budget and flexible budget.
- UNIT- IV Standard Costing and Variance Analysis: Standard costing as a control technique; Variance analysis- meaning and importance, kinds of variance and their uses - materials, labour and overhead variance.

References:

1. Horngren, C.T. Gary L. Sundem and William O. Stratton: Introduction to Management Accounting, Pearson Education, Delhi
2. Horngren Charles T. George Foster and Srikanta M. Dattar : Cost ,Accounting: A Managerial Emphasis, Pearson Education, Delhi.
3. Banerjee Bhabatosh : Management Accounting.
4. Anthony, Robert: Management Accounting, Tarapore-wala, Mumbai.
5. Garrison, Ray H. and Eric W. Noreen: Management Accounting, Richard D.Irwin, Chicago.
6. Jawaharlal : Adv. Management Accounting - S. Chand, New Delhi.
7. Jain & Narang, Cost Accounting, Kalyani publisher
8. Hansen, Don R. and Maryanne M. Moreen: Management Accounting, South-Western College Publishing, Cincinnati, Ohio.
9. Lall, B.M., and I.C. Jain: Cost Accounting: Principles and Practice, Prentice Hall. Delhi.
10. Pandey, I.M: Management Accounting, Kalyani publisher.
11. Manmohan & Goyal, Principles of Management Accounting, Sahitya Bhavan, Agra.

S.K. Pradhan
04/08/2018

Objective: The objective of this course is to help students to understand the conceptual framework of financial management and its applications under various environmental constraints.

UNIT -I Meaning, nature and scope of finance. Financial goal-profit Vs. wealth maximization. Finance functions-investment, financing and dividend decisions.

Capital Budgeting- investment evaluation criteria- payback period, accounting rate of return, net present value, internal rate of return and profitability index, Capital rationing, Cost of Capital.

UNIT -II Operating and Financial leverage-Measurement of leverage, Effects of operating and financial leverage on profit, combined financial and operating leverage.

Capital Structure Theories-Net Income Approach, Net Operating Income Approach, Traditional Approach and, MM Hypothesis, Determinants of Capital Structure decision.

UNIT -III Dividend Policies-Issues in dividend policies, Walter's Model, Gardon's Model (Relevance concepts) M. M. Hypothesis (Irrelevance Concept) Determinants of dividend policy, Dividend policy in practice-Forms of dividend policy.

UNIT -IV Management of Working Capital-Meaning, significance and types of working capital, Need for working capital-concept of operating cycle, estimation of working capital requirements, Financing of working capital.

Dimensions of working capital management-Management of Inventories receivable and cash.

References:

1. Pandey, I. M., Financial Management, (Vikas)
2. Chandra, P. Financial Management: Theory and Practice, (Tata McGraw Hill)
3. Khan M.Y. & Jain P.K, Financial Management: Text & Problems. (Tata McGraw Hill)
4. Sharma R.K. and Gupta S.K. Financial Management, (Kalyani)
6. Van Horne James C., Financial Management and Policy, (Prentice Hall)
7. T.P. Ghosh, Accounting and Finance for Managers, (Taxmann)
8. D. Chandra Bose, Fundamentals of Financial Management (Prentice Hall of India)
9. R.P. Rustagi, Financial Management, (Galgotia publishing Company)

S. I. Pradhan
04/08/2018

SEMESTER – II

MC-CC201

MANAGERIAL ECONOMICS

Objective: This course aims to develop managerial perspective to economic fundamentals as an aid to decision making under given environmental constraints.

- UNIT-I Nature and scope of Managerial Economics, Managerial Economist's Role and Responsibilities, Objectives of Business Firm. Demand Analysis: Determinants of Demand, Theory of Consumer Choice: Cardinal Utility Approach, Indifference Curve Approach.
- UNIT –II Production Theory: Production Function, Law of Variable Proportion; Law of Returns to Scale, Economics of Scale, Cost Concepts, Short and Long run Cost Function- their nature and shape.
- UNIT –III Price Determination: Methods of Price Determination, price determination under Perfect Competition, Monopolistic Competition, Oligopoly and Monopoly.
- UNIT –IV Business Cycles: Nature and Phases of a Business Cycle, Theories of Business Cycles- Monetary and Innovation.

References:

1. Varshney R.L., and Maheswari K.L., Managerial Economics, (Sultan Chand & Sons)
2. Dean, Joel, Managerial Economics, (Prentice Hall)
3. Mote, V.L., Paul S. & Gupta, G.S., Managerial Economics Concepts and Cases, (TataMcgrawhill)
4. Dwivedi, D.N, Managerial Economics, (Vikas Publishing House)
5. Adhikary M. Business Economics, (Excel Books)
6. Chopra OP: Managerial Economics, (TataMc.GrawHill)
7. D.M. Mithani, Managerial Economics, (Himalaya)
8. Mishra & Puri, Economics for Management :Text and Cases, (Himalaya)
9. H.L. Ahuja, Business Economics : Micro & Macro, (S.Chand & Co. Ltd.)
10. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics & Financial Analysis, (New Age)

S.K. Pradhan
04/08/18

Objective: The objective of this course is to facilitate understanding of the conceptual framework of marketing and its applications in decision making under various environmental constraints.

UNIT-I Introduction: Evolution of marketing, Concepts of marketing, Marketing mix, Strategic marketing planning and overview.

Market Analysis and Selection: Marketing environment, macro and micro components and their impact on marketing decision, Market segmentation and positioning.

UNIT-II Product Decisions: Product classification of Products, Major product Designs, Product line and Product Mix, Product Life Cycle, New Product Development and Consumer Adoption Process.

UNIT -III Pricing Decisions Factor affecting price determination, Pricing Policies and Strategies, Discounts and Rebates.

UNIT -IV Promotion and Distribution Decisions, Promotion mix-Advertising, Personal Selling, Sales Promotion, Publicity and Public Relations, Nature, function and types of distribution channels, distribution channel intermediaries, Channel management decision.

References:

1. Kotler, Philip, and Gary Armstrong: Principles of Marketing, (Prentice Hall)
2. Kotler, Philip :Marketing Management: Analysis, Planning Implementation and Control, (Prentice Hall)
3. Ramaswamy, V.S. and Namkumari S.: Marketing Management, (Macmillan)
4. Srinivassan, R.: Cass Studies in Marketing : The Indian Context, (Prentice Hall)
5. Stanton, William J., and Charles Fatrell: Fundamentals of Marketing: (Mc.Graw Hill)
6. Still, Richard R, Edward W.Coundiff and Norman A.P. Govani: Sales Management: Decisions, Strategies and cases, (Prentice Hall)
7. F. Cherunilam, Industrial Marketing, (Himalaya)
8. S.A.Sherlekar, Marketing Management, (Himalaya)
9. S.A.Sherlekar, K.Nirmala, Prasad and S.J.Salvadore Victor: Principles of Management (Himalaya)
10. S.K. Grover &T.N.Chhabra, Marketing Management, (DhanpatRai& Company)

S.K. Pradhy
09/08/18

MC-CC203

FINANCIAL INSTITUTIONS AND MARKETS

Objectives: The course aims at providing students with an understanding of the structure, organization and working of financial institutions and markets in India.

- UNIT-I Introduction, Nature and Role of Financial System, Indian Financial System, Financial markets: Money market and capital market, Role of SEBI
- UNIT-II Commercial Banks: functions, management and present structure, e-banking, recent developments in commercial banking; Reforms in Banking Sector.
- UNIT-III Development banks: Concept, objectives, functions, operational and promotional activities of development banks: IFCI, ICICI, IDBI and NABARD
- UNIT-IV Foreign investment: types, trends, implications, Regulatory framework for foreign investment in India.

References:

1. Bhole, L.M., Financial Markets and Institutions, (Tata McGrawHill)
2. Khan M.Y., Indian Financial System, (Tata Mc.GrawHill)
3. Srivastav, R.M., Management of Indian Financial Institutions, (Himalaya)
4. Avdhani, Investment and securities market in India, (Himalaya)
5. Avdhani, Investment and Securities Market in India, (Himalaya)
6. Giddy, I.H., Global Financial Markets, AITBS.
7. Gordan&Natarajan, Financial Markets & Services, (Himalaya)
8. Varshaney, P.N., Indian Financial Systems, (Sultan Chand & Sons)
9. Verma, J.C, Guide to Mutual Funds and Investment Portfolio, (Bharat Publishing)
10. M.Y. Khan, Indian Financial System, (Tata Mc.GrawHill)

S.K. Pradhan
04/08/18

Objective: To provide an understanding the theoretical aspects computer, networking and word processing.

UNIT-I Introduction to computer: Basic components of a Computer and their operation, Classification of software, Application software, System software.

Operating Systems: Batch processing, Multiprogramming and time sharing OS, Introduction to WINDOWS: Platform menu bottoms, boxes, Accessories, etc. Creation, Deletion and Search for files, Customizing start menu, Creation, shortcuts to Programs and Files. LINUX: Features and advantages.

UNIT-II Word Processing: Introduction to MS-WORD, Creation and editing of text files. Find and replace Cut, Copy, and Paste. Text formatting: line spacing, Fonts, text alignment, page layout, Page numbering, Headers & footer, Spelling check, Creation of tables, Mail merge facility.

Spread Sheet: Introduction to MS-EXCEL, Worksheet, Cell, Range, Creation of Worksheet, Editing: Insertion of columns and Rows, deletion of columns and rows, use of formula, drawing different types of charts, printing of worksheet data.

UNIT-III Presentation: Introduction to MS-Power point, preparation and presentation of slides, Creation of graphs, tables, organization charts, Addition of new slides, changing slide layouts, slide show.

UNIT-IV Introduction to Computer Networking: Need of networking, Types of Network-LAN, MAN, WAN, Network Topologies, Network protocol, Internet, Intranet, Extranet, uses and basic services of internet, Concept of WWW.
Database Management System: Concept and components of DBMS, Database models, creating and using a database.

References:

1. The Compact Guide to Microsoft Office by Ron Mansfield. BPB Publications.
2. Fundamental of Computers by V. Rajaraman.
3. Computer for Beginners by Jaggi&. Jain, Academy.
4. Straight to the point MS Office 2000, (Firewall Media)
5. Introduction to Database Systems C.J. Date- Addison Wesley Massachusetts
6. <http://office.microsoft.com/en-001/training>

S.K. Pradhan
04/08/18

Objective: The objective of the course is to acquaint students with the techniques and principles to manage human resource of an organization.

UNIT-I : Introduction to Human Resource Management: Introduction ,concept of human resources management, scope of human resource management, history of human resource management ,function of human resource management ,role of HR Executives.

Human Resource planning: Process of human Resource Planning, Need for Human Resource Planning, HR forecasting Techniques, Successful Human Resource Planning.

UNIT-II: Recruitment and Selection : Concept of Recruitment, Factors Affecting Recruitment ,Sources of Recruitment ,Recruitment Policy ,Selection ,selection Process, Application Forms ,Selection Test ,Interviews,Evaluation,Placement ,Induction.

Training and Management Development: Meaning of Training, Methods of Training, Concept of Management Development, Management Development Methods, Differences between Training and Development, Evaluation of Training and Management Development

UNIT-III; Performance Appraisal: Concept and Need for Performance, Reviews, Overview of Performance Appraisal, Types of Appraisal Method, 360 degree appraisal, Benefits. Compensation Management: Wage and Salary Administration, Managing Wages, Concept of Rewards and Incentives, Managing Benefits in Organization.

UNIT-IV:Grievance and Grievance Procedure: Concept of Grievance Causes Of Grievance, Forms and Effects of Grievance, the Grievance Handling Procedure, Need for Grievance Redressal Procedure.

Employee welfare and Working Conditions: Concept of Employee Welfare, Welfare Measures, Types, Employee Welfare Responsibility, the Business Benefits of Employee Welfare Activities.

References:

1. L.M.Prasad
2. C.V.Gupta
3. Armstrong, M.(1995). Armstrong's handbook of human resource management practice. Koran page 147
4. Dessler , Garry , "Human Resources Management", Prentice Hall, New Jersey, 1997
5. Aswathappa K, "Human Resources Management", Fifth Edition, Tata McGraw – Hill Companies, 2008.

S.K. Pradlan
04/08/2018

SEMESTER - III

MC-CC301

BUSINESS RESEARCH & BUSINESS COMMUNICATION

Objective: The objective of this course is to familiarize the students with the process and technique of scientific research and its relevance in the managerial decision making. Another objective of this course is to provide a broad view of communication skills to the students.

- UNIT-I Research: Meaning and Definition, Functions of Social Science Research, Limitations of Social Science Research, Research in Functional Areas: Finance, Marketing, Production, Human Resources.
- UNIT-II Planning of Research: The planning Process, Selection of a Research Problem, Sources of Research Problems, Formulation of the Research Problem, Formulation of the Hypothesis, Research Design.
- UNIT-III Report Writing: Categories of Report, Planning Report Writing, Research Report Format, Principles of Writing of Footnotes and Bibliography, Oral Presentation.
- UNIT-IV Communication: Interpersonal Communication: Significance; Concept of Two-way Communication; Process of Communication, Barriers to effective Communication; Types of Communication: Written and Oral Communication.
- Organizational Communication: Factors influencing Organizational Communication, Informal Communication.

References:

1. Krishnaswami O.R. & Ranganatham M., Methodology of Research in Social Sciences, (Himalaya)
2. Bajpai S.R.: Methods of Social Survey and Research (Kitab Mahal)
3. Sarvanavel P., Research Methodology (Kitab Mahal)
4. Kooper D.R. & Schindler P.S., Business Research Methods (Mc. Grow Hill)
5. Kothary, C.R.: "Research Methodology, Methods & Technique" (Wiley Eastern)
6. Rai & Rai, Business Communication (Himalaya)
7. Pradhan H, & Pradhan, N.S., Business Communication (Himalaya)
8. Locker & Kaezmark, Business Communication, (Tata Mc-Graw hill)

S. G. Pradhan
04/08/2018

MC-CC302

INTERNATIONAL BUSINESS

Objective: The objective of this course is to provide a glimpse of global business environment and the emerging trends thereof.

- UNIT-I International Business: Meaning, Nature, Theories of International Business, Scope, Competitive Advantage and Problems of International Business.
- UNIT-II Modes of Entering International Business: International Business Analysis, Different Modes of Entry in to International Business. Globalization: Meaning and Definition, Features, Drivers, Components, Benefits and Demerits of Globalization.
- UNIT-III World Trade Organization (WTO) and Multi-national Corporations, Trade Blocks and Business Centers: NAFTA and SAARC.
- UNIT-IV International Finance: International Accounting, International Finance, International Financial Institutions: World Bank, IMF and ADB.

Reference:

1. International Business: Text and Cases P. SubbaRao (Himalaya)
2. International Business, Cherunilam (S. Chand)
3. International Business Environment, F. Cherunilam (Himalaya)
4. International Business, V.K. Bhalla & S. Sivaramu (Anmol)
5. International Business, K. Aswathappa (Tata Mc.Graw)
6. International Marketing Management, Varshney & Bhattacharyya (Sultan Chand)
7. International Finance, Manju Agarwal, (IIF, Delhi)
8. International Trade & Export Management, F. Cherunilam (Himalaya)
9. Export & Import Management, Acharya & Jain (Himalaya).

S. G. Pradhan
04/08/2018

Objective: The Objective of this course is to expose students to advanced accounting issues and practices

- UNIT-1 Valuation of goodwill and share: Need for valuation, Factors affecting value of goodwill, Methods of valuation of goodwill, Need for valuation of shares, Methods of valuation of shares.
- UNIT-II Accounting issues relating to amalgamation, absorption and reconstruction of companies: Meaning and methods of external and internal reconstruction, Calculation of purchase considerations, Alteration of share capital, Reduction of share capital, Accounting treatments and entries.
- UNIT-III Accounts of Holding Companies: Introduction and Meaning of holding company and subsidiary, Merits and demerits and consolidation of financial statements. Basic rules for constructing a consolidated balance sheet with some special adjustments.
- UNIT-IV Recent trends in corporate accounting: Social Responsibility accounting, Human resource accounting. (No Practical Problems will be asked from Unit V).

Reference

1. Beams, F. A. : Advanced Accounting, (Prentice Hall)
2. Dearden, J, and S. K. Bhattacharya: Accounting for Management, (Vikas)
3. Engler, C., L.A. Bernstein & K.R. Lambert, Advanced Cost Accounting, (Irwin)
4. Fischer, P.M., W.J. Taylor & J.A. Leen, Advanced Accounting, (South-Western)
5. Gupta, R. L., Advanced Financial Accounting, (S. Chand and Co.)
6. Monga, J.R, Advanced Financial Accounting, Mayoor Paperbacks
7. Narayanaswamy, R.: Financial Accounting: A Managerial Perspective, (Prentice Hall)
8. Neigs, R.F., Financial Accounting, (Tata McGraw Hill)
9. Shukla, M. C. and T. S. Grewal: Advanced Accountancy, (Sultan Chand & Co).
10. Warren, C.S. & P.E. Fess: Principles of Financial and Managerial Accounting, (South-Western)

S. L. Pradhan
04/08/2018

Objective: To provide an understanding to the students regarding Accounting theories, standards and corporate reporting.

- UNIT-I : Accounting an Introduction: Accounting as an Information System, Branches of Accounting, Meaning of Financial Accounting, Objective of Accounting, Users of Accounting Information.
- UNIT-II : Development in Accounting Theory : Concept of Accounting Theory, Role of Accounting Theory, Classification of Accounting Theory, Methodology in Accounting Theory – Positive and negative Methodology.
- UNIT-III : Accounting Standards: Defining the term standard, Benefits of Accounting Standard, Management and Standard Setting, Govt. as standard setter, Private sector as standard setter, Standard setting body, Standard setting by agency, Types of standard setting.
- UNIT-IV : Corporate Reporting: Concept of financial reporting, Qualitative Characteristics of Financial Reporting, Benefits of Financial Reporting Objective of financial reporting, General purpose and specific purpose reporting.

References:

1. Accounting Theory, R.K. Lele and JawaharLal, (Himalaya)
2. Advanced Accounting : Financial Accounting, Dr. Ashok Sehgal& Dr. Deepak Sehgal, (Taxmann)
3. Studies in Accounting Theory, P.K. Ghosh, G.C. Maheswari, R.N. Goyale, (Wiley Eastern Limited)
4. Corporate Financial Reporting: Theory and Practice, Prof. Jawaharlal, (Taxmann)
5. Accounting for Management, Dr. JawaharLal, (Himalaya)

S.K. Pradhan
04/08/2018

INVESTMENT IN STOCK MARKETS

Objective: To enable the students to understand the modus operandi of Indian Stock Market and to know the technical aspects of investment in Indian Stock Markets.

Unit-I: Capital Market in India: Primary Market/New Issue Market and Secondary Market/Stock Market, Functions of Primary Market, Methods of Marketing Securities in the Primary Market, Role of Primary Market, Regulation of Primary Market.

Unit-II: Functions of Stock Market, Listing of Securities, Stock Exchanges in India, and Regulation of secondary market.

Unit-III: Trading and Settlement System in Stock Exchanges, Speculation, Types of Speculators, Margin Trading and Depositories.

Unit-IV: Stock Market Quotations and Indices: Types of Indices, Methods of Calculation of Stock Market Indices and Usefulness of Stock Market Indices.

Unit-V: Stock Market Analysis- Fundamental Analysis: Economy Analysis, Industry Analysis and Company Analysis, Technical Analysis

Reference:

1. Bhalla, V.K. Investment Management, Security Analysis, S. Chand, New Delhi.
2. Kevin S: Portfolio Management, Prentice Hall, New Delhi.
3. Desai Vasant: Financial Market and Financial Market and Financial Services, Himalaya Publishing House, Giragaon, Mumbai-4.
4. Agarwala, K.N and Agarwala D: Bulls, Bears and the Mouse, Macmillian, N. Delhi.

S.K. Pradhan
04/08/2018

SEMESTER - IV

MC-CC 401

MANAGEMENT INFORMATION SYSTEM

Objective: To provide an understanding to the students the basic information needs of manager for the decision making process. The supporting systems which continuously provide the information to the managers.

UNIT - I Introduction to MIS: concept of information system. Data & information, MIS and levels of management, Characteristics of MIS, importance and significance of computer based MIS, Goals of Information System.

UNIT-II Planning & Controlling Information System: : Introduction to planning, strategic information systems panning, tactical and operational planning, business a system planning, critical success factors, computer aided planning tools, acquisition of hardware, software and services, hardware evaluation factors, software evaluation factors, evaluation of vendor support, implementation MIS, problems of MIS.

Controlling information system: Why are controls needed? Information system controls: input controls, processing control, output controls, storage controls, procedural controls, physical facility controls, controls for end user computing, controlling information systems costs, auditing information systems.

UNIT-III Decision support system : introduction, managerial decision making, phases in decision making, process factors that shape the decision process, architecture of DSS (DBMS, MBBS, DGMS). Information support for intelligence, Design and choice phase, DSS as tool for decision making, difference between EDP, MIS and DSS.

UNIT-IV Application of information system:

- i) Accounting information system – order processing, inventory control, accounts receivable: accounts payable etc.
- ii) Financial information system – Cash and securities management, capital budgeting, financial forecasting, financial planning.
- iii) Marketing information system-sales, product, management advertising and promotion, sales forecasting, market research.
- iv) Manufacturing information system-process control, product control and scheduling etc.

References:

1. Computer in Business Management an Introduction by James A.O. Brien
2. Management Information Systems: Conceptual Fundamentals, Structure and Development by Gorden B. Davis Margrethe H. Olson.
3. Information Systems for Modern Management by Robert G. Mardick, & Ross. (Printice Hall)
4. Management Information System for Higher Education by Centre for Educational Research & Innovations, Canada.
5. Management Information System by W.S. Jawadekar, (Tata McGraw Hill)
6. Management Information System (Text & Applications) by Mr. C.S.V. Murthy, (Himalaya)
7. Management Information System , O'Brien Markes (Tata Mc.Graw Hill)

S.K. Pradham
64/05/2018

Objective The Objective of this Course is to enable students gain knowledge about e-commerce and its various components.

UNIT-I Introduction to E-Commerce: Meaning and Concept; Electronic commerce versus traditional commerce; E-commerce and e-business; Channels of e-Commerce; Need-for e-commerce, special features of e-commerce.

UNIT-II Business Models of E-Commerce and Infrastructure: E-Commerce models; Supply chain management, product and service digitization, remote servicing, procurement; Online marketing and advertising; E-commerce resources and infrastructure, resources and planning for infrastructure.

UNIT-III Business to Consumer E-Commerce: Cataloguing, order planning and order generation, cost estimation and pricing, order receipt and accounting, order selection and prioritization, order billing and payment management; Post sales services.

Business to Business E-Commerce: Need and alternative models of B2B e-commerce; EDI architecture, EDI standards, VANs.

UNIT-IV Security Issues in E-Commerce: Security risks of e-commerce, types of threats, sources of threats, security tools, Corporate Digital Library.

Electronic Payment Systems: Special features required in payment systems for e-commerce; Types of e-payment systems; E-cash and currency servers. e-cheques, credit cards, smart cards, electronic purses and debit cards, Components of an effective electronic payment system.

References:

1. Agarwala, K.N. and DeekshaAgarwala: Business on the net: What's How's of E-Commerce: Macmillan, New Delhi
2. Janal D,S,: On-Line Marketing Hand Book, Van Mostrannd Reinhold, New York.
3. Agarwal K. N. and DeekshaAgarwala: Business on the Net: Bridge to the on line storefront: Macmillan, New Deihi
4. Cady, Glee Harrab and McGregor Pat: Mastering the Internet, SPS Publication, New Deihi
5. DiwanPrag and Sunil Sharma: Electronic Commerce- A Manager's Guide to E-Business, Vanity Books International Deihi
6. Janal D. S.: On-Line Marketing Hand Book, Van Nostrand Reinhold, New York.
7. Kosivr David: Understanding Electronics Commerce, Microsoft Press, Washington
8. Minoli and Minol: Web Commerce Technology Handbook, Tata McGraw Hill, New Delhi.
9. Schneider Gray P: Electronic Commerce, Course Technology, Deihi
10. Young, Margaret Levine: The Complete Reference to Internet, Tata McGraw Hill, New Delhi.
11. O'Brien J.: Management Information Systems, Tata McGraw Hill, New Deihi
12. DeewanBhusan - E Commerce - S. Chand, New Delhi
13. ParagDiwan and Sunil Sharma, E- Commerce- A managers guide to E- Business; Excel Books, New Deihi
14. BhusanDeewan : E-Commerce, Sultan Chand, New Deihi.

S.H. Proadhan
04/08/2008

SPECIALISED ACCOUNTS

Objective: To provide opportunity understanding the peculiarities of each such special Accounts like H R Accounts, Environmental Accounts, Inflation Accounts and Government Accounts.

- UNIT-I Human Resources Accounting : Meaning, Objectives and Significance of HRA Assumptions Underlying HRA, Important Factors in Developing HRA in an Organization Major Aspects of HRA, Use of HRA.
- UNIT-II Environmental Accounting: Advantages of EA, Key issues in EA Constituents of EA, Major Accounting issues in EA.
- UNIT-III Inflation Accounting : Introduction , Limitation of historical Cost Accounting , Methods of accounting for inflation , Current purchase power (CPP) Accounting , Current Cost Accounting, Holding gain/loss, Depreciation Adjustment, Cost of sales Adjustment (COSA), Monetary Working Capital Adjustment (MWCA), Gearing adjustment.
- UNIT-IV Accounts of Indian Government: Introduction, Central of Government Finances, Recording of Financial Transactions of Government. Treasury System, Structure of Government Accounts, Capital and Revenue Expenditure/Receipts, Comptroller and Auditor General of India, Public Accounts Committee- Consolidation of funds- Compilation of Accounts.

References:

1. Jain S.P. and Naranga K.L. : Advanced Accounting, Kalyani Publisher, Ludhiana.
2. Arulanandam M.A. and Raman K.S. : Advanced Accountancy, Himalaya Publishing House, Mumbai.
3. Sehgal Ashok and Sehgal Deepak : Advanced Accounting, Taxman's Publication, New Delhi.
4. Saxena V. K. : Advanced Accounting, Sultan Chand and Sons, New Delhi.
5. Xavier Grancis G.: Fundamental and Advanced Accounting, Tata MC Graw Hill Publishing Company Ltd., New Delhi.

S. L. Prasad
64/08/2008

Objective: To help the students to understand the meaning and importance of Auditing in costing, Management Accounting and Government Sector.

- Unit-I Introduction : Meaning necessity and type of audit: Generally accepted auditing principles and techniques : standard auditing practices.
- Unit-II Cost audit : Characteristics, scope and function of cost audit : Benefits and limitations : Provision of cost audit in companies Act :Cost audit rules. Cost audit Procedure: cost audit reports.
- Unit-III Management Audit: Management audit Vis-a-Vis financial audit and cost audit. Audit of various operations and management functions.
- Unit-IV Government and Tax Audit: audit of government departments and public sector undertaking : Tax audit under Income Tax Act.

Reference:

1. Maheswari, S. N. : Advance Cost Accounting, Sultan Chand & Sons, Kishore, Ravi M. : Advance Management Accounting, Taxmann Publications, New Delhi.
2. Batra, G. S. : Auditing and Contemporary Accounting : New Horizons, Deep and Deep Publications, New Delhi.
3. Arun Kumar and Rachna Sharma : Auditing Theory and Practice, Atlantic Publisher, New Delhi

S. K. Dhillon
04/08/2008

DISSERTATIONS

- I. Sixty percentage weight age for dissertation papers and forty percentage weightage for presentation.
- II. Dissertation is to be prepared under the guidance of a faculty of the department during the semester period covering the areas of commerce & management.
- III. To complete this paper fifty percent mark is required.

GUIDELINES FOR DISSERTATION

The objective of the project course is to help the student develop ability to apply multidisciplinary concepts, tools and techniques to solve organizational problems. The project may be from any one of your areas preferably of specialization area: Comprehensive case study (covering single organization/multifunctional area, problem formulation, analysis and recommendations). Inter-organizational study aimed at inter-organizational comparison/validation of theory/survey of management practices, field study (empirical study).

SYNOPSIS

The Proposal of the proposed Project should essentially have the following:

- I. Introduction, brief background and relevance of the topic chosen for the project.
- II. Statement of the problem.
- III. Objectives (clearly stated in behavioural terms).
- IV. Research Methodology:
 - Research Design
 - Nature and source of data/information to be collected. Sample and sampling technique.
 - Rationale of chosen organisation and the sample.
 - Tools and Techniques to be used for data collection - details of the tools/questionnaire to be used and its relevance with the objectives of the project.
 - Method/s to be used for data collection.
- V. Data handling and analysis- organisation and analysis of data. Statistical tools to be used for analysis. Relevance of statistical tools with the objectives of the project.
- VI. Findings and conclusions.
- VII. Limitation of the proposed project, if any.
- VIII. Scope for further research (optional).
- IX. Any other relevant detail which will help better appreciation and understanding of the project proposal.

S. K. Reddy
04/08/2018

PROJECT REPORT

The Project Report must have the following:

- I. Cover Page – must have the name and roll no. of the student and the name & designation of the guide along with the title of the Project.
Acknowledgement, declaration, Certificate of originality signed by the guide with date.
- II. Detailed tables & figures of contents with page nos. Index of Chapters
- III. All pages of the Project Report must be numbered as reflected in Index of Chapters

Chapter-I: Introduction & Review of literatures,

Chapter-II: Research Methodology,

Chapter-III: Conceptual & Theoretical Descriptions,

Chapter-IV: Analysis & Interpretations,

Chapter-V: Testing of Hypotheses,

Chapter-VI: Conclusion,

suggestions & Scope for further research. References, Annexure, etc.

Research Methodology:

- I. Research Design
- II. Nature and Source of data/information
- III. Sample and Sampling method with rationale
- IV. Details of the tools:
- V. The Questionnaire and other methods used and their purpose
- VI. Reliability and Validity of the tools used
- VII. Administration of tools and techniques
- VIII. Data collection
- IX. Data Handling, Statistical tools used for Data Analysis
- X. Data Interpretation and Findings
- XI. Recommendations
- XII. Summary and Conclusion
- XIII. Limitations of the Project
- XIV. Direction for further research
- XV. Reference/Bibliography
- XVI. Annexure/Appendices (Questionnaire used etc.)

S. L. Dhadhan
04/08/2018

(Copy to - Controller of Examination)