GOVT GHANSHYAM SINGH GUPT PG COLLEGE BALOD, DIST-BALOD (C.G.)

DEPARTMENT OF COMMERCE

BACHELOR OF COMMERCE

OBJECTIVE OF THE PROGRAMME:

The college follows Hem hand Yadav University, Durg syllabus for Bachelor in Commerce. The objectives of the prescribed course are:

- This program aim to provide students with specific knowledge and skills relevant to their disciplines and careers.
- This program satisfies the educational entrance requirements for membership of relevant professional bodies.
- To determine and understanding of the principles of accounting, finance, economic and business law.
- To develop numerical abilities of students
- To inculcate writing skills and business correspondence
- To create awareness of law and legalizations related to commerce and business
- To introduce recent trends in business , organizations and industries
- To acquire practical skills related with banking and other business.

PROGRAMME OUTCOME:

1. This program could provide Industries, Banking Sectors, Insurance Companies, Financing companies, Transport Agencies, Warehousing etc., well trained professionals to meet the requirements.

2 .After completing graduation, students can get skills regarding various aspects like Marketing Manager, Selling Manager, over all Administration abilities of the Company.

3. Capability of the students to make decisions at personal and professional level will increase after completion of this course.

4. Students can independently start up their own Business.

5. Students can get thorough knowledge of finance and commerce.

6. The knowledge of different specializations in Accounting, costing, banking and finance with the practical exposure helps the students to stand in organization.

COURSE OUTCOME:

1. The students can get the knowledge, skills and attitudes during the end of the B.com degree course.

2. By goodness of the preparation they can turn into a Manager, Accountant , Management Accountant, cost Accountant, Bank Manager, Auditor, Company Secretary, Teacher, Professor, Stock Agents, Government employments and so on., 3. Students will prove themselves in different professional exams like C.A., C.S., CMA, UPSC and state PSC's as well as other courses.

3. The students will acquire the knowledge, skill in different areas of communication, decision making, innovations and problem solving in day to day business activities.

4. Students will gain thorough systematic and subject skills within various disciplines of finance, auditing and taxation, accounting, management, communication, computer.

5. Students can also get the practical skills to work as accountant, audit assistant, tax consultant, and computer operator. As well as other financial supporting services.

6. Students will learn relevant Advanced accounting career skills, applying both quantitative and qualitative knowledge to their future careers in business.

7. Students will be able to do their higher education and can make research in the field of finance and commerce.

PROGRAMME SPECIFIC OUTCOME:

B.COM I YEAR

FINANCIAL ACCOUNTING

- After studying this Chapter they are able to identity the various accounting entries and they know about the various types of account like Real Account, Nominal Account, and Personal Account etc.
- They know about the various concepts of Financial Accounting and Accounting Standard.
- They identify the accounting errors & rectify the errors.
- They learn about the Depreciation Policies.
- Student gets Knowledge about the Hire Purchase & Installment purchase System and their provisions.
- To get knowledge about the Partnership Act 1943.

BUSINESS MATHEMATICS

- They know about basic mathematics like simulationous equations and Linear Programming.
- They learn about matrices and determinate, Logarithm and antilogarithms.
- They are able to calculate the interest, Annuities, problem relating to sinking Fund.
- They are able to calculate Ratio & proportion, Average and Percentage.
- They are able to calculate Commission, Brokerage, Discount, Profit & Loss, and Transportation Problems.

BUSINESS REGULATORY FRAMEWORK

- They learn about the Law of Contract 1872, Sales of Goods Act 1930.

- They get knowledge about Negotiable Instrument Act 1881.
- They learn about The Consumer Protection Act.
- They get Knowledge about Intellectual Property Right Act.
- They Learn about Indian Partnership Act 1932.

BUSINESS COMMUNICATION

- After studying the know about the basic thing of Business communication i.e. verbal communication, non verbal communication (Self Development, Body Language, Kinesics, Proxemics and Para language).
- They learn about models and process of Business Communication.
- Students are more effective in Group Discussion, Seminar and effective listening.
- They are able to write Business Letter like Good news letter, Bad news letter, Job Application letter & Office memorandum etc.
- In this they learn about report writing, short report, Formal Report etc.

BUSINESS ENVIRONMENT

- They get basic knowledge about the environment which is related to Business. It helps to various problems related with the Business.
- It helps to deal with economic problems i.e. unemployment, poverty, regional imbalance, social injustice, inflation and industrial sickness.
- They get the knowledge about industrial polices, industrial licensing and Export – Import Policies.
- They are known about the Planning Commission. How they can make plan the Strategy and also learn international environment.
- They are known about the role of Government, Monetary & Fiscal Policy, Privatization, and Liberalization & Globalization.

BUSINESS ECONOMICS

- After studying this, students are known about the basis of economics, in this they study about macro economics & Micro economics. They know about the utility Analysis.
- They learn about the law of demand & Elasticity of Demand.
- They learn about law of production.
- They get knowledge about various types of market i.e. Monopoly, Oligopoly, Perfect Competition etc.
- To get knowledge of theories of distribution.

B.COM PART II

CORPORATE ACCOUNTING

- Student gets knowledge about the corporate world. They are able to understand how company can raise their Funds.
- To provide knowledge about Accounting Practices of Company Act 2013.
- They learn about the Goodwill and valuation of Goodwill of Company.
- They learn about consolidated Balance sheet of Holding Company & Subsidiary Company.

COMPANY LAW

- Students are enlightened about the corporate personalities. They learn about how company can be incorporated.
- They learn about memorandum of association, Article of Association, Prospectus and Share capital.
- They learn about the Company meetings like Proxy, Quorum, and Resolution etc.
- They know about the capital management of Company and about the Company Directors.
- In these students get knowledge about the majority power and minority rights.

COST ACCOUNT

- After study the subject student get knowledge about basic thing of cost accounting and their tools.
- They learn about the Cost Concepts and cost classification, Accounting for materials etc.
- They learn accounting for labours, Labours turnover and methods of wages payment.
- They know about the Cost Ascertainment, Unit costing, Batch and contract costing.
- They learn about operating costing, Process Costing, Cost record, Cost reconciliation and Financial Account etc.

PRINCIPLES OF BUSINESS MANAGEMENT

- After the studying the students are get knowledge about the business management. It helps the students to make a better idea about management.
- They can learn management process, management rules, Principles of management.
- They learn management planning, and strategies.
- They are able to understand organizational structures, organization process, centralization and decentralization.
- They learn about motivation (Financial & Non financial incentives), Leadership, Communication etc.
- They are able to understand managerial control, controlling process and effective controlling system.

BUSINESS STATISTICS

- It enable the students to gain understanding of statistical techniques as per applicable to business.
- They learn about dispersion, portion value, skewness and measures.
- They understand bivariate data and linear regression with to variable.
- They understand about index Number, test of adequacy.
- They learn about Business forecasting, theory of probability.
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FUNDAMENTALS OF ENTERPRENEURSHIP

- It provides exposure to this to these students to the entrepreneurial culture and industrial growth so as to preparing them to setup and manage their own small units.
- They learn about entrepreneur and entrepreneurship.
- They understand about the ventures, venture capital, opportunity analysis and legal requirement for establishment of New Unit.
- They learn about entrepreneurial development program, and role of government in organizing EDP.

B.COM PART III

INCOME TAX

- It enables the students to know the basics of Income Tax Act and its implications.

- After studying this they are able to calculate the taxable salary, income from House property, Income from Business & Profession, Capital Gain & other source of income.
- They are able to calculate Tax Liability of various forms of organization (Individual, Firms, and HUF).
- They learn about Tax management, Tax planning and Tax avoidance.

AUDITING

- The students get knowledge about the Principle and methods of Auditing.
- They are able to understand the Audit program, Audit Process and Audit technique.
- They learn about internal check system, internal Audit, verification of Assets & Liability.
- They learn about knowledge of Cost Audit, Tax Audit & Management Audit.
- They learn about Audit of Limited Companies.
- They understand investigation and Audit of Non Profit Companies.

INDIRECT TAXES WITH GST

- This Course aims at imparting basic knowledge about GST and applies the provisions of GST Law to various situations.
- They understand the Custom duties Act and their calculation.
- They learn about state excise duties and CENVAT.
- They learn about Goods & Service Tax and GST Counsel.
- They learn the procedure of registration under the GST, assessment & returns.

MANAGEMENT ACCOUNTING

- This course provides the students and understanding of the application of accounting techniques and tools for management.
- They learn about the Fund Flow statement & Cash Flow Statement as per Indian accounting standard -3
- To impart the knowledge about absorption and marginal costing. Exploring new market.
- They learn about budgeting for profit planning and control.
- They are able to understand the standard costing and variance analysis.

PRINCIPLES OF MARKETING

- The objective of this course is to help students to understand the concept of marketing and its applications.
- They learn about the consumer behavior and market segmentation.
- They learn about the product (product packaging , brand name , product price , marketing mix)
- They understand the distribution channels (retail and wholesaler).
- They understand the promotion tech. and method of promotion. Function of sales man.

INTERNATIONAL MARKETING

- This course aims at acquainting student with the operations of marketing in international environment.
- They are able to understand domestic marketing & International Marketing.
- They learn about identifying and selecting foreign market, Product planning for international market, Branding & Packaging.
- It helps to understand to promotion of Product/ servicing in abroad.
- It helps to learn export Policy and practices in India.

GOVT GHANSHYAM SINGH GUPT PG COLLEGE BALOD, DIST-BALOD (C.G.)

MASTER OF COMMERCE

OBJECTIVE OF THE PROGRAMME:

The college follows Hem hand Yadav University, Durg syllabus for Master of Commerce. The objectives of the prescribed course are:

- To opens up innumerable career options and opportunities to the aspiring managers both in India and abroad.
- To train the student to develop conceptual and applied skills for effective problem solving and right decision making in routine and special activities relevant to financial, management, banking transaction of a business.
- M.Com program also prepares one to start a business of his/ her own in the capacity of an entrepreneur.
- Prepares the students for positions of leadership in business organizations at the local and national levels.
- Prepare the students to apply Statistical methods and skilled use of tools for modelling and analysis of business data.
- Facilitate the students to apply capital budgeting techniques for investment decisions.
- To train the student in project works, which is compulsory in 4th SEM.

PROGRAMME OUTCOME:

The Master of Commerce programme ensures:

- To acquaint a student with conventional as well as contemporary areas in the discipline of Commerce.
- To enable a student well versed in national as well as international trends.
- To enable the students for conducting business, accounting and auditing practices, role of regulatory bodies in corporate and financial sectors nature of various financial instruments.
- To provide in-depth understanding of all core areas specifically Advanced Accounting managerial Economics, Income Tax Law & Accounts, Statistical analysis, corporate legal frame work, business Economics, Specialized Accounting ,Business law, Advanced Statistics,

Tax Planning &management, Advance Cost Accounting, Management Accounting, Accounting for managerial decisions, IN Group (A) - Marketing, Group (B)management, Group (c) Banking and Insurance, Group (D) Taxation & Accounting and Project work as well.

COURSE OUTCOME:-

- Work as accountant in any private or Government sector.
- Work as an Auditor, manager, Accountant.
- Pursue research in their chosen areas.
- Work as Data Analyst
- Work as an investment consultants after a brief internship in suitable organizations absorbed in Banking and Insurance sector as executives.
- Pursue professional courses like CA, CMA, CS and other accounting fields.

PROGRAMME SPECIFIC OUTCOME:

The course of Semester First M.Com has been divided into Five Papers:-

M.COM – IST SEMESTER

MANAGERIAL ECONOMICS

- This course develops managerial perspective to economic fundamentals as aids to decision making under given environmental constraints.
- Its helps the students to emphasis there knowledge about the economics which are helps in decision making in organization.
- They are able to take decision related with the economics in organization.
- They learn about the role of managerial economist.
- They get knowledge about fundamental economics concepts.
- They learn about demand analysis, theory of consumer choice and production theory.

ADVANCED ACCOUNTING

- Its aims to expose students to accounting issues and practices such as maintenance of company accounts and handling accounting adjustments.
- They get the knowledge about accounting for issue, forfeited and redemption of share and debenture.
- They learn about final accounts and financial statements of companies.
- They learn about accounting for holding and subsidiary companies.

INCOME TAX LAW AND ACCOUNTS

- It helps the students to understand and conceptual framework of income tax.
- They get the knowledge about the low relating to income tax.
- They learn about the calculation of taxable income under various head i.e. salary, house property, Business profession, Capital gain and Income from other source.

- They learn about the set off and carry forward off loss.
- They get knowledge about appeals and revision reference of high court and Supreme Court offences and penalties.

STATISTIC ANALYSIS

- The objective of this course is to help student learnt application of statistical tools and techniques for decision making.
- They learn about the basic of statistics.
- They are able to understand about the various types of data.
- they learn about the dispersion , co-efficient of variance and skewness ,_correlation ,karl-parsons etc.
- They learn about probability theory and probability of distribution.

CORPORATE LEGAL FRAMEWORK

- Its emphasis the knowledge of relevant provisions of various semester laws influencing business operations.
- They learn about the company act 1956.
- They are able to understand the negotiable instruments and endorsement and crossing of cheque.
- They learn about legal environment for security markets.

M.COM. IIND SEMESTER

BUSINESS ECONOMICS

- It helps to develops managerial perspective to economic fundamentals as aids to decision making under given environmental constraints.
- They learn about the cost theory and estimations.
- They learn about the price determination under different market conditions
- They are able to understand about business cycle.
- They learn about the inflation and inflation in terms of dam and pull cost etc.

SPECIALISED ACCOUNTING

- The objective of this course is to expose students to accounting issues and practices such as maintenance of company accounts and handling accounting adjustments.
- They learn about the accounts of general insurance company.
- They get the knowledge about the accounts of banking companies, royalty accounts and investment accounts.
- They are learning about the accounts of public utility concern, double accounts system.

TAX PLANNING AND MANAGEMENT

- This course aims at making students conversant with the concept of corporate tax planning and Indian tax laws, as also their implications for corporate management.
- They are able to calculate taxable income and tax of firms and companies.
- They learn about tax planning, tax avoidance and tax evasion.
- They learn about income tax return, advance payment of tax.

ADVANCE STATISTIC

- The objective of this course is to help student learnt application of statistical tools and techniques for decision making.
- They learn about statistical decision theory.
- They are learning about statistical estimations and tester.
- They are able to understand about association of attributes.
- They get the knowledge about statistical quality control and interpolation and extrapolation.

BUSINESS LAWS

- The objective of this course is providing knowledge of relevant provisions of various laws influencing business operations.
- They get the knowledge about the SEBI Act 1992.
- They are able to understand the MRTP Act.1969.
- They learn about the consumer protection Act 1986.
- They get the knowledge about FEMA Act. 1999.
- They are able to understand about the WTO.

M.COM. IIIRD SEMESTER

MANAGEMENT CONCEPT

- The objective of this course is to help student understand and conceptual framework of management and organizational behavior.
- It emphasis the knowledge of schools of management thought.
- It helps the student to understand the managerial function of management.
- They are able to do planning, organizing, staffing, directing and controlling.
- They learn about motivation and various theories of motivation.

ORGANIZATIONAL BEHAVIOUR

- The objective of this course is to help student understand and conceptual framework of management and organizational behavior.
- Students are able to understand about the organizational behavior.
- They learn about the leadership and various theory of leadership.
- They are able to understand about the organizational conflict.
- They learn about the organizational development.

ADVANCED COST ACCOUNTING

- This course exposes the students to the basic concepts and the tools used in cost accounting.
- They get the knowledge about labour cost and various overhead.
- It helps the students to understand the job, batch, contract and operating costing.
- They are able to understand the process costing, joint products and by products.
- They learn about budgetary control and they are able to prepare the zero base budgeting, performance budgeting, cash budget, production and sales budget.

MANAGEMENT ACCOUNTING

- This course is to acquaint student with the accounting concepts, techniques for managerial decisions.
- They get the knowledge about management accounting; they are able to understand the management accountant position, role and responsibilities.

- The y learns about accounting plans and responsibility centers i.e. cost center responsibility center, profit center and investment center.
- They learn about the budgeting and understand the types of budget i.e. functional budget, master budget, fixed budget and flexible budget.
- They get the knowledge about standard costing, marginal costing and variance analysis.

ACCOUNTING FOR MANAGERIAL DECISIONS

- This course is to acquaint students with the accounting concepts, tools and techniques for managerial decisions.
- They are able to understand about the break-even analysis, cost volume profit analysis and sales mix etc.
- They learn about the analyzing the financial statements and its method.
- They are able to understand the cash flow analysis and fund flow analysis.
- They learn about the contemporary issues in management accounting.

M.COM. IV SEMESTER
GROUP - A (MARKETING GROUP)

PRINCIPLE OF MARKETING

- This course is helps the students to facilitate understanding of the conceptual framework of marketing and its applications in decision making under various environmental constraints.
- They learn about the market analysis and marketing environment.
- They learn about the product decisions i.e. product line, product mix, branding packaging , labeling etc
- They get the knowledge about the pricing decisions like factors affecting the price determination, pricing policy and strategies.
- They learn about the distribution channels and physical distribution decisions.

ADVERTISING & SALES MANAGEMENT

- It help the students identify and respond to clients' advertising and marketing communications objectives by applying principles of marketing and communications.
- They are able to perform a market segmentation analysis, identify the organization's target market/audience and define the consumer behaviour of each segment.
- It helps to develop an advertising plan and present and defend it persuasively.
- Contribute to evaluating the effectiveness of advertising and marketing communications initiatives.
- It Collaborate in the development of advertising and marketing communications material, in compliance with current Canadian legislation, industry standards and business practices.

MARKETING RESEARCH

- It helps the students to understand the conceptual framework of basic of marketing research.
- They are able to understand the basic concepts related to marketing research.
- They are able to explain the concepts about contemporary marketing research.
- They learn about the interpret development of marketing research.
- They are able to define each step and concept in the marketing research process.

INTERNATIONAL MARKETING

- It helps the students to develop knowledge and understanding of key issues associated with international marketing:
- It help the students to learn about an Importance of global and international marketing
- It helps to understand Motives to internationalization
- It have developed an understanding of major issues related to international marketing
- It have developed skills in researching and analyzing trends in global markets and in modern marketing practice
- They are able to assess an organization's ability to enter and compete in international markets.

GROUP –B (FINANCE GROUP)

FINANCIAL MANAGEMENT

- The objective of this course is to help students of understand the conceptual framework of financial management, and is applications under various environmental constraints.
- To provide introduction to Financial Management
- To create an awareness about capital structure and theories of capital structure
- To make them understand the cost of capital in wide aspects
- To provide knowledge about dividend policies and various dividend models.
- To enable them to understand working capital management.

PERSONNEL MANAGEMENT

- To aiming to enable the students in Human Resources Management
- To introduce the students about placement and training
- To facilitate the knowledge about performance appraisal and different methods
- To provide an idea about different compensation policies

PRODUCTION MANAGEMENT

- To understand Importance and Procedure of Production Planning, Routing scheduling,
- factors affecting scheduling, Dispatch and Follow up
- To acquire knowledge on Quality Control and supply chain management (SCM)
- Operation.
- To understand work measurement and work standards.

STRATEGIC MANAGEMENT

- Making students aware complexity of business.
- To provide the students the knowledge of strategy formulation and choice of alternatives and its implementation, evaluation.
- To give the knowledge of functional strategies and global issues in strategic management.

GROUP – C (BANKING AND INSURANCE)

BANKING PRECTICES

- To help to gather knowledge on banking and financial system in India
- To provide knowledge about commercial banks and its products
- To aim to familiarize banking system in India
- To enable them to understand better customer relationship

- To create awareness about modern banking services like e-banking, m-banking and
- internet banking

BANKING INSTITUTION IN INDIA

- It helps to know about the Banking – Types of Commercial Banking systems.
- They get the knowledge about the Indian Commercial Banking Structure.
- They learn about Bank Nationalization and its Evaluation, Banking Sector reforms.
- They learn about RBI, Banking Regulation Act 1949.

LIFE INSURANCE

- They are able to understand the risks faced by human beings and ways to overcome them.
- It helps the students to understand the difference between Life and Non-Life Insurance.
- They are able to understand how to choose life insurance policies based on their needs.
- They learn about the settlements of Life Insurance claims Guidelines and procedures.
- They able to understand Insurance Regulatory and Development Authority Act, 1999.

GENERAL INSURANCE

- They get the knowledge of insurance contracts and provisions, and the features of property-liability insurance, marine and fire insurance, and miscellaneous insurance.
- It gives knowledge of the operation and management of insurance entities, and the economic implications of organizational design and structure.
- It helps to develop skills to facilitate insurance product cost and pricing, marketing, and distribution.
- It helps to develop practical skills through professional development seminars, internships, and/or practicum's in insurance and risk management.

GROUP – D (TAXATION AND ACCOUNTING)

DIRECT TAX IN INDIA

- It helps to accustom legal regime governing the direct taxes.
- It helps to gain knowledge and understanding of the provisions of the direct tax laws.
- It helps to acquire the ability to apply the knowledge of the provisions of the direct tax laws to the various situation in actual practice.
- It help to develop the skill of independent thinking and creativity in the field of direct tax laws
- To familiarize the students with recent amendments in Income-tax. On successful completion of this course, the student should be well versed in the prevailing act.

GOODS AND SERVICE TAX AND CUSTOM LAW

- They are able to understanding of Goods and Service Tax Concepts.
- They Learn about Supply of Goods and Services
- They Learn about time of Supply and Value of Supply
- They learn about Return and Payment of Tax.
- They learn about Tax Rate structure and Refund of Tax
- Transition to GST and Input Service Distributor

ACCOUNTING IN SERVICE SECTOR

- They are able to know how to prepare accounts for Hotel Companies, Cash Book, Visitors ledger.
- It helps to understand type of govt. grants and its accounting, Annual statement of accounts.
- It helps to understand how to make accounts of agricultural farms.
- They are able to understand basic principal of govt. accounting, Commercial Accounting and Consolidated Funds and Public Accounts.

GROUP – E

BUSINESS ENVIRONMENT

- At the end of this course students should be able to explain the concept of business environment.
- They are able to distinguish between for-profit and nonprofits businesses
- They are able explain the four factors of production required to sustain a business Identify the primary functional areas within a business and describe their contribution to the organization
- They learn the methods economists use to evaluate the health of an economy, such as GDP, unemployment rate, and CPI
- They learn the effect that the four stages of an economy (expansion, peak, contraction and trough) have on business operations.

FINANCIAL INSTITUTION AND MARKETS

- At the end of this course students should be able to understand what financial market is and what makes it useful.
- They are able to understand role of banks, UTI, Mutual Funds and Insurance Sector in India.
- They are able to know about merchant banking services, SEBI, non-Banking Financial Institution in India etc.
- They are able to understand ways in which businesses obtain financial system and Economic Development.

RESEARCH METHODOLOGY

- This course aims at providing students with an understanding of research methodology.
- Students are be able understand a general definition of research design.
- Students are be able know why educational research is undertaken, and the audiences that profit from research studies.
- Students are being able to identify the overall process of designing a research study from its inception to its report.
- Students are be able be familiar with ethical issues in educational research, including those issues that arise in using quantitative and qualitative research.
- Students are be able know the primary characteristics of quantitative research and qualitative research.

SECURITY ANALYSIS

- At the end of this course students should be able to provide a theoretical and practical background in the field of investments.
- They are able to designing and managing the bond as well as equity portfolios in the real word.
- Valuing equity, preference shares, economic analysis, industry analysis and company analysis.
- They are able to understand the various issues in security analysis.
- To understand what is Depository Act 1996 and its need.

GOVT GHANSHYAM SINGH GUPT PG COLLEGE BALOD, DIST-BALOD (C.G.)

Department of Mathematics

B.Sc.- I YEAR
(MATHEMATICS)
COURSE TITLE:- ALGEBRA & TRIGNOMETRY

COURSE OUTCOMES

- Learn to solve system of linear equation and higher degree equation.
- Learn to find roots of polynomial over rational .
- Learn to find graphs , roots and primes integer using maxima software
- Define subgroup ,center, normalize of a subgroup .
- Define normal subgroup , quotient groups and index of a subgroups.
- Define Homomorphism , kernel of a Homomorphism , Isomorphism.
- Prove Lagrange's theorem, Euler's theorem and Fermat's theorems.

COURSE TITLE:- CALCULUS

COURSE OUTCOMES

- Gain knowledge of fundamental concept of real numbers .
- Verify the value of the limit of a function it a point using the definition of the limit .
- Introduction to sequence and series .
- Learn to check function is continuous understand consequences of the intermediate value theorem for continuous functions .

COURSE TITLE:- VECTOE ANALYSIS & GEOMETRY

COURSE OUTCOMES

- Introduction to analytical geometry of two dimensional.
- Study of lines in two and three dimension .
- Finding equation in various form of line , circle ,ellipse, sphere, cones etc.
- Give the knowledge of geometry using maxima software.
- Find the angle between plans , bisector planes, perpendicular distance from a point to a plan, image of a line on a plan , intersection of two lines.
- Find and interpret the gradient ,curl ,divergence for a function at a given point.
- Interpret line , surface and volume integrals.
- Evaluate integrals by using Greens theorems, Stokes theorems , Gauss's theorem.

B.Sc.-II YEAR
(MATHEMATICS)
COURSE TITLE:- ADVANCED CALCULUS

COURSE OUTCOMES:

- To understand different indeterminate form of limit
- Calculate functional value in neighbourhood of some points using expensions
- Continuity and limits , prove convergence and divergence of limits using the ε-δ definition .
- Differentiation – identify and prove basic facts about derivatives and their properties .
- To understand the maxima and minimum behavior of a function of two variables.
- Finding extreme values of function.
- Students will be to understand differentiation and fundamental theorem in differentiation and various rules .
- Geometrical representation and problem solving on MVT and Roll's theorem.

COURSE TITLE:- DIFFERNTIAL EQUATION

COURSE OUTCOMES:

- Find a solution of differential equation of the first order and of a degree higher than the first .
- Compute all the solution of second and higher order linear differential equations with constant coefficients , linear equations with variable coefficients.
- Use inverse Laplace transform to return familiar functions .
- Apply Laplace transform to solve second order linear differential equation and simultaneous linear differential equation.
- Solve differential equation using variation of parameters .
- Solve linear systems of ordinary differential equation .

COURSE TITLE :- MECHANICS

COURSE OUTCOMES:

- Understand the motion of objects in different frame of references .
- Understand law of motion, references and its application.
- Understand the idea of conservation of angular momentum , central forces and the effective potential.
- Understand the application of central force to the stability of circular orbits , kepler's law of planetary motion .
- Understand the basic of material properties like ,elasticity , elastic constant and their relation , torsion of a cylinder .
- Understand the basic of motion of fluid which includes streamlined and turbulent flows , equation of continuity , critical velocity.
- Understand the dynamics and gravitation .
    - Understand the definition of center of gravity in hemisphere , hollow hemisphere etc.

B.Sc.-III
(MATHEMATICS)
COURSE TITLE:- ANALYSIS

COURSE OUTCOMES:

- Describe fundamental properties of the real numbers that lead to the formal development of real anaylisis.
- Define countable and uncountable set
- Write Holders and Minkowski inequality .
- Differentiate the concept of continuity and uniform continuity .
- Characterize the concept of compactness in metric space.
- Explain the geometric meaning of each of the metric space.
- Distinguish between open and closed balls in a metrics space.
- Define convergence for a sequence in a metric space converges.

- State and use the triangle inequality and use the Binomial theorem and Mathematical induction method to prove inequalities which involve an integer n .
- Use the strategies introduced for determining least upper bounds and greatest lower bounds.
- Explain how the least upper bound properties is use to define arithmetic operations with real numbers and explain the meaning of rational power.
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COURSE TITLE:- ABSTRACT ALGEBRA

COURSE OUTCOMES:-

- Introduction to vector space and subspace.
- Use computational techniques and algebraic skills essential for the study of systems of linear equation , matrix algebra, vector spaces, eigenvalues and eigenvectors , Orthogonality and Diagonalization .
- Define vector space , Quotient space , direct sum , linear span and linear independence , basis and inner product.
- Learn properties of inner product space and determine orthogonality in inner product space.
- Discuss the linear transformation , Rank , Nullity.
- Prove Cayley-Hamilton theorem ,Schwartz inequality, Gramschmidt orthogonalisation process.
- Define rings , zero divisor of a ring , integral domain field and prove theorem .
- Understand the basic concept of group action and their applications.
- Recognize and use the sylow theorem to characterize certain finite groups

COURSE TITLE :- DISCRETE MATHEMATICS

COURSE OUTCOMES:

- Lean about partially ordered sets, lattices and their types.
- Understand Boolean algebra and Boolean functions , logic gates , switching circuit and their applications .
- Solve real life problems using finite state and Turing machines.
- Assimilates various graph theory concepts and familiarize with their application .
- To understand logical concept and to show logical equivalence by using truth tables and rules in logic
- Learn concept related to counting .
- Apply counting principles to determine probabilities
- Demonstrate an understanding of relations and functions and be able to determine their properties
- Demonstrate different traverse method for trees and graphs .
- Model problems in computer science using graphs and trees.

MSc. Mathematics

Objective of the program:

The main objective of this program is to cultivate a mathematical apptitute and nature the interests of students towards problem solving aptitude. Further, It aims at motivating the young minds for research in mathematical science and to train computation scientists who can work on real life challenging problems . The Program Objectives are the knowledge skills and attributes which the students have the time of post graduation .At the end of the program the student will be able to

1. To provide comprehensive curriculum to groom the students into quantitative scientific manpower.
2. Enable student to Enhance mathematical skills and understand the fundamental concepts of pure and applied mathematics.
3. To provide quantitative education through effective teaching learning processes by introducing projects, participative learning and latest software tools.

4. To include innovative skill, team work , ethical practices among students so as to meet social expectation.
5. To encourage collaborative learning and application of mathematics to real life situations.
6. To inculcate the curiosity for mathematics in student and to prepare them for future research.

Programme Outcomes :

• Inculcate critical thinking to carry out scientific investigation objectively without being based with preconceived notions.
• Equip the student with skills to analyze problems, formulate an hypothesis, evaluate and validate results, and draw reasonable conclusions thereof.
• Prepare students for pursuing research or careers in industry in mathematical sciences and allied fields
• Imbibe effective scientific and /or technical communication in both oral and writing.
• Continue to acquire relevant knowledge and skills appropriate to professional activities and demonstrate highest standards of ethical issues in mathematical sciences.
• Create awareness to become an enlightened citizen with commitment to deliver one's responsibilities within the scope of bestowed rights and privileges.

Programme Specific Outcomes :

• Understanding of the fundamental axioms in mathematics and capability of developing ideas based on them.
• Inculcate mathematical reasoning.
• Prepare and motivate students for research studies in mathematics and related fields.
• Provide knowledge of a wide range of mathematical techniques and application of mathematical methods/tools in other scientific and engineering domains.
• Provide advanced knowledge on topics in pure mathematics, empowering the students to pursue higher degrees at reputed academic institutions.
• Strong foundation on algebraic topology and representation theory which have strong links and application in theoretical physics, in particular string theory.
• Good understanding of number theory which can be used in modern online cryptographic technologies.
• Nurture problem solving skills, thinking, creativity through assignments, project work.
• Assist students in preparing (personal guidance, books) for competitive exams NET , GATE etc.

M.Sc. – I SEMESTER

Course Outcome:

Course Title: Advanced Abstract Algebra

On completion of this course, the student will be able to:
• Explore the properties of groups normal series and composition series of group, Solvable group and Nilpotent group.
• Understand the concepts of homomorphism, isomorphism and automorphism of groups.
•. Explore the properties of rings, integral domain, principle ideal domain, Polynomial rings, Euclidean ring ,Euclidean domain and UFDs .
• Understand the concept of Field, Extension field, Algebraic extension and separable extension.
• Explain the symmetric functions , Normal extension , Splitting field , Galois theory and Polynomial solvable by radicals.

Course Title: Real Analysis

On completion of this course, the student will be able to:
• Determine the basic properties of subsets of the real numbers and real valued functions.
• Construct mathematical proof of basic results in real analysis .
• Analyze test for convergence and uniform convergence of series and sequences .
• Understand about Riemann-stieltjes integration and its properties.
• Explain the derivative of functions of several variables and prove a theorem about the its derivatives e.g.

Inverse and Implicit function Theorem .
• Prove the Weierstrass approximatiom theorem ,Abel, Tauber and Riemann theorem .
• Understand the differentiation of integrals and stoke's theorem .

. **Course Title: Topology**

On completion of this course, the student will be able to:
• Understand the concept of topological spaces and its basic properties .
• Apply the properties of continuity and homeomorphism on topology .
• Analyze the separation axioms of topological space and the concepts of countable spaces and separable spaces.
• Understand the concepts and basic properties of the compactness and connectedness.
• Develop the knowledge to proof of Uryshon lemma, Tietze extension theorem and Lindelof theorem

Course Title : Complex Analysis

On completion of this course, the student will be able to:
•Understands the concept of complex analytic function , harmonic functions .
•Define the Analytic functions, Cauchy-Riemann differential equations,.
• Describe the zeros, singularities, Taylor series and Laurent's series.
•Develop the knowledge to proof of Cauchy's theorem, Cauchy's integral formula, Morera theorem, Liouville's theorem Swartz lemma and applications.
•Understands about Cauchy's residue theorem and its applications.
•Recognize the Mobious transformation , their properties and classifications .

Course Title: Advanced Discrete Mathematics

On completion of this course, the student will be able to:
• Define Semigroup, Monoid , subsemigroup, submoniod, Homomorphism and Isomorphism.
• Describe the propositional logic, quantifiers, predicate calculus and theory of inference .
• Illustrate Tautology, Tautological implication, Truth Tables, Normal Forms, Principal Normal Forms.
• Discuss the Grammars and Languages with their types , regular sets, Pumping lemma and Kleen theorem .
• Interpret the Lattices and its properties, Boolean Algebra and Switching algebra .

M.Sc. – II SEMESTER

Course Outcome:

Course Title: Advanced Abstract Algebra

On completion of this course, the student will be able to:
•Define the modules, Cyclic modules , Simple modules , Noetherian and artinian modules and rings ,Hilbert basis theorem, Wedderbern artin theorem.
•Discuss about Algebra of linear transformation, Singular and non singular transformation, characteristic roots and vectors, matrices and linear transformations.
•Describe Canonical Forms , Reduction to triangular forms, Nilpotent transformations , proof of the primary decomposition theorem .
• Understand Smith normal form, Fundamental structure theorem over Principal ideal domain and its applications to finitely generated abelian groups.
• Interprate the Rational canonical form, Jordan blocks , Jordan forms and Generalized Jordan form over any field.

Course Title: Real Analysis

On completion of this course, the student will be able to:
• Define Riemann-Stieltjes integral, Properties of the Integral ,the fundamental theorem of Calculus and Rectifiable curves.
. •Describe the measure measure space, Measurable sets and Lebesgue measure, construction of non-measurable sets, Measurable functions.
•Discuss about Lebesgue integration, convergence theorems for Lebesgue integrals and Fubini's theorem.
•Understand L^p spaces and its completeness ,Computation of Lebesgue measures. Extension of the concepts of measures and integration.

• Establishing measurability or non-measurability of sets and functions.
• Approximating measurable functions by simple and step functions.

Course Title: Topology

On completion of this course, the student will be able to:
• Define topological spaces, product topology and it's characterization ..
• Discuss the continuity,contability,regularity, connecteness and compactness on product topology .
• Describe embedding and metrization,embedding lemma,paracompactness.
• Prove the Urysohn metrization theorem, , Nagata-Smirnov metrization theorem, Ascoli's theorem .
• Understand The fundamental group and covering spaces-Homotopy of paths.

Course Title : Complex Analysis

On completion of this course, the student will be able to:
• Define Gamma function and its properties, Riemann Zeta function, Runge's theorem, Mittag-Leffler's theorem.
• Understand Power series method of analytic continuation , Schwarz Reflection Principle, Monodromy theorem and its consequences.
• Prove Harnack's inequality and theorem, Dirichlet Problem, Green's function.
• Discuss about Canonical products, Jensen's formula, Poisson-Jensen formula ,Order of an entire function, Exponent of Convergence and Borel's theorem.
•Prove of the Bloch's theorem, The Little Picard theorem, Schottky's theorem, Montel Caratheodory , The Great Picard theorem and the 1/4-theorem.

Course Title: Advanced Discrete Mathematics

On completion of this course, the student will be able to:
• Understand the basic concepts of graphs, directed graphs, and weighted graphs and a graph by matrices , Eulerian and Hamiltonian graphs .
• Understand the properties of trees and finding a minimal spanning tree for a given weighted graph.
• Understand Finite state machine, finite automata, Turing machine ,reduced machine .
• Apply shortest path algorithm to solve Chinese Postman Problem and Dijkstra's algorithm.
• Apply the knowledge of graphs to solve the real life problem.

Msc – III SEMESTER

Course Outcome:

Course Title: Integration Theory & Functional Analysis

On completion of this course, the student will be able to:
• Understand the normed linear spaces, Banach space and Dual spaces.
• Understand inner product spaces, orthogonality and Hillbert spaces.
• distinguish between finite and infinite dimensional spaces.
• Concept of the weak convergence and normed linear spaces of bounded linear transformations.
• Define Signed measure, product measure, baire measure and regularity of measure , Labesgue decomposition , Regularity of measures on locally compact spaces .
•Prove Hahn decomposition theorem , Radon-Nikodym theorem, Riesz representation theorem , Riesz Markoff theorem

Course Title: Partial Differential Equation & Mechanics

On completion of this course, the student will be able to:
• Define generalized coordinate ,cyclic coordinate and D'Alembert's principle.
• Derive Lagrange's equation of first and second kinds .
•Discuss about poisson bracket, Motivating problems of calculus of variation.
• Attain the applications of Lagranges formulation and Hamilton canonical equation.
.• Explain the PDE and its classification , Non-homogeneous Equation, Mean Value Formulas, Properties of Harmonic Functions, Green's Function,
•Derive the fundamental solution of Laplace's Equation , Heat Equation, Wave Equation ; Energy Methods.

•Derive the attraction and potential due to various physical bodies.

Course Title: Fuzzy sets and its Applications

On completion of this course, the student will be able to:

• Find crisp sets and fuzzy sets and discuss the types of fuzzy sets.

• Classify the operations on fuzzy sets.

•Understand about the Extension principle, Fuzzy number and fuzzy arithmetic.

• Illustrate fuzzy relation and it's compositions , fuzzy equivalence relations.

• Explain fuzzy measures and classify possibility and necessity measures.

• Fuzzy Relations on Fuzzy sets, Composition of Fuzzy relations and Fuzzy equivalence relations.

Course Title: Operation Research

On completion of this course, the student will be able to:

• Formulate some real life problems into Linear programming problem.

• Use the simplex method to find an optimal vector for the standard linear programming problem and the corresponding dual problem

• Prove the optimality condition for feasible vectors for Linear programming problem and Dual Linear programming problem.

• Find optimal solution of transportation problem and assignment problem

• Learn the constructions of networks of a project and optimal scheduling using CPM and PERT.

Course Title: Programming in C (With ANSI Features)

On completion of this course, the student will be able to:

• Recognize and understand the purpose of basic computer components

• Implement of simple 'C' origram, data types and operators and console I/O function

• Understand decision control statements, loop control statements and case control structures.

• Understand the declaration and implementation of arrays, pointers, functions and structures.

• Understand Function, Variables and Constants, Expressions and The Preprocessor directives.

Msc – IV SEMESTER

Course Outcome:

Course Title: Functional Analysis

On completion of this course, the student will be able to:

• Derive Uniform boundedness theorem, Open mapping and closed graph theorems.

• Understand Hahn-Banach theorem for real,compex and normed linear spaces.

• Define Inner product spaces, Hilbert spaces, Orthonormal Sets, Bessel's inequality and Complete orthonormal sets.

• Prove Projection theorem, Riesz representation theorem and the generalized Lax-Milgram theorem

• Understand about Adjoint of an operator , Self-adjoint operators, projection, normal and unitary operators on a Hilbert space, Reflexivity of Hilbert spaces.

Course Title: Partial Differential Equation & Mechanics

On completion of this course, the student will be able to:

• Define Non-linear First Order PDE, Characteristics, Hamilton Jacobi Equations, Hopf-Lax Formula, Weak Solutions, Uniqueness and Conservation Laws.

• Understand Laplace and Fourier Transform, Hopf-Cole Transform, Hodograph and Legendre Transforms, Potential Functions.

• Derive Hamilton's Principle, Poincare Cartan Integral invariant., Whittaker's equations, Hamilton-Jacobi equation .

• Discuss canonical transformations and properties of generating functions,
Lagrange Brackets and Poisson brackets, invariance of Lagrange brackets and Poisson brackets under canonical transformations.

Course Title: Fuzzy sets and its Applications

On completion of this course, the student will be able to:

• Define Fuzzy Logic, Fuzzy propositions, Fuzzy quantifiers, Linguistic variables and hedges, Inference from conditional fuzzy proposition.

• Discuss Fuzzy implications and their selection and the role of fuzzy relation equation.
• Understand Fuzzy controllers, Fuzzy rule base, Fuzzy inference engine , Fuzzification , Defuzzification and it's various methods.
• Determine decision making in fuzzy environments , Fuzzy ranking methods and solve fuzzy L.P.P. by simplex method.

Course Title: Operation Research

On completion of this course, the student will be able to:
• Formulate and solution of linear programming model of two person zero sum game .
• Solve nonlinear programming problems using Lagrange multiplier and using Kuhn-Tucker conditions.
• Solve Integer Programming and Quadratic programming problem .
• Understands to solve Dynamic Programming, . Separable Programming, Convex Programming and Non-convex Programming.
•Analyze and solve linear programming models of real life situations.

Course Title: Programming in C (With ANSI Features)

On completion of this course, the student will be able to:
• Understand the Storage Classes , Scope, the register Specifier and ANSI rules for the syntax and Semantics of the storage-class keywords.
• Understand Structures and Unions, Dynamic Memory Allocation, Linked Lists and enum Declarations.
• Understand Input and Output-Streams, Buffering , the Header File.
• Understand Error Handling, Opening and Closing a File, Reading and Writing Data and the standard library for Input / Output.

Bsc. (Mathematics)

Ojective of the programme

Individuals who have completed a degree in mathematics should be equipped to:
• find employment utilizing their mathematical knowledge;
• use their mathematical knowledge to solve problems; and
• undertake further studies related to mathematics.

Based on these over-arching objectives, a set of program outcomes has been adopted which describe the skills, knowledge, attitudes, values and behaviors that students should be able to demonstrate by the time they complete the program. Specifically, students completing a mathematics major should:
• gain knowledge in foundational areas of mathematics;
• communicate mathematics accurately, precisely and effectively;
• develop mathematical thinking;
• apply mathematical knowledge; and
• be able to solve mathematical problems using technology.

Programme Outcome

•Enabling students to develop a positive attitude towards mathematics as an interesting valuable subject of study.
• A student should get a relational understanding of mathematical concepts and concerned structures, and should be able to follow the patterns involved, mathematical reasoning.
•Ability to analyze a problem, identify and define the computing requirements, which may be appropriate to its solution.
• Introduction to various courses like group theory, ring theory, field theory, metric spaces, number theory.
•Enhancing student's overall development and to equip them with mathematical modeling abilities, problem solving skills, creative talent and power of communication necessary for various kinds of employment.
• Ability to pursue advanced studies and research in pure and applied mathematical science.

Programme Specific Outcome of B.Sc. Mathematics

• Think in a critical manner.

- Know when there is a need for information, to be able to identify, locate, evaluate, and effectively use that information for the issue or problem at hand.
- Formulate and develop mathematical arguments in a logical manner.
- Acquire good knowledge and understanding in advanced areas of mathematics and statistics, chosen by the student from the given courses.
- Understand, formulate and use quantitative models arising in social science Business and other contexts.

GOVT GHANSHYAM SINGH GUPT PG COLLEGE BALOD, DIST-BALOD (C.G.)

DEPARTMENT OF BIOTECHNOLOGY
PROGRAMME: BACHELOR OF SCIENCE (BIOTECHNOLOGY)
PROGRAMME OUTCOMES

PO-1: B.Sc. Biotechnology curriculum is so designed to provide the students a comprehensive understanding about the fundamentals of Biotechnology covering all the principles and perspectives.
PO-2: The branches of Biotechnology such as Molecular Biology, Biophysics, Biochemistry, Biostatistics, Genetics, Recombinant DNA Technology, and Immunology expose their diversified aspects of biotechnology where the students experience a broader outlook of the subject.
PO-3: The syllabi of the B.Sc. Biotechnology course are discretely classified to give stepwise advancement of the subject knowledge right through the three years of the term.
PO-4: The practical exercises done in the laboratories impart the students the knowledge about handling of various equipments and instruments available and identify the suitable and appropriate experiments for their research. They would have gained sufficient knowledge about the assays and analyzing data.
PO-5: Students will learn to identify and isolate different microorganisms from soil, air and water, to grow different plants under laboratory conditions through tissue culture technique using different equipments and instruments in practical classes.

B.Sc. 1st year
PAPER I (Biochemistry, Biostatistics and Computers)

Learning Objectives:

1. The student would be able to comprehend the structures of the major classes of macromolecules.
2. The student is exposed to importance of biological macromolecules.
3. To develop a skill that introduces the students to the basics of computer operations.
4. The student is imparted with knowledge on both hardware and software.
5. The students have a better understanding on the use of computers for various applications.

Learning Outcomes:

1. The student acquires knowledge in the quantitative and qualitative estimation of biomolecules.
2. The student will study the influence and role of structure in reactivity of biomolecules.
3. The student has a thorough understanding on the role of biomolecules and their functions.
4. Able to understand simple calculations and gain the knowledge of basic statistical methods to solve problems.
5. How to plan and execute research designs, how to operate various statistical software packages.

6. Able to analyze data, interpret and present information.
7. Able to publish research data.
8. Able to appreciate the importance of statistics in research and prepares them for a career in research.
9. The students will be able to design and carry out scientific experiments as well as accurately record and analyses the results of experiments.

PAPER II (Cell Biology, Genetics and Microbiology)

Learning Objective:

1. To make the students to understood the concept of cell and their activities and molecular signaling.
2. To make the student to understood microorganisms and their participation in day to day activities.
3. To make the student to understand the way characters get transferred through generations and methods to analyze and modify them.
4. To make the student to understood the concept of genes and their behavior.
5. To student should have understood: Basic genetics and their role.
6. The student will be taught Mendelian genetics, their principles and gene interaction.
7. To learn about chromosomal aberrations and structure of chromosomes.
8. To gain a basic understanding on human genetics and hereditary.
9. To develop an understanding on the metabolism and mechanism of microbial life.

Learning Outcomes:

Upon successful completion of this course, the student will be able to

1. To understand the basic unit of the organism.
2. To differentiate the organisms by its cell structure.
3. To know components of the cell and their division.
5. To comprehend the cell organelle, cell membrane.
6. To explain the arrangement of Genes and their interaction.
7. To describe the influence of environment on gene expression.
8. To understand extra nuclear inheritance linkage and crossing over.
9. To identify microbes using modern techniques and role of microorganisms in the diversity.
10. To understand microbial diversity, physiology and nutrition.

B.Sc. Second year

PAPER I (Molecular Biology and Biophysics)

Learning Objective:

1. The student should have understood the molecular aspects of Molecular biology.
2. The student should have the understanding to identify the physical principles responsible for maintaing the basic cellular function.
3. To appraise the importance of various biophysical techniques.

Learning Outcomes:

1. The students will be able to understand what genes are, how they are inherited.
2. The student will be able to understand the genetics at molecular level.
3. Students will be able to understand that how genes control cellular activity and they respond to environment.
4. The students will be able to illustrate the basic principles and techniques to understand the biological problem.

PAPER II (Recombinant DNA Technology)

Learning Objectives:

1. To understand the concept of gene manipulation and gene transfer technologies.
2. To understand the Manipulation of genes, Transfer techniques, Expression systems and methods of selection.

Learning Outcomes:

1. Able to recognize mechanism of gene manipulation.
2. Able to understand the genes at molecular level.
3. Able to learn about DNA, RNA and their replication, mutations, DNA repair mechanism.

4. To train the students in understanding genetics and relate modern DNA technology for disease diagnostics and therapy.

B.Sc. FINAL YEAR
PAPER I (General Biotechnology)

Learning Objective:

1. To make the student to understood usage of Plant and Animal products and exploitation of them in Biotechnology.
2. To understand the concepts in tissue culture applicable to plants and Animals.
3. To understand the applications of plants and animals in biotechnology and biochemical research.

Learning Outcomes:

After the completion of the course, Students will be able to

1. To understand the application of Plants in Biotechnology.
2. To understand the Crop development, Callus culture, Biotechnological applications of plants.
3. Able to understand Animal tissue culture, Animal products, production and improvement of them.
4. Introduces the students to explore entrepreneurial avenues in this field.

PAPER II (Immunology)

Learning Objective:

1. To make the student to understood the concept of immunology.
2. To develop an understanding of immunity, Antigen, Antibody, Cells of immune system and their function and regulations.
3. To be able to learn about molecular basis of antigen recognition, hypersensitivity reaction, antigen-antibody reactions.

Learning outcomes:

1. The course develops in the student an appreciation for principles of immunology and its applications in treating human diseases.
2. To develop an understanding of basic defense mechanism of animals.

GOVT GHANSHYAM SINGH GUPT PG COLLEGE BALOD, DIST-BALOD (C.G.)

DEPARTMENT OF BOTANY
PG BOTANY DEGREE PROGRAM
Program specific outcomes (PSOs), Course outcomes (COs)

Vision of the Botany Department:

Our vision is to conduct innovative research, teaching and outreach on the patterns and processes of life with a focus on plants and their environments.

Mission of the Department:

Mission is to foster an environment of excellence by attracting and upporting the outstanding students, faculty and staff needed to sustain our vision.

We focus on the patterns and processes that enable predictive understanding of plants and their environments at local, regional, and global scales, leading to strengths in the areas of ecology, evolution, and systematics.

These topics are investigated using such tools as spatial data analysis, remote sensing, genomics, computational science, stable isotopes, microscopy, biogeochemical and physiological approaches and field and laboratory experiments.

Learning outcomes for Postgraduate Programme M.Sc. Botany

Upon successful completion of M.Sc. Botany Post-Graduates are expected to-

PSO1: Develop a conceptual understanding of principles and importance of Botany. Students would be benefited with knowledge of core subjects like plant diversity, physiology and biochemistry, molecular

cytogenetic and application of statistics etc. which are offered in these subjects Modules on analytical techniques, plant tissue culture and photochemistry would make them obtain skills that help in doing research.

PSO2: Learn about practical technique in lab for detail study of plant cell structure, reproduction, anatomy, breeding procedures for hybridization. Maintain a high level of scientific excellence in botanical research with specific emphasis on the role of plants. Create, select and apply appropriate techniques, resources and modern technology in multidisciplinary way. Practice of subject with knowledge to design experiments, analyze and interpret data to reach to an effective conclusion.

PSO3: They would identify, formulate and analyze the complex problems with reaching a substantiated conclusion. Logical thinking with application of biological, physical and chemical sciences. Learning that develops analytical and integrative problem-solving approaches.

PSO4: Students would perform functions that demand higher competence in national/international organizations with sporty and helping spirits. Prepare the students for many competitive exams like MPSC, UPSC NET SET GATE.

PSO5: Best problem-solving skills in students would encourage them to carry out innovative research projects thereby making them to use knowledge creation in depth. Enable the students to be resourceful in identifying the plants.

PSO6: Knowledgeable, disciplined students with good values, ethics, and kind heart will help in nation building globally. Student should be aware of ethical issues and regulatory considerations while addressing society needs for growth with honesty.

SEMESTER - I

PAPER - I

CYTOLOGY

End of this course, the students will be able to:

CO1: Correlate the theoretical description of cell components with microscopic ultra structures

CO2: Describe cell wall, plasma membrane and plasmodesmata

CO3: Understand cell organelles Golgi complex, lysosomes, paroxysms etc.

CO4: Understand cell organelles Chloroplast, Mitochondria, Ribosomes structure and function.

CO5: Study the nucleus-ultra structure and function.

CO6: Students will understand about cell cycle and apoptosis. And role of different enzymes envalved in cel division like cdka.

CO7: Students know about Programmed Cell Death mechanism, during cell division role of various harmons effect and cell pate Formation.

CO8: Students know about Microtubule, Microfilament roll of organization of cell .

CO9: Study cell Biology Technique help for highly transcript of cell. Technique of FISH, GISH, Confocal Microscopy.

PAPER - II

GENETICS

After completion of this course students will gain –

CO1: Understanding of the history of gene from 'something', 'factor'; and gene and one gene one enzyme one characters hypothesis. Student will also know the interaction of gene, genetic recombination producing the characters differently.

CO2: Understanding of the structure of chromosome and how the packaging of DNA occurs. Student can differentiate Euchromatin and heterochromatin region of chromosome on the basis of staining properties. Student can draw a good karyotype and Idiograms of Karyotype, and also how the evolution of Karyotype takes place.

CO3: Understanding of the different structural and numerical changes why? And how? It occurs in the chromosome students, can able to use the trisomic and monosomic for the chromosome mapping.

CO4: Understanding the role and process of mutation and different mutagenic agent which brings about mutation in the organism. Students will also understand the role of mutation in crop improvement and permutation.

CO5: Student can also draw good figure of chromosome directly from microscope with the help of Camera Lucida and prepared an ideogram of chromosome on graph paper. Understanding the different technique of plant breeding.

CO6: Study the technique of hybridization.

PAPER – III

MICROBIOLOGY, PHYCOLOGY AND MYCOLOGY

After completion of this course -

CO1: Students will be able to understand the structure, type and identification of Bacteria and cyan bacteria.

CO2: Students will gain understanding of Thallus structure, reproduction and economic importance algae.

CO3: Students will gain understanding of the classification, structure of mycelium reproduction of fungal species. They will know about the hazardous and useful fungi. Student will also know and learn classification and evolutionary trends in fungi.

CO4: Students will gain understanding of the plant diseases, causal organism, host and their relationship and control measure for plant diseases, Understanding of fungicide and use of chemical physical and biological controlling of diseases mentioned in the unit.

PAPER - IV

BRYOPHYTA, PTERIDOPHYTA AND GYMNOSPERM

After completion of this course students will gain knowledge of -

CO1: the characters, distribution, classification and regeneration in Bryophytes.

CO2: the characters of different orders of Bryophytes.

CO3: How the stele evolution occurs in Pteridophytes and also familiar with the work done by Indian pteriodologist.

CO4: the classification of Pteridophytic classes and the morphological and anatomical characters of genus included in the different Pteriodophytic order.

CO5: Understanding the meaning of fossil and its use in the determination of age of plant materials, Understanding the applied knowledge and different aspects of Paleobotany.

CO6: Students can critically differentiate fossil and living fossil. Students will also understand the evolutionary tendencies and comparative morphology of Cycadales, Cycadeodales and Pteridospermales.

CO7: Students can compare the characters of different orders &relationship of each order from Cordaitales to Gnetales.

CO8: Student can critically differentiate the characters of three orders of Gymnosperm i.e., Ginkogales, Coniferales, and Taxales.

(Lab Work) Laboratory exercise

Contents: Cytology & Microbiology, Algae & Fungi –

After completion of this course students will gain knowledge of -

CO1: Students will be able to understand the isolation of chloroplast, mitochondria, lysosome, and nucleus etc.

CO2: Understands the action of low treatment of colchicine and para-dichlorobenzene during plant cell division creating polyploidy in the organism.

CO3: Student will understand the importance of cell wall. They also get to know about plasmodesmata.

CO4: Student will understand the role of various cell organelles. They will have developed knowledge about various phases of cell division.

CO5: Student can also draw good figure of chromosome directly from microscope with the help of Camera Lucida and prepared an ideogram of chromosome on graph paper.

CO6: Student can identify different types of forms of cyanobacteria.

CO7: Student can classify and identify the Algal and fungal genus and specimen included.

CO8: Student can collect few species from locality and identify morphologically during collection of material in the local visit.

(Lab Work) Laboratory exercise

Contents: Genetics & Bryophyta, Pteridophyta, & Gymnosperm

After completion of this course students will gain knowledge of -

CO1: Study the salivary gland chromosome of chiranomas larva.

CO2: Isolate DNA and prepare cot curve

CO3: Student can also draw good figure of chromosome directly from microscope with the help of Camera Lucida and prepared an ideogram of chromosome on graph paper.

CO4: Students know about DNA and RNA chemical and molecular structure.

CO5: Students also known of plant breeding system and improvement new variety and new plants to benefited socioeconomic value for human beings.

CO6: Students also preparation different types of plant stainer.

CO7: Student can collect few species from locality and identify morphologically during collection of material in the local visit.

CO8: Student will develop the skill and will be able to prepare double stained micro preparation of the given material and identify on the basis of observation.

CO9: Student can make micropreparation of the material of Pteridophyta and bryophytes and idenfied anatomically.

CO10: Student can make micropreparation of the material of Gymnosperm and idenfied anatomically.

CO11: Students gain the skill of identifying the fossil specimen.

SEMESETR- II

PAPER - I

TAXONOMY AND DIVERSITY OF PLANTS

After completion of this course students will gain knowledge of -

CO1: Students will get to know about scope, aim, principles of taxonomy. They will get knowledge about concepts of taxa, genus etc.

CO2: Students will get knowledge about various taxonomic evidences. They will also understand how to prepare herbarium sheets and how to read floras.

CO3: Students are able to make herbaria

CO4: Students will understand about biosystematics. They will also understand adaptive features of ICBN.

Students will get knowledge about classification of Angiospermaic plant groups.

CO5: Students will be able to know the probable ancestors of angiosperms, extinct species.

CO6: Students will know the interesting features & systematic position of Rannunculaceae, Magonaliaceae, Nymphaceae, Meliaceae, Fabaceae, Cucurbitaceae, Umbelliferae Asteraceae

Bignoniaceae , Labiateae Verbenaceae, Euphorbiaceae, Moraceae, Cactaceae, Orchidaceae, Zingiberaceae, Cypraceae and Poaceae etc.

CO7: Students are able to comments on specimen and identify from locally available families.

PAPER – II

MOLECULAR BIOLOGY

After completion of this course -

CO1: Students will understand the structure and functions of ribosomes. They will get to know about how transcription and translation takes place in Prokaryotes and Eukaryotes.

CO2: Students will understand about fine structure of gene. They will also understand machinery involved in protein sorting.

CO3: Students will get to know about the structure of phage genome. They will also develop knowledge about genetic recombination.

CO4: Students will understand about cell cycle and apoptosis. They will get knowledge about the process of signal transduction.

CO5: Understanding the role and process of mutation and different mutagenic agent which brings about mutation in the organism. Students will also understand the role of mutation in crop improvement and permutation.

PAPER - III

PLANT PHYSIOLOGY

After completion of this course -

CO1: Students will be able to understand the various physiological life processes in plants.

CO2: They will also gain about the various uptake and transport mechanisms in plants and are able to coordinate the various processes.

CO3: They understand the role of various harmones, signaling compounds, thermodynamics and enzyme kinetics.

CO4: During the course students will gain knowledge about various mechanisms such as channel or transport proteins involved in nutrient uptake in plants.

CO5: Demonstrate an understanding of how water moves in plants at both molecular and organism levels.

CO6: The field of plant physiology includes the study of all the internal activities of plants-those chemical and physical processes associated with life as they occur in plants.

CO7: A program that focuses on the scientific study of the cell and molecular plant biology and physiology, water relations and transpiration and mineral nutrition, especially nitrogen metabolism. . **CO8**: The students will be learning about the various signal transduction mechanisms in plants. The concept of second messengers, calcium signaling, kinases/phosphatases in plant signaling would be delineated to

enhance their grasping power for understanding of different signaling pathways operative in plants. Two component signaling concept would be introduced and extended to plant hormone signaling. Quoram sensing and its potential biotechnological applications should be clear to students after these classes.

CO9: During this course you also will learn how plant growth and development and their tropisms, nastic movements, photoperiodism, photomorphogenesis, circadian rhythms under different environmental conditions.

CO10: Understand how to apply the basic concepts of Plant Physiology in other disciplines of agriculture.

CO11: To understand, to know and discuss the concept of physiological processes of plants.

CO12: Study the stress biology, biotic and abiotic stress.

CO13: students also known mechanism of plant responces and adaptation to salinity, metal toxicity, freezing, heat and oxidative stress of plants. Understand the properties, structure and mechanism of action of enzymes.

PAPER - IV

PLANT METABOLISM

After completion of this course -

CO1: Students will understand the importance of photosynthesis in plants. They will also understand photosynthesis is one of the most important processes that allow plants to Live.

CO2: Students will come to know that, energy produced by respiration is essential for normal functioning of body.

CO3: Student will understand importance of metabolism to maintain living state of cells. They also understand role of nitrogen cycle in environment.

CO4: Students will understand how enzymes serve important function in body, in digestion and metabolism. They have developed knowledge about pathways of water through xylem and phloem.

CO5:The students are able to isolate starch, pectine and various nutritive products from the plants. Qualitative and quantification of the plant contents and its biochemistry and mode /mechanism of synthesis etc.

CO6:Learn Nitrogen fixation process and its use by plants.

CO7:Know about various plants product (Lipids) formation and uses socioeconomically or commercially.

CO8:Understanding Biosynthesis of different Fatty acids (PlantsProduct like Oil, Wax, latex, Fibre, Gums Etc.)

CO9: During this course you also will learn how plant growth and development and their tropisms, nastic movements, photoperiodism, photomorphogenesis, circadian rhythms under different environmental conditions.

CO10:Learn about Sensory photobiology Know about the Plant Growth hormones (Auxins, Gibberellins. Cytokinins, Ethylene).

Lab Work) Laboratory exercise

Contents: Taxonomy and Diversity of plants &Molecular Biology-

After completion of this course students will gain knowledge of -

CO1: to independent identify and study plants at family, genus and species level.

CO2: get motivated to recognize and classify plants and preserve them as resources for posterity.

CO3: study the plant communities at different localities of known and unknown destinations.

CO4: Description of specimens from representative, locally available families.

CO5: Description of various species of a genus; location of key characters and preparation of keys to generic level.

CO6: Location of key characters and use of keys at family level.

CO7: Training in using floras and herbaria for identification of specimens described in the class.

CO8: Comparison of different species of a genus and different genera of a family to calculate similarity coefficient and preparations of dendrograms.

CO9: Study aware tour under the supervision of lecturers to a place of botanical interest. Access knowledge available in the various databases for carrying out genomic and proteomic research.

CO10: Understand the role played by mutations in plant and would be in a position to put the accrued knowledge for use.

CO11: Genomics will provide the way for the students to take up in silico investigations towards assisting work in manipulating genes to produce plants with desired characters.

CO12: Isolate DNA and prepare cot curve.

CO13: Understanding the role and process of mutation and different mutagenic agent which brings about mutation in the organism.

CO14: Students will also understand the role of mutation in crop improvement and permutation.

(**Lab Work) Laboratory exercise**

Contents: Plant Physiology and Plant Metabolism -

After completion of this course students will gain knowledge of -

CO1: Perform the experiments on photosynthesis, respiration and growth of plants.

CO2: Identify amount of metabolic-protein, amino acids, fat, carbohydrate, present in plants.

CO3: Water potential by gravimetric and falling drop methods.

CO4: Osmotic potential by Plasmolytic method.

CO5: Quantitative estimation of total chlorophyll content and carotenoid contents inleaves.

CO6: Absorption spectrum of chlorophyll pigments by spectrophotometric method.

CO7: Differentiation of C3 and C4 plants by starch test.

CO8: Determination of nitrogen content in roots and root nodules.

CO9: Effect of temp., substrate concentrate pH and inhibitor concentrate on nitrate reuctase activity.

CO10: UV-B effect on nitrate reducates.

CO12: Demonstration of Brownian movement in the latex of Calotropis.

CO13: Demonstration of tyndalleffect.

CO14: Determination of isoelectric pH of Protein.

CO15: Estimation of Protein, free amino acids, carbohydrate contents in plant sources.

CO16: Estimation of Vitamin C in fruits – titrimetric method.

CO17: Paper chromatographic identification of plant pigments, sugars and amino acids.

SEMESTER - III

PAPER - I

PLANT DEVELOPMENT AND PLANT RESOURCES

After completion of this course students will gain knowledge of -

CO1: Students will understand diversity of phanerograms.

CO2: They will also know about difference between mnocotylecodn and dicotyledon plants. Know about plants anatomical structure, their developmental patterns.

CO3: Student will understand the role of various hormones in plant development. They will understand how growth of shoot apical meristem takes place.

CO4: Classify different kind of cytohistological zonation of shoot and root meristem

CO5: Students know about leaf structure, type, development, and its function. They also known its anatomical character, structure and function.

CO6: Vascular tissues and its constituents by sections and maceration, wood anatomy, TS, TLS and RLS Mechanical tissues (Collenchyma, Sclerenchyma, Stone cells and Xylem) , Secretary tissues (Mucilage Canals, Resin canals, Nectaries, and oil glands), laticifers (Latex cells and Vessels).

CO7: Students also known wood development,structure,type and fnction they also known Normal and abnormal secondary growth etc.

CO8: The students will also deal with applied aspect such as cell lineages, cell fate mapping, positional informational techniques for studying development.

CO9: This knowledge will help students to undertake research in the field of developmental biology.

CO10: Students will understand tissue system in Angiosperms. They will also have developed knowledge about anatomical feature of Angiospermic plant.

CO11: Identify and recognize potential of food crops namely cereals, millets, pulses, sugar yielding plants, spices, condiments, tubers, fruits and medicinal plants

CO12: Venture into cultivation, process and harvest economically useful plants**.**

CO13: Gain confidence in pursuing entrepreneurial projects.

CO14: An understanding of commercial products derived from plants that provide us with consumable products such as beverages, herbs and spices, and materials such as cloth, paper, and wood.

PAPER - II

PLANT ECOLOGY- I (ECOSYSTEM AND VEGETATION ECOLOGY)

After completion of this course -

CO1: Students will understand the vegetative organization in community. Students will get to know about how changes take place during ecological succession.

CO2: Student will have developed knowledge about structure and function of ecosystem. They also will understand about biogeochemical cycle in environment and its role.

CO3: Students will understand the effect of air, water and soil pollution in environment. They will also develop knowledge about greenhouse gases its sources and role.

CO4: Student will get knowledge about invasive species of plant. They will get to know about how ecological management takes place.

CO5: Understand core concepts of Economic Botany and relate with environment, populations, communities, and ecosystems .

PAPER – III

BIOTECHNOLOGY AND GENETIC ENGINEERING OF PLANTS AND MICROBES

After completion of this course -

CO1: Students will become familiar with the tools and techniques of genetic engineering DNA manipulation enzymes, genome and transcription analysis and manipulation tools, gene expression regulation, production and characterization of recombinant proteins.

CO2: Students will get knowledge about importance of recombinant DNA technology for the production of vaccines. Students will be able to know about crop developed by genetic engineering used to enhance yields & nutritional quality.

CO3: Students will have knowledge about creative genetically modified bacteria. They will get knowledge that advance proteomic technologies can help us to develop better drugs.

CO4: Students will know how they can grow disease free plant by tissue culture technique. They will develop understanding about how gene technology has helped in improving various qualities in Crops.

CO5: Students will know about the use of computational approach to analyze, manage & store biological data.

CO6: They are able to know, the use of information technology in biotechnology for data storage, Analyzing the DNA sequences.

CO7: Students will learn DNA replication, recombination and repair, transcription and translation

CO8: Students will be aware of the modern tools and techniques of genomics and isolation and identification of genes.

CO9: Students will understand the biology and application of antisense technologies and biology of cancer.

CO10: Students will acquire knowledge of advances in biotechnology- healthcare, agriculture and environment cleanup via recombinant DNA technology.

CO11: Students will learn the principals and technical advances behind the in vitro culture of plant cells and rDNA techniques.

CO12: Students will learn the applications of plant transformation for improving the productivity and performance of plants under biotic and abiotic stresses.

CO13: The course will make the students to learn various diagnostic techniques such as PCR, RTPCR, Real-time PCR.

CO14: This course exposes students to the applications of genetic engineering in biological research.

CO15: The students will learn the theoretical and practical aspects of human genetics.

CO16: The students will understand different types of NAA tests for the diagnosis of microorganisms of medical importance and in forensic science.

CO17: This course will describe pharmaco-genomics and toxic genomics.

PAPER - IV

ELECTIVE COURSE - MOLECULAR PLANT PATHOLOGY-I

After completion of this course -

CO1: Learn about classification, characteristics, ultra structure of Prokaryotic and Eukaryotic microbes.

CO2: Know about organisms and causal factor responsible for plant diseases & methods of studying plant diseases.

CO3: Familiarize with some common plant diseases of India. Gain knowledge on Host parasite interaction process.

CO4: To acquaint with different strategies for management of plant diseases.

CO5: To acquaint with post harvest diseases of agricultural produce and their ecofriendly management.

CO6: To impart knowledge about symptoms, epidemiology of different diseases of vegetables and spices and their management.

CO7: To acquaint with seed-borne diseases, their nature, detection, transmission, epidemiology, impacts/loses and management. To impart knowledge on the concepts, principles and judicious use of chemicals in plant disease management.

CO8: Acquaintance with formulation of different fungicides and plant protection appliances.

CO9: Formulation of fungicides, bactericides and nematicides; in vitro evaluation techniques, preparation of different concentrations of chemicals including botanical pesticides based on active ingredients against pathogens; persistence, compatibility with other agro-chemicals; detection of naturally occurring fungicide resistant mutants of pathogen; methods of application of chemicals.

CO10: To provide knowledge on soil-plant disease relationship.

CO11: To study principles and application of ecofriendly and sustainable management strategies of plant diseases.

CO12: To educate about the nature, prevalence, etiology, factors affecting disease development and control measures of field and medicinal crop diseases.

CO13: To acquaint the learners about the principles and the role of Plant Quarantine in containment of pests and diseases, plant quarantine regulations and set-up. To study the nomenclature, classification and characters of fungi. To acquaint with the structure, virus-vector relationship, biology and management of plant viruses.

(**Lab Work) Laboratory exercise**

Contents: Plant Development and Ecology -

CO1: Students will be able to understand the isolation of chloroplast.

CO2: Students will gain knowledge about floral symmetry and anatomical features of various taxa.

CO3: Student can extract chloroplast pigment from leaves.

CO4: Student can identify structure of stomata while peeling epidermis leaves of Tradescantia.

CO5: Students will be able to understand the anatomical structure of monocot and dicot plants

CO6: Food crops: Wheat, Rice, Maize, Chickpea, Potato, Tapioca, Sweet Potato, Sugar cane, Morphology, Anatomy, Micro chemical tests for stored food material.

CO7: Forage/Fodder crops: Study of any five important crops of the locality (For example fodder sorghum, Bajra, Bersem, Clove, Guar bean, Gram, Ficus sp.)

CO8: Plant fibers: (i) Textile fibers: Cotton, Jute, Linen, Sunn hemp, Cannabis. (ii) Cordage fibers; Coir (iii) Fibers for stuffing: Silk and Cotton.

CO9: Study of frequency, abundance and density by quadrate method.

CO10: Student will have developed knowledge about distribution of various plant species by quadrate Method.

CO11: Study of statistical problems based o biometry

CO12: Students will learn the use of mathematical and statistical theory and application of biostatistical methods; use & interpret results from specialized computer software for the management and statistical analysis of research data.

CO13: Students will learn to participate in a research team setting in study design, data coordination and management and statistical analysis and reporting of study results.

CO14: Students also aware scientific visits to a protected area, a wet land, a mangrove, NBPGR, BSI, CSIR, ICAR labs and a recognized botanical gardens or a museum.

(**Lab Work) Laboratory exercise**

Contents: Plant Biotechnology and Plant Pathology -

CO1: This study throws light on virus cultivation, phages and bacterial/yeast genetics.

CO2: Describe DNA replication, recombination and repair, transcription and translation.

CO3: Discuss the modern tools and techniques of genomics and isolation and identification of genes.

CO4: Study Isolation & quantification of genomic DNA.

CO5: Plasmid isolation & quantification,Southernblotting and RFLP analysis

CO6: Isolation and quantification of RNA,Isolation of poly A + RNA

CO7: Computational analysis of genomic and proteomic data.

CO8: Network search on genomic and proteomic databases.

CO9: Use of PERL programming for : i) Storing DNA sequence ii)DNA to RNA transcription iii) Counting nucleotides.

CO10: Isolation characterization and maintenance of pathogens, role of different storage conditions on disease development.

CO11: application of antagonists against pathogens in vivo and in vitro conditions.

CO12: Comparative efficacy of different chemicals, fungicides, phytoextracts and bioagents.

CO13: Detailed study of symptoms and host parasite relationship of representative diseases of plantation crops.

CO14: Collection and dry preservation of diseased specimens of important crops. Conventional and advanced techniques in the detection and identification of seed-borne fungi, bacteria and viruses.

CO15: Relationship between seed-borne infection and expression of the disease in the field.

CO16: Acquaintance with formulation of different fungicides and plant protection appliances.

CO17: Quantification of rhizosphere and rhizoplane microflora with special emphasis on pathogens; pathogenicity test by soil and root inoculation techniques, correlation between inoculum density of test pathogens and disease incidence, demonstration of fungistasis in natural soils; suppression of test soil-borne pathogens by antagonistic microorganisms.

CO18: Isolation and identification of different biocontrol agents.

CO19: Isolation, characterization and maintenance of antagonists, methods of study of antagonism and antibiosis, application of antagonists against pathogen in vitro and in vivo conditions.

CO20: Study of symptoms caused by viruses, transmission, assay of viruses, physical properties, purification, method of raising antisera, serological tests, electron microscopy and ultratomy, PCR.

SEMESTER - IV

PAPER - I

PLANT REPRODUCTION AND UTILIZATION OF RESOURCES

After completion of this course -

CO1: Student will understand floral structure of Angiospermic plants and how stamens and carpels are evolved. They will also understand adaptive feature of pollinators.

CO2: Students will understand the structure of Anther and it's various. They will understand about pollen wall protein.

CO3: Students will understand the development of male gametophyte. They will get to know about biochemical aspects of pollen.

CO4: Students will understand carpel determination of pistil. They will also understand megasporogenesis.

CO5: Students will understand pollination mechanism. They will understand the concept of Incompatibility.

CO6: Students will get knowledge about reproduction in plants. They are able to differentiate the types of endosperms.

CO7: Students can understand the relation between embryo and endosperm. Students will get idea about practical importance of polyembryony.

CO8: Students are able to know overall development of endosperms. Students will develop understanding of the formation of embryo from somatic cell.

CO9: Student will understand the structure of anther and role of gene expression during pollen development. They will get to know about fertilization and how pollen stigma interaction takes place.

CO10: Students will understand how endosperm provides nutrition to embryo development. They also understand how germination of seed takes place in plants.

CO11: Students known fruit maturation and its contents.

CO12: Introduce to Aesthetic botany in syllabus to study phytogeography and forest types in India

CO13: Understand the technique of grafting, budding, industrial gardening, terrace gardening etc.

CO14: Develop nurseries and other management for cultivation of flowers

CO15: Design landscape in commercial, residential bungalows

CO16: Develop the technique to set up playhouses and ornamental succulents.

CO17: Bring out the relevance of ethnobotany in the present context Know about the major and minor ethnic groups or Tribals of India, and their life styles.

CO18: Learn about the Methodology of Ethnobotanical studies.

CO19: Gain knowledge on the role of Role of ethnobotany in modern Medicine.

CO20: Get awareness on the conservation practices of medicinal plants.

PAPER - II

POLLUTION AND BIODIVERSITY CONSERVATION

By the end of this course, the students will be able to -

CO1: Understand the concept of community and vegetable development and succession

CO2: Organize the ecosystem and mechanism of biogeochemical cycle

CO3: Students will differentiate hydrophytes, mesophytes, and xerophytes and discussing the concept of ecosystem stability.

CO4: Know about IUCN, red data book, sanctuaries, national park

CO5: Study of topography of an area and sampling of plant community by quadrate method.

CO6: Study of composition of wetlands and mangroves.

To analyze the threat and suggest conservative measures.

CO7: Students aware about climate and their role in environment equilibrium.

CO8: Students also known pollution ad pollutant and their role in change environment.

CO9: The students are also trained in the environmental impact analysis.

CO10: Students are able to analyze, monitor various physical, chemical and biological properties of soil water and air.

CO11: ystematically understand biodiversity and its vital role in ecosystem function.

CO12: Identify the importance of biodiversity in natural environments Critically examine.

CO13: biodiversity and human linkages, and help policy formulating for conservation Application of knowledge in general communication for public extension.

CO14: Identification of Rare, Endengered and Threatened species from the region.

CO15: Developing critical thinking for shaping strategies viz. scientific, social, economic and¬ legal issues; for environmental protection and conservation of biodiversity, social equity and sustainable development.

PAPER – III BIOTECHNOLOGY-II

PLANT CELL, TISSUE CULTURE AND ORGAN CULTURE

After completion of this course -

CO1: Biotechnology in an historical perspective

CO2: Scope and Importance of Biotechnology.

CO3: Familiarization of the terms associated with plant tissue culture.

CO4: Learning important milestones in the plant tissue culture.

CO5: Understanding the concepts and principles of Plant tissue culture.

CO6: Learning the techniques of sterilization and monitoring method of sterilization.

CO7: Learning different pathways of plant regeneration under in vitro conditions - organogenesis and somatic embryogenesis.

CO8: Techniques of establishing cell suspension culture. Synthetic seeds and applications.

CO9: Understanding the techniques of virus elimination – methods of virus indexing.

CO10: Meristem and Shoot tip culture and Applications.

CO11: Performing procedures for Micropropagation techniques in rose and banana.

CO12: Culturing of reproductive structures - anther, microspores, embryos, endosperm, Ovule and ovary cultures and methods to produce haploids.

CO13: Protoplast isolation, culture and protoplast fusion - applications

CO14: Somaclonal variation - applications.

CO15: Learning methods to conserve germplasm under In vitro.

CO16: Production of Secondary metabolites production through cell culture.

CO17: Know about the application of tissue culture in forestry, horticulture, agriculture and pharmaceutical industry.

PAPER - IV

ELECTIVE PAPER-- MOLECULAR PLANT PATHOLOGY

After completion of this course -

CO1: To acquaint the students with plant disease epidemiology

CO2: To acquaint the students with plant disease forecasting methods

CO3: To acquaint the students with measurement of plant disease and yield loss

CO4: To acquaint the students with physical and legislative method of plant disease management

CO5: To acquaint the students with cultural methods of plant disease management

CO6: To acquaint the students with biological methods of plant disease management

CO7: To acquaint the students with chemical control of plant diseases

CO8: To acquaint the students with use of resistant varieties in plant disease management

CO9: To acquaint the students with Integrated Plant Disease Management

CO10: To acquaint the students with general characteristic and classification of viral plant pathogens.

CO11: To acquaint the students with classification of bacterial plant pathogens.

CO12: To impart knowledge on the concepts, principles and judicious use of chemicals in plant disease management.

CO13: To teach the students about the different groups of insects that vector plant pathogens, vector-plant pathogen interaction, management of vectors for controlling diseases.

CO14: To acquaint with diseases of fruits, plantation, ornamental plants and their management.

CO15: To impart training on various methods/techniques/instruments used in the study of plant diseases/pathogens.

(**Lab Work) Laboratory exercise**

Contents: Plant Development and Ecology -

CO1: Study of microsporogenesis and gametogenesis in sections of anthers.

CO2: Students Examined of modes of anther dehiscence and collection of pollen grains for microscopic examination (Maize, Grasses, Cannabis Sativa Crotolaria, Tradiscantia, Brassica, Petunia, Solunum melongena etc.)

CO3: Students also known Pollen storage, Pollen-pistil interaction, self-incompatibility in vitro pollination.

CO4: Student aware ovule in cleared preparations, study of monosporic, bisporic and terrasporic types of embryo sac development through examination of permanent, stained serial sections.

CO5: Students Field study for types of flower with different pollination mechanisms (wind pollination thrips pollination bee/butterfly pollination, bird pollination.

CO6: Students know Practically Emasculation, bagging and hand pollination to study of pollen germination, seed set and fruit development using self compatible and obligate out crossing system. **CO7**: Study of ceistogamous flowers and. Their adaptations.

CO8: Also known and study of nuclear and cellular endosperm through dissections and staining.

CO9: Study of endospermic and non-endospermic seed.

CO10: Students knowledge seed dormancy and methods to break dormancy.

CO11: Students aware local Medicinal and Aromatic plants; Depending on the geographical location College/University select five medicinal and aromatic plants each from a garden, crop field or from the wild only if they are abundantly available

CO12: Students learn and study of live or herbarium specimens or other visual materials to become familiar with these resources.

CO13: Students also known Different Vegetable oil plants. Mustard, Groundnut, Soya bean, Coconut, Sunflower and Castor.

CO14: Students also known and study of Gums, Resins, Tannins and Dyes plants and perform tests to understand their chemical nature.

CO15: Field survey of a part of town or city to make the students aware of the diversity of plants in urban ecosystems.

CO16: Students aware and study soil moisture content, porosity, water holding capacity and bulk density of soil collected from varying depths at different locations.

CO17: Students estimate rate of carbon dioxide evolution from different soils using soda lime or alkali absorption method.

CO18: Students practically determine gross and net phytoplankton productivity by light and dark bottle method.

CO19: Students estimate practically the dissolved oxygen content in eutrophic and oligotrophic water samples by azide modification method.

CO20: Students aware and study environmental impact of a given developmental activity using checklist as an EIA method.

(**Lab Work) Laboratory exercise**

Contents: Plant Biotechnology and Plant Pathology -

CO1: Study of media for plants tissue culture

CO2: Students are able to isolate protoplast and determine its viability

CO3: Students will be able to conduct experiment on preparation of media for plant tissue culture.

CO4: Students are liable to perform experiment on embryo culture.

CO5: Students are liable to perform experiment on embryo culture.

CO6: Students are liable to perform experiment on callus culture.

CO7: Students are liable to perform experiment on anther culture.

CO8: Students are liable to perform experiment on ovary culture.

CO9: Students are liable to perform experiment on single cell culture culture.

CO10: Students are liable to perform experiment on protoplast fusion.

CO11: Students knowledge aware sterilization technique.

CO12: Students known working principle and uses of laboratory instruments in which use culture technique.

CO13: Study of symptoms sing antisera, serological tests, electron microscopy and ultratomy, PCR.

CO14: Isolation, purificationcaused by viruses, transmission, assay of viruses, physical properties, purification, method of rai, identification and host inoculation of phytopathogenic bacteria, staining methods, biochemical and serological characterization, isolation of plasmid and use of antibacterial chemicals/antibiotics.

CO15: Methods to prove Koch's postulates with biotroph and necrotroph pathogens, pure culture techniques, use of selective media to isolate pathogens.

CO16: Preservation of plant pathogens and disease specimens, use of haemocytometer, micrometer, centrifuge, pH meter, camera lucida. Microscopic techniques and staining methods.

CO17: Detailed study of symptoms and host parasite relationship of representative diseases of plantation crops.

CO18: Collection and dry preservation of diseased specimens of important crops.

CO19: Detailed study of symptoms and host pathogen interaction of important diseases of vegetable and spice crops.

CO20: Detailed study of symptoms and host parasite relationship of important diseases of above mentioned crops. Collection and dry preservation of diseased specimens of important crops.

FACULTY OUTCOMES OF DEPARTMENT OF BOTANY :

Application knowledge of science to different fields.

Application of science to problems to develops scientific temper.

Application of science to human development

Application of scientific investigation for development of scholary debate.

Application of plant and environment knowledge.

GOVT GHANSHYAM SINGH GUPT PG COLLEGE BALOD, DIST-BALOD (C.G.)

COURSE OUTCOME, PROGRAMME OUTCOME & PROGRAMME SPECIFIC OUTCOME (CO'S, PO'S & PSO'S)

Department of Chemistry

B.Sc(CHEMISTRY)

Year-First, Second, Third

OBJECTIVE OF THE PROGRAMME:

The qualification description for B.Sc. programme in Chemistry includes.

• Demonstration of a comprehensive knowledge based on concepts, principles and theories relating to chemistry that spans the traditional sub-disciplines (inorganic chemistry, organic chemistry, physical chemistry, analytical chemistry and biochemistry) as well as advanced and emerging topics.

• Demonstration of an ability to apply underlying concepts and principles outside the context in which they were first studied and in interdisciplinary scenarios.

• Acquisition of competence in the use of routine materials, techniques and practices of chemistry.

• Exhibition of skills required for conducting the documented laboratory procedures as well as well-developed skills for the gathering, evaluation, analysis and presentation of information, ideas, concepts and quantitative and/or qualitative data.

• Acquisition of skills in the operation of standard chemical instrumentation.

• Demonstration of skills in the use of safety data sheets, safe handling of chemical materials, considering their physical and chemical properties including any specific hazards associated with their use.

Development of awareness of the role of chemistry in contemporary societal and global issues, including areas such as sustainability and green chemistry.

• Development of the appreciation of the uses of chemistry in daily life.

• Development of competence in intellectual, practical and transferable skills (Communication skills, IT skills, Interpersonal skills) necessary for employment as a professional chemist

Programme Outcomes

Students will demonstrate an understanding of major concepts in all disciplines of chemistry. Students will employ critical thinking and the scientific method to design, carry out, record and analyse the results of chemical experiments and get an awareness of the impact of chemistry on the environment, society, and other cultures outside the scientific community.

1. Demonstrate, solve and an understanding of major concepts in all disciplines of chemistry.
2. Solve the problem and also think methodically, independently and draw a logical conclusion.
3. Employ critical thinking and the scientific knowledge to design, carry out, record and analyse the results of chemical reactions.
4. Create an awareness of the impact of chemistry on the environment, society, and development outside the scientific community.
5. Find out the green route for chemical reaction for sustainable development.
6. To inculcate the scientific temperament in the students and outside the scientific community.
7. Use modern techniques, decent equipment's.
8. The syllabi of the B.Sc. Chemistry course are discretely classified to give stepwise advancement of the

subject knowledge right through the three years of the term.

9.The practical exercises done in the laboratories impart the students the knowledge about various chemical reagents and reactions. Thereby, hone their skills of handling the corrosive, poisonous, explosive and carcinogenic chemicals making themselves employable in any kind of chemical industries. They are also trained about the adverse effects of the obnoxious chemicals and the first aid treatment.

Course Outcomes

1. B.Sc. Chemistry provides backbone in all the traditional branches of Physical, Inorganic and organic chemistry.
2. The experimental work will be continuing throughout the session to develop the theoretical knowledge and practical as well.
3. Graduates from this course will be better prepared to understand the new environment friendly systems and can understand the processes that the chemical industry is adopting.
4. The course has been designed to have insight in almost all the aspects of chemistry and to build a solid foundation in the subject to choose a career in industry or academics or research.
5. The syllabus very well designed and it covers the areas like water chemistry, consumer products-soaps, detergents, shampoos, skin preparations, polymer chemistry, drugs, industrially important chemicals used in Industry.
6. The employment areas for the B. Sc. Chemistry graduates include pharmaceutical industries, chemical manufactures, forensic science department, plastic industries, agro industries etc. apart from these they are also recruited in the field such as oil, gas and power sectors, defence services.
7. After completion of degree, students gained the theoretical as well as practical knowledge of handling chemicals.
8. The knowledge available opportunities related to chemistry in the government services through public service commission particularly in the field of food safety, health inspector, pharmacist etc**.** Afford a broad foundation in chemistry that stresses scientific reasoning and analytical problem solving with a molecular perspective.
9. Understand the importance of the elements in the periodic table including their physical and chemical nature and role in the daily life.
10.Understand the concept of chemistry to inter relate and interact to the other subject like mathematics, physics, biological science etc.
11. Learn the laboratory skills and safely to transfer and interpret knowledge entirely in the working environment.

Programme Specific Outcome

B.Sc. 1st year

PSO -01 COURSE TITLE: - (PAPER I) INORGANIC CHEMISTRY

Learning Objectives

1. To understand the shapes of different orbitals
2. To understand different principles for filling electrons.
3. To understand how to draw energy diagrams and calculate bond order.
4. To understand how to calculate lattice energy through Born Haber Cycle.
5. The students will be able to understand general trends in the chemistry behind p-block elements.
6. The students will be able to know the important compounds and important applications of compounds of boron and carbon.
7. The students will understand the biological significance of sodium, potassium, magnesium and calcium.
8. The students will be able to describe the salient features of alkali and alkaline earth metals
9. To understand the concept of chemical bonding

Learning Outcomes

1. Able to write electronic configuration of given atomic number.
2. Able to tell the name of orbitals by recognizing shapes of orbitals.
3. Able to calculate bond order of different molecules.
4. Able to draw MO diagrams of different molecules.
5. Able to calculate effective nuclear charge using Slaters Rule.
6. The students will be able to design and carry out scientific experiments as well as accurately record and analyse the results of experiments.
7. Students will be able to explain why chemistry is an integral activity for addressing social, economic and environmental problems.
8. The students will be able to describe the periodic table as a list of elements arranged so as to demonstrate trends in their physical and chemical properties.
9. The students will able to state the principle resemblances of elements within each main group in particular alkali metals, alkaline earth metals, halogens and noble gases.

PSO -02 COURSE TITLE :- (PAPER II) ORGANIC CHEMISTRY

Learning Objective

1. To understand the core concepts of organic chemistry i.e. resonance, hyperconjugation, inductive effect etc. and their application.
2. To study about the isomerism and types of isomerism.

3. To understand optical isomerism, geometric isomerism and conformational isomerism.
4. To acquire basic knowledge of reactive intermediates and mechanism of organic reactions.
5. To study about nomenclature, synthesis, isomerism and physical properties of alkanes and cycloalkanes.
6. To identify addition reactions for alkenes and alkynes.
7. To understand the nature of double and triple bonds for addition reactions.
8. To identify the difference between dienes and alkenes.
9. To understand the mechanism of attack of electrophiles and nucleophiles.
10. To understand the preparation methods for alkenes, alkynes, alkyl halides.

Learning Outcomes

Upon successful completion of this course, the student will be able to

1. Recognize and draw constitutional isomers, stereoisomers, including enantiomers and diastereomers, racemic mixture and meso compounds.
2. Know the fundamental principles of organic chemistry and predict outcomes and derive mechanism of various types of organic reactions.
3. Understand various types of reactive intermediates and factors affecting their stability.
4. Understand the nomenclature, synthesis, isomerism and physical properties of alkanes and cycloalkanes.
5. Recognize the basic practical skills for the synthesis of alkenes, alkynes, alkyl halides.
6. Able to predict the reactivity of organic compound from its structure.
7. Able to understand the rules for naming different organic compounds.
8. Able to recognize mechanism for given chemical reaction.

PSO -03 COURSE TITLE: - (PAPER III) PHYSICAL CHEMISTRY

Learning Objective

1. Students will be able to describe the concept of pressure from a macroscopic and microscopic perspective.
2. Students will describe the relationship between partial pressures and total pressure as described in Dalton's Law of partial pressure.
3. Students will be able to explain the quantitative relationship between T,V,n & P as described by kinetic molecular theory.
4. To describe a reaction rate in terms of a change in concentration divided by a change in time (at constant volume) and a general form of a (differential) rate law.
5. To write a general form of the rate law for any chemical reaction and define the order of a chemical reaction.

6. To determine integrated rate expression for zero order, first order, second and third order reaction and their respective half-life period expressions.
7. To study the various factors which affect the rate of a chemical reaction such as concentration, temperature, solvent, catalyst etc. And theories of chemical kinetics.

Learning Outcomes

1. Students should be able to describe the characteristic of the three states of matter.
2. Students should be able to describe the different physical properties of each state of matter.
3. Students should be able to determine the difference between solids, liquids and gases.
4. Students will be able to define what matter is and where you can find it.
5. Students will be able to give examples of solids, liquids and gases.
6. Mention and explain various methods for the determination of transport number.
7. Derive integrated rate expressions for zero order, first order, second order and third order reaction.
8. Understand theories of reaction kinetics and differentiate them.

B.Sc. Second year

PSO -04 COURSE TITLE :- (PAPER I)INORGANIC CHEMISTRY

Learning Objective

1. In order to study transition metals to understand the trends in properties and reactivity of the d-block elements. and to explain the typical physical and chemical properties of the transition metals.

3. To identify simple compound classes for transition metals and describe their chemical properties.

To understand the nomenclature, classification, properties and preparation of coordination compounds

4. To make the students understand that solutions which have water as a solvent are called aqueous solutions and those with solvent other than water are called non-aqueous solutions.

5.To study lanthanide and actinides elements

6.To understand the concept of acid and base

Learning Outcomes

1. The students will be able to explain the fundamental concepts in coordination chemistry of transition metals.
2. The Students should be familiar with the basic knowledge of the non-aqueous solutions and applications of non-aqueous solvents in analytical chemistry.
3. Students will be able to describe different quantitative methods of analysis of organic and inorganic substances.
4. The students will be able to understand the various uses of lanthanides elements in flash light powders and in dying cotton.

5. The students will be able to understand about recently lanthanides have been used in lasers.
6. The students will be able to know about actinides elements are used as nuclear fuels for various Purposes.

PSO -05 COURSE TITLE :- (PAPER II) ORGANIC CHEMISTRY

Learning Objectives

1. To understand the methods for preparation of alcohols.
2. To understand the different classes of alcohols.
3. To understand the structure of carboxylic acid and their derivatives.
4. To understand the reactivity of different carboxylic acid derivatives.
5. To understand the chemical reactions of phenols.
6. To understand how to name different aldehydes and ketones.
7. To understand the reactivity of different carbonyl compounds towards nucleophilic reaction.
8. To understand how to write the products of addition reaction to carbonyl compounds.
9. To understand to differentiate between primary, secondary and tertiary amines.

Learning Outcomes

1. Able to recognize structures of acid halides, esters, amides, acid anhydrides.
2. Able to convert given name of alcohol to structure.
3. Able to write the order of reactivity of different carboxylic acid derivatives.
4. Able to describe different classes of alcohols.
5. Able to write down structure of phenol and phenoxide ion.
6. Students are able to recognize mechanism of different reactions related to carbonyl compounds.
7. Students are able to differentiate between given different amines.
8. Able to recognize different functional groups by given only graph of peaks.
9. Able to write mechanism of different condensation reaction.
10. Able to recognize the reactivity of substituted aromatic amines.

PSO -06 COURSE TITLE :- (PAPER III) Physical chemistry

Learning Objective

1. To understand thermodynamic terms: system, surrounding etc. Types of systems, intensive and extensive properties. State and path functions and their differentials.

2. To understand Heat capacity, heat capacities at constant volume and pressure and their relationship. Joule's law

3. To understand the concept of equilibrium constant, free energy, chemical potential

4. To understand the Nernst distribution law – its thermodynamic derivation, modification of distribution law when solute undergoes dissociation, association and chemical combination. Applications of distribution law

Learning Outcomes

After the completion of the course, Students will be able to

1. Recognize the basic concepts of thermodynamics
2. Able to predict the reversible and irreversible reaction
3. Able to understand the physical significance of third law of thermodynamics
4. Able to recognize the reaction of electrochemical cells and types
5. Able to predict the energy change in heat capacities at constant volume and pressure and their relationship.
6. Able to derive relationship between modification of distribution law when solute undergoes dissociation

B.Sc. FINAL YEAR

PSO -07 COURSE TITLE: - (PAPER I) INORGANIC CHEMISTRY

Learning Objective

1. To understand the concepts of metal ligand bonding in transition complex compounds, thermodynamics and kinetic aspects of metal complexes.
2. To understand the chemistry of organometallic compounds, homogenous hydrogenation and carbonyls, the bioinorganic chemistry of haemoglobin, myoglobin etc.
3. To understand the role of metal ions in biological system, oxygen transport.
4. To understand the concept of Hard and soft acids and bases.
5. To understand the uses of inorganic polymers.

Learning Outcomes

After the completion of the course, Students will be able to

1. Recognize the bonding in transition compounds by VBT and CFST theories.
2. Able to determine the properties and preparations of Li, Al, Hg, Sn, Ti etc. metal compounds.
3. Able to recognize the biological reaction alkali and alkaline earth metals, nitrogen fixation, haemoglobin and myoglobin.
4. Students are able to describe role of different metal ions in biological system.
5. Students are able to recognize role of porphyrin ring in haemoglobin.
6. Students are able to count total of electrons in organometallic compound.

7. Students come to know about uses of different inorganic polymers in making of tyres, toys, plastics bags.
8. Students are able to name different organometallic compounds

PSO -08 COURSE TITLE :- (PAPER II) ORGANIC CHEMISTRY

Learning Objective

1. In order to study the NMR spectroscopy to understand the important role of nuclear magnetic resonance spectroscopy in the study of the structures of organic compounds.
2. To develop an understanding of the significance of the number, positions, intensities and splitting of signals in nuclear magnetic resonance spectra.
3. To be able to assign structures to simple molecules on the basis of nuclear magnetic resonance spectra.
4. In order to study the infra-red spectroscopy and uv -visible spectroscopy to understand the important in the study of compound
5. In order to study carbohydrates will develop the skills to recognize and draw particular carbohydrate structures.
6. To know general structural elements of cyclic monosaccharide and disaccharides and their implications for structure and function.
7. The main aim of Heterocyclic compounds study is to develop novel, efficient, convenient, selective and environmentally benign synthetic methods in organic chemistry.
8. The objective of the present study of heterocyclic compounds is to develop green methodologies for the synthesis of nitrogen containing heterocyclic.
9. The course aims to provide an advanced understanding of the core principles and topics of biochemistry and their experimental basis.

Learning outcomes

1. Students are skilled in probing solving, critical thinking and analytical reasoning.
2. After completion of course students should have the ability to identify organic compounds by analysis and interpretation of spectral data.
3. Students should have the ability to explain common terms in NMR spectroscopy such as chemical shift, coupling constant and anisotropy and describe how they are affected by molecular structure.
4. The students should be able to demonstrate advanced knowledge and understanding in aspect of protein structure.
5. The students will be able to introduce about basic chemistry of the heterocyclic.
6. The students will develop fundamental theoretical understanding of heterocyclic chemistry.

7. The students will be able to fully comprehend the chemistry of many heterocyclic products, carbohydrate, amino acids, peptides, proteins and lipids in use such as drugs and food.

PSO -09 COURSE TITLE: - (PAPER III) PHYSICAL CHEMISTRY

LEARNING OBJECTIVES

1. To understand the concept of black body radiations.
2. To understand the concept of wave functions.
3. To understand different properties of molecular structure.
4. To understand the basic features of spectroscopy.
5. To understand the Harmonic Oscillator.
6. To understand the transitions through electronic spectroscopy

LEARNING OUTCOMES

1. Able to recognize different regions for different spectroscopy. Able to explain the concept of Electromagnetic Waves.
2. Able to explain the concept use in Black Body Radiation.
3. Able to calculate dipole moment in given molecules.
4. Able to use concept of polarizability
5. Recognize the basic rules of electronic spectroscopy.

Name of the Program: - B.A. & M.A. in Economics

Program Specific Outcomes

After successful completion of the course the students would be able to:

1. Understand the key concept of economics, theories and models.
2. Comprehend current perspectives and issue in major areas of the Indian economy and World economy.
3. Have a comprehensive knowledge of the socio-economic issues and make a critical appraisalof policy measures addressing their effectiveness.
4. Understand the relevance and application of economic theories to contemporary economicissues.
5. Prepare for advanced studies leading to M.Phil. and Ph. D in economics.
6. Equip themselves to be trained quality teachers, researches and policy makers.

Course Outcomes

B.A. - I Subject: Economics

Paper-I: Micro Economics (Code: 0111)

Upon successful completion of this Paper the student will be able to:

1. Factors affecting consumer demand.
2. Production and cost matrix in output determination.
3. Various market forms and determination of prices in these markets.
4. How factor prices are determined
5. Factors of welfare as conceptualized by economist.

Paper-II: Indian Economy (Code: 0112)

Upon successful completion of this Paper the student will be able to:

1. How Indian economy is changing toward a market based economy.
2. What are basic features of Indian Economy?
3. Planning in India and economic reform introduced and rationale behind reform.
4. Role of Industry and various policy decisions to induce industrial revolution in India.
5. Importance of foreign sector and rationale behind export promotion schemes.

B.A. - II Subject:
Economics

Paper-I: Macro Economics (Code: 0181)

Upon successful completion of this Paper the student will be able to:

1. National income and understand how it is calculated.

2. Factors responsible for employment determination.

3. Consumption and investment and their importance in national income determination.

4. Trade cycles and various factors responsible for trade cycle.

5. Export- Import and its related concepts

6. International institutions for trade and Economics.

Paper-II: Money Banking and Public Finance (Code: 0182)

Upon successful completion of this Paper the student will be able to:

1. How value of money changes.

2. Inflation and measures to control inflation.

3. Banks, their role in economy and Central Banking System.

4. State and effect of its intervention in the economy.

5. Sources of various revenues to state.

6. Public debt and economics effects.

B.A. - III Subject: Economics

Paper-I: Development and Environmental Economics (Code: 0242)

Upon successful completion of this Paper the student will be able to understand:

1. Economic well being of various nations; Poverty and emerging trends to measure poverty and deprivation.

2. Population and Economy linkage, various perspective developments.

3. Environment, importance of study of Environment Economy and sustainable development.

4. Various socio- economic issues affecting mankind.

Paper-II: Statistical Methods (Code: 0243)

Upon successful completion of this Paper the student will be able to:

1. Statistics, data collection

2. Measurement of representative values.

3. Easement of various representative values.

4. Inter-relationship between social and economic variables.

5. Construction of Index numbers and Measurement of trend

M.A. - Ist Sem Subject: Economics

Paper-I: Micro Economics

Upon successful completion of this Paper the student will be able to:

1. Define Demand Theories Apply elasticity on price demand measurement.

2. Uses of various methods to implore consumer behaviors.

3. Impact of Time pattern on production process.
4. Cost & Revenue analysis in various market forms.

Paper-II: Macro Economics

Upon successful completion of this Paper the student will be able to:

1. Understand the Flow of National Income.

2. Various assessment of national income.

3. factors affecting employment and income.

4. Consumption & Investment.

5. Money and its supply and demand.

Paper-III:

Upon successful completion of this Paper the student will be able to:

1. To measure Skewers in data.

2. Measure relationship between economic variables.

3. Interdependence and permutation between various factors.

4. How to fine values through Extrapolation and Interpolation.

5. Time based variables and importance and construction of Index Number.

Paper-IV: Indian Economy

Upon successful completion of this Paper the student will be able to:

1. Component and structure of National Income.

2. Demographic features of India.

3. Agriculture and its importance in Indian economy.

4. Industrialization and initiative taken for industrialization of India.

5. Regional imbalance.

Paper-V: Industrial Economics

Upon successful completion of this Paper the student will be able to:

1. Firm Industry and factors affecting their location.

2. Factors affecting productivity & capacity utilization and profitability of a firm.

3. Funding of Industry and firm.

4. Labor related issues.

5. Some big industries.

M.A. - IInd Sem.
Subject: Economics

Paper-I: Micro Economics Analysis

Upon successful completion of this Paper the student will be able to:

1. How a firm takes decisions to maximize its objective.

2. Determination of returns to various factors of production.

3. Welfare economics imply value judgment and assess principles of welfare.

4. Analyze economy as a whole.

5. Operational problem solution.

Paper-II: Macro Economics Analysis

Upon successful completion of this Paper the student will be able to:

1. Understand price rise and employment inflation trade off.

2. Growth dilemmas unstable & unsteady growth.

3. Monetary policy for stability and growth.

4. Govt.'s policy and its economic implications.

5. Complexities of various monetary and fiscal measures.

Paper-III: Research Methodology and Computer Application

Upon successful completion of this Paper the student will be able to:
1. Research designs Methods to carry out researches.

2. Sampling Data collection to study and understand a problem.

3. Presentation of data.

4. Formulation of hypothesis and testing of hypothesis.

5. Uses of computer for Statistical Analysis.

Paper-IV: Indian Economy Policy

Upon successful completion of this Paper the student will be able to:

1. Uses of planning process for growth and desired changes in Indian Economy.

2. Problem of poverty and measurs taken to remove poverty and employment generation policies.

3. Working Finance Commissions to foster centre state relation.

4. Trade Reforms and contribution of export - import in Indian economy.

5. Budget and its importance international economic associations and their importance for India.

Paper-V: Labour Economics

Upon successful completion of this Paper the student will be able to:

1. Labour Market Interplay of forces of Labour market.

2. Employment, wage and wage determinations, role of bargaining power.

3. Formation of trade union, utility and functioning of trade union.

4. Govt. intervention in labour market.

M.A. - IIIrd Sem

Subject: Economics

Paper-I: Economics of Growth

Upon successful completion of this Paper the student will be able to:

1. Essence of economic growth, impediments to growth.
2. Measurements of Growth, Alternative discourse on Growth.

3. Perspectives of various economists on development and their formulation for speedy development.

4. Contraction in strategies of development.

Paper-II: International Trade

Upon successful completion of this Paper the student will be able to:

1. Importance of trade in economy of a nation.

2. Why does different nation trade.

3. What are conditions of trade and how these terms for trading determined.

4. Affects of trade on various macro parameters of Economy.

5. Balance of payment and measure to bring about desirable changes in international payment position of a country.

6. Determination of external value of domestic currency.

Paper-III: Public Finance

Upon successful completion of this Paper the student will be able to:

1. Taxation importance of taxation for Government.

2. Impact of taxes on production, consumption and distribution.

3. Changing pattern of taxation in India.

4. Different forms of taxation

5. Public expenditure and Public debt and its impact on economy.

6. Process of budget making.

Paper-IV: Environment Economics

Upon successful completion of this Paper the student will be able to:

1. Need to study Environment as part of Grand Economics Theory.
2. Environment as a factor in general welfare.

3. Economic welfare and its measurements.

4. Impact of Environment influencing activities on market forces of demand and supply.

5. Price calculation when Environmental influence affects market forces.

Paper-V: Demography

Upon successful completion of this Paper the student will be able to:

1. Factors governing population changes in population.

2. Role of Economic forces in shaping population trend of a nation.

3. Role of population in Economic parameters of a nation.

4. Factor responsible for birth rate, death rate, infant mortality rate.

5. Economic and demographic inter linkages.

M.A. - IVth Sem. Subject: Economics

Paper-I: Economics of Development and Planning

Upon successful completion of this Paper the student will be able to:

1. Process of Planning, Planning in India and achievements of Indian Five Year Plan.

2. Various theoretical perspectives on strategies to remove back wardress.

3. Role of Govt. and Banking System in development of a Nation.

4. International comparison on two bases of poverty, prosperity and happiness.

5. Some important macro issues and their solution.

Paper-II: International Economics

Upon successful completion of this Paper the student will be able to:

1. Role of bilateral and multilateral integration.

2. Various international cooperative formations and their compact on different economies.
3. International capital movement, its advantages and disadvantages.

4. Various international Institutions for general economic improvement of participating nations.

5. Impact analysis of structural reforms of 1991 on the foreign trade of India.

Paper-III: Public Economics

Upon successful completion of this Paper the student will be able to:

1. Federal system of India.

2. Finances of States and Centre.

3. Constitutional provision to distribute resources between center and states and among states.

4. Idea of fiscal federalism.

5. Analysis of budgets of center and Chhattisgarh.

6. Fiscal analysis of Chhattisgarh.

Paper-IV: Economics of Social Sector

Upon successful completion of this Paper the student will be able to:

1. Pollution, impact analysis of Pollution and causes of Pollution.

2. Various laws to protect environment.

3. Uses of various natural resources and their implications and consequences.

4. Education as an important economic variable and outcome.

5. Health as an important economic variable and outcome.

Paper-V: VIVA-VOCE

Upon successful completion of this Paper the student will be able to:

Students are evaluated for their comprehensive ability to understand and explain two various economic facts of life through personal interface.

GOVT GHANSHYAM SINGH GUPT PG COLLEGE BALOD, DIST-BALOD (C.G.)

Department of History

B.A.-History

Program Outcome

After completion of BA in History a student will develop:

1. Understand and evaluate the historical development of variousnations, societies and culture.
2. Understand Indian and world history with scientific, critical andrational approach.
3. Prepare themselves for career option in fields like Civil services,teaching.

Program Specific outcome

Name of the program - B.A

There are different score in different areas like sericulture departmentAs demonstrator, care taker pf the forum trainer for others etc.

a) Archaeologist: - Archaeological swivey of India with private firmsrelated to Archaeology.

b) Historian: - with so much debate over the authenticity of historicalbooks, there is over increasing demand for Historians.

c) Public Service :- for History graduate, the option of public servicelike UPSC, CGPSC are open.

d) Teacher:- After B.A in History one can always find employmentas a History teacher.

e) Social Worker:- NGO and social wall fare organization alsoemploy History graduate.

f) Writer subject export :- Now a days a lot of publishing houses seeksubject matter expertsive publication of school text book od supplementary reading materials.

g) Travel and Tourism Export: - with an extensive knowledge of History Historical monuments, History graduate can work as a travelexport for tourist spot of Historical importance.

B.A.1 (History)

Paper-1 (Paper Code-)

Subject- Ancient Indian History, Culture and ArchaeologyProgram

Outcome-

a) Students are able to understand the genesis of History and Development of History writing in different country as well as in India.

b) Source of ancient India Civilization like and Aryan.

c) Political and religious changes in 6century B.C Mauryan empire etc.and student.

d) From this segment of the syllabus student aware about the History ofancient India from 1206 AD.

B.A -1 (History)
Paper-2 (Paper code-)

Subject: - World History (1453-1789) Program Outcome-

a) This paper deal with political, Economic and Social changes ofEuropean countries like France, Spain America Russia etc.

b) Narrate the enlightened despotism in Europe especially in France,Prussia and America.

c) Discus the reform of peter the Great and Catherine -2 of Russia.

d) Discus the causes for the American War of independence.

B.A.- 2(History)

Paper-1 (Paper Code-)

Subject:- medium History of India -1206 AD to 1769 AD

Program outcome-

a) Understand the foundation of the Delhi Sultanate and the SultanateAdministration.

b) From this paper student can learn about formation,expansion and consolidation of Mughal Empire.

c) Explain the administration and art and architecture of Mughals.

d) Recognize the Socio, Economic and Religions condition underVijayanagar Empire.

e) Analysis the rise of the Marathas and the contribution Shivaji.

B.A-2 (History)

Paper-2 (paper Code)

Subject – World History 1890 AD to 1960 AD.

Program outcome -

1) This paper deal with changes of Europe oftoe the France Revolutionand political changes in the countries like Russia, Italy and Persia.

2) Freedom struggle of Greece and the German War.

B.A -3 (History)

Paper-1 (paper Code-) Subject :-

Modern History of India-(1761-1950)Program Outcome-

a) Discus the advent of Europeans and their administration.

b) Evaluate the Anglo-Mysore Wars and Anglo Sikh Wars.

c) Retire the permanent revenge system and Lord Ripens local self-Government.

d) Understand about the Socio-religious reform movement in 19thcentury.

B.A-3 (History)

Paper-2 (paper Code-)

Subject- World History of (1871-1945 AD)

program outcome-

1) This paper gives an idea about the Cold War and its consequencesproblem of third world war this foundation and whole of UNO.

2) This paper gives an idea about the wise of nationalism in Europe,consequences and results of 1st and 2nd world war.

3) The Syllabus covers changes of China from its opening to outsideworld to the foundation of the Republic.

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हिन्दी विभाग

एम.ए. हिन्दी – प्रथम सेमेस्टर

प्रथम प्रश्न पत्र – हिन्दी साहित्य का इतिहास

इतिहास ऐतिहासिक घटनाओं और वृतान्तो का लेखा–जोखा ही नही प्रस्तुत करता, इतिहास का निमार्ण भी करता हैं। इतिहास के स्वरूप को समझना सरल कार्य नहीं। इतिहास से मनुष्य का संबन्ध पुराना हैं। हमारा, सरकार, हमारा व्यवहार, हमारी संस्कृति, हमारी नीति अतीत से अनुशासित एक अनवरत धारा है। अतीत के परिपेक्षय में वर्तमान को समझ सकतें है। अतः विद्यार्थीयों के लिए यह सर्वाधिक उपयोंगी पाठ्यक्रम हैं।

द्वितीय प्रश्न पत्र– प्राचीन एवं मध्यकालीन काव्य

प्राचीन एवं मध्यकालीन काव्य में समाज को दिशा निर्देश देने के साथ धार्मिक एवं ऐतिहासिक तथ्यों से लोंगो को अवगत करना साहित्य का मुख्य उददेश्य है। काव्य में भक्तिकाल जहां लोकजागरण को स्वर देने वाला है, वही रीतिकाल अपने लौकिक– श्रृगारिक परिदृश्य में तत्कालीन, सामाजिक, सांस्कृतिक, राजनीतिक स्थितियों को बहुत अभिव्यंजित करता हैं।

तृतीय प्रश्न पत्र – द्विवेदीयुगीन एवं छायावादी काव्य

साहित्य समाज का सहचर होता है समाज आते बदलाव का साक्षी होता है। साहित्य सिर्फ समुन्नत समाज की कल्पना नही करता बल्कि सर्वागीण विकास जिसमे समता, स्वतंन्त्रता और बंधुता का भाव हो। साहित्य के आधुनिकता, लोक व कुलीन इतिहास व वर्तमान सभी का ध्यान में रखकर चलता है। तथ्य और सत्य दोनों की अराधना साहित्य का विषय होता है।साहित्य के चिंतन मनन कल्याण के बीच छिपे है इन समस्त स्थितियों से विद्यार्थियों को अवगत कराना है। ताकि उनमें चेतना का संचार हो, उनमें लेखन की भावना जागृत हों।

चतुर्थ प्रश्न पत्र – हिन्दी गद्य साहित्य

आधुनिक काव्य गद्य की विधाओं पर आश्रित है यह मानव के मन और मस्तिष्क में अनक प्रयोजनो को प्रस्तुत करता है। उन्ही भावनाओं के आधार पर काव्य का सृजन होता है। इसमें चिन्तन मनन और रागात्मकता का प्रस्तुतीकरण कौशलपूर्ण ढंग से होता है।प्राकृतिक परिवेश मे काव्य वैभव का भाव एवं कला पक्ष इसमें गद्य साहित्य की विविध विधाओं मे अत्यन्त विशाल बन गया है। प्राकृतिक परिवेश में काव्य वैभव का भाव एवं कला पक्ष इसमें गद्य साहित्य की विवध विधाओं में अत्यन्त विशाल बन गया है। हमारी सांस्कृतिक चेतना को इसने अत्यन्त प्रभावित किया है। साहित्य के विद्यार्थी इससे लाभन्वित होते है।

एम. ए. हिन्दी – द्वितीय सेमेस्टर

पंचम प्रश्न पत्र – आधुनिक काव्य–2 प्रगतिवाद, प्रयोगवाद, नई कविता एवं समकालीन कविता

साहित्य एक सामाजिक संस्था है इसलिए समाज में परिवर्तन का अर्थ है साहित्य के स्वरूप और दृष्टिकोण मे परिवर्तन केवल हिन्दी कविता पर ध्यान दे तो उसमें वीरगाथा काल, भाक्तिकाल, रीतिकाल, भारतेन्दुयुग,द्विवेदी युग, छायावाद, प्रगतिवाद, नई कविता एवं समकालिन कविता जैसी विविध– काव्य दृष्टियां परिलक्षित होती है। जीवनानुभूतियां और उन पर पडने वाले तत्कालिक दबावों को कारगर ढंग से व्यक्त करने के लिए कविता आवश्यक है। अतः यह पाठ्यक्रम विद्यार्थियों के लिए उपयोगी है।

षष्ठ प्रश्न पत्र – आधुनिक गद्य साहित्य – उन्यास, निबंध एवं कहानी

छात्राओं में नाटक एवं एकांकी के रसास्वाद की दृष्टि विकसित हुई। इनमें हिन्दी नाटक का स्वरूप, तत्व आदि मानदंडो के आधार पर समिक्षा की क्षमता निर्मित हुई। उनमे हिन्दी के प्रतिनिधि उपन्यास, निबंध, कहानीकारों का परिचय प्राप्त हुआ।उनकी कहानी एवं नाटको में निहित तत्वों से अवगत हुए। अच्छाइयों एवं बुराइयों को समझने की उनमें चेतना जागृत हुई।

सप्तम प्रश्न पत्र – उत्तर मध्यकाल से आधुनिक काल तक

छात्राओं मे हिन्दी साहित्य के विकास क्रम की समझ पैदा करना। उत्तर मध्य काल की परिस्थितयों एवं प्रवृत्तियों परिचित कराना। स्वाधीनता आंदोलन की पृष्टभूमि में साहित्य की भूमिका को परिलक्षित करना । गद्य लेखन के पादुर्भाव एवं महत्व से भी छात्राओं को परिचित कराना इस पठन का उददेश्य है। इस पाठ के

माध्यम से विद्यार्थी आधुनिका काल के साहित्य की प्रमुख रचनाओं एवं प्रवृत्तियों जान एवं समझ सकेंगे।

अष्टम प्रश्न पत्र – मध्यकालीन काव्य

विद्यार्थियों को मध्ययुग के कवियों के योगदान का परिचय प्राप्त हुआ। विद्यार्थियों मे साहित्यिक कृतियों के शिल्प एवं सौन्दर्य को देखने की दृष्टि विकसित होती है। इनमें संत एवं भक्तो के काव्य सौन्दर्य की जानकारी प्राप्त होती है छात्राओ को हिन्दी साहित्य के प्रतिनिधि रचनाकारों का महत्व प्रदेय, प्रभाव आदि का ज्ञान प्राप्त हुआ।

एम. ए. हिन्दी – तृतीय सेमेस्टर

प्रथम प्रश्न पत्र – साहित्य के सिद्वान्त तथा आलोचना शास्त्र

भारतीय काव्यशास्त्रीय आचार्य हित चिंतन के पक्षधर रहे है। साहित्य मानवीय मूल्यों की स्थापना व प्रतिष्ठा करने का बेजोड़ माध्यम है। आज इंटरनेट व आनलाईन तकनीकि के माध्यम से छद्म सतही प्रेम के दौर में साहित्य ही तो बचा है जो मानवीय प्रेंमवस्तु को प्रस्तुत करता है मनुष्य के मनचेतना में तर्क वितर्क गुणो व अवगुणो की विवेचना शक्ति का विकाश हुआ।

द्वितीय प्रश्न पत्र – भाषा विज्ञान

विद्यार्थियों को भाषा विज्ञान के माध्यम से हिन्दी भाषा के व्यवस्थित और यथोचित प्रयोग का ज्ञान प्राप्त कराना। छात्राओं में भाषा विज्ञान के वैज्ञानिक अध्ययन की दृष्टि से विश्व में फैली विभिन्न भाषाओं का तुलनात्मक, ऐतिहासिक कालक्रमनुसार अध्ययन कराना अददेश्य है। जिससे विद्यार्थियों को विविध रूपो का ज्ञान प्राप्त हो सकें। विद्यार्थियों को भाषाके स्वरूप परिभाषा और विशेंषताओं की जानकारी प्राप्त कराना इसका उददेश्य है।

तृतीय प्रश्न पत्र – कामकाजी हिन्दी और पत्रकारिता

मानव की सामाजिक आवश्यकताओं और जीवन में भाषा का विशेष महत्व है। कामकाजी हिन्दी में राजभाषा का विशेष प्रयोजन है। ज्ञान–विज्ञान के क्षेत्र में ज्ञानर्वधक सामग्री का प्रयोग किया जा सकता है। शासकीय एवं अशासकीय कार्यों की भाषा संबंधित शब्दावली का सुन्दर प्रयोग करके इसे सरल बनाया जा सकता है। स्नातकोत्तर के विद्यार्थियों के लिए यह पाठ्यक्रम उपयोगी व सार्थक है।

चतुर्थ प्रश्न पत्र – भारतीय साहित्य

मनुष्य विविध देशकाल में भाषा, साहित्य और संस्कृति का सृजन और विकास करना आाया है जिसमें अनेक प्रकार की विविधताएं विभिन्नताएं और समानता पाई जाती है, इन भिन्नताओं और समानताओं का अध्ययन आवश्यक है। विश्व साहित्य में जो कुछ भी श्रेष्ठतम अध्ययन मनन और प्रचार करना चाहिए ताकि प्राणवान और सत्य विचारों की धारा प्रवाहित की जा सकें। इसलिए पाठ्क्रम उपयोगी है।

एम. ए. हिन्दी – चतुर्थ सेमेस्टर सेमेस्टर

प्रथम प्रश्न पत्र – हिन्दी आलोचना तथा समीक्षा शास्त्र

हिन्दी आलोचना के अंतर्गत शास्त्रीय, व्यक्तिगत, ऐतिहासिक, प्रभाववादी, समाज की मनोविश्लेषणवादी तुलनात्मक काव्यधाराओं का वर्णन समाहित है जो हिन्दी आलोचना का औचित्य प्रदर्शित करता है। हिन्दी आलोचना तथा समीक्षाशास्त्र के अध्ययन से विद्यार्थियों को समझने व परखने का अवार मिलता है। जिससे सामाजिक और सांस्कृतिक परिवेश को समझने में विद्यार्थियों को सहायता मिलती है।

द्वितीय प्रश्न पत्र – हिन्दी भाषा

लोक मानस भाषा का व्यवहार अपनी जरूरतों के मुताबिक प्रयोग करता है। संविधान में हिन्दी भाषा को राजभाषा का दर्जा दिया गया है। कोई भी भाषा जनता के जितने करीब होती है। उनमें जनभाषा बनने की की उतनी ही सामर्थ्य होती है। भाषा का विकास जनता की राष्ट्रीय भावना के विकास का प्रतीक है। अतः यह पाठ्यक्रम विद्यार्थियों के विकास में बहुत उपयोगी होगा।

तृतीय प्रश्न पत्र – लेखन एवं अनुवाद

आज के युग में मीडिया लेखन का अत्यधिक महत्व है। मीडिया के माध्यम से देश विदेश में होने वाली घटनाओं, क्रियाकलापों एवं गतिविधियों की जानकारी शीघ्र प्राप्त होती है। ज्ञान विज्ञान तकनीकि, अनुसंधान, सामाजिक, आर्थिक, धार्मिक, सांस्कृतिक, राजनीतिक समस्त क्षेत्रों में घटित होने वाली समस्त प्रकार की जानकारी मीडिया के माध्यम से विद्यार्थियों को प्राप्त होती है। उनमें चेतना जागृत होती है। यह पाठ्यक्रम छात्राओं के लिए उपयोगी है।

चतुर्थ प्रश्न पत्र – छत्तीसगढ़ी भाषा

जनपदीय भाषा एवं साहित्य के माध्यम से छात्राओं को छत्तीसगढ़ की गौरव गाथा, ऐतिहासिक, पौराणिकता का ज्ञान कराना है। छत्तीसगढ़ी साहित्य की सामाजिक, धार्मिक, सांस्कृतिक, गतिविधियों का जीवंत दस्तावेज है। जनपदीय भाषा साहित्य के माध्यम से छत्तीसगढ़ी भाषा की विकास यात्रा का विस्तृत ज्ञान कराता है। विद्यार्थी छत्तीसगढ़ी साहित्य एवं साहित्यकारों का अध्ययन कर यहां की रीति–रिवाज, रहन–सहन, खान–पान, संस्कृति का ज्ञान प्राप्त कराता है।

GOVT GHANSHYAM SINGH GUPT PG COLLEGE BALOD, DIST-BALOD (C.G.)

DEPARTMENT OF HOME SCIENCE
BA (Home Science)
Objective of Program

- Home Science is both Science and Social science are related multi disciplinary field of Study Programme has been designed to integrate its application of science and humanities to create a cadre of home scientists to improve the quality of life of individuals, family, community and nation.
- Home science program practical oriented and helps to develop skills to empower the cadre required towards innovations entrepreneurship along with professional and employable skills.
- Home science is a course encompassing variety of subjects with the result it covers all the benches of home science namely food science & Nutrition.
- Human development and Resource management and Textiles and clothiers

    1. To impact the fundamental knowledge in all major domains of Home science.
    2. To develop competency in application of knowledge in different settings ie family, community and workplace.
    3. To impact and develop skills for professional life.
    4. Foster research and development, teaching, government and public service and entrepreneurship.

- The curriculum envisages to cater to the developmental trends in higher education incorporating multidisciplinary skills, professional and soft skill such as team work, communication skills, leadership skills, time management skills and inculcate human values, professional ethics and the spirit of innovation entrepreneurship and critical thinker among student.
- Curriculum aims to equip the students with competencies like problem solving analytical reasoning and moral and ethical awareness.

Programme outcome in Home Science

- Deliver quality education through learning while doing.
- Instant both generic and subject specific skills to succeed in the employment market.
- Develop resourcefulness and competence to leader service to families, communities and the national at large.
- Promote research innovation and development following all disciplines in Home science.
- Appreciate and benefit from the symbiotic relationship among the five core discipline of Home science. Resource Management, food and nutrition textiles and clothing, human development and extension.

Course Outcome

- Home Science subject offers

    1. All around development of the personalities of the members in home and family.
    2. Preparation for careers.

- The overall objectives of the learning outcomes based curricular framework are

1. Enable prospective students, parents, employees and other understand the nature and level of learning outcomes knowledge, skills, attitudes and values or attributes a graduate in a programme should be capable of demonstrating on successful completion of the programme.
2. Maintain national standard and international comparability of learning outcomes and academe standard to ensure global competitiveness and to facilities student mobility.
3. Provide higher education institution an importance part of reference for designing teaching learning strategies ass.

Program Specific Outcomes

BA-I Home Science

Paper-1

Anatomy Physiology & Hygiene

- This paper has been structured to provide information about the anatomy and the functioning of human body.
- It proposes to explore the students to personal, social, environmental and industrial Hygiene.
- Deals with importance and purification of Air and water.
- Focus on first aid Home Nursing.

Paper-2

Home Science Extension Education

- Knowledge about areas of Home Science and its inter relationship with extension.
- Focus on role of Home Scientist in community development.
- Awareness of community development problems.
- Focus on Teaching method and Aids.
- Deals with National and International Agencies and their collaboration with Home Science.
- Curriculum Planning in Home Science.
- Job opportunities in Home Science.

BA-II Home Science

Paper-1

Fiber & Clotting Science

- Students get acquaintance with textile fibers.
- Knowledge of different weaves.
- Learn different printing methods.
- Knowledge of different stain removal.
- Impact of clothing on personality .

Paper-2

Family Resource Management

- Focus on management of resources in family for achieving family goals.
- To create awareness among student about management in family as well as other systems.
- Students learn values, goal and standards.
- Awareness of family budget.
- Learn skill of time energy management.

- Emphasis on work simplification techniques.
- To understand various element and principles of art used in the interior decoration.

BA-III Home Science
Paper-1
Human Development

- Knowledge about physiology of pregnancy.
- Different aspects of human growth and development.
- To understand human Holistic development.
- Theories and significance of play.
- Learn about habit formation.
- Knowledge about causes and remedial measures of child delinquency.

BA-III Home Science
Paper-2
Food and Nutrition Science

- Knowledge of all different micro and macro nutrients.
- Understanding of different food groups.
- Study of food preservation, food poisoning and food storage.
- Meal planning in Normal and Therapeutic Nutrition.

GOVT GHANSHYAM SINGH GUPT PG COLLEGE BALOD, DIST-BALOD (C.G.)

DEPARTMENT OF LAW
LL.B. Three Year Course

Program Outcomes (POs), Program Specific Outcomes (PSOs) and Course Outcomes (Cos) .

Objective of LL.B. Three Year Course-

This programme is designed with view of spreading legal knowledge among professionals from other disciplines in the society. Its objective is to impart legal education to the students from various backgrounds and equip them to perform various roles of a legal professional, beyond the traditional role of litigation. The students will gain knowledge and develop advocacy skills which will help them in achieving their goals and objective and serve the society.

Programme Outcomes –(LL.B. Duration: 3 years Pattern: Semester pattern)

1: **Knowledge and Understanding**

Display an awareness and understanding of the ethical, social, political and economic context in which the basic concepts, values, principles and rules of the Legal System.

2: **Intellectual skills**

To present logical legal arguments by exhibiting the ability to research and critically analyse and apply legal knowledge in legal problem solving and conflicting perspectives .

3**: Professional Skills**

Communicate effectively in oral and in writing, using language and legal terminology accurately and effectively.

4: **Transferable skills**

Demonstrate an ability to organise and prioritise work and engage in effective teamwork.

5: **Employability**

Demonstrate a willingness to continuously improve skills and abilities through critical

self-reflection and evaluation and initiative to find solutions to issues and problems.

Course Outcomes

(LLB Duration: 3 years Pattern: Semester pattern)

Students will be able to demonstrate that they have the ability:

1. Apply a systematic approach to the acquisition of knowledge, underpinning concepts and principles.

2. Deploy a range of subject specific, cognitive and transferable skills.

3. Evaluate the appropriateness of different approaches to solving well defined problems and communicate outcomes in a structured and clear manner.

4. Identify and discuss the relationship between personal and work place experience.

5. Analyse findings from books and journals and other data drawn from the field of study.

6. Critically assess law reform proposals and present alternatives

7. Present critical arguments, drawing on both doctrinal and policy-based perspectives from a wide range of sources, in both written and oral form.

8. Apply legal knowledge to complex problem situations and offer potential.

Program Specific Outcome
SEMESTER – I

Paper - 1

Contract -I

Students will be able to:

1. Define, distinguish and apply the basic concepts and terminology of the law of contract;

2. Define and distinguish amongst the various processes involved in contract formation;

3. Identify the relevant legal issues that arise on a given set of facts in the area of contract law;

4. Select and apply a range of approaches to written communication, and apply the critical thinking required to bring about creative solutions to complex legal problems in the area of contract law;

Paper - 2

Contract -II

Students will be able to:

1. In the society wherein all major ventures are getting corporatized, a law student should acquaint himself with the knowledge of special contracts apart from equipping himself with general principles of contract.

2. Set out a range of subject specific, cognitive and transferable skills

3. This course equips the students to better appreciate the legal services required in a corporate office so

that he can enhance his relevance as a lawyer in society.

5. Formulate oral and written arguments in response to a given set of facts.

Paper - 3

Jurisprudence

Students will be able to:

1. Demonstrate an advanced and integrated understanding of the political, social, historical,

philosophical, and economic context of law.

2. Engage in identification, articulation and critical evaluation of legal theory and the implications for policy.

3. Critically analyze and research complex problems relating to law and legal theory and make reasoned and appropriate choices amongst alternatives.

Paper - 4

Course Name :- Law of Tort including Motor Vehicle Accident & Consumer Protection Laws

Students will be able to:

1. To study the principles of Tortuous liability, The defenses available in an action for torts, the capacity of parties to sue and be sued and matters connection there with.

2. To study and evaluate the specific torts against the individual and property. With rapid

industrialization, inadequacy of the law to protect the individual is exposed.

3. The students should reflect on the alternative forms, and also the remedies provided under the Consumer Protection Act, 2019.

Paper - 5

Course Name :- Legal and Constitutional History of India

Students will be able to:

1. To study the historical dovelopement of India about law. They able to know is dovelope in ancient time.

2. The students know how to Constitution of India is made.and what was the dovelopement about the Constitution before 1950.

SEMESTER – 2

Paper-1

Course Name :- Family Law I

Students will be able to:

1. Students studying family law learn about basic concepts like marriage, divorce, parental custody, domestic abuse and children's rights.

2. Family law examines historical and social contexts that have influenced the modern definition and regulation of families.

3. Students will gain skills of thinking, analysis, written and verbal presentation of ideas of Argument.

Paper-2

Course Name :- Family Law II

Students will be able to:

1. Students studying family law learn about concepts like Succession, Inheritance

2. Family law examines and compares personal laws

3. Students will gain skills of thinking, analysis, written and verbal presentation of ideas of Argument.

Paper-3

Law of Crimes

Students will be able to:

1. Understand and describe areas of criminal justice, law and society through a critical analysis of the subject

2. Analyze lacunas within the criminal justice system and suggest the amendments have to make to provide the justice according to the changing needs of the society.

3. Summarize the process of judicial review and identify criteria used by courts to evaluate the constitutionality of criminal law of India.

4. Identify and synthesize social theory about crime, justice, and social deviance and explain

and address various obstacles and barriers experienced by individuals before, during, and after internment

5. Problem-solve complex issues in the criminal justice.

Paper - 4

The Code of Criminal Procedure, 1973, Juvenile Justice Act, 2000 and Probation of Offenders Act, 1958

Students will be able to:

1. Students will understand importance of criminal procedure followed by criminal courts.

2. It explains procedure from arrest till trials and punishments.

3. It is important legislation which gives practical knowledge to students.

4. It also covers appeals revision etc.

5. It explains hierarchy of criminal courts.

Paper - 5

Law of Evidence

Students will be able to:

1. Analyse and define the concept and general nature of evidence, and illustrate the different types of evidence and court procedures relating to evidence.

2. Analyse the rule relating to relevance of evidence and admissibility of evidence before the court.

3. Evaluate the rules relating to dying declaration and admissibility of dying declaration

4. Determine and analyse the standard of proof and burden of proof in civil and criminal cases, and specify types of presumptions.

5. Analyse and evaluate the rules governing examination in chief, cross examination and reexamination, and establish the procedures in the conduct of a civil or criminal trial

6. Determine the rules relating to competence and compellability of witnesses in relation to case study material.

Semester-3

Paper – 1

Constitutional Law – I

Students will be able to:

1. To create and set up a basic philosophical tenets of Indian Constitutional Law

2. To instill not just a bare understanding of but a perspective on constitutional developments in Indian Constitutional Law.

3. To understand the system of Government and the fundamental principles governing its organization.

4. To understand the detailed analysis of fundamental freedoms guaranteed under the Indian Constitution.

Teaching Hrs distribution per Unit/ Marks weightage per chapter

UNIT No.	TITLE:	No. of Hrs:	Marks weight age
Topic 1	Preamble, Indian Territory & Citizenship	15	20
Topic 2	Fundamental Rights – I	15	20
Topic 3	Fundamental Rights – II	15	20
Topic 4	Fundamental Rights – III	15	20
Topic 5			

Paper - 2

Constitutional Law II

Students will be able to:

1. To understand the form of Government- Parliamentary and Presidential.

2. To understand the Parliamentary democracy and its structure

3. To understand the contemporary status of centre-state relations.

4. To generate understanding of methods of amendment in the constitution of India.

Paper - 3

Administrative Law

Students will be able to:

1. Administrative law is mainly a judge-made law and has secured its present features through a Myriad of judicial decisions. A student got a deep knowledge of the operation and changing phenomena of these standards from a comparative angle.

2. The ever increasing number of delegated legislation in the form of rules, regulations, circulars and general orders has the characteristics of law, which though framed by administration, impose burden on the rights of citizens.

3. Analyze the scope of review of delegated legislation and the limitations on the judicial review of administrative action, the Principles of Natural Justice also have studied in detail in this course.

Paper – 4

Trust and Equity

Students will be able to:

1. To facilitate and promote awareness among the people to donate various organs of human bodyWithin preview of law.

2. To ensure people's involvement in developing a society wherein peace, justice and equality

prevail.

3. To promote self employment and other ventures for the benefits of weaker sections.

Paper – 5

Professional Ethics, Bar Bench Relations & Accountancy for Lawyers

Students will be able to:

1. To understand and apply the professional ethics and ethical standard of the legal profession

2. To know and evaluate the key themes in professional ethics, in order to give them an insight.

Semester-4

Paper – 1

Labour Law-I

Students will be able to:

1. The nature and scope of labour laws

2. The rationale of labour laws in organizations.

3. To identify all aspects of Labour Law practiced in India

4. To exhibit a comprehensive theoretical and practical understanding of Labour Law

5. To demonstrate an intellectual capacity for solving industrial disputes-

Paper – 2

Labour Law-II

Students will be able to:

1. The nature and scope of labour laws

2. The rationale of labour laws in organizations.

3. To identify all aspects of Labour Law practiced in India

4. To exhibit a comprehensive theoretical and practical understanding of Labour Law

5. To demonstrate an intellectual capacity for solving industrial disputes

Paper – 3

CG Land Law

Students will be able to:

1. Understand and describe legislative power to make laws relating to land and land ceiling is

in the state list.

2. Different states have enacted their own laws on this subject and the application of these

laws is varied from state to state.

3. The Constitutional perspectives relating to these subjects have to be taught as an essential

part of this course.

4. Problem-solve complex issues in the land related matters and society related to policies, law enforcement, government bindings and etc.

Paper – 4

Environmental Law

Students will be able to:

1. Analyze advanced and integrated understanding of the complex body of knowledge in the field of environmental law

2. Develop the capacity to identify new law and apply existing law in the rapidly evolving legal context for environmental law

3. Understand in depth knowledge of the specialist area of environmental law and associated disciplinary

areas

4. Determine and analyse the different causes of pollution and legal remedies to control it on national level.

5. Analyse and evaluate laws relating to environmental aspect on a national level and its comparison with other countries.

Paper – 5

Arbitration, Conciliation and Alternative Disputes Resolution Systems

Students will be able to:

1. Familiarize with the modalities and techniques of resolution of conflict which is a necessary component in the endeavours of developing expertise in juridical exercise.

2. To understand and analyze the traditional justice delivery system through adjudication by

along with an alternative mode of dispute resolution in the common law countries.

3. To approach the processes of arbitration, conciliation and mediation in areas where the

traditional judicial system had its sway in the past and in the new areas of conflicts that demand resolution by alternative methods.

Semester-5

Paper - 1

Company Law

Students will be able to:

1. Explain and apply to various fact scenarios the concept of separate legal entity.

2. To explain the basic documents such as MOA and AOA required for company.

3. To develop the ability to identify and effectively use the corporate law resources. And to

develop the ability to learn company law both independently and cooperatively in a professional environment.

4. To evaluate and analyze socially reasonable corporate behaviour.

Paper - 2

Interpretation of Statutes

Students will be able to:

1. Know that the techniques adopted by courts in construing statutes and the importance of the law making

process in the present context.

2. Know that the matters to be reckoned with by legislature while enacting laws.

3. Understand and analyze the judicial interpretation, construction of words, phrases and expressions.

Paper - 3

International Law

Students will be able to:

1. Demonstrate knowledge and understanding of the international law framework, its origins and justifying theories;

2. Demonstrate capacity to assess how international law may be asserted, enforced or violated;

3. Critically evaluate the relationship between international and domestic law .

Paper - 4

Human Rights

Students will be able to:

1. Demonstrate knowledge and understanding of the international human rights framework, its origins and justifying theories;

2. Demonstrate capacity to assess how specific human rights may be asserted, enforced or violated;

3. Critically evaluate the relationship between international and domestic law on human rights;

4. Demonstrate understanding of the role of lawyers in human rights protection and capacity to contribute to ongoing processes of law reform.

Paper – 5

Moot Courts

Students will be able to:

1. Understand how to prepare a suit and how to file.

2. Know the practical approach of the law course

3. Get the practical training to make the career bright.

Semester-6

Paper – 1

Intellectual Property Rights

Students will be able to:

1. Get a holistic understanding of the complexities involved in the process of attributing intellectual property rights to people.

2. Learn the legalities of intellectual property to avoid plagiarism and other IPR relates crimes like copyright infringements, etc.

Paper - 2

Property Laws including Transfer of property Act, 1882 and Easement Act, 1882

Students will be able to:

1. Analyse and define the concept and nature of transfer of immovable property, and illustrate

the different types of transfers and rules relating to it.

2. Analyse the rule relating to transfer of property within two living persons and the consequences of it

3. Evaluate the rules relating to general transfer of immovable property.

4. Determine and analyse the rules of Sale of Immovable Property and rights and liabilities of seller and buyer.

5. Analyse and evaluate the rules governing Mortgages, Leases, Exchanges, Gift and Actionable Claims rights and liabilities of transferor and transferee.

6. Analyse and evaluate the rules relating concept of easement and kinds of easement and rights and liabilities of transferor and transferee.

Paper - 3

The Code of civil Procedure, 1908 and the Limitation Act, 1963

Students will be able to:

1. Know the detail procedure for redresses of civil rights.

2. Understand, where the suit is to be filed? The essential forms and procedure for institution of suit, the documents in support and against, evidence taking and trial, dimensions of an interim order, the peculiar nature of the suits, the complexities of executing a decree and provisions for appeal and revision are all

matters which a lawyer for any side is to be familiar with.

3. To have good grounding in the subject before one enters the profession.

Paper - 4

Law of Taxation

Students will be able to:

1. Know the introduction, overview and fundamental concepts of income tax law.

2. Employ a broad understanding of tax law.

3. Conduct tax law research by using research skills to interrogate primary and secondary legal materials, and analyse and synthesise complex legal information.

Paper - 5

Drafting, Pleading and Conveyancing

Students will be able to:

1. Analyze and define the concept of Pleading and various rules of pleading and able to handle the client during the course of interaction.

2. Articulate the argumentation process and apply the legal drafting abilities during the appearances before Court and Tribunals.

3. Recognize the way to move to the criminal justice system with aid of various complaints.

4. Identify and discuss the various forms of conveyancing deed such as sale deed, gift, mortgage etc.

5. Apply legal drafting skills and understand practical aspect of registration of such documents.

GOVT GHANSHYAM SINGH GUPT PG COLLEGE BALOD, DIST-BALOD (C.G.)

Subject-Zoology

Class-B.Sc. part 1

1st paper

Syllabus –

1-The cell (Prokaryotic n Eukaryotic), Organization of cell: Extra nuclear and nuclear, Nucleus, chromosome, DNA and RNA.

2-Cell division(mitosis and meiosis).Cancer cells and Cell transformation, An elementary idea of Immunity, Lymphoid organs, cells of immune system, Antigen, antibody and their interaction.

3-General character n classification of phylum Protozoa, Poriferan, and Co elenterata up to order paramecium ,sycon, obelia.

4-General character and classification of phylum Platyhelminthes, Nemathelminthes, Annelids and Arthropoda up to order.

5-General character and classification of phylum Mollusca and Echinodermata up to order.

PROGRAMME OUTCOMES

Paper-1

1-*Understand the nature and basic concepts of cell biology n genetics.

*Understand the structure and purpose of basic components of prokaryotic and eukaryotic cells.

2-*Learn about different stages of mitosis and meiosis division

*Understand the cancer cell and cell transformation

*Gain knowledge about basic concept of immunolog

3-*Learn about general character n classification of lower invertebrate animals

*To describe the polymorphism of coelenterates .

4-Understand the general character and classification of phylum platyhelminthes, nemathelminthes, annelida and arthropods..

*Learn about life cycle and larval stages and parasitic nature in invertebrate animal..

5-*understand about General character n classification of phylum Mollusca and Echinoderms .*Learn about economic importance of molluscan.

Paper-2nd

(Chordata and Embryology)

Syllabus-

1.General character n classification of hemichordata, classification of protochordates, A comparative account of Petromyzon and Myxine.

2-Fishes-Skin and Scale, migration and parental care in fish. Parental care n Neoteny in Amphibians. Reptilia-Poisonous & Non-poisonous snake, Poison apparatus, snake venom and extinct Reptiles.

3-Birds-Flight adaptation, Migration, Perching mechanism, Discuss-Birds are glorified reptiles.

Mammals-Comparative account of Prototheria, Metatheria, Eutheria and Affinities.

Aquatic mammals and their adaptation.

4-Fertilization.

Gametogenesis, structure of gamete and types of eggs, Cleavage, Development of frog up to formation of three germ layers, Parthenogenesis.

5-Embryonic induction, Differentiation and Regeneration.

Development of chick(a)up to formation of three germ layers. Extra embryonic membrane .

Placenta in mammals.

PROGRAMME OUTCOMES.

PAPER- 2nd

1-understand about evolution of chordates.

2-know the classification of fishes and their migratory nature. Understand about parental care n economic important of fishes.

3-understand the classification of amphibians and their neotenic form.

4-understand the classification of Reptilia .

*Learn about poisons & nonpoisons snake n extinct reptiles.

5-understand about lower to higher mammals.

* Know about comparative study of Prototheria, Meta theria and Eutheria...

COURSE OUTCOME

*Teach invertebrate biology in educational institute.

*There are various undergraduate and postgraduate course available in this field of fisheries

*We have job started in Aquaculture field.

*The work involves conducting field and laboratory research. Dealing with complex subject such as In-vitrofertilization and cryogenics.

*To become teacher in educational institute.

*To become employee the Scientific Industry.

*To become researcher.

*We can work as Wildlife biologist, Zoocurator, Wildlife educator, Zoology faculty, Lab technicians..

Class -B.Sc.2nd year

Paper 1st

Syllabus-

1-Integument and it's derivatives: Structure of scale, hair and feathers ,Alimentary canal and digestive gland in vertebrates ,Respiratory organs: Gills and lung, airsac in birds.

2-Endoskeleton(a)Axial skeleton- Skull and Vertebrae(b) Appendicular skeleton: Limb and Girdle.Circulatory system, Evolution of heart and aortic arches, Urinogenital system: Kidney and excretory ducts.

3-Nervous sistem: General plan of brain & spinal cord, Ear and Eye: Structure n function, Gonads and genital ducts.

4-Digestion and absorption of dietary components, Physiology of heart, Cardiac cycle and ECG, Blood Coagulation, Respiration: Mechanism and control of breathing.

5-Excretion:Physiology of excretion, Osmoregulation, Physiology of muscle contraction, Physiology of nerve impulse, Synaptic transmissions.

PROGRAMME OUTCOME

PAPER- 1st

1-Course provides student comparative understanding about skin,digestive glands and respiratory organ in vertebrates.

*Understand about scale in fishes and feather in birds.

2-Student gain knowledge about Endoskeleton and their function.

*Understand the Comparative study of evolution of heart and aortic arches in mammals.

*Understand about different types of kidney and it's function in mammals.

3-Gain knowledge about the Comparative study of brain and spinal cord.

*Learn about structure n function of Eye and Ear of mammals.

4-Understand about how to work heart in mammals, Cardiac cycle, ECG and some cardiac disease in human.

*Gain knowledge about Theories Regarding Blood Clotting and Factor effecting blood coagulation.

* Learn about mechanism of respiration,cellular respiration and their process.

5-Student gain knowledge about the comparative physiological concept of excretion, muscle contraction ,nerve impulse and synaptic transmission.

*Learn about physiology of osmoregulation and Homeostasis.

Class-B.Sc.2nd

Paper 2nd

Syllabus-

1. Structure and function of endocrine glands. Hormone receptor. Biosynthesis n secretion of thyroid, adrenal, ovarian and testicular hormones. Endocrine disorder of pituitary, thyroid ,adrenal and pancreas.

2-Reproductive cycle in vertebrate. Menstruation, Lactation and Pregnancy. Mechanism of parturition. Hormonal regulation of gametogenesis.

3-Evidence of organic evolution. Theories of organic evolution,Variation, Mutation ,Isolation and Natural selection. Evolution of horse.

4-Introduction to Ethology: Branches and concept of ethology . Patterns of Behaviour, Taxes, Reflexes, Drives and Stereotyped behavior. Reproductive behavioural patterns. Drugs and behaviour, Hormones and behaviour.

5-Prawn culture, Sericulture, Apiculture, Pisciculture, Poultry keeping, Elements of pest control: Chemical &Biological control.

PROGRAMME OUTCOME

Class-B.Sc.2nd

Paper-2nd

1-Student gain fundamental knowledge of Endocrine glands and their hormones.

*Understand about Endocrine disorders due to hormones of the glands.

2-Gain depth knowledge about Developmental biology .

*Understand about Reproductive cycle in vertebrates.

*Gain knowledge about mechanism of parturition,lactation and pregnancy ,and abnormalities of pregnancy.

*Know about Hormonal regulation in gametogenesis.

3-Understand the theories of Evolution,lamarckism Darwinism and natural selection.

*Knowledge about eras and evolution of species.

*Understand about Gene mutation,Variation and Isolatio.

4-Undestand the complex the evolutionary process and behaviour of animals.

*Learn about different types of taxes in animal.

*Learn about Drugs ,Reproductive behaviour and Drugs abuse and Drug Dependence drugs.

5-Understan the application of biological science in Apiculture,Aquaculture, Poultry keeping,agriculture & medicine.

*Understand the concept of fisheries,fishing tools and site selection.

COURSE OUTCOME

B.Ss.2nd

1-Study of museum specimen identified and classified the specimen which are present the departmental museum by the student for a practical knowledge.

2-To become Neurologist, Ostiologist in hospital or medical research.

3-To become researcher.

4-Teach in educational institute.

5- After completing B.Sc. in genetics, you can also go for further course like M.Sc., Ph.D.etc.

6-After M.Sc. you can apply CSIR -NET or UGC- NET ,which will make you eligible for Lecturership may provide you research fellowships.

7-To become employee the related industry.

8-You can start business in Apiculture,Sericulture, Aquaculture, poultry keeping etc.

B.Sc.3rd

Syllabus-1(Ecology)Aims and Scope of ecology.

1.Major ecosystem of the world-Brief introduction.

Population-characteristics and regulation of densities.

Communities and Ecosystem.

Biogeochemical cycles.Air and water pollution.

Ecological succession.

2-(Environmental Biology)

Laws of limiting factors.

Food chain in freshwater ecosystem.

Energy flow in ecosystem-Trophic levels.

Conservation of Natural resources.

Environmental impact Assessment.

3-(Toxicology)

Defination of Toxicity.

Classification of toxicants.

Principle of systematic toxicology.

Toxic agent and their action-Metallic and inorganic agents.

Animal poison-Snake venom,Scorpion and bee poisoning.

4-(Microbiology)

General and Applied microbiology.

Microbiology of Domestic water and sewage.

Microbiology of milk and milk product.

Industrial microbiology.

5-(Medical microbiology)

Brief introduction to pathogenic micro-organisurs,Rickettsia,Spirochetes and Bacteria.

Brief account of life history and pathogenicity of the following bn pathogens with reference to man;Prophylaxis and treatment-

(a) Pathogenic protozoans-Entamoeba,Trypanosoma and Guardia.

(b) Pathogenic helminth -Schistosoma

(c)Nematode Pathogenic parasites of man.

Vector insects.

B.Sc.3rd

PAPER 1st

PROGRAMME OUTCOMES

1- Understand about ecology and major ecosystem in the world like fresh water ecosystem and marine water ecosystem.

*Learn about population and their harmful effect.

*Understand about biogeochemical cycle like N,O,C,S,P in ecosystem.

2-Ability to construct the food chain.

*Knowledge about limiting factor and energy flow through the ecosystem &10%law.

*Apply the knowledge about conservation of natural resources like mineral,water forest&wild-life.

3-Understand about plant,animal toxin and metallic &inorganic agent and their action.

*Understand about animal poison and food poisoning.

4-Gain knowledge about microorganisms present in water,milk and sewage.

*Learn about milk testing and Pasteurization of milk.

*Gain knowledge about production of Alcoholic Beverages.

5-Understand about virus,bacterial and spirochetes diseases.

*Learn about Life cycle and Pathogenicity ,Prophylaxis and treatment of the pathogenic Protozoan,Helminth&Nematode..

B.Sc. 3rd

Paper-2

Syllabus

1-(Genetics)

Linkage and Linkage maps.

Varieties of gene expression-Multiple alleles;lithogenesis,Pleiotropic genes;gene interaction;epistasis.

Sexchromosome system,and sex linkage.

Mutation and chromosomal alterations;meiotic consequences.

Human genetics-chromosomal and single gene disorder(Somatic cell genetics)

2-(Cell Physiology)

General idea about pH and Buffer.

Transport across membrane-Cell membrane;Mitochondria and Endoplasmic reticulum.

Active transport and it's mechanism;Active transport in Mitochondria and Endoplasmic reticulum.

Hydrolytic enzyme-Their chemical nature,Activation and specificity.

3-(Biochemistry)

Amino acids and peptides-basic structure and biological functions.

Carbohydrate and it's metabolism-Glycogenesis , Gluconeogenesis,Glycolysis, Glycogenolysis,Kisi cycle.

Lipid metabolism -Oxidation of glycerol,oxidation of fatty acid.

Protein metabolism -Deamination,Transamination,Transmethylation , biosynthesis of protein.

4-(Biotechnology)

Biotechnology-scope and importance.

Recombinant DNA and Gene cloning.

Cloned genes and other tools of biotechnology.

Application of biotechnology in (1)Pharmaceutical industry ,(2)Food processing industry.

5-(Biotechnique)Principles and techniques about the following.-

pH meter.

Colorimeter.

Microscopy-Light microscope,Phase contrast and Electron microscopes.

Centrifugation.

Separation of biomolecules by chromatography,and Electrophoresis.

Histochemical methods for determination of Protein ,Lipids,and Carbohydrate

PROGRAMME OUTCOMES

B.sc.3rd

Paper 2nd

1-Understand the linkage and Various types of gene.

*Gain knowledge about Sexchromosomes and chromosome theory of sex determination.

*Learn about chromosomal disorder and Genetics diseases...

2-Understand the pH of biological fluid &the tissue.

*Understand the importance of biomolecules and different types of enzyme.

3-Understand about Protein, Carbohydrate and Lipid metabolism and their biological significance.

*Learn about Distinction between polypeptide and protein.

4-Understand the application of biotechnology, familiar with the tools and techniques of genetics & biotechnology.

*Learn about production of Recombinant DNA,gene cloning,Vector and some important Example of

cloned genes.

5-Understand different types of tools and technique which is used in research field.

*Learn clinical procedure for blood & urine analysis in practically.

*Develop skill in simple biochemical, histochemical laboratory procedure.

* Understand about separation of biomolecules by chromatography..

B.sc.3rd

COURSE OUTCOMES

*Enable the learners to take certificate of master's degree in zoology.

*Motivation further studies and research in the field.

*Producing contributor in the area of Biological research ,Teaching , & Biodiversity conservation.

*To become microbiologist in a hospital or medical research center generally requires a master in microbiology along with Ph.D.in life science.

*To become physician & researcher in laboratories.

*We start own business in food processing industries.

*To become Aquatic ecologist.

*We can field job opportunities in hospital, Pharmaceutical companies and other health services.

*Some of the public sector companies that offer lucrative career are as follow:-Blood service,Drug manufacturing companies,Industrial laboratories,Forensic science.

*To become Biotechnologist.

PROGRAME OUTCOME , COURSE OUTCOME AND PROGRAMME SPECIFIC OUTCOME

DEPARTMENT OF POLITICAL SCIENCE

Objective of the programme :-

This course is designed to develop a sound understanding of Political Science with the different meaning of politics and how is it interpreted differently by people holding different ideological positions. The critical engagements with ideologies will allow the students to develop their own understanding of politics. Since the state occupies a central position in the
discourses on politics, the understanding of different theories on the state will allow the students to understand the role of the state in the society and how it governs and regulate the power structure. Media and civil society are the drivers of the politics as they perform a communication role, important for information and ideology transmission.

- To Increase knowledge of the political science discipline; its principal theoretical frameworks and applications, conceptual vocabulary, and methods of inquiry; its major subfields of study; and its interrelationships with the other social science fields.

- To increase understanding of basic facts and concepts about the American political system, including its history, philosophical, constitutional and legal foundations, leading political values and ideas, governing institutions, and policymaking processes.
- To increase knowledge of diverse political systems around the world, including empirical area-based knowledge; broader theoretical understanding of different political systems, institutions and processes; and the changing domestic and global contexts within which they operate.
- To increase knowledge of the history of classical and modern political thought; of the fundamental values and ethical issues contested in politics over time; and of alternative moral and ethical frameworks for interpreting and evaluating contemporary political discourses.
- To increase recognition of the major problems, the leading policies, and the legal issues confronting contemporary political systems, particularly in the U.S.
- To increase acquisition of citizenship skills, ethical values, and the ability to understand and appreciate human diversity; and to engage in community life as active citizens.
- To increase understanding of political science research and analytical skills, including the ability to think critically; to construct logical arguments; to collect, analyze, and interpret evidence and data; and to formulate reasoned conclusions.
- To increase development of writing skills through research papers, essay exams, senior projects in political science topics, and collaborative research/writing opportunities with faculty.
- To provide opportunities to undergraduate and graduate students to link theory and practice and to apply political science knowledge and skills to actual problem-solving and community service.

B.A.(BACHELOR OF ARTS)

YEAR - I,II & III

PROGRAMME OUTCOME :-

1. **Critical Thinking**: Ability to analyse, synthesize and integrate knowledge. Capability to evaluate the validity of arguments and conclusion.
2. **Effective Communication**: Proficiency in speaking, reading, writing and listening in English and one Indian language and find meaning of the world by connecting people, ideas, books, media and technology.
3. **Social Interaction**: Link with society and intercede the disagreement and help to reach conclusion in group sitting. Demonstrate intellectual awareness and competencies. Reflect on one's cultural identities and values.
4. **Effective Citizenship**: Promote active citizenship and community engagement. Ability to understand the national development, informed awareness of issues and participate in civic life.
5. **Ethics**: Understand and recognised value system, moral dimensions and self responsibility for nation and society. Demonstrate personal and intellectual integrity and academic accountability. Collaborate respectfully with others, individually and in teams.
6. **Environment and Sustainability**: Understand the issues and perspectives of environment context and sustainable development.
7. **Self directed and lifelong learning:** Acquire the ability to engage in independent and lifelong learning in broad context of socio-technological changes.
8. **Individual and team work**: Function effectively as an individual and as a member or leader of diverse teams and in multi-disciplinary settings.

9. **Evaluate and conduct research**: Engage in scholarly inquiry to identify and investigate questions of a theoretical and applied nature which identify gaps and limitations in the existing literature, understand the principles of the research process, apply appropriate research methodologies to specific problems and develop intellectual independence and
practices self-directed inquiry.
10. **Depth of understanding**: Demonstrate detailed knowledge and perspectives across disciplinary boundaries. Develop a detailed understanding of the current state of knowledge in one or more disciplines. Recognise the value, use and limits of multi-disciplinary learning. Cultivate an openness to consider and engage alternative research perspectives.

COURSE OUTCOME:-

B.A I Year - POLITICAL SCIENCE; POLITICAL THEORY (Concepts, Theories, Institutions)

- To understand the nature and scope of political theory.
- To understand the significance of political theory.
- To acquaint with the theories, approaches, concepts and principles of political theory.
- To appreciate the procedure of different theoretical ideas in political theory.
- To Interpret and assess information regarding a variety of political theory.
- To understand the various traditional and modern theories of political science.
- To evaluate the theories of origin of the state.
- To comprehend the sources of political information's
- To understand the concept of state, nation and civil society.
- To understand the elements and factors of state and nation.
- To know about the meaning sovereignty, types and characteristics.
- To analyse critically hu the theories of monism and pluralism.
- To learn the origin of the concepts such as Law, power, authority,constitution and legitimacy.
- To understand the forms of government in various countries and their working pattern
- To compare with procedure of various social institutions and government institutions.
- To analyze the meaning of organs of government and theory of separation of power.
- To understand the actual meaning of Feminism and Nationalism.

INDIAN GOVERNMENT AND POLITICS (Government and Politics)

- To understand the philosophy of Indian constitutions.
- To identify the causes, impact of British colonial rule.
- To appreciate the various phases of Indian national movement.
- To create value in young youth regarding the patriotism.
- To understand the various Government of Indian acts their provision and reforms.
- To know the salient features in making of Indian constitution
- To appreciate the socio-economic political factors which lead to the freedom
struggle.

• To understand the constitutional orderings and institutional arrangement.
• To appreciate the fundamental rights and duties and the directive principle of state policy
• To evaluate the evolution, functioning and consequences of political parties in India.
• To identify how electoral rules and procedure in India effect election outcomes.

B.A. II YEAR - POLITICAL THOUGHT

•To demonstrate knowledge of key thinkers and concepts.
• To understand the nature, methods and significance of political thought.
• To analyse the theory of ancient & medieval political thought of Greek India.
• To appreciate the ideas of them in context of classification of government, law and revolutions and slavery.
• To understand the relationship between religion and politics in early modern western political thought.
• To acquire knowledge about modern political thinkers and theirs view on state craft.
• To compare with the social contractualists thoughts of Hobbes, lock, and Rousseau and their view regarding state, government and general will.
• To appreciate the concept of liberty, representative government.,
• To analyse the Marxist philosophy in making a better society.
• To thoroughly compare the democratic revolution and creation of civil society.
• To appreciate the various social and political ideas of Indian political thinker
• To inculcate the spirit of ahinsa, satyagraha, through Gandhi ideology
• To criticize the causes for the theory of caste system in India and their impact.

COMPARATIVE GOVERNMENT AND POLITICS

- The students will be able to understand and apply different approaches to explain the functioning of different types of governing regimes.
- They will be able to compare democratic regimes and evaluate their functioning.
- They will be able to critically reflect on critical aspects of electoral democracy that includes functioning of parties and the relation between representation and democracy.
- They will be able to explain how media has changed the contours of elections and electoral democracy..

B.A. III YEAR - INTERNATIONAL POLITICS

• To understand the evolution, scope and significance of international relations and the rise of sovereign state system.

* To analyze the history of international relational through the causes and phases of colonialism.

* To know the impact of first world war and second world war and its causes and consequences.

* To criticize the various ideologies which lead to the destruction of world.

* To appreciates the post war developments through the emergence of third world.

* To understand the concept of power, national, regional ,global and peace security.

* To acquaint with the international organizations and their modules nations.

* To understand the international political economy.

* To analyse the international security Arms Race. Arms control and Disarmament.

* To understand the emerging area in international relations.

* To appreciate the foreign policy their determinants features and its relevance.

* To critically analyse the Indian's bilateral relations with major power and neighboring countries.

* To identify various issues and challenges towards international relations.

* To learn about issues of diversity and internationalism.

PUBLIC ADMINISTRATION

- The students will be able to make a difference between the public administration and private administration.
- They will be able to explain the journey of discourse in public administration in the sense that how the old public administration view was contested by the idea of new public administration and subsequently the discourse moved beyond that and started talking about New Public Administration and New Public Service.
- What is the scientific management school by Taylor and Fayol and how it was contested by the Human Relation School? They will be able to explain what is the decision-making approach of Herbert Simon?
- They will be able to explain the concepts and theories on motivation, leadership and conflict management in the organization.Understanding the nature and developments in national and international politics.

PROGRAMME SPECIFIC OUTCOME:-

- Demonstrate an understanding of fundamental political processes, institutions, actors,behavior, and ideas; and familiarity with major theories, methods, and concepts of Political Science.
- Demonstrate a proficiency in thinking systematically about political interactions in national, global and international contexts.
- Demonstrate proficiency in thinking systematically about the ethical dimensions of Politics.
- Write effectively, engage in intellectually grounded oral debate, and form and express coherent arguments.
- Synthesize, analyze, and critically evaluate major arguments in the discipline.

- Comprehend the basic structures and processes of government systems and/or theoretical underpinnings.
- Analyze political problems, arguments, information, and/or theories.
- Apply methods appropriate for accumulating and interpreting data applicable to the discipline of political science.
- Educate the elected representatives about the parliamentary procedures and constitutional position of the country.
- Service to people by opting for civil services.

GOVT GHANSHYAM SINGH GUPT PG COLLEGE BALOD, DIST-BALOD (C.G.)

COURSE OUTCOME, PROGRAMME OUTCOME & PROGRAMME SPECIFIC OUTCOME (CO'S, PO'S & PSO'S)

Department of Computer Science and Application

Objective of the programme:

The objectives of the computer sciences department is to prepare students for graduate training in computer science which is a job oriented program in industry, business or government sector, and to provide support courses for students of commerce, arts and science to acquire the computing skills.

The College follows Hemchand Yadav University, Durg Syllabus of Bachelors in Computer Application (BCA), and B.Sc.(Computer Science). The objectives of prescribed course are:

- Demonstrate proficiency in problem-solving techniques using the computer.
- Demonstrate proficiency in a high-level programming language with interconnection into databases and operating systems.
- Demonstrate proficiency in the analysis of complex problems and the synthesis of solutions to those problems.
- Demonstrate comprehension of modern software engineering principles.
- Demonstrate a breadth and depth of knowledge in the discipline of computer science.
- Demonstrate proficiency in the development of software packages in the different fields.
- Demonstrate proficiency in the development of websites (statics and dynamics types).

B.C.A. (Bachelor of Computer Application)

Year-First, Second, Third

Programme Outcome:

Students of Computer Application will possess:

- An ability to apply knowledge of computing and mathematics appropriate to the discipline.
- An ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
- An ability to design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs.
- An ability to function effectively on teams to accomplish a common goal.
- An understanding of professional, ethical, and social responsibilities.
- An ability to communicate effectively.

- An ability to analyze the impact of computing on individuals, organizations, and society, including ethical, legal, security, and global policy issues.
- Recognition of the need for and an ability to engage in continuing professional development.
- An ability to use current techniques, skills, and tools necessary for computing practice.
- An ability to apply mathematical foundations, algorithmic principles, and computer science theory in the modelling and design of computer-based systems in a way that demonstrates comprehension of the tradeoffs involved in design choices.
- An ability to apply design and development principles in the construction of software systems of varying complexity.

Course Outcome

- **Produce knowledgeable and skilled** human resources which is employable in IT field.
- **An ability to enhance** not only comprehensive understanding of the theory but its application too in diverse field.
- **Impart knowledge** required for planning, designing and building Complex Application Software Systems as well as provide support to automated systems or application.
- **Programmer:** The program prepares the young professional for a range of computer applications, computer organization, computer networking, and software engineering, Web Designing, JAVA, Linux, Oracle and Android Programming.
- **Project Development:** Introduced the concept of project development in different language/technology learnt during semester, in order to enhance programming skills of the students.
- **Produce entrepreneurs** who can develop customized solutions for small and medium Enterprises.

Programme Specific Outcome

PSO of BCA Courses is divided into three different years:-

Year: I

PSO 01 Course Title :-(Paper Code –BCA102) **Computer Fundamentals**

Students will be able to:

- Bridge the fundamental concepts of computers with the present level of knowledge.
- Understand binary, hexadecimal and octal number system and their arithmetic conversions.
- Familiarize with operating systems, programming languages, peripherals.
- Choose commands and features of operating systems and application software.

PSO 02 Course Title :-(Paper Code - BCA103) **Programming in 'C' Language**

- Explore algorithmic approaches to problem solving.
- Ability to analyze a problem and devise an algorithm to solve it.
- Able to formulate algorithms, pseudo codes and flowcharts for arithmetic and logical problems.
- Ability to implement algorithms in the 'C' language.
- Develop modular programs using control structures and arrays in 'C'.

PSO 03 Course Title :- (Paper Code - BCA104) **PC Software and Multimedia**

Students will be able to:

- Maintain their documents in digital Format.
- Understand and use attractive Presentation for business and personal purpose.
- Analyze report with excel and directly formulate it according to the requirement.
- It also features experimental and survey articles
- Helps to design and develop attractive tools
- Development and system support tools as well as case studies of multimedia applications.

PSO 04 Course Title: -(Paper Code - BCA105) **Web Technology and E-Commerce**

Students will be able to:

- Develop a dynamic webpage by the use of java script.
- Able to develop a web application using PHP.
- Students will gain the skills and project-based experience needed for entry into web application and development careers.
- To know about E-Commerce
- To understand E-Payment, E-Banking, E-Governance, etc

Year: II

PSO 01 Course Title: -(Paper Code – BCA202) **Database Management System**

Students will be able to:

- To design and build a simple database system.
- Demonstrate competences with fundamental task involved with modelling, designing, and implementing a DBMS.
- Design E-R diagrams for given problems.
- To understand and use data manipulation language to query, update and manage a database.

PSO 02 Course Title: -(Paper Code – BCA203) **Programming in C++**

Students will be able to:

- Understand object oriented programming, difference between object oriented programming and procedural programming.
- Build program using C++ features such as Class, objects, operator overloads, dynamic memory allocation, inheritance and polymorphism, file I/O, exception handling, etc.
- Build C++classes using appropriate encapsulation and design principles.
- Improve problem solving skills by applying object oriented or non-object oriented techniques.

PSO 03 Course Title: -(Paper Code – BCA204) **Computer Networks**

Students will be able to:

- Understand basic computer network technology.
- Understand Data Communications System and its components.
- Enumerate the layers of the OSI model and TCP/IP reference model.
- Able to identify the different types of network devices, their functions within a network and their applications.

PSO 04 Course Title: -(Paper Code – BCA205) Operating System with Linux

Students will be able to:

- Understand the concept of operating system and its uses .
- Use of basic Linux commands and Linux documentation
- Understand the concept of shell scripts with writing capabilities of shell script programme.
- Analyze the structure of Linux OS.
- Understand basic architectural components involved in Linux OS design.

Year: III

PSO 01 Course Title: -(Paper Code – BCA301) **Computer System Architecture**

Students will be able to:

- Get concepts of the basics organizational and architectural issues of a digital computer.
- Analyze performance issues in processor and memory design of a digital computer.
- Understand various data transfer techniques in digital computer.
- Explain block diagram of CPU, Memory and types of I/O transfers

PSO 02 Course Title: -(Paper Code – BCA302) **Programming in Java**

Students will be able to:

- Design the programs in Java Applet.
- Can invoke methods using class libraries etc.
- Able to handle abnormal termination of a program using exception handling
- Will able to use the Java SDK environment to create, debug and run simple Java program.
- Understanding the fundamentals of object- oriented programming concept in Java, including defining of classes.

PSO 03 Course Title: -(Paper Code – BCA303) **Operating System**

Students will be able to:

- Identify the need to create the special purpose operating system.
- Identify use and evaluate the storage management policies with respect to different storage management technologies
- Demonstrate understanding of the concepts, structure and design of operating Systems
- Demonstrate understanding of operating system design and its impact on application, system design and performance
- Demonstrate competence in recognizing and using operating system features.
- Describe the important computer system resources and the role of operating system in their management policies and algorithms.

PSO 04 Course Title: -(Paper Code – BCA304) **Software Engineering**

Students will be able to:

- Get Basic knowledge and understanding of the analysis and design of complex systems.
- Ability to apply software engineering principles and techniques.
- Ability to develop, maintain and evaluate large-scale software systems.
- Produce efficient, reliable, robust and cost-effective software solutions.

PSO 05Course Title: -(Paper Code – BCA305) **Multimedia Tools and Application.**

Students will be able to:

- Perform experimental and survey articles
- Helps to design and develop attractive tools
- Development and system support tools as well as case studies of multimedia applications.

PSO 06 Course Title: - (Paper Code-BCA 308) Project

Students will be able to:

- Demonstrate a sound technical knowledge of their selected project topic.
- Undertake problem identification, formulation and solution.

- Design engineering solutions to complex problems utilizing a systems approach.
- Share knowledge of basic SW engineering methods and practices, and their appropriate application.
- Share knowledge and application of collaborative tools for SW development.
- Implement teamwork behaviour and policies in a large class project.
- Demonstrate a breadth of knowledge in computer science, as exemplified in the areas of systems, theory and software development.
- Show ability to conduct a research or applied Computer Science project which requires writing and presentation skills that exemplify scholarly style in computer science.

B.SC. (Computer Science)
Year-First, Second, Third

Programme Outcome

- Develop ability to analyze a problem, identify and define the computing requirements, which may be appropriate to its solution.
- To prepare students to undertake careers involving problem solving using computer science and technologies.
- Develop ability to pursue advanced studies and research in computer science.
- To produce entrepreneurs who can innovate and develop software product.

Course Outcome

A student after completing his/her B.Sc. (Computer Science) degree will equipped with:

- **An awareness** of how computer science impacts our society and environment and the benefits it offers the technical society
- **Gain proficiency** in the handling of various hardware instruments, software's etc.
- **Develop basic scientific concepts** of programming which will help in rationale thinking and better understanding of various IT problems.
- **Exhibit excellent problem** solving ability by critical thinking and integrating various ideas learned during laboratory experiments or class lectures.
- **Participate in scientific debates** or arguments with confidence and will be able to convince the audience by logical presentation.
- **Undertake project** work for IT Sector, industry or NGOs regarding software engineering, Software testing, data analysis etc.

- **Develop research aptitude** in the various fields of computer for example fuzzy logic, cloud computing, internet technology.

Programme Specific Outcome

PSO of B.Sc. Courses in Computer Science divided into three different years: -

Year: I

PSO01 Course Title :-(Paper Code - 0805) **Fundamentals of Computer**

Students will be able to:

- Bridge the fundamental concepts of computers with the present level of knowledge.
- Understand binary, hexadecimal and octal number system and their arithmetic conversions.
- Familiarize with operating systems, programming languages, peripherals.
- Choose commands and features of operating systems and application software.

PSO 02 Course Title :-(Paper Code - 0806) **Programming in 'C'**

Students will be able to:

- Explore algorithmic approaches to problem solving.
- Analyze a problem and devise an algorithm to solve it.
- Formulate algorithms, pseudo codes and flowcharts for arithmetic and logical problems.
- Implement algorithms in the 'C' language.
- Develop modular programs using control structures and arrays in 'C'.

Year: II

PSO03 Course Title: -(Paper Code – 0855) **Computer Hardware**

Students will be able:

- To introduce the overall organization of micro processor
- To introduce the common peripheral devices used in computers
- To introduce the hardware component, use of microprocessor and function of various chip used in microcomputer
- To describe Program design, software development and used of operating system.

PSO04 Course Title: -(Paper Code – 0856) **Computer Software**

Students will be able:

- To introduce the internet and web related technology
- To learn the intricacies of web page designing using HTML
- To introduce the OOP's concept using C++ language.

- To introduce the problem solving methodology using the C++ programming features.

Year: III

PSO05 Course Title: -(Paper Code – 0909) **Computer Hardware**

Students will be able:

- To introduce the overall organization of the microcomputer and the operating system.
- To introduce the interaction of common devices used with computers with operating system, excluding the assembly languages with special reference to DOS/WINDOWS.
- To introduce the working of hardware components, microprocessor and various chips used in microcomputer by operating system, without the use of electronic circuitry.
- To introduce the use of operating system, architecture with IBM-PC and clones, excluding assembly language, with form an important part of hardware.

PSO 06CourseTitle: -(Paper Code – 0910) **Computer Software**

- To introduce database management system concepts.
- To introduce the relational database management system and relational database design
- To introduce the RDBMS Software and Utility of Query language
- To introduce basic concept of GUI programming and database connectivity using Visual Basic.

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DEPARTMENT OF SOCIOLOGY PROGRAMME SPECIFIC OUTCOMES

Sociology seeks to understand all aspects of human social behavior, including the behavior of individuals as well as the social dynamics of small groups, large organizations, communities, institutions, and entire societies. Sociologists are typically motivated both by the desire to better understand the principles of social life and by the conviction that understanding these principles may aid in the formulation of enlightened and effective social policy. Sociology provides an intellectual background for students considering careers in the professions or business. An Honours Graduate student of Sociology should able to develop:

- Critical Thinking: The programme seeks to develop in students the sociological knowledge and skills that will enable them to think critically and imaginatively about society and social issues.
- Sociological Understanding: The ability to demonstrate sociological understandings of phenomena, for example, how individual biographies are shaped by social structures, social institutions, cultural practices, and multiple axes of difference and inequality.
- Written and Oral Communication: The ability to formulate effective and convincing written and oral arguments.
- Better understanding of real life situation: The ability to apply sociological concepts and theories to the real world and ultimately their everyday lives.
- Analytical thinking: Field survey and preparation of dissertation paper is an inseparable part of Sociology Hons Programme. Students have to collect primary data for census as well as his/her research topic and analyse the data to draw conclusions. So, qualitative and quantitative analytical skills are enhanced.
- Observation power: a sensible observation power is necessary to identify the research problems in field study. So a perception about human society slowly grows up.
- Communication skills and Social interaction power: Students of Sociology stream have to work beyond the class room boundary at the time of field study activities. As a result good communication skill develops while interacting with local people.
- Ethical and Social Responsibility: Students have to learn about institutions, folkways , mores, culture, social control ,social inequality, population composition, population policy, society and culture of India. All these help to instill among the students of Sociology a sense of ethical and social responsibility.
- Professional and Career Opportunities: Students will have the opportunity to join professional careers in Sociology and allied fields. Sociology provides an intellectual background for students considering careers in business, social services, public policy,

government service, nongovernmental organizations, foundations, or academia. This programme lays foundation for further study in Sociology, Social work, Rural Development, Social Welfare and in other allied subjects.

COURSE OUTCOME

COURSE-I: INTRODUCTION TO SOCIOLOGY

The course is intended to introduce the students to a sociological way of thinking. It provides an understanding of the discipline of Sociology and sociological perspective. It also provides foundation for other more detailed and specialized courses in sociology. Students will be able to

- Define Sociology and demonstrate nature, scope and subject-matter of Sociology.
- Demonstrate how Sociology differ from and similar to other social sciences and theirareas of interdependence.
- Acquaint themselves with the basic concepts of Sociology like society, community,association, culture, social change, social stratification etc.
- Know the basic social institutions like family, marriage, kinship in a scientific way.
- Understand and demonstrate how self develops through various process of interaction. Demonstrate how societal and structural factors influence individual behaviour.
- Explain social change and the factors affecting social change. Realize the importance of cultural lag to understand social change.

COURSE-II: RURAL SOCIOLOGY IN INDIA

The course explores substantive issues in Rural Sociology. It gives attention to Indian themes. Studying the course students will be able to

- Define Rural Sociology and demonstrate nature, subject-matter and importance ofstudying Rural Sociology.
- Understand and analyze social, economic and political aspects of rural society.
- Demonstrate how caste system operates and its importance in rural society.
- Define and demonstrate democratic decentralization of power and importance ofPanchayati Raj Institution in bringing about changes in rural society.
- Understand the changes that are taking place in rural society with reference to agrarian reforms and rural development programmes.

COURSE-III: INDIAN SOCIETY AND CULTURE IN INDIA

This course is intended to introduce the students to basic social institutions to describe Indian society and culture of different periods from pre-history to modern era. It also provides knowledge about various social processes that play significant role in bringing about changes in Indian Society and Culture. Studying the course students will be able to

- Explore the roots of Indian civilization.
- Know economy, polity and society of ancient, medieval and modern India.
- Understand and analyze the key concepts of Hinduism, Jainism, Buddhism, Islam andimpact of these religions on society.
- Understand and analyze the areas of interrelations between India and South Asia.
- Demonstrate social, economic, political transformation of Indian society under colonialrule.
- Realize the basic issues of Indian society like unity in diversity, problems of nationalismand principles of Indian Constitution.
- Define globalization and analyze its impact on social, economic, political, culturalspheres.

COURSE-IV: SOCIOLOGICAL THEORY

The course aims to provide a general introduction to sociological theory and thought. The paper acknowledges the contributions of both western and Indian scholars in the development of sociology. It provides the students an opportunity to

- Define sociological theory, understand its features and describe and illustrate the role oftheory in building sociological knowledge.
- Introduce themselves to the classical theories of Sociology and contributions of different thinkers in this regard.
- Know the contributions of founding fathers of Sociology in developing sociology as an academic discipline.
- Understand the concepts and contributions of Indian social thinkers in the reform ofIndian society as well as to enhance knowledge about society.
- Know the contributions of Indian Sociologists in the development of sociologicalthought.

COURSE-V: SOCIOLOGY OF TRIBES, MINORITIES AND OTHER WEAKER SECTIONS

The course aims to draw attention mainly to the problems, policies and programmes taken for the upliftment of the backward sections of Indian society and causes of their backwardness. The

paper also throws light on the socio –economic life of the backward sections of Indian society. Studying the course students will be able to

- Introduce them with the geographical distribution, economy, polity, social organizationof tribal life of India.
- Know the problems faced by the tribes and policies and programmes taken by the Govt.for the upliftment of tribes.
- Understand social, economic and cultural features of minorities and other weaker sectionin India.
- Learn about the Constitutional Provision for the protection of minorities and other weakersection in India.
- Learn about the Reservation Policy in India.

COURSE-VI: URBAN AND INDUSTRIAL SOCIETY IN INDIA

Urban and Industrial Sociology are two specialized branches of Sociology. This course provides an exposure to key theoretical perspectives for understanding urban life in historical and contemporary contexts. Industrial Sociology intends to familiarize the students mainly with the process of industrialization and its impact on society. Students will get an opportunity to

- Define urban sociology and demonstrate the nature and scope of urban sociology.
- Develop an understanding about trends of urbanization in India and impact ofurbanization on Indian society.
- Develop awareness about urban problems and policies adopted to solve such problems.
- Define industrial sociology and demonstrate the nature and scope of industrial sociology.
- Develop an understanding of the process and trends of industrialization in India andimpact of industrialization on Indian society.

COURSE-VII: SOCIAL DEMOGRAPHY AND SOCIAL PROBLEMS IN INDIA

This course provides an understanding of the interrelation between population and society. It analyzes the impact of fertility, mortality and migration on the composition, size and structure of population. The course also addresses various problems of Indian society and measures taken to eradicate these problems. Studying the course students will gather knowledge on

- Key concepts of Social Demography.
- Demographic factors of social change.
- Theories of population.
- Factors affecting mortality and fertility.
- Population policy in India.

- Various social problems in India like poverty, illiteracy, domestic violence, violenceagainst women and measures taken to eradicate the problems.

COURSE-VIII: SOCIAL RESEARCH METHODS, FIELD WORK AND VIVA-VOCE

The course is an introductory course on how research is actually done. With emphasis on formulating research design, methods of data collection, and data analysis, it will provide students with some elementary knowledge on how to conduct both, quantitative and qualitative research. Field work is an applied part of social research methods. This paper aims to aquaint students with empirical field data collection, analysis and writing analytical and standard dissertation or research report in sociology. From the course students will able to learn about

- Meaning, scope, types and significance of Social Research.
- Importance of research design in Social Research and how to formulate it.
- How to collect, analyze data and how to write a field report.

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COURSE OUTCOMES, PROGRAMME OUTCOME, PRPGRAMME SPECIFIC OUTCOME (CO.S, PO.S & PSO.S)

DEPARTMENT OF PHYSICS

Objective of the programme:

- To know about the fact and principles of science and its application, consistent with the stage of cognitive development.
- To acquire the skills and understand the method of processes that lead to generation and validation of scientific knowledge.
- To develop a historical and developmental perspective of science.
- To relate science education to environment, local as well as global and appreciate the issues at the interface of science, technology and society.
- To acquire the requisite theoretical knowledge and practical technological skill to enter the world of work.
- To nurture the natural curiosity, aesthetic sense and creativity in science and technology.
- To imbibe the values of honesty, integrity, cooperation, concern for life and preservation of environment.
- To cultivate scientific temper, objectivity and critical thinking.

B.SC. (Bachelor of Science)
Year first, second, third

Programme outcomes:

- After successful completion of three year degree program in physics a student should be able to;

PO-1. Demonstrate, solve and an understanding of major concepts in all disciplines of physics.
PO-2. Solve the problem and also think methodically, independently and draw a logical conclusion.
PO-3. Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the result of physic experiment.
PO-4. Create an awareness of the impact of physics on the society, and development outside the scientific community.
PO-5.To inculcate the scientific temperament in the student and outside the scientific community.
PO-6. Use modern techniques, decent equipments and phonics software's.

Programme specific outcomes:

PSO-1. Gain the knowledge of physics through theory and practical's.
PSO-2. Understand good laboratory practices and safety.
PSO-3. Develop research oriented skill.
PSO-4. Make aware and handle the sophisticate instruments/equipments.

B.sc. first year

COURSE TITLE: (Paper I-paper code 0793) Mechanics, oscillations and properties of matter.

- **COURSE OUTCOMES :-**

- Understand lows of motion, reference frames, and its applications i.e. projectile motion, simple harmonic oscillator, rocket motion, elastic and collision.
- Understand the idea of conservation of angular momentum, central forces and the effective potential.
- Understand the application of central force to the stability of circular orbits, Kepler's lows of planetary motion, orbital precession and Rutherford scattering
- Understand the dynamic of rotating, object i.e. rigid bodies , angular velocity the moment of inertia, parallel axis theorem , the inertia tensor ,the motion of rigid bodies .Non – inertial frames :pseudo forces, example involving the centrifugal force and coriolis force.
- Understand the basics of material properties like, elasticity, elastic constants and their relation, torsion of a cylinder, bending of a beam, cantilever, beam supported at its end and loaded in the middle.
- Understand the basics of motion of fluid which includes streamlined and turbulent flows, equation of continuity, critical velocity, flow of a liquid through a capillary tube capillaries in series and parallel, stoke's formula.

COURSE TITEL:- (Paper II paper code 0794) ELECTRICITY, MAGNETISM AND ELECTROMAGNETIC THEORY

- **COURSE OUTCOMES:**

- Know the vocabulary and concepts of physic as it applies to : principles of Electric Field, Gauss's law, Electric Potential, Capacitance and Dielectrics, Current and Resistance, Direct Current Circuits, Magnetic Fields, Sources of

Magnetic Fields, Faraday's law, Inductance, Alternating Current Circuits, and Electromagnetic Waves.

- Understand the relationship between electrical charge, electrical field, electrical potential and magnetism.
- Be able to use electromagnetic theory and principles in a wide range of applications.
- Learn a variety of advanced mathematical methods and computer techniques.
- Develop skill to solve numerical problems on it.
- Solve mathematical problems involving electric and magnetic forces, fields, and various electro-magnetic devices and electric circuits.
- Develop explicit problem- solving strategies that emphasize qualitative analysis steps to describe and clarify the problem.
- Gain confidence in their ability to apply mathematical methods to understand electro-magnetic problems to real- life situations.
- Ability to define and derive expression for the energy both for the electrostatic and magnetostatic fields, and derive poyntings theorem from Maxwell's equation and physical interpret.
- Ability to describe and make calculation of plane electromagnetic waves in homogeneous media, including reflexion of such waves in plane boundaries between homogeneous media.
- Understanding of electrodynamics and relativity.

- **Lab outcomes :**

- Understand physical characteristics of SHM and obtaining solution of the oscillator using experiment.

- Use both analytical mathematics and numerical method to explore the subjects mentioned above. In particular you should be able to analyse experiment oscillator or wave phenomena, such as sound, using suitable methods.

- Use lissajous figures to understand simple harmonic vibration of same frequency and different frequency.
- Solve wave equation and understand significance of transverse waves.
- Solve wave equation of a longitudinal vibration in bars free at one end and also fixed at both the ends.
- Obtain boundary conditions of a longitudinal vibration in bars free at one end and also fixed at both the ends.
- Gain knowledge an applications of transverse and longitudinal waves.

B.sc second year

COURSE TITLE:- (PAPER-I) THERMODYNAMICS, KINETIC THEORY AND STATISTICAL PHYSICS

- **COURSE OUTCOMES:**

After studying the chapter, the student will be able to understand.

- Lows of Thermodynamics, transport phenomena and maxwell's expression of velocity.
- Carnot's theorem and reversible and irreversible process.
- Entropy- reversible and irreversible process, temp-entropy diagram.
- Joule –Thomson Effect porous plug experiment.
- Basic lows – Stefan's fourth power low, Rayleigh jeans low, plank's low, black body radiation, specific heat of gases- variation of specific heat of diatomic gases.
- Familiarize in depth about statistical distribution and have basic ideas about Maxwell 's Boltzman, Bose – Einstein and Fermi Dirac statistical and their applications.

COURSE TITLE-: (paper II) WAVES, ACOUSTICS AND OPTICS

- **COURSE OUTCOMES:**

After studying the chapter, the student will be able to understand

- Solve wave equation and understand significance of transverse waves.
- Solve wave equation of a longitudinal vibration in bars free at one end and also fixed at both the ends.
- Use Lissajous figures to understand simple harmonic vibration of same frequency and different frequencies.
- Understand the concept of mechanics, acoustics and the properties of
- To have developed the idea of interference, diffraction and polarization and to solve problems related to the phenomena.
- Understand about different laser systems and its application.

- **LAB OUTCOMES:**

- Student would gain practical knowledge about heat and radiation,

thermodynamics, thermo emf, RTD etc. and perform various experiments.

- The practical knowledge of wave motion doing experiments: tuning fork, electric vibration. they would also learn optical phenomena such as interference, diffraction and dispersion and do experiments related to optical devices: prism, grating, spectrometers.

B.sc third year

COURSE TITEL: (Paper I-paper code 0893) Relativity ,Quantum mechanics, Atomic molecular and nuclear physics.

- **Course outcomes:**
  - Know the Cartesian, Spherical polar and Cylindrical co-ordinate systems.
  - To understand the Special theory of Relativity.
  - Discuss the Michelson – Morley Experiment.
  - To obtain the series Solution by Frobenius method.
  - Study the generating function for Legendre, Hermite Polynomials.
  - Understand De – Broglie hypothesis and uncertainty principle.
  - Derive schrodinger's time dependent and independent equation .
  - Solve the problems using schrodinger's steady state equation.
  - Get knowledge of rigid rotator.
  - Understand different operator in Quantum Mechanics.
  - To know the Rutherford experiment of atom,to understand molecular spectra of atom , to study the Raman Spectra. To study the Zeeman effect, to understand the quantum numbers.
  - Know the properties of nuclear likes binding energy, magnetic dipole moment and electric quadruple moment.
  - To understand the concept of radioactivity and decays law.
  - To study achievement of Nuclear Model of physics and its limitations.
  - To give an extended knowledge about nuclear reactions such as nuclear fission and fusion
  - To understand the basic concept of particle physics.

COURSE TITEL: (Paper II- paper code -0894) Solid State Physics, Solid State Devices and Electronics.

- **Course outcomes:**
  - Know the principle of structures determination by diffraction.
  - To understand the principles and techniques of x- rays diffraction.
  - Know the fundamental principles of semiconductors and be able to estimate the charge carrier mobility and density.
  - To give an extended knowledge about magnetic properties like diamagnetic, paramagnetic, ferromagnetic, ferrites and superconductors.
  - Understand the basic concept of force between atoms and bonding between molecules.
  - Understand of diffraction experiment and reciprocal lattice.
  - Understand crystal vibrations: phonon heat capacity and thermal conductivity.
  - Understand free electron Fermi gas: density of states, Fermi level and electrical conductivity.
  - Understand electronic in periodic potential: energy bands theory classification of metals, semiconductors and insulators.
  - Understand semiconductors: band gap, effective masses, charge carrier distributions, doping, PN junction.
  - Understand metals: Fermi surface, temperature dependence of electrical conductivity.
  - Understand the relationship between conductor and insulators and super conductivity.
  - Understand the properties of matter and classification polarization.

- Understand the properties of semiconductors.
- Understand the relationship between semiconductor devices and understand the application of semiconductor device.
- Know the special purpose diode.
- To study the transistor amplifier.
- To understand the FET, JFET, MOSFET.
- To study the operational amplifier and their types.
- To know the timer IC-555 and its classification.
- To study the regulated power supply.
- To understand the sequential logic circuits.

➢ **Lab outcomes:**

- Understand the application of diode , npn transistor, OP-AMPand logica gates.
- Understand half adder and full adder
- Understand tunnel diode characteristics. (V-I)
- Understand optical components and systems.
- Understand and choose ,different models for light.
- Ability to calculate light level and ray paths in optical systems.
- Understand the operating principle of some important types of optical instruments.

➢ **SCOPE OF B.SC PHYSICS:**

1. B.sc physics paves a strong ground for student for further studies in physics concentrated courses. It also trains graduates to get entry – level jobs in the private or government sector.
2. Candidates who study B.sc physics degree also gain expertise in lab work through practical session and training programmes which help them excel at the workplace.
3. Student who are creative and have an interest in physic and relevant subject can pursue B.sc physic course .it is a good option for those who wish to study, explore and experiment in fields related to physic .they can implement their imagination in understanding the scientific phenomena and discover methodologies for the benefit of mankind.
4. After completion of B.sc physic course candidates con go for higher education or they can get a job in a relevant field .check various options available for higher education and job opportunities for B.sc physics candidates.

➢ **HIGHER EDUCATION AFTER B.SC PHYSICS**:

After the completion of B.sc degree course, student can pursue higher studies from top educational and research institutes in India.

Candidates can appear in national level entrance tests through which they can take admission in top institutes like IIT.

Here is a list of entrance examinations for higher education after B.sc physics: IIT JAM, JEST, TIFER GS.

➢ **JOB ROLES FOR B.SC PHYSICS GRADUATES :**

There are various job roles that b.sc physics candidates can opt after the completion of studies . here is the list of some of the job roles available :

PHYSICIST: A physicst is a person who studies and discovers the interaction of matter and energy. They perform experiments and investigate the theories of physics to reach a conclusion.
Usually, a PHD holder in physics becomes a Physicist. However, B.sc physics are also eligible to work as a research assistant or technician in a similar field. for growth and secure job as a physicist ,the candidate must go for higher studies in physic like M.sc or PHD.

PHYSICS LECTURER: A candidate with sound knowledge in a physics subject can join an institute or academy as a lecturer. It is a decent job role and candidates can expect a good salary as a lecturer. Further, they can pursue master's degrees for growth in the career.

LAB ASSISTANT: Candidates who hold ab.sc physics can work as a lab assistant in various firms, clinics or laboratories or institutes. Such professionals handle technical equipment and act as a helping hand for their supervisors.

Subject matter expert (SME): B.sc physics graduates can work as a subject matter expert in various organisations. Such candidates are responsible to creates content as per the requirement of the client. They are responsible to create effective and format based content as specific.

RESEARCHER: Candidates who hold a B.sc physics degree can apply for researcher or scientist posts at top organisations in India like DRDO, BARC, ISRO, NTPC, BHIL etc.

TECHNICIAN: various private organisations hire candidates with B.sc physics degree for technical support /technician jobs. candidates can look for vacancies and apply for the same .