



# Maharaja Ranjit Singh College of Professional Sciences-Indore

## Bachelor of Business Administration (BBA)

### Program Outcomes

After graduating the students will be able to:

- Exhibit an understanding of broad business functions – key concepts and principles.
- Providing global perspectives to effectively manage business challenges/opportunities.
- Demonstrate the ability to identify a business problem/opportunity, segregate its key components, and analyze the issues to draw appropriate conclusions and decisions, and the implications of the decisions in the global scenario.
- Develop the capabilities required to apply cross-functional business knowledge and technologies in solving real-world business problems.
- Developing Critical and Analytical Thinking Abilities, Creative Thinking Skills, Interpersonal and Intrapersonal Skills, Entrepreneurial Skills and Leadership Skills along with the technical aspects to resolve real world issues.
- Foster sensitivity to Societal Needs and Issues, Understanding CSR, Understanding Ethical and Sustainable Business Practices.
- Develop and demonstrate effective Communication Skills- in oral, written and digital form using appropriate supportive technologies.
- Develop and build Employability Skills needed across business sectors to become employable.
- Become self-employable and self-reliant as well as provide employment opportunities to others.
- Stimulate interest in Research and Innovation.
- Facilitate all-round development of the students' personality, helping them become good human beings and responsible members of the society.





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## Program Specific Outcomes

### **BBA (Finance)**

With the help of finance specialization students can prepare themselves in making predictions and forecasts about investments and insurance. The course is designed in such a manner that the students gain theoretical as well as practical knowledge of financial components such as Investments, Portfolio Management, Working Capital Management, International Finance, International Financial Services, and Corporate Finance etc. The specific outcomes of the course are as follows:

- To help students attain managerial/leadership roles by gaining in-depth knowledge of banking and finance.
- To acquire a professional qualification in banking.
- Encourage research so that students can pursue their Master's degree.
- Prepare students for numerous job opportunities available such as, Credit Analyst, Financial Investment Analyst, Loan Counsellor, Finance executive, Internal Auditor, Business analyst etc.
- To engage students in at least one internship or service learning experience to demonstrate relevancy of foundational and theoretical knowledge of Finance academic major and to gain career related experiences.

### **BBA (Human Resource)**

Specializing in HR or Human Resource Management enables students to understand and gain in-depth knowledge of human behavior, application of the various behavioral techniques to influence employee behavior so as to achieve business/competitive success through managing individuals and teams. Managing human resources effectively is crucial for optimal use of their talent and strategic business success. The specific outcomes of the course are as follows:





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- To help students understand in theory and practice, the principles of Motivation, Leadership, Team Building, Organization Culture, Change Management, Conflict management, Negotiation etc.
- To help students understand in theory and practice, the Employment Function, Training & Development, Career Planning and Development, Grievance handling, Discipline etc.
- To understand the importance of various Labour Laws, Labour-management Relations and their implications for business decisions.
- Prepare students for numerous roles in HRM field such as, HR Analyst, HR Executive, Recruiter, Learning and Development Specialist, OD Consultant, Labour Law Officer etc.
- To engage students in at least one internship or service learning experience to demonstrate relevancy of foundational and theoretical knowledge of HR academic major and to gain career related experiences

### **BBA (Marketing)**

To get insights and gain in-depth knowledge of and display competencies in all functional areas of Marketing Functions as Retailing, Product Development, Advertising, Brand Management, Consumer Behavior, Sales and Distribution, Marketing Research, Digital Marketing etc. The specific outcomes of the course are as follows:

- To help students get familiarized with the application of theory into practice of various marketing functions.
- To help students identify the paradigm shifts in marketing functions of business with increasing scope of technology and e-business.
- To prepare and develop the students for career in the various fields such as, Advertising, Consultancy, Banking, FMCG, Retail, Tourism, Media Sector etc.





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- Prepare students for numerous job opportunities available such as, Marketing Manager, Brand Manager, Sales Manager, Media Planning, Marketing Research Analyst, Product Management etc.
- To engage students in at least one internship or service learning experience to demonstrate relevancy of foundational and theoretical knowledge of Marketing academic major and to gain career related experiences.





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## Course Outcomes

### BBA I SEM

#### Managerial Skills (BB101)

- Enable students understand what is meant by management, importance of management principles and managerial effectiveness.
- Gain an understanding of the functions and responsibilities of managers.
- Identify and demonstrate the various roles which are fulfilled while working as a manager.
- Identify the managerial activities that contribute to managerial effectiveness.
- Exposure to and development of essential managerial skills as -Creative Problem-solving, Communication Skills, Interpersonal Skills, Intrapersonal Skills, Time-Management Skills, Leadership Skills, Delegating, Empowerment etc.
- Identify the causes of stress and everyday stressors in managerial life arising from conflicting roles and expectations.
- Understand time pressures in business decisions and the need for proactive management.
- Exposure to various tools and techniques that can be used in the performance of the managerial job.

#### Fundamentals of Management (BB102)

- To enhance student abilities and help them learn emerging ideas and practices in the field of management with respect to business enterprises.
- To understand the various concepts of the contemporary management practices in the changing business scenario.
- Understand the conceptual knowledge about nature, complexity, functions of management etc.





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- Identify the contributions of Taylor, Henry Fayol and Drucker and their relevance in contemporary business environment.
- To understand and apply the managerial tasks of planning, organizing, staffing, directing and controlling in a variety of business circumstances.
- To recognize and develop the skills required to manage and control diverse workforce.
- Enable the students learn professional challenges that manager's face in various organizations, and the need and importance of taking ethical decisions.

### **Economics-1 (BB103)**

- To learn the importance of business economics.
- To introduce students to the central concept of microeconomics analysis and decision-making in business environment.
- To help understand the different concepts of economics such as demand, supply, utility etc.
- Learn to interpret concept and relationship of law and variable proportion and return scale.
- Learn to apply economic analysis in the formulation of business policies.
- To learn usage and application of basic economic reasoning and principles to solve problems of business.
- To describe and apply the methods for analyzing consumer behavior through the analysis of demand and supply in business environment.
- To identify and appraise various models of how markets are organized and price and output decisions taken for maximum profit.





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## Basic Accounting (BB104)

- Develop an understanding of accounting concept for effective recording of business operations of and entity with special reference to corporate form of business organizations.
- Identify the purpose and needs of recording financial transactions in business organizations.
- Understand the basic concepts of accounting and its conventions.
- Understand accounting structure by means of general ledger trial balance.
- Understand transaction of business with bank by means of bank reconciliation statement.
- Summarize accounting transaction to know the profitability of business by means of final accounts.
- Understand accounting process in Companies and International Accounting Standards of accounting.

## Hindi (BB105)

- Understand communication process and barriers to communication.
- Develop skills for Verbal and Non-verbal communication.
- Have ability to give Effective Presentations.
- Understand the basics of Internal as well as External communication.
- Develop business and social etiquette.

## Information Technology: BB106

- To offer understanding of basics of computer, IT concepts and their application in day to day running of business.
- Understand the issues involved in managing IT and information system initiatives.





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- Understand the importance of IT and evolving technologies in management with respect to the dynamic business environment.
- To use IT Tools to prepare, analyze and design management reports.
- Comprehend and resolve common desktop and network issues.
- Analyze common business functions and identify, design, and develop appropriate information technology solutions (in web, desktop, network, and/or database applications) in changing business environment.

## **BBA II SEM**

### **Business Communication (BB201)**

- To understand the significance of all forms of effective business communication in the dynamic business scenario.
- To develop the ability to write various types of business letters, business reports and making effective presentations.
- To understand and analyze body language for effective communication.
- To learn and demonstrate optimum use of correct Business Vocabulary and Grammar in oral and written communication.
- To develop the communication skills required in business scenario such as listening skills, writing skills, oral skills.
- To learn draft effective business correspondence with brevity and clarity such e-mails, project reports, memos etc.
- To prepare students to be industry ready- through Interviews, Group discussions, Role-plays, Presentations etc.





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## Human Resource Management (BB202)

- To identify the basic concepts of Human Resource Management and the terminologies used.
- To understand the significance of HR Discipline in business so as to achieve strategic competitive edge in changing business environment.
- To learn motivate and manage diverse workforce through application of HRM principles.
- To critically analyze the human resource needs of an organization and formulate a human recourse plan accordingly and subsequent job analysis in different organizations.
- To understand and critically evaluate important HR functions such as recruitment, selection, training and development, career planning and development, grievance handling and discipline systems.
- To understand performance management system and learn application of various methods to evaluate employee performance.
- To understand the factors influencing wage and salary decisions and learn design compensation structures for different business needs.

## Economics-II (BB203)

- To describe and analyze the economy in quantitative terms using employment and national income statistics.
- Understanding and describing the contemporary banking and monetary systems.
- To help students examine and utilize simple contemporary economic model such as the Aggregate demand and Aggregate Supply Model.
- To understand and describe the interrelationship among prices, income, and interest rate as they affect consumption, saving and investment.





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- Analyze fiscal, monetary policy decisions to counter business cycle swing by using macro- economic model.

### **Financial Management (BB204)**

- To familiarize and develop an understanding of basic concepts, tools and techniques for effective analysis and interpretations of financial statements for a firm.
- To familiarize and develop an understanding of methods used for efficient management of funds of a business entity with special reference to corporate form of business organization.
- Preparation of Cash Flow Statement as per Accounting Standards and its analysis.
- Critical evaluation of investment decisions, selection and valuation of Investment Proposals.
- Understanding the need for and computation of Working Capital for a firm.

### **English (BB205)**

- To enable students learn develop good working practice in English language.
- Read excerpts of fiction, creative non-fiction, essays, and opinion while analyzing the structural and sentence level arrangement of the writing.
- Read and understand works of famous poets as John Milton, Ben Jonson, and Thomas Gray etc., understanding the usage of rhyming words.
- Learn basic concepts of English Grammar and its usage such as Nouns, Pronouns, verbs, Active and Passive Voice etc.
- Write in an effective manner that demonstrates an understanding of the basic concepts of grammar through Paragraph writing, Precis writing, Essays and Business Applications.
- Effectively express and exchange ideas through various modes of communication.





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## Management Information System (BB206)

To enable students:

- To understand the use of information system in Business and Organization.
- To learn planning implementation and controlling of Management Information System.
- To understand basic concepts of information system and phases of development.
- To help in managerial decision making with understanding to decision support system.
- To understand file organization and database management along with control and security.

## BBA III SEM

### Marketing Management (BB301)

- Understand the concepts of Marketing, identifying customer needs, role in improving the product and/or service to satisfy customer needs.
- Expand the tools and techniques of marketing to reach potential customers.
- Understand and interpret the Product -mix, branding, Packaging, Product Life Cycle and Market Segmentation.
- Understanding Promotion-mix with practical examples of pricing, promotion mix and sales promotion.
- Evaluate the advertising, personal selling techniques and role of Advertising Standards Council India.
- Learn to contrast the services rendered by the channels of distribution.
- Develop contemporary as well as digital marketing skills.





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## Organizational Behavior (BB302)

- Understand the basics of human behavior- behavioral process, Theory of Multiple Intelligence and its implications for organizations.
- Analyze organizational behavior concepts, and correlate organizational behavior concepts with individual and group behavior.
- Understand the models of organizational behavior, Individual Behavior and Group Behavior.
- Understand values, attitudes and their importance in individual and group behavior.
- Evaluate personality types, perception, learning process on human behavior.
- Recognize the application of motivational theories in practical terms.
- Examine and understand the various Leadership Styles, Contemporary leadership styles, Women as a leader etc. and to develop leadership skills.
- Critically evaluate organizational culture, organizational change, resistance to change organizational development and implementing change interventions and their implications for organizations in changing business scenario.

## Business Environment (BB303)

- Demonstrate and develop conceptual framework of business environment, correlating it with threats and opportunities to a business.
- Understand how overall business environment helps firms in strategic decision making, future planning and to predict its impact on the firm.
- Analyze the economic environment, understand the role of Economic Policy, Structural reforms and Privatization and their implications for business.





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- Understand the Socio -cultural and Technological environments and their influence on the businesses to create, evaluate and assess a range of business options.
- Understand the impact of global environment and globalization and its relevance to Indian Business Scenario and the challenges of international business and foreign capital in Indian Business.
- Analyze and examine significant contemporary ethical issues and challenges facing organizations and the manager's social and environmental responsibilities to a wide variety of stakeholders, including employees, customers and the public in the current business context.

### **Business Costing (BB304)**

- Understand basics of Costing and Cost elements (material, labour, direct expenses and overheads).
- Understand various costing methods.
- Understands cost accounting system.
- Apply costing methods and costing techniques appropriately as per the nature of business and the requirement of the firm.

### **Operations Management (BB305)**

- Understand concept of production and operations management and its various functions to forecast the demand.
- Understand function and decision making in operations management.
- Understand production process and system.
- State the different plant layout designs and its procedures used by the organization.
- Understand importance of plant location and facility layout.
- Understand Material Management and quality control.





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## **Business Statistics (BB306)**

- Critically appraise the need for data analysis, learn to formulate and solve statistical problems.
- Understand and interpret the results of statistical analysis for improved managerial decision making.
- Demonstrate the concepts of statistics, mean, median and mode.
- Breakdown the measures of Dispersion such as standard deviation and quartile deviation.
- Examine the goodness of fit and correlation, ANOVA, Regression analysis.
- Examine Time series, its various trends and extrapolation with practical examples.
- To apply statistical analytical skills in different sectors of business organizations in the Indian context.

## **BBA IV SEM**

### **Entrepreneurship (BB401)**

- To understand and describe business opportunities and an in-depth understanding of characteristics of an entrepreneur and their role in the economic development of the country.
- To cultivate unique entrepreneurial skills such as thinking outside the box, problem-solving, decision-making etc.
- Cultivate and demonstrate knowledge to come up with business ideas, develop their own venture by helping them to learn about core business area such as finance, sales marketing, management and accounting.
- Learn and understand the key processes to bring new products and services to market by designing new business plan, organizing and executing a project report for a new venture foreseeing the entry barriers to the industry.
- Gain knowledge of the government policies and incentives for small enterprises.





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- Identify stages of growth in entrepreneurial ventures along with changing face of family business in India.
- To become self-employable by exploring the new entrepreneurial opportunities as an entrepreneur.

### Supply Chain management (BB402)

- To understand the process of overseeing and controlling the movement of goods and services from manufacture to the customer by logistics management.
- To demonstrate the complexity of inter-firm and intra-firm coordination.
- To understand the decisions involving investment in productive resources, configuration of processes and the development of partnerships with suppliers and channels of distribution.
- To use analytical tools and conceptual frameworks with an integrated IT focus to make decisions in supply chain contexts.

### International Business (BB403)

- To impart the students with an understanding of International Business.
- Understand the fundamentals of International Market and framework.
- Learn and understand the concepts related to international business with reference to decision making and factors affecting it.
- Understand the role and effect of international Institutions and trade agreements.
- Develop an understanding of India's participation in international or global trade.
- Awareness and understanding of the risks associated with international trade along with various factors.
- To examine the Regional Economic factors along with International Monetary and Financial System which effect International Business.





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## Indian Legal System for Business (BB404)

- To understand the rights the business have against other business and individuals by becoming aware of Laws in general in Indian context.
- To understand the Legal Environment of business and to apply basic legal knowledge to business transactions.
- To become familiar with the laws governing commercial deals.
- To create commercial contracts, by learning to communicate effectively using standard business and legal terminology.
- To increase over-all interest in laws prevalent in the country relevant to various types of businesses.

## Management Accounting (BB405)

- To provide a basic understanding of the Management Accounting tools for decision making in organizations.
- Understand the basic principles and relationship of Management Accounting with other accounting branches.
- Understand utility of budgetary control and various types of budgeting processes.
- Understanding of standard costing method for decision making.
- Understand of marginal costing as a tool for decision making.

## Operations Research (BB406)

- To gain an understanding and appreciation of principles and applications relevant to planning, design and operations of manufacturing/service firms.
- To understand the interdependence of operation functions with other key functional areas of the firm.
- To apply analytical and problem-solving tools to the analysis of the operations problems.





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- To increase knowledge and develop the necessary skills to lead business operations.

## BBA V SEM

### Customer Relationship Management (BB501)-Core

- To understand the core concept of CRM paradigm, its dimensions and significance for an organization as a business strategy to manage customer relationships.
- To design, develop and integrate CRM process with other functional areas of organization so as to develop a customer centric organization culture.
- To design and integrate CRM process in E-Business as a tool for managing customer relationships on online platform.
- To learn and demonstrate the tools and techniques to manage relationship with customers to build Lifetime value of customers.
- To understand the importance of implementing CRM by choosing the right CRM solutions.

### Research Methodology (BB502)-Core

- To provide knowledge and experience in applying commonly used qualitative and quantitative research methods to solve business problems as well as for research.
- To refine research questions to meet research objectives/questions.
- To build hypotheses to meet research objectives/questions and learn hypothesis testing.
- To build data collection instruments according to the underlying theoretical framework.
- To learn analyzing data using appropriate statistical tests and Statistical Packages.
- To understand the steps of business research and writing the research report.

### Indian Financial System (BB503)-Core

- Describe the role and structure of Indian system and financial markets.





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- Understand concepts of financial institution such as banking and non-banking Financial Institutions.
- Understand capital market and concepts related to primary and secondary market.
- Understand Institutional structures and Institutions providing Financial Services.

## **Project Management (BB504)-Core**

- Understand Project and project life cycle along with various analysis parts.
- Understand feasibility studies and project appreciation along with risk.
- Understand various techniques involved in project management like CPM and PERT.
- Understand project software, human aspects of project management and project monitoring.

## **Electives: Marketing**

### **Advertising and Brand Management (BB505M)**

- To identify and respond to clients advertising and marketing communication objectives by applying principles of communication.
- Relate theoretical aspects of advertising with practical situations.
- Develop unique promotional and branding strategies for positioning a brand.
- Understand the emerging trends in advertising and branding, ethical issues involved in adopting the emergent trends.

### **Sales and Distribution Management (BB506M)**

- To identify and respond to clients' distribution and selling needs.
- Relate theoretical aspects of sales and distribution with practical aspects.
- Develop unique sales and distribution strategies.
- Design effective distribution channels.





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## **Electives: Finance**

### **Banking and Insurance (BB505F)**

- Understand the importance of risk and insurance, with general principles of insurance.
- Understand life insurance, various other products and claims related to it.
- Understand general insurance and its mechanism along with variety of insurance available in this segment.
- Understand IRDA, its role and other rules related to insurance.
- Understand banking structure in India along with role of RBI.

### **Working Capital Management (BB506F)**

- Understand concept and principles of working capital.
- Understand calculation of estimation of Working Capital needs.
- Understand credit policy and management of factors affecting working capital.
- Understand inventory management and cash management.

## **Electives: HR**

### **Human Resource Development (BB505H)**

- To make the students aware of the various concepts, process and practices of HRD in the present dynamic corporate world.
- To develop the necessary skills as an HRD professional to build a HRD culture that enhances superior-subordinate relationships in the organization.
- To understand the concept of work-life integration along with career development.
- To develop a holistic approach towards employee development and culturally diverse employees.





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## Industrial Relations (BB506H)

- To develop the conceptual skills needed to understand the nature of the employment relationship.
- To acquaint the students with the Industrial Relations framework in the country.
- Understand the importance of maintaining industrial peace and efforts to reduce strikes and lockouts.
- Understand the laws regarding registration of Trade Unions, their rights and duties of a registered trade union.
- Critically examine the provisions of the Industrial Disputes Act, for the prevention and settlement of industrial disputes.
- Learn and understand the disciplinary and grievance handling procedures to be followed for misconduct.

## BBA VI SEM

### Total Quality Management (BB601)-Core

- Understand the evolution of quality, its dimensions and role in different systems of organization.
- Recognize and distinguish the salient features and importance of quality in services.
- Understand the scope, evolution and practices of TQM in manufacturing and service industries.
- Develop the skills for implementing TQM philosophy in organizations and analyze the resultant benefits by application of TQM tools.
- Understand the concept of Six-Sigma, its goals and implementation in manufacturing and service industries.





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## **Retail Management (BB602)-Core**

- Understand and apply the basic concepts of retailing to understand the market.
- Develop knowledge and understanding of the traditional retail formats.
- Understand and compare modern retail formats over traditional retail formats for current business scenario.
- Critically evaluate how strategic planning can enable organizations develop better retailing strategies and assessing future retail trends in India.
- Develop awareness and understanding of ethical and legal issues in retailing and how to deal with them.

## **Strategic Management (BB603)-Core**

- Gain knowledge of the various concepts in the field of strategic management and the ability to develop the skills for applying these concepts.
- Understand the concepts and tools that support strategic planning in organizations.
- Categorize the internal and external environmental factors affecting the organization.
- Apply the concepts to analyze strategic issues in organizations especially in relation to understanding the employability of various strategies in different situations.
- Develop knowledge of frameworks and concepts related to strategy formation, strategic changes and strategic innovation.

## **Indian Ethos in Management (BB604)-Core**

- Understand the relevance of Indian Ethos for enrichment of holistic leadership principles and practices.
- Understanding the significance of conducting business practices with ethical and moral values and the impact on various stakeholders.
- Applying ethics to business, management and decision making.





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- Understanding the application of several important concepts and frameworks of moral reasoning to complex business issues.
- Provide insights to students for developing leadership that is socially, environmentally and culturally responsible.

## Marketing

### Marketing of Services (BB605M)

- Gain an in depth knowledge of services as an essential economic activity.
- Understand the concept of effective service marketing, the challenges and the ability to handle the challenges and opportunities in marketing services globally.
- Understanding the service delivery process, its special features by mapping service encounters for satisfactory outcomes.
- Understanding market segmentation for services, developing strategies for targeting and positioning of services.
- Understanding the levels and dimensions of Relationship Marketing.

### Consumer Behavior (BB606M)

- Understand and apply the basic concepts of consumer behavior to understand the market.
- Understand the cultural environment and consumer behavior so as to develop appropriate objectives and strategies.
- Understanding and determining the consumer buying behavior process through various models.
- Understanding the significance and role of consumers' attitudes towards decision making process.
- Design and develop effective strategies after understanding consumer behavior.





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## **Electives: Finance**

### **Merchant Banking and Financial Services (BB605F)**

To develop an insight and understanding of Merchant Banking and Financial Services by learning and applying:

- Understand the nature, scope and regulation of Merchant Banking activities with special emphasis on Indian Merchant banking scenario.
- Examine Financial Services management as an important and contemporary area of financial management for a company.
- Understand the various financial services and their future.
- Determine the most suitable financial service by learning and applying Factoring.
- Developing a deep understanding on credit rating and its regulatory.

### **International Finance (BB606F)**

To develop an insight and understanding of International Finance by learning and applying:

- Concepts and theories related to international trade along with tariff and non-tariff barriers.
- BOP and its effect in the international market along with rules and regulations related to it.
- Structure of foreign market exchange and rules and regulations related to foreign exchange in foreign trade.
- Determination of foreign exchange rate, theories and, role of foreign exchange rate in international business.
- Role of International Financial Institutions and currency value in international Finance





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## Electives: HR

### Performance Management (BB605H)

- Understand and examine the importance of an effective performance management system in helping organizations define and achieve short and long term goals.
- Understand the importance of measuring the effectiveness of human resource activities that are designed to enhance individual and organizational performance.
- Design an organization's performance management process compatible with law and which supports organizational mission and strategy.
- Critically evaluate the various methods of potential and performance evaluation.
- Understand and examine Competency Mapping for managing employee performance effectively.
- Assess how increased employee involvement can contribute to effective performance, role of coaching and counselling employees to identify career paths and resources available to support individual development.

### Leadership Skills and Change Management (BB606H)

- Acquire an in-depth knowledge of the role and concepts of organizational change with special emphasis on the role of leaders in bringing about successful organizational change.
- Develop the ability to conceptualize the process of organizational change, understanding and applying models that describe that change, and the factors that drive and resist change.
- Understand the leadership process, the key role of leadership in bringing effective change, the desirable characteristics of good leaders, and the leadership styles especially in professional organizations.





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- Develop and acquire skills to be more effective members of teams, management of teams, and the ability to communicate more effectively with members of the organization.





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## Department of Computer Sciences

### **Program Outcome (BCA)**

At the end of the BCA the students will be able to

- Work in the IT sector as web developer, system administrator, software developer etc.
- This program integrates expertise of students in office support systems and software development area.
- Student shall develop competence in the field of Commerce, Management and Computational Tools.

### **Program Specific Outcomes (BCA)**

- Student shall have proficiency in computer.
- Student shall have an understanding of programming languages, operating system.
- Students shall have an understanding of Accounts, management.
- Student shall have an ability to apply knowledge of computing and mathematics appropriate to the discipline.
- Another Benefit of BCA is that student will have wide job opportunities.





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## COURSE OUTCOMES

### BCA I Sem

#### Mathematics I

- Limit continuity and differentiability of one variable.
- Successive differentiation, Mean value theorem, Taylor theorem.
- Curvatures, asymptote, reduction formulae.
- Differentiation of vector functions, curl, divergence and gradient.
- Rank, nullity and solution of simultaneous equations.

#### Programming & Problem Solving Through C-I

- To understand the concept of algorithm & flowcharts and types of languages and translators.
- To understand data types used in c language and type conversion concept.
- To understand the various types of operators and their uses. Concepts of conditional & iterative statements to write c programs.
- To understand the concept of array and its types, concepts of string and string functions.
- To be able to develop programs using structure and array of structure, concepts of pre processor and its types.
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## Statistics I

- To understand the concept of population and sample.
- To use frequency distribution to make decision
- To understand and to calculate various types of averages and variations.
- To use correlation and regression analysis to estimate the relationship between two variables.
- To understand the concept and techniques of different types of index numbers

## PC Software I

- To get the knowledge on working with Computers using windows
- Understand working with MS-Office. Creating, editing Document, formatting documents.
- Learn MS-Excel & its operations. Representing data using charts ,graphs etc.
- To get quick overview creating database, managing & editing.
- To learn how to present the ideas or any topic with the help of MS-Power Point.

## Physics I

- Frictional electricity
- Magnetic property of materials and magnetic circuits
- A C circuits
- Ohm's law and it's uses
- Classification of solids

## English I

- Students will able to understand the varieties of stories and poem on different issues by Indian authors.
- Students will able to understand the basic concept and language skills of English language.





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- Students will be able to understand the different use of vocabulary in their sentences.
- By comprehension and unseen passage students' ability increases to process text and understand its meaning.

### Digital Computer organization I (For sessions 2018)

- To understand fundamentals of computer and different types of input and output devices.
- To apply the principle of number system, binary codes and various binary operations.
- Acquire the knowledge about various logic gates and logic families and analyze basic circuits of these families, Boolean algebra and K-map to minimize logic expressions.
- To design various combinational and sequential circuits such as register and counter using flip-flops.
- To understand various memory systems and its comparison. Explain transfer of information between I/O devices, CPU and memory.

### BCA II Sem

#### Mathematics Paper - II

- Curve tracing, improper integration.
- Beta Gamma function, rectification.
- Multiple integrals, vector integration.
- Partial differentiation, mean value and Taylor's theorem of two variables.
- Maxima, minima of function of two and more variables, convergence of series.

#### Mathematics (For sessions 2020)

- Curve tracing, improper integration.
- Beta Gamma function, rectification.
- Multiple integrals, vector integration.
- Partial differentiation, mean value and Taylor's theorem of two variables.





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- Maxima, minima of function of two and more variables, convergence of

## Programming & Problem Solving through C-II

- Understand the concept of functions, its types, Advanced features of functions: Prototyping, back to function(return)
- Learn recursion and its types, Macro verses functions.
- Understand Pointer and its types, pointer and array, array of pointer, pointers array and pointer with 2-Dimensional array.
- Learn memory allocation and reallocation at run time.
- Understand concept of Union and accession of union member, union of structure.
- Understand Concept of Formatted and Unformatted functions (Input/Output and Console Input / Output).
- Learn File handling functions in C and command line arguments.
- Understand Display adapters, video modes and Resolution.
- Understand concept of color in text and graphics, video pages
- Learn Graphics programming built-in functions.
- Able to develop games and desired software.

## Statistics II

- To understand the concept of population and sample.
- To use frequency distribution to make decisions.
- Understanding theory of Probability.
- To study distribution of sampling and testing of Hypothesis.
- To use correlation and regression analysis to estimate the relationship between two variables.





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## Operating System Fundamentals II (For sessions 2018)

- To understand the basic of operating system, its types and storage structure and device management of operating system.
- To understand the concept of process and process scheduling and various CPU scheduling algorithms.
- To understand the concept of inter process communication, critical section problem and classical problem of synchronization.
- To understand concept of Deadlock, its characteristics and methods for handling deadlocks.
- To understand concept of Memory Management, virtual memory, memory allocation and various page replacement algorithms.

## Introduction to Information System Paper - II

- Understand Information system, its types, need, applications and components of Computer system and fundamental of data processing
- Understand scientific model its problems and opportunities, Developing and Implementing System solution methodology
- Understand characteristics of system, different phases of SDLC
- Understand MIS, its process and design such as form, database, Input/Output and file
- Understand E-commerce its types, application and EPS
- Understand Communication system and Internet, WWW, digital marketing & SEO

## Physics Paper - II

- Basic properties of electromagnetic wave propagation
- Interference
- Diffraction
- Polarization
- Doppler's effect of light and its application , LASAR





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## हिन्दी भाषा: II

- इस पाठ्यक्रम से विद्यार्थी हिन्दी भाषा और सम्प्रेषण कौशल को आत्मसात करेगा
- विद्यार्थी अपने समाज, इतिहास, संस्कृति और प्रकृति आदि के प्रति स्वस्थ एवं रागात्मक दृष्टि विकसित करने के दिशा में प्रवृत्त हो सकेगा
- विद्यार्थी भाषा के साथ सामान्य ज्ञान के विविध क्षेत्रों के सम्बन्ध में ज्ञान प्राप्त करेगा
- भाषा, साहित्य और संस्कृति से विद्यार्थी परिचित होकर अपने समाज और देश को अधिक समझ सकेगा
- विद्यार्थी श्रेष्ठ साहित्य के पठन-पाठन को प्रेरित होंगे।

## BCA III Sem

### Discrete Mathematics III

- Differential equations of 1st order and 1st degree, higher degree.
- Family of curves.
- Linear differential equation of second order.
- Initial and boundary value problems.
- Partial differential equation.

### Discrete Mathematics For sessions 2020

- Algebra of logic and Boolean algebra.
- Set and functions.
- Combinatory.
- Relations.
- Graph, tree, languages and grammars.

### Data Structure using C III

- To understand the concept of dynamic memory management, data types and algorithms.
- To understand basic data structures such as array, link list, stack and queue with different applications of data structures.





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- To understand the hash function and concepts of collision and its resolution methods.
- To solve problems involving graph, tree and understand different algorithms for traversing of graph and tree.
- Apply algorithm for solving problems like sorting, searching, insertion and deletion of data with different types.

### UNIX OPERATING SYSTEM III

- Understand the Concept of Operating System, logical architecture, Functions and types of Operating system.
- Understand the basic of UNIX operating system, its features, Kernel-Shell relationship and general utility commands.
- Understand File system of UNIX and its architecture
- Learn about the command shell, pipe redirection of input and output.
- Set and manipulate ownership and permission of files.
- Extract information by using Simple and Advanced filter commands.
- Learn about system process, shell process and process creation system calls
- Learn communication and scheduling jobs.
- Understand Unix editors, concept of Shell Script writing.
- Understand UNIX system administrator and its functions
- Learn about firewall, administration backup and user services.

### Accounting and financial mgt III

- To enable the students to learn principles and concepts of Accountancy
- Students gain Knowledge in the practical applications of accounting and technical expertise in maintaining the books of accounts.
- To instil the knowledge about accounting procedures, methods and techniques
- To enable students to understand the Basic concepts of Partnership Accounting.





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## Communication skill III

- To understand the meaning and various forms of Business Organisation.
- To understand the concept, process and importance of communication.
- To develop awareness regarding new trends in business communication.
- To provide knowledge of various media of communication.
- To develop business communication skills through the application and exercises

## OOPs Using C++ III

- Understand the basic concepts of OOPs such as abstractions, encapsulation, inheritance, polymorphism and its applications in solving real life problems
- Understanding about modular programming, functions and parameter passing within functions thorough programming
- Understanding the concept of objects, classes, building and destroying instances and functions to handle strings.
- Implement data encapsulation, polymorphism and overloading
- Implement inheritance, templates and exception handling

## BCA IV Sem

### Coordinate Geometry of Three dimension IV(2016-2017)

- Cartesian, cylindrical and spherical coordinates, Straight lines in 3-D
- Sphere, surface and conicoids.
- Conicoids and polar planes, Paraboloid ,
- Ellipsoid, director sphere, polar planes.
- Cone and cylinder.





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## Software Engineering IV

- Understand the Concept of System, its types and components, Environment.
- Learn about SDLC (System Development Life Cycle) and Its phases.
- Learn Software Engineering principles and techniques.
- Understand different models to develop system.
- Gain knowledge about analysis and design of complex systems
- Able to produce efficient, robust and cost-effective software
- Learn to manage time, processes and resources effectively.
- Learn to use different information gathering tools
- Understand different project sources and Evaluation process of projects by different committee methods
- Understand different issues such as modularity and coding statements.
- Learn to prepare System Requirements and SRS (System Requirement Specification) and RFP (Request for Proposal)
- Learn to apply Testing and Quality assurance techniques.
- Prepare Technical documentation and presentation on various aspects of a software development project.
- Understand maintenance and handle change request.
- Understand MIS, DSS and its components and Implementation in service sector.

## Computer Oriented Numerical Methods IV

- To find real roots of the equations using different iterative methods such as Bisection Method, False Position, Newton Raphson Method etc.
- To be able to solve simultaneous linear equations using different methods such as Gauss Elimination Method, Triangularization Method etc. Also learnt to solve the problems of curve fitting.





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- To find solution of all Interpolation problems using Newton's Forward, Backward, Divide interpolation formulas and Lagrange's Interpolation formula.
- To be able to solve numerical differentiation problems using different formulas and solve numerical integration problem using Trapezoidal rule, Simpson's 1/3 and 3/8 rules.
- To be able to find the solution of ordinary differential equation using different methods such as Euler's method, Euler's modified method and Runge Kutta Method etc.

### DBMS IV

- To understand DBMS architecture, physical and logical database designs, database modeling, relational, hierarchical, network and E-R models.
- Learn and apply structured query language (SQL) for database definition and database manipulation.
- Demonstrate and understanding of Normalization theory and apply such knowledge to the normalization of a database.
- To understand various transactions processing, concurrency control mechanism and database protection mechanism.
- To understand basic database storage structure and access techniques such as file organizations, indexing methods including B-Tree and hashing.

### Programming with JAVA IV

- Develop and understanding the features of JAVA programming language and its applications
- Implement the control structures in JAVA using programs
- Understand the concept of classes, objects, constructors, destructors, access modifiers, Inheritance, overloading and overriding by programs
- Understand the packages and interface, exception handling, threading in JAVA, JAVA I/O package by implementing programs





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- Handle strings in JAVA, various utility classes JAVA Util package and database connectivity by programs.

### **Environmental Awareness and Green Computing IV**

- Awareness about the environment and human dependence on the environment.
- Awareness about environmental pollution and factors causing environmental pollution.
- The impact of environment on one's life and future generation.
- Learning the alternative to live better, using the environmental resources in a replenish able manner.

### **Entrepreneurship IV**

- To enable the student to learn about the meaning of entrepreneurs and their work .
- To help students to increase their living standards and create capital .
- Entrepreneurship develops their initiative , lifelong learning process and helps them to be more creative and self – confident in whatever they undertake and to act in a socially responsible way
- To help them learn about the project writing , reports , government policies and how to overcome these challenges and problems .

### **Digital Computer organization IV**

- To understand fundamentals of computer and different types of input and output devices.
- To apply the principle of number system, binary codes and various binary operations.
- Acquire the knowledge about various logic gates and logic families and analyze basic circuits of these families, Boolean algebra and K-map to minimize logic expressions.
- To design various combinational and sequential circuits such as register and counter using flip-flops.





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- To understand various memory systems and its comparison. Explain transfer of information between I/O devices, CPU and memory.

## BCA V Sem

### Discrete Mathematics and linear algebra V

- Algebra of logic and Boolean algebra.
- Boolean functions and fundamental forms.
- Basic concepts of sets, functions, groups, subgroups, cosets and normal subgroup, ring, field.
- Vector space, linear maps on vector space.
- Matrix representation of linear transformation, eigen values, eigen vectors.

### Linear Algebra Geometry For sessions 2020

- Basic concepts of sets, functions, groups, subgroups, cosets and normal subgroup, ring, field.
- Vector space, linear maps on vector space.
- Matrix representation of linear transformation, eigen values, eigen vectors.
- Conicoids and polar planes, Paraboloid ,
- Ellipsoid, director sphere, polar planes.Cone and cylinder

### Introduction to Data Science V

- Learn fundamentals of data Science
- Work with R language to analyze structured and unstructured data
- Develop the ability to build and assess of data-based models
- Predict outcomes with supervised and unsupervised machine learning techniques





Established by Government of Madhya Pradesh in 1994

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## Information Technology Trends V

- Get knowledge about Modern Communication system
- Be familiarized with concept of Mobile Commerce and Geographic Information system
- Understand the concept of Data Warehouse, Data Mining and Big data
- Understand the use of Artificial Intelligence and IoT in current context.

## Computer Networks V

- Independently understand basic computer network technology
- Understand & explain data communication system & its components
- Identify different types of networks topologies and protocols
- Enumerate layer of OSI and TCP/IP model and function of each layer
- Identify different network devices and their functions within network
- Understand and building the skills of subnetting & routine mechanisms
- Get familiarity with the basics protocols of computer networks and how they can be used to assist in network design and implementation.

## Introduction to Cloud Computing V

- Understand the core issues of cloud computing
- Security, Privacy and Interoperability
- Identify Problems and Explain problems
- Analyze and evaluate various Cloud computing solutions.

## Human Values and Professional Ethics V

- To be a better human being.
- Understanding the concepts of how moral values and ethics influence the personality of a person.





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- Helping individual to achieve success in all walks of life including their profession using human values.

## BCA VI Sem

### Operational Research VI

- Identify and develop operational research models from the verbal description of real system
- Analyze the different operation research model data needed to solve optimization problems
- Understand the mathematic tools that are needed to solve business problems
- Formulate and solve the problems as networks and graphs
- Apply analytical skills and problem solving tools to the analysis of operations problems

### Internet and Web Technology using PHP VI

- Develop and understanding about the basic concepts of webpage design using HTML and CSS
- Develop and understanding about the website development using PHP
- Create powerful and dynamic web applications using PHP & MYSQL
- Build a simple, yet functional web application using PHP/ MYSQL

### Computer Graphics and Multimedia VI

- Learn the basic concepts of Computer Graphics
- Implement various algorithms to scan, convert the basic geometrical primitives, transformation, area filling, clipping
- Create 2D animations using tools
- Create 3D graphical seen using open graphics library suits
- Implement image manipulation and enhancement
- Lear fundamentals of animation and its related technologies





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## Principal and Practice of Management VI

- To provide basic knowledge & understanding about business management concept.
- To provide an understanding about various functions of management.
- Learning about the need of planning organising , Directing and controlling in management.
- To understand the need of motivation and various theories related to motivation.
- To understand the importance and need of leadership and various types of leadership





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## U.G. Program Outcomes

### Department of Arts

- The students acquire knowledge in the field of social sciences, literature and humanities which make them sensitive and sensible enough.
- The B.A. graduates will be acquainted with the social, economical, historical, geographical, political, ideological and philosophical tradition and thinking.
- The program also empowers the graduates to appear for various competitive examinations or choose the post graduate programme of their choice.
- The B. A. program enables the students to acquire the knowledge with human values framing the base to deal with various problems in life with courage and humanity.
- The students will be ignited enough to think and act over for the solution of various issues prevailed in the human life to make this world better than ever.
- Programme provides the base to be the responsible citizen.

### Programmers' Specific Outcomes (Economics + Sociology + Hindi literature)

On completion of the Program student able to :

- Pinpoint and understand the past, present Socio-economic conditions of the country. They are equipped with the techniques to find solution of the problems.
- As the Under Graduate Course (UGC) contains the fields like statistics and economics principles, it enhances them to compute and assess the real situation of the economy and social structure.
- Its include the size and changes of population, income pattern, nature of an extend of employment, rate of development with pattern of investments and savings, policies in relation to other countries, and social security measures adopted in the country.
- Basically, these graduates are familiar with the knowledge and application of Indian Economy and society.





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- Students will develop functional knowledge of Hindi.
- They will be confident at listening, speaking reading and writing skills.
- Demonstrate the oral communication skills needed to participate in a conversation.
- Students will be able to increase confidence in speaking publicly.
- Graduates from our department are effectively taught and explained the cause with the help of visual aids like white board and PowerPoint presentation. They will be able to visualize the real world situation and enhance them to initiate the programmes for pursuing studies and be alert with the importance of entrepreneurial skills for their self-employment, to improve the general attitudes and living conditions of the masses.

## Programs Specific Outcomes

### (Economics + Computer Application + English Literature)

On completion of the Program student able to :

- Pinpoint and understand the past, present economic conditions of the country. They will also be able to forecast the future course of changes and development through their knowledge of policies and programs set by the governments and other development agencies. They are equipped with the techniques to find solution of the problems like mobilization of manpower and materials available in the country.
- As the Under Graduate Course (UGC) contains the fields like statistics, mathematics and economics principles, it enhances them to compute and assess the real situation of the economy including the size and changes of population, income pattern, nature of an extend of employment, rate of development with pattern of investments and savings, policies in relation to other countries, and social security measures adopted in the country.
- Basically, economic graduates are familiar with the knowledge and application of microeconomics and Indian economics for the formulation of policies and planning. They are equipped with all the relevant tools/ knowledge based on economic





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principles including market functions and structures, efficiency in manpower and resources management, need of credit/finance for initiating and accelerating projects.

- Though the syllabi do not contain research methodology, students are taught the techniques to collect and disseminate information like primary and secondary data, preparation of questionnaire. Students are deployed to do survey and on the spot interaction with the personnel of the case under study. Students who graduated from this institution are directly involved and effectively participate in the discussions and final presentation of the findings of the projects undertaken.
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## Course Outcomes

### Economics Group

#### B.A I Year

##### Paper I – Micro Economics

- Develop ideas of the basic characteristics of Micro Economics, its utility, Supply, Commodity, Public Goods and Private Goods.
- To understand Law of Demand and its exceptions, Elasticity of demand and price.
- Demonstrate marginal productivity theory of distribution, theory of wages, identify different types of rent, and illustrate different theories of interest and profits.
- Understand how factor market works, identify the various determinants of firm's demand for factor services, bilateral monopoly, market equilibrium.

##### Paper II – Indian Economy

- Develop ideas of the basic characteristics of Indian economy, its potential on natural resources.
- Sensitize the overall development and engine of growth in agriculture. Draw distinctive features of rural and urban economy or agricultural and non-agricultural which can influence the whole economy.
- Gain knowledge of the causes of regional variations in productivity and production, social and economic inequality, size of land holdings and lack of quality inputs etc. and suggest appropriate measures for the whole economy.

#### B.A. II Year

##### Paper I - Macro Economics

- This course will help the students to access knowledge on the followings Concepts and methods of National income accounting.
- Theories of aggregate income and employment.
- Theories of consumption function and investment spending.
- Rate of interest- Classical, Keynesian and IS-LM Model





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- Basics of international trade -open economy and closed economy, balance of payments etc.

### **Paper II – Public Finance and International Economics**

- Enable the students the pattern and nature of international trade and their contribution to economic development. It also enables learners to know the role of public authorities in raising revenue and its spending.
- Role and significance of public finance including market economy.
- Public revenue – tax and non-tax revenue, theories of taxation etc.
- Pattern and trend of Public expenditure.
- Public debt – sources of public debt, methods of debt redemption, debt management policy.
- Public enterprises and public utility- forms, pricing policies etc.
- After completion of this paper student will get to know from traditional to modern, theoretical to analytical development of international economies.
- International trade policy - free trade and protection, globalization, capital movements etc.
- Foreign exchange markets, exchange rates, balance of payments
- Evolution of international monetary system, WTO, IMF etc.





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## English Literature Group

### B.A I Year

#### PAPER I (POETRY)

- To develop an understanding of poetic forms.
- The students would gain a brief understanding of the socio-political issues of the times in which the poems were written.

#### PAPER II (DRAMA)

- Through the prescribed plays the students would get a glimpse of the social problems prevalent in the twentieth century England and twenty first century India.

### B.A. II Year

#### PAPER I (POETRY)

- To gain insight into poetic devices employed by the poets who came after nineteenth century.

#### PAPER II (DRAMA)

- The students would get a deeper understanding of the Elizabethan Age.
- To decipher the relevance of Shakespeare in contemporary times.
- To analyze how Shakespeare universalizes human emotions.





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## Sociology Group

### BA I Year

#### Paper 1 Basic Concept of Sociology

- The students are able to understand origin of concept sociology and its scientific nature and its relationship with other social sciences and its branches.
- The basic concepts like social structure, function, values and role and status. It also helps to understand social control agencies and their influences and culture, its elements and socialization processes.

#### Paper 2 Indian Society

- Understand and analyze the key concepts of Varn System, Ashram System, Purusharth and Sanskar.
- Understand Indian Caste System and Family System.
- Realize the basic issues of Indian society like Dowry, Divorce, Domestic Violence, Communalism, and Gender Inequality.

### BA II Year

#### Paper 1 Social Processes and Change

- It helps to understand various social institutions like marriage, family, kinship, religion and education and their important role in the society.
- These institution guides members from birth to death. It also helps to study social change and theories of social change.

#### Paper 2 Rural, Urban and Tribal Society

- It enlightens about Indian society both rural and urban, its features and different types problems and possible solutions.
- It also helps to understand aboriginals and their identical features and problems.
- It gives knowledge about urban infrastructure





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## हिन्दी साहित्य

### बी. ए. - भाग 1

#### प्रश्नपत्र प्रथम : प्राचीन एवं मध्यकालीन काव्य

- प्राचीन काव्य के प्रति छात्रों के मन में अभिरूचि निर्माण करना
- हिन्दी के प्राचीन और मध्यकालीन काव्य से परिचित होना
- हिन्दी काव्य के उद्भव और विकास की जानकारी
- मध्यकालीन काव्य की समकालीनता को छात्रों के सामने स्पष्ट करना
- मध्यकाल के संत साहित्य के प्रति समझ बढ़ाना
- तत्कालीन युग की सामाजिक, राजनीतिक, सांस्कृतिक, आर्थिक परिस्थितियों का विश्लेषण करना
- उत्तर मध्यकाल में शृंगार की प्रवृत्तियों को समझना
- कविता के दरबारी होने की परिस्थितियों का विश्लेषण
- विभिन्न कवियों के व्यक्तित्व और कृतित्व को जानना

#### प्रश्नपत्र द्वितीय: हिन्दी कथा साहित्य

- उपन्यास के उद्भव और विकास की जानकारी
- उपन्यास के स्वरूप का परिचय
- उपन्यास साहित्य और समाज के संबंध का विवेचन
- ग्रामीण और शहरी परिस्थितियों को समझना
- विविध कहानीकारों के जीवन परिचय से अवगत होना
- विद्यार्थी विविध कहानियों के माध्यम से जीवन के विविध पहलुओं तथा समस्याओं को समझ सकेंगे
- पारिवारिक जीवन को स्वस्थ बनाए रखने के लिए आवश्यक गुणों को जानेंगे
- आधुनिक काल की कुछ महत्वपूर्ण समस्याओं को स्पष्ट करना





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## बी.ए.-भाग 2

### प्रश्नपत्र प्रथम: अर्वाचीन हिन्दी काव्य

- आधुनिक हिन्दी काव्य की विभिन्न प्रवृत्तियों को समझना
- हिन्दी काव्य में द्विवेदी युग
- छायावाद युग की प्रवृत्तियां
- प्रगतिवादी साहित्य
- प्रयोगवाद और नयी कविता को समझेंगे
- कविताओं के माध्यम से जीवन के सुख:दुःखए उतार:चढ़ाव को स्पष्ट करना
- साहित्य से आनंद प्राप्त करना।

### प्रश्नपत्र द्वितीय : हिन्दी भाषा एवं साहित्य का इतिहास और काव्यांग विवेचन

- हिन्दी भाषा की उत्पत्ति और विकास की जानकारी
- हिन्दी साहित्य के इतिहास का लेखन और विकास
- आदिकाल भक्तिकाल रीतिकाल और आधुनिक काल की परिस्थितियों का परिचय प्राप्त करना
- हिन्दी प्रमुख बोलियों विभिन्न भाषा राष्ट्रभाषा राजभाषा और संपर्क भाषा की जानकारी लेना
- हिन्दी के शब्द भण्डार को समझना हिन्दी के प्रमुख व्याकरणकारों का योगदान
- आधुनिक हिन्दी गद्य साहित्य के विकास की जानकारी लेना
- काव्य के विविध अंग रस छंद अलंकार का परिचय लेना





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## Computer Application Group

**BA I Year**

### **Paper – 1: Fundamental of Computer and PC Software**

- To understand computer its classification, applications and components of computer with block diagram. Memory(Primary and Secondary)
- Input Output devices and Secondary Storage devices
- Understand Programming language and its types, Language Translators (Compiler, Interpreter and Assembler)
- Understand Software and its types (Application and System)
- Operating system, its logical architecture, functions and types, CUI and GUI environment
- Concept of Windows, its features and control panel, My Network places.
- Understand Word processing Software (MS-Word), features, Mail-Merge, Macros, Formatting and Table handling features,MS-Excel (working with Worksheets), formula and Charts and MS-Power-Point,(Custom Animation, slide sorter and slide show options).
- Understand DSS (Decision Support Ssystem), its components and importance.
- Learn Expert System and role of IT in MIS, Centralization and Decentralization.
- Concept of Internet and types of Internet connections (VSAT, Leased Line, WIFI), Web browser and URL, Domain name.
- Concept of E-mail and different Protocols used in E-mail, Social networking ethics.





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- Understand Business applications of Internet (Telnet, news group, Usenet), Intranet and Extranet
- Concept of Fire wall, Viruses and Anti Viruses.
- Understand E-banking and E-business models.

## Paper 2: Desktop Publishing

- To incorporate visual communication and aesthetic relationship in visual problem
- Solving , critical thinking and conceptual thinking to students.
- To compose projects that show the relationship between type and image, use of grid lines and visual hierarchy for print, production, and web ready format in order to effectively communicate ideas to the students.
- To utilize traditional studio techniques interactively with computer design.

## BA 2 Year

### Paper – 1: Database Management System

- To understand DBMS architecture, physical and logical database designs, database modelling, relational, hierarchical, network and E-R models.
- Learn and apply structured query language (SQL) for database definition and database manipulation.
- Demonstrate and understanding of Normalization theory and apply such knowledge to the normalization of a database.
- To understand various transactions processing, concurrency control mechanism and database protection mechanism.





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- To understand basic database storage structure and access techniques such as file organizations, indexing methods including B-Tree and hashing.

### **Paper – 2: E. Commerce**

- To familiarize students with organizational and managerial foundations of information systems.
- To understand the basic concepts and technologies used in the field of management information systems.
- To understand the processes of developing and implementing information systems.  
Be aware of the ethical, social, and security issues of information systems





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## Department of Biosciences

### Program Outcomes

- Bachelor of Science (B.Sc.) Degree programme offers theoretical as well as practical knowledge about various trans- disciplinary subject areas in science. These include Biotechnology, Microbiology, Life science, Chemistry, Computer, Pharmaceutical Chemistry.
- This course is beneficial for students who have a strong interest and background in Biological Sciences and wishes to pursue multi and inter-disciplinary science careers in future.
- This program defines and explains major concepts in the biological sciences where students will also be able to learn the use of biological instrumentation and proper laboratory techniques.
- Biotechnology/ Microbiology are rapidly growing fields having importance in every sphere of life. These subjects find applicability in various industries like food, chemical, textile, leather, medical, waste management etc.
- This course forms the basis of science and helps to develop scientific temper amongst the students which can contribute for the welfare and development of society.
- After the completion of this course, students can opt for higher studies and can prepare for various national and international level competitive exams. They can also find professional jobs in different industrial sectors, teaching jobs in educational institutes and can also find employment in government sectors.
- The course encourages individual learning and builds in strong conceptual knowledge of biological sciences. Thus, students may opt for establishing their own business or industrial unit, promoting entrepreneurship skills





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## Department of Biosciences

### Program Specific Outcomes

#### Biotechnology + Life Science + Chemistry

- The students will be able to demonstrate proficiency in basic concepts of botany and zoology, and knowledge of plant and animal systems morphology and functioning to be explored through biotechnological approaches.
- Demonstrate basic knowledge in different fields of applied life sciences like horticulture, biogas production, medicinal plants, hydroponics, vertical garden etc.
- Demonstrate competence in basic concepts of organic, inorganic, physical Chemistry, their biological aspects and their application in day to day life.
- For Higher education preparedness: Demonstrate an ability to appear for National level examination to pursue higher studies. Demonstrate practical and theoretical knowledge essential for pursuing higher studies.
- Biotechnology industry oriented preparedness: Demonstrate an ability to identify careers in biotechnology, domain like Pharmaceutical, Food Industry etc, and skills required to work in a biotechnology laboratory or manufacturing facility.

#### Biotechnology + Chemistry + Computer Science

- This program will be beneficial for the students to develop a strong grip in the field of applied biology. The students will be able to grasp knowledge in the backbone subject of science, that is Chemistry and also the students will be able to learn the basic fundamentals of Computer Science.
- This program demonstrates learning ability in basic microbiology, cell biology, molecular biology, fermentation, plant tissue culture and animal tissue culture.
- Demonstrate basic concepts of organic, inorganic and physical Chemistry and will be able to learn their biological applicability.
- Demonstrate theoretical and practical knowledge on C and C++ language programming, data structure, Microsoft office and DBMS.
- This will enable them to pursue their future in Chemistry
- Informatics or Bioinformatics or developing software programming in the field of biology.
- Biotechnology industry oriented preparedness: Demonstrate an ability to identify careers in biotechnology, IT and pharmaceutical industries.





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## Microbiology + Chemistry + Pharmaceutical Chemistry

- This program is specially designed for students interested in taking up jobs in ever-expanding pharmaceuticals and related industries. The students will be efficiently trained for all the research and analytical oriented skills for these industries in well-equipped laboratories.
- This program demonstrates learning ability in basic microbiology, immunology, medical, food and industrial microbiology.
- Demonstrate basic concepts of organic, inorganic and physical Chemistry and will be able to learn their biological applicability.
- Demonstrate practical based knowledge on production and formulation of medicines, APIs, intravenous drugs, vaccines and will be able to understand the insights of the working in various pharmaceutical departments like Quality Control, Quality Assurance, Research and Development etc.
- Microbiology industry oriented preparedness: Demonstrate an ability to identify careers in food, dairy, pharmaceutical, fermentation industries and will also be able to pursue career in waste management and bioplastics development.

## Microbiology + Chemistry + Life Science

- This program nurtures the interest of the students in the fundamentals of science. The students are made to understand the intricacies of the subject with routine practicals and lavish lab facilities where learning becomes interesting and easy.
- This program demonstrates learning ability in basic microbiology, immunology, medical, food and industrial microbiology.
- Demonstrate basic concepts of organic, inorganic and physical Chemistry and will be able to learn their biological applicability.
- Demonstrate basic knowledge in different fields of applied life sciences like horticulture, biogas production, medicinal plants, hydroponics, vertical gardens etc.
- For higher education preparedness: Demonstrate an ability to appear for National level examination to pursue higher studies.
- Microbiology industry oriented preparedness: Demonstrate an ability to identify careers in food, dairy, pharmaceutical, fermentation industries and will also be able to pursue career in waste management and bioplastics development.





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## Department of Biosciences Course Outcomes (Biotechnology)

### B. Sc. I Year

#### CO for Biotechnology Paper I : Cell Structure & Biology

On completion of the course students will be able

- To understand overall concept of cell structure & arrangement, gram's positive & gram's negative cells.
- To learn about basic features, structure & functions of organelles of eukaryotic cells, structure & components of bacterial cells.
- To know about various events of cell like cell division, cell synchrony, cell-cell interaction, cell locomotion & cell differentiation.
- To understand the details of cell membrane, various models & transport across membrane.
- To learn about mechanism of cell death, related pathways, apoptosis in relation to cancer & types of cancer.

#### CO for Biotechnology Paper II : Microbiology

On completion of the course students will be able

- To understand history of microbiology, classification of micro-organisms & their features
- To learn about taxonomy & Bergey's manual.
- To know about structure & diversity of bacteria, virus, archaeobacterial; their nutritional requirements.
- To learn about the structure & diversity of algae, protozoa, fungi, mycoplasma & extremophiles, various staining methods.
- To learn about the patterns of microbial growth, factors affecting & quantification; methods for control of micro-organisms.
- To explore fermentation processes, microbial metabolism, diseases associated with plants & animals.





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## B. Sc. II Year

### CO for Biotechnology Paper I : Biophysics & Biochemistry

On completion of the course students will be able

- To understand overall concept of thermodynamics- laws & applications, thermodynamics potentials & relations.
- To learn about general biophysical methods & their applications in biology, determination of crystal structure.
- To know about various fundamentals of biochemistry- atoms, molecules & chemical bonds, structure & properties of water.
- To understand the details of biomolecules- carbohydrates, proteins, lipids, amino acids, nucleic acid & RNA's.
- To learn about the details of enzyme structure, classification & function, types of enzyme inhibition & identification etc.

### CO for Biotechnology Paper II: Bioinstrumentation, Biostatistics & Bioinformatics

On completion of the course students will be able

- To understand various microscopic & centrifugation techniques.
- To learn about the concepts & types of chromatography & electrophoresis.
- To study the techniques like colorimetry, spectrophotometry, autoradiography.
- To learn about the scope & applications of biostatistics, various related parameters.
- To learn about the features & organization of computers, basic bioinformatics.
- To explore biological databases like protein database, sequence database etc.





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## B. Sc. III Year

### CO for Biotechnology Paper I: Molecular Biology & Genetic Engineering

On completion of the course students will be able

- To understand the properties & structure of nucleic acids; prokaryotic & eukaryotic genome; replication & its types.
- To learn about the concept of epigenetics & eukaryotic chromosomal organization.
- To study the concept of evolution, mendel's genetics.
- To learn about the recombinant DNA technology, restriction enzymes & types of vectors.
- To explore the details of plasmids, mutation & types.
- To study process of transcription & translation.

### CO for Biotechnology Paper II : Applied Biotechnology

On completion of the course students will be able

- To understand overall concept of food microbiology, industrial production of products like- amylase, glutamic acid, alcohol etc.
- To learn about various aspects of plant tissue culture, genetic manipulation of plants.
- To know about details of immune system- cells, organs, antigens & antibodies and their reactions, vaccines & its types.
- To understand the details of animal biotechnology- various methods & applications.
- To learn about the details of fermentation technology, types of fermentation & basic design.
- To study the environment in respect with pollution, control & management, concepts of bio pesticides, bio fertilizers & bioremediation.





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## Department of Biosciences

### Course Outcomes

(Microbiology)

## B. Sc. I Year

### CO for Microbiology Paper I: General Microbiology & Cell Biology

On completion of the course students will be able

- To understand overall concept of microbiology- history & development, applications in human welfare.
- To learn about detailed structure of prokaryote, dormant structures, structure of organisms like cyanobacteria, actinomycetes etc.
- To know about general characters of fungus- classification & structure, viruses- classification & structure.
- To understand the details of structural organization of cells & various processes.
- To learn about isolation & maintenance of micro-organisms & pure cultures.

### CO for Microbiology Paper II: Tools & Techniques in Microbiology

On completion of the course students will be able

- To understand working principle of microscope & its types.
- To learn about instrumentation techniques like- colorimeter, centrifugation, chromatography etc.
- To know about different type of staining techniques & stains used.
- To learn about media- preparation & characteristics, use of physical & chemical agents with their mode of action.
- To explore basics of biostatics, bioinformatics, databases & applications.





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## B. Sc. II Year

### CO for Microbiology Paper I: Biochemistry & Microbial Physiology

On completion of the course students will be able

- To study properties, classification & functions of biomolecules, concept of enzyme activity.
- To learn about growth curve, factors affecting growth.
- To know about various fundamentals of fermentation, various metabolic pathways.
- To understand the details of energy utilization in microbes, transport of nutrients in bacteria.
- To learn about the details of photochemical reactions, electron transport chain.

### CO for Microbiology Paper II: Microbial Genetics & Molecular Biology

On completion of the course students will be able

- To understand structure & genetic material of micro-organisms, types of RNA, Cot curve.
- To learn about the concepts replication- mechanism & types, process of transcription & translation.
- To study the features of genetic code, process of translation, concept of operons.
- To learn about the genetic recombination, transposons & vectors.
- To learn about the concept of mutation & its types, mutagens, repair & recombination.

## B. Sc. III Year

### CO for Microbiology Paper I: Applied & Environmental Microbiology

On completion of the course students will be able

- To understand the design & types of fermenter, industrial production of products, immobilization method.
- To learn about the concept of food spoilage, food borne diseases, preservation, production of single cell protein.





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- To study the concept of soil microflora & management, microbial diseases of crop plants, bio fertilizers.
- To learn about the concept of microbial interaction; soil, water & air pollution.
- To explore the details of bioremediation, bioleaching, bio pesticides, biodegradation & sewage treatment.

### CO for Microbiology Paper II: Immunology & Medical Microbiology

#### **On completion of the course students will be able**

- To understand overall concept of immune systems- cells, organs, MHC, type of immune response.
- To learn about the properties of antigens, antibodies, antigen-antibody interactions.
- To know about details of tumor immunology- origin, oncogenes, antigens, tumor evasion & immune diagnosis.
- To understand the details of immunization, hypersensitivity, autoimmunity & blood group system.
- To learn about the details of pathogenesis; bacterial, viral & fungal diseases of humans.





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## Department of Biosciences Course Outcomes (Life Science)

### B. Sc. I Year

#### CO for Life Science Paper I: Introduction to Biochemistry, Cell biology, Plant & Animal Diversity

Students will be able to:

- Understand the basic knowledge of biomolecules (Protein, Nucleic acids, Lipids, Carbohydrate etc.) their structure and classification.
- Gain knowledge in the interactions and interdependence of physiological and biomolecules.
- Understand essentials of the metabolic pathways along with their regulation.
- Understand the principles, practical handling and applications of bioanalytical techniques.
- Understand fundamental principles of cell Biology such as difference between Eukaryotic and Prokaryotic cells, their structure and composition, microscopic and cytochemical techniques to study them.
- Understand how these cellular components are used to generate and utilize energy in the cell and cellular components underlying mitotic cell division.
- Understand the range and evolution of Plant diversity in terms of structure and Plant classification.
- Understand the range and evolution of Animal diversity in terms of structure and Animal classification.

#### CO for Life Science Paper II: Environmental Biology, Genetics & Evolution

Students will be able to:

- Understand the core concepts and methods from ecological and physical sciences and their application in environmental problem solving.
- To understand basic principles of Mendelian inheritance
- To explore the multifactorial inheritance.
- To acquire the chromosome structure, chromatin organization and variation.
- To learn the concepts of Linkage concept of sex linked inheritance.
- Learn the history and evidence for evolution and understand detailed explanations of the processes of evolution by mutation, migration, genetic drift, non-random mating, and natural selection.





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## B. Sc. II year

### CO for Life Science Paper I: Morphology, Development Biology and Physiology of Angiosperm

Students will be able to:

- Understand the habit of the angiosperm plant body and the plant morphology
- Know the vegetative characteristics of the plant.
- Learn about the reproductive characteristics of the plant.
- Know importance and scope of plant physiology.
- To understand the plants and plant cells in relation to water.
- Understand the process of photosynthesis in higher plants with particular emphasis on light and dark reactions, C3 and C4 pathways.
- Understand the respiration in higher plants with particular emphasis on aerobic and anaerobic respiration.
- Learn about the movement of sap and absorption of water in plant body.
- Understand the plant movements and significance of plant growth regulators.
- Understand the growth and developmental processes in plants.
- Understand the process of translocation of solutes in plants.
- Know the nitrogen metabolism and its importance.

### CO for Life Science Paper II: Morphology, Development Biology and Physiology of Mammals

Students will be able to:

- Understand the physiological mechanisms in Mammals.
- Learn the physiology of digestive and respiratory system of Mammals.
- Understand the blood composition, types, groups and circulatory system of Mammals.
- Know the physiology of excretory system and nervous system of Mammals.
- Learn the physiology of sense organs, muscles and reproductive system.
- Understand the basic concepts of developmental biology.
- Understand how fertilization, cleavage and gastrulating occur.
- Understand the basic concepts of organogenesis and placentation in mammals.





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B. Sc. III year

## CO for Life Science Paper I: Microbiology, Immunology and Animal Cell Culture

Students will be able to:

- Get basics and importance of Microbial classification and Bergey's Classification.
- Gain the knowledge about Microscopy, staining, sterilization, characterization of microbes along with microbial structure.
- Develop basic skill in aseptic techniques.
- Gain knowledge of cultivating bacteria with different cultivation technique.
- Learn the basics of fermentation technology.
- Describe the roles of the immune system in both maintaining health and contributing to disease.
- Identify the cellular and molecular basis of immune responsiveness.
- Describe immunological response and how it is triggered and regulated.
- Learn significance of Immunological Techniques.
- Gain knowledge about Vaccines and its types.
- Comprehend the fundamental concepts of animal cell culture, and its importance.
- Learn aseptic techniques, Media and in handling of animal cell cultures in invitro conditions.
- Gain knowledge to subculture animal cells and quantify cell growth.
- Obtain Knowledge about sterile filtration for media preparation and optimize cell growth parameters.

## CO for Life Science Paper II: Molecular Biology, Genetic Engineering and Plant Tissue Culture.

Students will be able to:

- Gain an understanding of chemical and molecular processes that occur in and between cells.
- Gain knowledge about the central dogma of cell-DNA replication, RNA transcription, Protein translation.
- Gain knowledge of tools and strategies used in genetic engineering and Recombinant DNA technology.
- Learn basic knowledge of Plant Tissue Culture in invitro conditions and their applications.





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## Department of Biosciences Course Outcomes (Chemistry)

### B. Sc. I Year

#### CO for Chemistry Paper I: Physical Chemistry

- Explain shapes of orbitals based on quantum numbers.
- Explain the difference between liquids and gases, how real gases are different from ideal gases at different temperature and pressure.
- Explain methods of liquefaction and discuss intermolecular forces & structural differences between solids, liquids and gases.
- Draw molecular orbital diagram[MOD] of different molecules.
- Explain Accuracy and precision and their use in practical data or results analysis and errors.
- Calculate partition coefficient, different types of liquids, and different laws for ideal solution (Raoult's law & Henry's law).
- State and apply the laws of thermodynamics; perform calculations with ideal and real gases; design practical engines by using thermodynamic cycles; predict chemical equilibrium and spontaneity of reactions by using thermodynamic principles.
- To apply the concepts of colloids and gels.
- To learn depth knowledge about liquid states.

#### CO for Chemistry Paper II: Inorganic Chemistry

- Explain the properties of alkali and alkaline earth metals, phenomenon of photoelectric effect, diagonal relationship.
- Discuss the structure of diborane, lewis acid nature of boron trihalides, preparation of carbides & silicones, preparation & industrial applications of nitride, hydrazine & hydroxylamine .preparations & applications, preparation of polymeric phosphonitrilic compounds.
- Explain the Principles of qualitative analysis: anions &cations identification, separation by applying basic principles such as solubility product & common ion effect.
- Discuss Bond polarization: covalent bonds polarity & non polarity. Types of reactions.
- Explain types of oxides and oxyacid, their structure and reactivity in s- block & p block elements, inter halogen compounds, pseudo halogens & clatherate compounds.
- Discuss the properties d block elements & triads of transition elements.
- Knows about Atomic structure quantum model. Bohrs Theory and its limitations, Schrodinger Wave Equation and its function, quantum numbers. Slater rules and its applications and limitations.





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- Lattice energy and its application, Born-Haber cycle and its application. Shapes of molecules on the basis of valence bond theory and valence shell electron pair repulsion theory.
- Explains ionic and covalent bonding with VBT and VESPER Theory and
- Detailed description of Molecular orbital theory with homonuclear and heteronuclear diatomic molecules.
- Physical effects and electronic displacement in organic molecules.

## CO for Chemistry Paper III : Organic Chemistry

- Explain the properties of alkali and alkaline earth metals, phenomenon of photoelectric effect, diagonal relationship.
- Discuss the structure of diborane, lewis acid nature of boron trihalides, preparation of carbides & silicones, preparation & industrial applications of nitride, hydrazine & hydroxylamine .preparations & applications, preparation of polymeric phosphonitrilic compounds.
- Explain the Principles of qualitative analysis: anions & cations identification, separation by applying basic principles such as solubility product & common ion effect.
- Discuss Bond polarization: covalent bonds polarity & non polarity. Types of reactions.
- Discuss Preparations & reactivity of alkanes, alkenes & alkynes by applying rules : stability of cycloalkanes by Baeyer strain theory.
- Explain aromaticity of benzenoids & non-benzenoids, the preparation, reactivity & structure of aromatic compounds.
- Discuss the preparations, reactivity & stereochemistry of SN1 & SN2 reactions of Halogen compounds.
- Reactive intermediates.
- Conformational, optical and geometrical type of stereoisomerism and assignment of configuration.
- Preparation reaction and structure of alkenes, alkenes and alkynes.
- Students will also know and recall the fundamental principles of organic Chemistry that include chemical bonding, nomenclature, structural isomerism, stereochemistry, chemical reactions and mechanism.

## **B. Sc. II Year**

### CO for Chemistry Paper I: Physical Chemistry

- Student learn quantitative methods of analysis by volumetric methods of analysis using permanganometry, dichrometry and acidimetry.
- Learn to determine various physical constants by experiments.
- Enable the students to apply the basic concepts of thermodynamics, quantum mechanics





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- and spectroscopy to chemical, physical and biochemical systems.
- Students learn the derivation of mathematical relations in thermodynamic and quantum mechanics
- Learn about non-spectroscopic methods of analysis.
- Enable the students to learn the different laws of thermodynamics and the relations that govern the various thermodynamic equations of state.
- Learn the basics of group theory.
- Enable the students to learn the different laws of thermodynamics and the relations that govern the various thermodynamic equations of state.
- Learn the basics of group theory

## CO for Chemistry Paper II: Inorganic Chemistry

- To understand the structure of molecules
- To acquire the knowledge about different types of bond.
- Acquire the knowledge about periodic properties of elements and their applications in various field.
- To understand the fundamental nuclear reactions and its applications in medical and industrial field.
- To acquire the fundamental knowledge about Nano materials.

## CO for Chemistry Paper III: Organic Chemistry

- To understand classification, nomenclature, and mechanism of reaction aromaticity and Chemistry of aliphatic and aromatic substituted compounds.
- To acquire the knowledge about stereochemistry of organic compounds.
- To acquire the basic idea about photo chemical reaction.
- Learn about various carbohydrates, heterocyclic compounds, amino acids and nucleic acids.
- Understand different natural products such as Terpenes, alkaloids, vitamins etc.
- Get a general idea of different polymers and polymerisation process.
- Learn the different reagents in organic synthesis and the application of organometallics in synthesis.

## B.Sc. III Year

### CO for Chemistry Paper I: Physical Chemistry

- Basic fundamental of Elementary Quantum Mechanics, Schrodinger wave equation, Physical interpretation of the wave function and its importance, Particle in a one dimensional box and Molecular orbital theory (MOT), Basic ideas criteria for forming the molecular orbital (MO) from Atomic Orbitals (A.O.), also to calculate the energy level





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from wave function, Basic concept of sigma, sigma star, pi, pi star calculation of coefficient of AO's used in the hybrid orbitals.

- Students understand the basic terminology like Electromagnetic radiation, Wave, Wavelength, Frequency and wave number and also introduce molecule degree of freedom and spectroscopy techniques such as Rotational Spectrum, Vibrational Spectrum, Raman spectrum, Electronic Spectrum, UV Spectroscopy,
- Basic fundamental of Photochemistry: Interaction of radiation with matter, law of photochemistry, Quantum Yield,
- Basic understanding to photosensitized chemical reaction and energy transfer processes and their sample analysis.
- Physical Properties and Molecular Structure: Optical Activity, Polarization, Orientation of dipoles in an electric field, Dipole moment, Induced dipole moments, Measurement of dipole moment, Temperature Method and Refractive method,
- Magnetic Properties: Paramagnetism, Diamagnetism and ferromagnetism
- And also students to understand the practical skills of Physical Chemistry like to determine the velocity constant (specific reaction rate) of hydrolysis of methyl acetate/ ethyl acetate catalyzed by hydrogen ions at room temperature also to determine the partition coefficient of iodine between carbon tetra chloride and water. Also to understand the pH value and Acid-base titration.

## CO for Chemistry Paper II: Inorganic Chemistry

- Introduction: Hard and Soft Acids and Bases (HSAB), Classification of Hard and soft acid-base, Application of hard-soft acid base theory.
- Introduction Classification, properties and applications of inorganic Polymers like Silicones and Phosphazenes.
- Metal Ligand Bonding in Transition Metal Complexes: Introduction: Limitations of valence bond theory, Crystal Field Theory, factor affecting the crystal field parameters, Applications of crystal field theory and limitation of crystal field theory.
- Introduction Magnetic Properties, Types of Magnetic properties and behavior.
- Electronic Spectra of Transition Metal Complex: Type of electronic transition, Selection rules for d-d transitions,
- Organometallic Chemistry(OMC): General Introduction, Nomenclature and Classification of Organometallic Compounds, General Methods of preparation: Alkyl and aryl Organometallic compounds of Lithium
- Bio-Inorganic Chemistry: Essential and trace elements in biological processes, Biological function of the bio-elements, Availability of Bio-metals and bio-non-metals, Metalloporphyrins, Haemoglobin structure and biological function, Myoglobin-





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mechanism of oxygen transfer through haemoglobin and myoglobin, Relation between haemoglobin and myoglobin, Biological role of alkali and alkaline earth metal ions with special reference to  $\text{Ca}^{2+}$ , Nitrogen Fixation

- Metal Nitrosyl Complex: Nitrosyl agents, synthesis, structure Properties and bonding.
- And also students to understand the practical skills of Inorganic Chemistry like Gravimetric Analysis (Estimation), Complex Compound Preparation and Effluent water Analysis, Water Analysis, etc.

### CO for Chemistry Paper III : Organic Chemistry

- Nuclear Magnetic Resonance Spectroscopy (NMR), Explanation of PNMR spectra of simple organic molecules eg. ethanol, ethyl bromide, acetaldehyde, 1,1,2-tribromo ethane, ethylacetate, Toluene, and acetophenone, Application of UV, IR, and PNMR spectroscopy for simple organic compounds.
- Organo-metallc Compounds: Organo-magnesium compounds: Grignard Reagent, Preparation, structure and chemical reactions, Organo-zinc compounds: preparation and chemical reactions, Organo-sulphur compounds: Nomenclature, Structural characteristics thiol, thio-ether, sulphonic acid, sulphonamide and sulphaguanidine method of preparation and chemical reactions.
- Organic synthesis by enolates: Synthesis of ethylacetoacetate, Keto-enoltautomerism form in ethylacetoacetate, alkylation of diethyl malonate and ethyl acetoacetate,
- Chemistry of Carbohydrates :Classification and nomenclature of monosaccharide, Mechanism, Inter conversion of glucose into fructose. Disaccharides introductory idea of maltose, sucrose, and lactose (excluding structure) Polysaccharides introductory idea of starch and cellulose (Excluding Structure).
- Fat, Oil and Detergents: Natural fat, edible and industrial oil of plant origin, Hydrogenation of unsaturated oil Saponification value, iodine value and acid value, Synthetic Detergents: Alkyl and aryl sulphonate
- Amino Acids and Nucleic Acid: Classification of Amino Acid, Structure, Acid base behavior isoelectric point and electrophoresis, Preparation and chemical reaction of alpha amino acids.
- Peptide and Proteins: nomenclature and structure, classification of proteins, determination of peptide structure, end group analysis, Structure of peptide and proteins, Nucleic Acids: constitution of nucleic acid, Double helix structure of DNA.
- Synthetic Dyes: Colour and constitution (electronic concept), Classification of dyes and their chemical reaction and applications.





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## Maharaja Ranjit Singh College of Professional Sciences-Indore

- Chemistry of Heterocyclic compounds: Introduction, Classification nomenclature, Aromatic Character and molecular orbital picture of Pyrrole, Furan, Thiophene and Pyridine, Furan: Preparation, Properties, Structure, Thiophene: Preparation, Properties, Thiophene as a Resonance hybrid, Pyrrole: Preparation, Properties, Orbital Structure, Orientation in pyrrole in electrophilic substitution reaction Six atom heterocyclic compounds: Pyridine, synthesis, orientation in pyridine substitution reactions, properties, uses, structure Quinoline: Preparation, Properties, uses and constitution of quinoline Isoquinoline: Preparation, Properties, uses and constitution of Isoquinoline, Exercises.
- Also students to understand the practical skills of Organic Chemistry like to separate and identify organic mixture having two solids organic compounds and also prepare their derivatives and Organic Reactions and synthesis like: Acetylation, Benzoylation, m-dinitrobenzene, Picric Acid.





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## Department Of Commerce

### Programme Outcome

- To Develop an understanding of Commerce and equip graduates with the skills required in business.
- To train the graduates with the know-how of operating successfully in a continuously changing business environment.
- To apply the skills and knowledge acquired by them in any business organization required to lead management position.
- To teach graduates ethical decisions based on thorough knowledge of commerce concepts.
- Teach students importance of working independently and in a team.
- To enhance the Capability of the students to make decisions at personal & professional level.
- Develop an ability to effectively communicate both orally and verbally
- Have exposure of complex commerce problems and find their solution
- Understand required mathematical, analytical and statistical tools for financial and accounting analysis
- Develop self-confidence and awareness of general issues prevailing in the society.





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## Programme Specific Outcome

### **B.Com Plain**

- Papers related to Economics and Banking are the optional papers studied in Plain stream which enables one to learn more about how the world works.
- Studying in this stream helps one to gain knowledge about
- The impact that decisions have on firms, industries and nations
- The impact of international trade both good and bad
- The effects that government policies have on the economy and on employment.
- Students studying this course can take up Career in
- Banking
- Share Markets
- Civil Services like UPSC, PSC, SSC etc.
- India Economic Services

### **B.Com Computer Application**

- B.Com in Computer Application is a three year course which focuses on the application of computers in business. This course has got a great scope in the field of both commerce and software.
- The objectives of the Programme shall be to provide sound academic base from which an advanced career in Computer Application can be developed. Conceptual grounding in computer usage as well as its practical business application will be provided.
- It enables one to learn papers related to Computer application and programming like PC Software, Web Designing, C Programming, Desktop Publishing, E-Commerce etc.





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- Students can explore various possibilities in this field. Graduates in this stream can find lucrative jobs in :-
- Software programming and development.
- Mobile Application Developer
- Accounts Assistant
- Computer Operator
- Computer-Laboratory Technician
- Clerk-cum- Computer Operator

### B.Com Tax Procedure

- This course enhances the candidate's proficiency in taxation.
- Students pursuing this course get exposed to details related to Direct and Indirect taxes.
- Candidates can seek employment in both private as well as Government sectors. Completion of a degree with B. Com Taxation program may prepare an individual for a career as:-
- An auditor
- A tax Consultant related to Income Tax and GST.
- Tax collector
- Graduates in taxation degree programs often go on to become accountants and auditors and Lawyers who graduate with an LLM often specialize in tax law.





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## B.Com Honours

- B.Com. (Hons) course is a unique course wherein the students are studying subjects from diverse streams.
- This course offers subjects from Commerce, Management, Computer, Taxation and Business Legislations.
- The main objectives of this course are to impart knowledge of commerce Management, Computer and Business to the students so that they can get prepared for their higher studies. The students studying in this stream have an edge over other students of same discipline.





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## COURSE OUTCOME

### ACCOUNTS GROUP

#### I YEAR

##### **Paper 1 - Financial Accounting:**

- To enable the students to learn principles and concepts of Accountancy
- Students gain Knowledge in the practical applications of accounting and technical expertise in maintaining the books of accounts.
- An insight into the aspects of various types of accounting like departmental Accounting, Branch Accounting and Royalty is taught so as to enable them to understand its need and purpose.
- To instil the knowledge about accounting procedures, methods and techniques
- To enable students to understand the Basic concepts of Partnership Accounting.

##### **Paper – 2: Business Mathematics**

- To enable the students to know basic calculations required for purposes of accounting and business transactions. To understand the concept and application of profit and loss in business
- Creates a base for preparation of competitive examinations
- To understand the concept of Simple interest, compound interest and the concept of EMI.





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## For B. Com. Hons Students

### **Paper 1 - Financial Accounting**

- To enable the students to learn principles and concepts of Accountancy.
- To teach student preparation of final accounts , Bank Reconciliation Statement and Depreciation
- An in site in to the aspects of various types of accounting like departmental Accounting, Branch Accounting and Single Entry system is taught so as to enable them to understand its need and purpose.
- To enable students to understand the Basic concepts of Partnership Accounting.
- To study accounting related to dissolution and conversion of firms to companies

### **Paper – 2: Business Mathematics**

- To enable the students to know basic calculations required for purposes of accounting and business transactions like ratio proportion and percentage
- To understand the concept of annuities , true discount and bankers discount
- To study concepts of Set theory and Simultaneous equation
- To understand the concept of Quadratic Equations and Linear Programming

## MANAGEMENT GROUP

### **Paper - 1: Business Law**

- To acquaint students with the basic concepts, terms & provisions of Mercantile and Business Laws.
- To develop the awareness among the students regarding these laws affecting business, trade and commerce and need of Law in any country.





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- To provide knowledge to the students related to various types of contracts.
- The enable the students to understand the need for Consumer Protection Act and Foreign Exchange and Management Act.
- The create an understanding of Various Negotiable Instruments and their use

## **Paper -2: Business Organisation and Business Communication**

- To understand the meaning and various forms of Business Organisation.
- To understand the concept, process and importance of communication.
- To develop awareness regarding new trends in business communication.
- To provide knowledge of various media of communication.
- To develop business communication skills through the application and exercises

## **For B. Com. Hons Students**

### **Paper -1: Principles of Management**

- To acquaint students with the basic concepts related to Management and evaluation of Management thoughts of leading Management thinkers
- To develop the awareness among the students regarding Planning and Leadership
- To provide knowledge to the students related to Organisation.
- The enable the students to understand the need for Co ordination and Decision Making.
- To create an understanding of Controlling and Staffing in an Organisation.





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## Paper 2: Business Organisation and Business Communication

- To understand the meaning and various forms of Business Organisation their functions and the social responsibilities of business.
- To study the various types of Company and understanding the significance of Public Enterprises
- To develop awareness regarding Objects of a good communication system, means of communications. Providing Knowledge of motivation and theories related to motivation.
- To know the importance of Non verbal communication, body language and paralanguage and various channels and barriers of communication.
- To study the modern forms of communication.

## ECONOMICS GROUP

### Paper 1: Micro Economics

- To expose Students of Commerce to basic micro economic concepts and inculcate an analytical approach to the subject matter.
- To stimulate the student interest by showing the relevance and use of various economic theories.
- To apply economic reasoning to problems of business.
- To enable the students to understand various factors of production and forms of market
- Concepts of demand and supply and the factors determining the market them.

### Paper 2: Macro Economics

- The objective of the course is to familiarize the students the basic concept of Macro Economics and application.
- Study the behaviour of the economy as a whole.





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- To Study the relationship among broad aggregates.
- To apply economic reasoning to problems of the economy
- To enable students to understand concepts of National Income .

## COMPUTER GROUP

### **Paper – 1: Fundamental of Computer and PC Software**

- To understand computer its classification, applications and components of computer with block diagram. Memory(Primary and Secondary)
- Input Output devices and Secondary Storage devices
- Understand Programming language and its types, Language Translators (Compiler, Interpreter and Assembler)
- Understand Software and its types (Application and System)
- Operating system, its logical architecture, functions and types, CUI and GUI environment
- Concept of Windows, its features and control panel, My Network places.
- Understand Word processing Software (MS-Word), features, Mail-Merge, Macros, Formatting and Table handling features,MS-Excel (working with Worksheets), formula and Charts and MS-Power-Point,(Custom Animation, slide sorter and slide show options).
- Understand DSS (Decision Support Ssystem), its components and importance.
- Learn Expert System and role of IT in MIS, Centralization and Decentralization.
- Concept of Internet and types of Internet connections (VSAT, Leased Line, WIFI), Web browser and URL, Domain name.





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- Concept of E-mail and different Protocols used in E-mail, Social networking ethics.
- Understand Business applications of Internet (Telnet, news group, Usenet), Intranet and Extranet
- Concept of Fire wall, Viruses and Anti Viruses.
- Understand E-banking and E-business models.

## **Paper 2: Desktop Publishing**

- To incorporate visual communication and aesthetic relationship in visual problem
- Solving , critical thinking and conceptual thinking to students.
- To compose projects that show the relationship between type and image, use of grid lines and visual hierarchy for print, production, and web ready format in order to effectively communicate ideas to the students.
- To utilize traditional studio techniques interactively with computer design.

## **TAXATION GROUP**

### **Paper 1: Direct Tax System Income Tax**

- To introduce the basic concept of Income Tax
- In order to familiarize with taxation various definitions will be studied.
- To help to build an idea about income from Salaries.
- To study the taxability of income from House Property and income from business or profession.
- Understanding the concepts of Capital Gains





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## **Paper -2 : Goods and Service Tax**

- To understand about the Background and features of GST and study various terms related to GST
- To study the registration process and details related to persons liable to tax liability
- To understand the exempted list of goods and determination of taxable supply
- To study various conditions and restriction for composition Levy.
- To study provisions related to Input tax credit

## **APPLIED ECONOMICS GROUP**

### **(for Hons Students Only)**

#### **Paper -1: Managerial Economics**

- To expose Students of Commerce to nature and scope of Managerial Economics and its application in managerial decisions and study Concepts of demand
- To study the types of Production function and various laws related to it.
- To enable the students to understand various factors of production and forms of market
- To study various theories related to Rent and Wages.
- To study the Economic Policy of 1991

#### **Paper – 2 : Macro Economics**

- The objective of the course is to familiarize the students the basic concept of Macro Economics and application.
- To enable students to understand concepts of National Income





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- To study various theories related to Rent and Wages and Employment.
- To understand Monetary theories
- To get an insight about the industrial Policy and Finance Commissions

## II YEAR

### ACCOUNTS GROUP

#### **Paper - 1: Corporate Accounting**

- To enable the students to develop awareness about Corporate Accounting in conformity with the provisions of Companies Act and Accounting as per Indian Accounting Standards
- To make students aware about the conceptual aspect of corporate accounting
- To enable the students to develop skills related to Valuation of Shares and Goodwill of Companies.
- To enable students to understand accounting of Banking and Insurance Companies.
- To enable students to understand concepts of Holding and subsidiary companies

#### **Paper – 2: Cost Accounting**

- To explain the need and importance of Cost accounting in any business and its impact on profitability.
- To impart knowledge about various concepts and elements of Cost.
- To Install the knowledge about accounting procedures, methods and techniques.
- Ascertainment of Material and Labour Cost.
- The Cost Accounting procedures in various types of industries like process industries, Transport Industries, industries on contractual basis etc.





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## For B. Com. Hons Students

### **Paper -1: Corporate Accounting**

- To give knowledge about Accounting of shares.
- To enable the students to develop awareness about Corporate Accounting in conformity with the provisions of Companies Act.
- To enable the students to develop skills related to Valuation of Shares and Goodwill of Companies
- To make students aware about the conceptual aspect of Holding and Subsidiary.
- To enable students to understand accounting related to Merger of Companies and Internal Reconstruction.

### **Paper – 2: Advanced Accounting**

- To explain Accounting of Non Profit Making Organisation..
- To impart knowledge about Value added accounting and accounting of Consignment accounts .
- Understanding accounting of Royalty and Hire Purchase System.
- To study and understand Banking and Insurance Accounts.
- To understand in brief concepts of Indian Government Accounting.

## MANAGEMENT GROUP

### **Paper - 1: Principles of Statistics**

- To understand the concept of population and sample.
- To use frequency distribution to make decision





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- To understand and to calculate various types of averages and variations.
- To use correlation and regression analysis to estimate the relationship between two variables.
- To understand the concept and techniques of different types of index numbers.

## **Paper 2: Principles and Practices of Management**

- To provide basic knowledge & understanding about business management concept.
- To provide an understanding about various functions of management.
- Learning about the need of planning organising , Directing and controlling in management.
- To understand the need of motivation and various theories related to motivation.
- To understand the importance and need of leadership and various types of leadership.

### **For B. Com. Hons Students**

#### **Paper – 1: Marketing Management**

- To develop an idea about marketing and its functions.
- To enhance the students on consumer behaviour.
- To familiarize students about product and its classifications.
- To make them understand pricing policies.
- To introduce the concept of sales forecast and sales Promotion.

#### **Paper – 2: Financial Management**

- Learn the tools and techniques for making and analysing the financial decisions





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- To use the information about financial environment at Indian and global level for managerial decision making.
- To understand the techniques for making judicious use of funds and finance.
- To understand the various Capital structure theories and use them in designing optimal Capital Structure.

## ECONOMICS GROUP

### **Paper - 1: Indian Company Act**

- To impart students with the knowledge of fundamentals of Company Law.
- To update the knowledge of provisions of the Companies Act of 2013.
- To acquaint the students with the duties and responsibilities of Key Managerial Personnel.
- To impart students the provisions and procedures under company law.
- To appraise the students of new concepts involving in company law regime.

### **Paper – 2: Banking Law and Practice**

- To acquaint the students with Banking Law and Practice in relation to the Banking system in India.
- To understand the legal aspects of Banking transactions and its implications as Banker and Customer
- To make the Students aware of the Banking Law and Practice in India





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## COMPUTER GROUP

### **Paper – 1: Database Management System**

- To understand DBMS architecture, physical and logical database designs, database modelling, relational, hierarchical, network and E-R models.
- Learn and apply structured query language (SQL) for database definition and database manipulation.
- Demonstrate and understanding of Normalization theory and apply such knowledge to the normalization of a database.
- To understand various transactions processing, concurrency control mechanism and database protection mechanism.
- To understand basic database storage structure and access techniques such as file organizations, indexing methods including B-Tree and hashing.

### **Paper – 2 : E. Commerce**

- To familiarize students with organizational and managerial foundations of information systems.
- To understand the basic concepts and technologies used in the field of management information systems.
- To understand the processes of developing and implementing information systems.
- Be aware of the ethical, social, and security issues of information systems;





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## TAXATION GROUP

### **Paper 1 - Income Tax Practice and Procedure**

- To get an outline about various provisions and rules of various heads of income and study rules related to set off and carry forward
- To study the Deductions under Sec 80 C to 80U
- To understand payment of Advance Tax and TDS.
- To study Computation of Total Income and Tax liability of Hindu Undivided Family
- To understand the Procedure of Computation of Income of a Company and deductions related to Co operative society.

### **Paper – 2: Advanced Goods and Service Tax**

- To study various provisions related to GST and learn preparation of Tax invoice
- To study rules related to Accounts and records and provisions related to refund and interest.
- To understand the various types of returns to be furnished in GST.
- To study provisions related to Integrated goods and service tax.
- To give an idea about various types of assessment, GST administration, penalties and offences.





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## APPLIED ECONOMICS GROUP

(For B. Com. Hons Students Only)

### **Paper – 1: Public Finance**

- To understand the meaning nature and scope of Public Finance and understand the role of state in public finance
- To study the sources of revenue, types of Canon of taxation and Impact of Taxation and tax evasion on Indian Taxation System
- To study the Principle of Public Expenditure and Public debts and understand the effects of Public Expenditure on production and distribution.
- Understanding the concept of budget and sources of revenue of central and state government.
- Studying the Constitution and function of finance commission and recommendations of finance commission. Studying the objectives of NITI AYOOG.

### **Paper – 2 : Advanced Statistics**

- To understand the concept of population and sample.
- To use frequency distribution to make decisions.
- Understanding theory of Probability.
- To study distribution of sampling and testing of Hypothesis.
- To use correlation and regression analysis to estimate the relationship between two variables.





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## ACCOUNTS GROUP

### III YEAR

#### Paper – 1: Income Tax Law and Practice

- To introduce the basic concept of Income Tax
- In order to familiarize the different know-how and heads of income with its components.
- To help to build an idea about income from house property as a concept.
- To give more idea about the income from business or profession
- To understand the basic concepts and to acquire knowledge about Computation of Income, Submission of Income Tax Return, Advance Tax, and Tax deducted at Source, Tax Collection Authorities under the Income Tax

#### Paper 2: Goods and Service Tax & Custom Duty

- To create an understanding of the theoretical issues associated with design of GST.
- To enlighten graduates on the current GST tax reform, all forms of supply of goods and services like transfer, sale, barter, exchange and rental having an effect on CGST and SGST and IGST
- To understand the problems involved in implementing and administering a GST, along with the politics and economics of moving to such a tax.
- To create awareness about Common procedures for registration of taxpayers, refund of taxes, uniform formats of tax return, common tax base, common system of classification of goods and services.
- To give an idea about various types of assessment, GST administration, penalties and offences





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## For B. Com. Hons Students

### **Paper – 1: Management & Cost Accounting**

- To enlighten the students thought and knowledge on management Accounting.
- To give proper idea on financial statement analysis in practical point of view and to introduce the concept of Fund flow statement
- The study Cost Accounting procedures like Process Costing and Standard Costing.
- To provide knowledge about budget control keeping in mind the scope of the concept.
- To develop the know-how and concept of marginal costing with practical problems.

### **Paper – 2 : Income Tax Law and Practice**

- To introduce the basic concept of Income Tax
- In order to familiarize the different know-how and heads of income with its components.
- To help to build an idea about income from house property as a concept.
- To give more idea about the income from business or profession
- To understand the basic concepts and to acquire knowledge about Computation of Income, Submission of Income Tax Return, Advance Tax, and Tax deducted at Source, Tax Collection Authorities under the Income Tax





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## MANAGEMENT GROUP

### **Paper – 1: Auditing**

- To acquaint themselves about the concept and principles of Auditing, Audit process, Assurance Standards, Tax Audit, and Audit of Systems.
- Understanding of Objective of various Audits
- To get knowledge about preparation of Audit report
- In depth knowledge of Appointment, Qualification & Qualities of an auditor
- To create an awareness about the changing responsibilities of auditors for fraud detection and financial statement attestation.

### **Paper – 2: Management Accounting**

- To enlighten the students thought and knowledge on management Accounting.
- To give proper idea on financial statement analysis in practical point of view.
- To introduce the concept of fund flow and cash flow statement
- To provide knowledge about budget control keeping in mind the scope of the concept.
- To develop the know-how and concept of marginal costing with practical problems

### **For B. Com. Hons Students**

#### **Paper- 1: Human Resource Management**

- To aiming to enable the students in Human Resources Management
- To learn methods of Career Planning and HR Audit and advantages of Recruitment
- To introduce the students about placement and training





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- To facilitate the knowledge about performance appraisal and different methods.
- To study about employee welfare and Trade unions

## Paper – 2: Research Methodology

- To familiarize students with basic of research and the research process.
- To develop understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.
- To have adequate knowledge on measurement & scaling techniques as well as the quantitative data analysis.
- To have basic awareness of data analysis-and hypothesis testing procedures.
- To familiarize students with Statistical tools needed during research work.

### ECONOMICS GROUP A) Finance Group

#### Paper 1: Public Finance

- To understand the meaning nature and scope of Public Finance and understand the role of state in public finance.
- To study the sources of revenue, types of Canon of taxation and Impact of Taxation and tax evasion on Indian Taxation System.
- To study the Principle of Public Expenditure and Public debts and understand the effects of Public Expenditure on production and distribution.
- Understanding the concept of budget and sources of revenue of central and state government.





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- Studying the Constitution and function of finance commission and recommendations of finance commission. Studying the objectives of NITI AYOOG.

## **Paper -2 : Financial Management**

- Learn the tools and techniques for making and analysing the financial decisions
- To use the information about financial environment at Indian and global level for managerial decision making.
- To understand the techniques for making judicious use of funds and finance.
- To understand the various Capital structure theories and use them in designing optimal Capital Structure.

### **ECONOMICS GROUP**

#### **B) Marketing group**

## **Paper – 1: Marketing Management**

- To develop an idea about marketing and its functions.
- To enhance the students on consumer behaviour.
- To familiarize students about product and its classifications.
- To make them understand pricing policies.
- To introduce the concept of sales forecast

## **Paper 2: International Marketing**

- This will helpful to know requirement of decision making in international Marketing.
- The role of marketing mix and market selection in international marketing.
- Imparting knowledge about International Marketing Strategies And Elements of International Marketing Mix.





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Established in the year 1994

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- It will teach us about market segmentation, targeting and positioning of product.
- It plays an important role to know cultural issue in international market.

## COMPUTER GROUP

### **Paper – 1: Web Designing**

- To Understand the principles of creating an effective web page.
- Become familiar with graphic design principles that relate to web design and learn how to implement theories into practice.
- To develop skills in analyzing the usability of a web site.
- To learn the language of the web: HTML and CSS.

### **Paper – 2 : Digital Marketing**

- To harness the potential of internet marketing/online marketing.
- To effectively leverage its impact on consumers.
- To understand and estimate the mindset of the online consumer.
- To enable students to gain knowledge on Internet Marketing and increase their job opportunities.

## TAXATION GROUP

### **Paper – 1 : Various Central and Provincial Taxes**

- To study about customs duty and various rules and calculations related to import and Export.
- To determine the assessable value . customs duty
- To study Madhya Pradesh Excise Duty Act and duty collected on intoxicants





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- To study the main provisions related to professional tax
- To study rules related to registration of properties and stamp duty.

## **Paper – 2 : Income Tax Planning and Management**

- To introduce the basic concept of Tax Planning
- In order to understand tax planning for income like income from salary.
- To give more idea about tax planning of income from business or profession and income from house property
- To study Tax planning of Capital Gains and income from other sources.
- To understand the basic concepts of Tax Management, Submission of Income Tax Return, Appeals and revision and Penalties and Prosecutions under the Income Tax
- Tax, and Tax deducted at Source, Tax Collection Authorities under the Income Tax

## **APPLIED ECONOMICS GROUP**

### **For Hons Students**

#### **Paper – 1: Banking Law and Practice**

- To acquaint the students with Banking Law and Practice in relation to the Banking system in India.
- To understand the legal aspects of Banking transactions and its implications as Banker and Customer
- To make the Students aware of the Banking Law and Practice in India

#### **Paper – 2 : Goods and Service Tax & Customs Duty**

- To create an understanding of the theoretical issues associated with design of GST.





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- To enlighten graduates on the current GST tax reform, all forms of supply of goods and services like transfer, sale, barter, exchange and rental having an effect on CGST and SGST and IGST
- To understand the problems involved in implementing and administering a GST, along with the politics and economics of moving to such a tax.
- To create awareness about Common procedures for registration of taxpayers, refund of taxes, uniform formats of tax return, common tax base, common system of classification of goods and services.
- To give an idea about various types of assessment, GST administration, penalties and offences.

## **Project Report and Viva Voce (For Hons Students Only)**

Practical training in any organisation, firm, business etc and preparation of report regarding the experience and difficulties faced during training process.





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## Department of Computer Sciences

### Program Outcomes

#### B. Sc.

- A graduate in B.Sc. shall be eligible to apply his/her knowledge of science across a wide range of fields.
- Students is acquainted with latest trends in technological development and can impact on individuals and society.
- Students can generate new ideas and solutions to existing problems.

### Program Specific Outcomes

#### B.Sc. Computer Science + Mathematics + Physics

- Students can integrate the knowledge of Computers, Mathematics and Physics.
- Benefits of taking Computer Science are that students will have wide job opportunities.
- Almost every field now a day need computer skilled workers.
- Students can take up research in computer science.

#### B.Sc. Information Technology + Mathematics + Physics / Electronics

- Students can integrate the knowledge of Computers, Mathematics and Physics/ Electronics.
- Students shall develop understanding of complex computer systems and can interpret the results from these systems.
- Shall have an understanding of thermodynamics, optics and quantum mechanics.
- Students shall develop proficiency in amplifiers, semiconductors, and microprocessor.
- Shall have an understanding of software and hardware of computers and information technology.





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## **B. Sc. Physics + Chemistry + Mathematics**

- Students can integrate and implement the knowledge of core subjects Physics, Chemistry and Mathematics.
- Students can pursue research in any of the above three subjects.
- Students can apply methods of research and design to solve problems in any of these disciplines.

## **B.Sc. Electronics + Mathematics + Physics**

- Students can integrate the knowledge of Electronics, Mathematics, and Physics.
- Students shall develop proficiency in amplifiers, semiconductors, and microprocessor.
- Students can pursue research in any of the above three subjects.
- Students can apply methods of research and design to solve problems in any of these disciplines.

## **B.Sc. Computer Science (Hons)**

- Students can integrate the knowledge of Computer Languages.
- Students will have an understanding of the software development process.
- Students will have an understanding of software testing and quality assurance techniques.
- Students will be aware about software documentation process (Manual).
- Benefits of taking Computer Science are that students will have wide job opportunities.
- Almost every field now a day need computer skilled workers.
- Students can take up research in computer science.





**MRSC**  
Established at Indore in 1999

# Maharaja Ranjit Singh College of Professional Sciences-Indore

**Department of Computer Science**

## **Course Outcome**

### **I YEAR**

#### **Fundamental of Computers Paper – I**

- Internal organization of computers, CPU, memory unit and Input/Outputs and the relations between its main component
- history and development of modern computers, developing an appreciation for the potential and directions for future change
- Learn about different types of machines & Input/Output devices.
- Understanding different aspects like H/W,S/W & firmware.
- Getting familiar with OS & Windows.
- Learn to work on MS Office
- Identify, understand and apply different number systems and character codes.
- Understand the digital representation of data in a computer system.
- Understand the general concepts in digital logic design, including logic elements, and their use in combinational and sequential logic circuit design.
- Understand computer arithmetic formulate and solve problems, understand the performance requirements of system
- Understand different types of memories & Memory devices.
- Understand Word Length, Processing Speed & Memory addressing capability of CPU.
- Learn about microprocessors & microcontroller.
- Study CPU architecture &Data Transfer schemes

#### **Programming in C Paper – II**

- To understand what is language? Programming languages and its types
- To understand different programming tools such as Algorithm, flowchart, pseudo code, Decision table and Decision Tree.
- To understand structured programming language approaches as Bottom-up Top-down, Modular and Structured.





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- To be understand concept of SDLC (Software Development Life Cycle) and its different phases.
- To be understand the concept of Structure of C-Language, Variable, Constant, Data types, Operators and its precedence.
- Concept of Formatted and Unformatted, Branching, jumping and Loop statements
- Concept of function? Its types and Array (Linear & Multidimensional)
- Concept of Recursion and Pointers, Array of Pointer and Structure.
- File Handling in C and Graphics programming.
- Able to develop programs as required by enduser.

## II YEAR

### OOPS Using C++ Paper – I

- Understand the difference between the top-down and bottom-up approach
- Describe the object-oriented programming approach in connection with C++
- Apply the concepts of object-oriented programming
- Apply virtual and pure virtual function & complex programming situations

### Data Structure Paper – II

- To understand the concept of dynamic memory management, data types and algorithms.
- To understand basic data structures such as array, link list, stack and queue with different applications of data structures.
- To understand the hash function and concepts of collision and its resolution methods.
- To solve problems involving graph, tree and understand different algorithms for traversing of graph and tree.
- Apply algorithm for solving problems like sorting, searching, insertion and deletion of data with different types.





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## III YEAR

### DBMS Paper – I

- To understand DBMS architecture, physical and logical database designs, database modeling, relational, hierarchical, network and E-R models.
- Learn and apply structured query language (SQL) for database definition and database manipulation.
- Demonstrate and understanding of Normalization theory and apply such knowledge to the normalization of a database.
- To understand various transactions processing, concurrency control mechanism and database protection mechanism.
- To understand basic database storage structure and access techniques such as file organizations, indexing methods including B-Tree and hashing.

### Operating System Concepts Paper – II

- To understand the basic of operating system like kernel, shell, types and views of operating system.
- To understand the concept of process scheduling and various CPU scheduling algorithms.
- To understand various memory management techniques with their algorithms and concept of thrashing.
- To understand the concept of inter process communication, use disk management and disk scheduling algorithms for better utilization of external memory.
- To recognize file system interface, protection and security mechanism.
- To understand concept of Linux operation system and different Linux commands.

### Computer Organization (Hons only)

- Have a good understanding of the OSI Reference Model and in particular have a good knowledge of Layers 1-3.





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- Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies;
- Have a basic knowledge of the use of cryptography and network security;
- Specify and identify deficiencies in existing protocols, and then go onto formulate new and better protocols;
- Have an understanding of the issues surrounding Mobile and Wireless Networks.
- Have a working knowledge of datagram and internet socket programming
- Implement interactive web page(s) using HTML, CSS and JavaScript.
- Design a responsive web site using HTML5 and CSS3.
- Demonstrate Rich Internet Applicant

## Software Engineering (Hons only)

- Understand the Concept of System, its types and components, Environment.
- Learn about SDLC (System Development Life Cycle) and Its phases.
- Learn Software Engineering principles and techniques.
- Understand different models to develop system.
- Gain knowledge about analysis and design of complex systems
- Able to produce efficient, robust and cost-effective software
- Learn to manage time, processes and resources effectively.
- Learn to use different information gathering tools
- Understand Structured System Analysis and its tools.
- Understand different project sources and Evaluation process of projects by different committee methods
- Understand different issues such as modularity and coding statements.
- Learn to prepare System Requirements and SRS (System Requirement Specification) and RFP (Request for Proposal)
- Learn to apply Testing and Quality assurance techniques.
- Prepare Technical documentation and presentation on various aspects of a software development project.
- Understand maintenance and handle change request.





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- Learn Hardware and Software selection, Implementation, post-Implementation review of software projects.

## JAVA ( Hons only)

- Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Be aware of the important topics and principles of software development.
- Have the ability to write a computer program to solve specified problems.
- Be able to use the Java SDK environment to create, debug and run simple java program

## I YEAR

### Introduction to Information Technology & Computer Organization Paper –I (IT)

- Understood the theory and architecture of central processing unit.
- Understood functions of INPUT & OUTPUT Devices
- Understood memory & its types (Primary & Secondary)
- Understood H/W and S/W & it's types & functions
- Gained knowledge about Open source, Freeware and shareware S/W.
- Understood Word processor, Formatting and Table handling features in MS-WORD.
- Understood the features and concepts of spreadsheet and Power Point.
- Define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation.
- Understood various types of registers, logic gates and computer codes in computer system.
- Understood various types of display devices and printing technologies in computer system.





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## Programming & Problem Solving Through C & C++ Paper – II (IT)

- To understand data types used in c language and type conversion concept.
- To understand the various types of operators and their uses.
- To understand the concepts of conditional & iterative statements to write c programs.
- To understand the concept of functions and their prototypes.
- To understand the concept of array and its types, concepts of string and string functions.
- To be able to develop programs using pointers, structure and array of structure.
- To understand the Object oriented paradigm with concepts of streams, classes, functions, data and objects.
- To understand the dynamic memory management techniques using pointers, constructors, destructors etc.
- To understand the concepts of function overloading, operator overloading, virtual functions and polymorphism. Classify inheritance with understanding of early and late binding, uses of exception handling.
- To understand the file handling concepts in C++.

## II YEAR

### Operating System Concepts & Computer Network Paper –I (IT)

- To understand the basic of operating system like kernel, shell, types and views of operating system.
- To understand concept of Unix operation system and different Unix commands.
- To understand the concept of process scheduling and various CPU scheduling algorithms.
- To understand various memory management techniques with their algorithms and concept of thrashing.
- To understand the concept of inter process communication, use disk management and disk scheduling algorithms for better utilization of external memory.
- To recognize file system interface, protection and security mechanism.





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- To understand different types of network, various topologies and various applications of network.
- To understand the concept of networking models, protocols, functionality of each layer and to understand the error detection and correction techniques.
- To understand the concept of data link protocols, multiple access protocols and IEEE 802 standards for LAN.
- To understand routing and congestion in network layer with routing algorithm and classify IPV4 addressing scheme. Working of transport and application layer.

## **Internet Programming using JAVA Paper –II (IT)**

- Understand fundamentals of programming such as variables, conditional and iterative execution, methods, etc.
- Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc.
- Be aware of the important topics and principles of software development.
- Have the ability to write a computer program to solve specified problems.
- Be able to use the Java SDK environment to create, debug and run simple Java programs

## **III YEAR**

### **DBMS & RDBMS using Oracle Paper –I (IT)**

- To understand DBMS architecture, physical and logical database designs, database modeling, relational, hierarchical, network and E-R models.
- Learn and apply structured query language (SQL) for database definition and database manipulation.
- Demonstrate and understanding of Normalization theory and apply such knowledge to the normalization of a database.
- To understand various transactions processing, concurrency control mechanism and database protection mechanism.





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- To understand basic database storage structure and access techniques such as file organizations, indexing methods including B-Tree and hashing.

## Information Technology Trends Paper –II (IT)

- To introduce most of the latest technologies & trends of Information Technology.
- Understand distributed & parallel computing systems.
- Understand the concept of e-CRM, e-SCM & ERP Systems.
- Understand the Big Data & Hadoop.
- Understand the networks via Mobile commerce & VPN
- Understand GIS software & its use
- Understand modern communication & telephone technologies & different generations of mobile networks.
- Learn wireless communication technologies.
- Understand the network security concepts.
- Learn all Multimedia concepts.
- Understand Artificial Intelligence & Expert Systems.
- Introduce Virtual Reality.
- Learn elementary concepts of IoT, smart systems, embedded systems & cloud computing.





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## Course Outcomes Department of Chemistry

### I Year

#### Paper I: Physical Chemistry

- Explain shapes of orbital based on quantum numbers.
- Explain the difference between liquids and gases, how real gases are different from ideal gases at different temperature and pressure.
- Explain methods of liquefaction and discuss intermolecular forces & structural differences between solids, liquids and gases.
- Draw molecular orbital diagram [MOD] of different molecules.
- Explain Accuracy and precision and their use in practical data or results analysis and errors.
- Calculate partition coefficient, different types of liquids, and different laws for ideal solution (Raoult's law & Henry's law).
- State and apply the laws of thermodynamics; perform calculations with ideal and real gases; design practical engines by using thermodynamic cycles; predict chemical equilibrium and spontaneity of reactions by using thermodynamic principles.
- To apply the concepts of colloids and gels.
- To learn depth knowledge about liquid states.

#### Paper II: Inorganic Chemistry

- Explain the properties of alkali and alkaline earth metals, phenomenon of photoelectric effect, diagonal relationship.
- Discuss the structure of diborane, lewis acid nature of boron trihalides, preparation of carbides & silicones, preparation & industrial applications of nitride, hydrazine & hydroxylamine .preparations & applications, preparation of polymeric phosphonitrilic compounds.





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- Explain the Principles of qualitative analysis: anions & cations identification, separation by applying basic principles such as solubility product & common ion effect.
- Discuss Bond polarization: covalent bonds polarity & non polarity. Types of reactions.
- Explain types of oxides and oxyacid, their structure and reactivity in s- block & p block elements, inter halogen compounds, pseudo halogens & clathrate compounds.
- Discuss the properties d block elements & triads of transition elements.
- Knows about Atomic structure quantum model. Bohrs Theory and its limitations, Schrodinger Wave Equation and its function, quantum numbers. Slater rules and its applications and limitations.
- Lattice energy and its application, Born-Haber cycle and its application. Shapes of molecules on the basis of valence bond theory and valence shell electron pair repulsion theory.
- Explains ionic and covalent bonding with VBT and VESPER Theory and
- Detailed description of Molecular orbital theory with homonuclear and heteronuclear diatomic molecules.
- Physical effects and electronic displacement in organic molecules.

### Paper III : Organic Chemistry

- Explain the properties of alkali and alkaline earth metals, phenomenon of photoelectric effect, diagonal relationship.
- Discuss the structure of diborane, lewis acid nature of boron trihalides, preparation of carbides & silicones, preparation & industrial applications of nitride, hydrazine & hydroxylamine .preparations & applications, preparation of polymeric phosphonitrilic compounds.
- Explain the Principles of qualitative analysis: anions & cations identification, separation by applying basic principles such as solubility product & common ion effect.
- Discuss Bond polarization: covalent bonds polarity & non polarity. Types of reactions.





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- Discuss Preparations & reactivity of alkanes, alkenes & alkynes by applying rules : stability of cycloalkanes by Baeyer strain theory.
- Explain aromaticity of benzenoids & non-benzenoids, the preparation, reactivity & structure of aromatic compounds.
- Discuss the preparations, reactivity & stereochemistry of SN1 & SN2 reactions of Halogen compounds.
- Reactive intermediates.
- Conformational, optical and geometrical type of stereoisomerism and assignment of configuration.
- Preparation reaction and structure of alkenes, alkenes and alkynes.
- Students will also know and recall the fundamental principles of organic chemistry that include chemical bonding, nomenclature, structural isomerism, stereochemistry, chemical reactions and mechanism.

### II YEAR

#### Paper I: Physical Chemistry

- Student learn quantitative methods of analysis by volumetric methods of analysis using permanganometry, dichrometry and acidimetry.
- Learn to determine various physical constants by experiments.
- Enable the students to apply the basic concepts of thermodynamics, quantum mechanics and spectroscopy to chemical, physical and biochemical systems.
- Students learn the derivation of mathematical relations in thermodynamic and quantum mechanics
- Learn about non-spectroscopic methods of analysis.
- Enable the students to learn the different laws of thermodynamics and the relations that govern the various thermodynamic equations of state.
- Learn the basics of group theory.





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- Enable the students to learn the different laws of thermodynamics and the relations that govern the various thermodynamic equations of state.
- Learn the basics of group theory

### Paper II: Physical Chemistry

- To understand the structure of molecules
- To acquire the knowledge about different types of bond.
- Acquire the knowledge about periodic properties of elements and their applications in various field.
- To understand the fundamental nuclear reactions and its applications in medical and industrial field.
- To acquire the fundamental knowledge about Nano materials.

### Paper III: Physical Chemistry

- To understand classification, nomenclature, and mechanism of reaction aromaticity and chemistry of aliphatic and aromatic substituted compounds.
- To acquire the knowledge about stereochemistry of organic compounds.
- To acquire the basic idea about photo chemical reaction.
- Learn about various carbohydrates, heterocyclic compounds, amino acids and nucleic acids.
- Understand different natural products such as Terpenes, alkaloids, vitamins etc.
- Get a general idea of different polymers and polymerisation process.
- Learn the different reagents in organic synthesis and the application of organometallics in synthesis.





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## III YEAR

### Paper I: Physical Chemistry

- Basic fundamental of Elementary Quantum Mechanics, Schrodinger wave equation, Physical interpretation of the wave function and its importance, Particle in a one dimensional box and Molecular orbital theory (MOT), Basic ideas criteria for forming the molecular orbital (MO) from Atomic Orbitals (A.O.), also to calculate the energy level from wave function, Basic concept of sigma, sigma star, pi, pi star calculation of coefficient of AO's used in the hybrid orbitals.
- Students understand the basic terminology like Electromagnetic radiation, Wave, Wavelength, Frequency and wave number and also introduce molecule degree of freedom and spectroscopy techniques such as Rotational Spectrum, Vibrational Spectrum, Raman spectrum, Electronic Spectrum, UV Spectroscopy,
- Basic fundamental of Photochemistry: Interaction of radiation with matter, law of photochemistry, Quantum Yield,
- Basic understanding to photosensitized chemical reaction and energy transfer processes and their sample analysis.
- Physical Properties and Molecular Structure: Optical Activity, Polarization, Orientation of dipoles in an electric field, Dipole moment, Induced dipole moments, Measurement of dipole moment, Temperature Method and Refractive method,
- Magnetic Properties: Paramagnetism, Diamagnetism and ferromagnetism
- And also students to understand the practical skills of Physical Chemistry like to determine the velocity constant (specific reaction rate) of hydrolysis of methyl acetate/ ethyl acetate catalyzed by hydrogen ions at room temperature also to determine the partition coefficient of iodine between carbon tetra chloride and water. Also to understand the pH value and Acid-base titration.





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## Paper II: Inorganic Chemistry

- Introduction: Hard and Soft Acids and Bases (HSAB), Classification of Hard and soft acid-base, Application of hard-soft acid base theory.
- Introduction Classification, properties and applications of inorganic Polymers like Silicones and Phosphazenes.
- Metal Ligand Bonding in Transition Metal Complexes: Introduction: Limitations of valence bond theory, Crystal Field Theory, factor affecting the crystal field parameters. Applications of crystal field theory and limitation of crystal field theory.
- Introduction Magnetic Properties, Types of Magnetic properties and behavior.
- Electronic Spectra of Transition Metal Complex: Type of electronic transition, Selection rules for d-d transitions,
- Organometallic Chemistry(OMC): General Introduction. Nomenclature and Classification of Organometallic Compounds, General Methods of preparation: Alkyl and aryl Organometallic compounds of Lithium
- Bio-Inorganic Chemistry: Essential and trace elements in biological processes. Biological function of the bio-elements, Availability of Bio-metals and bio-non-metals, Metalloporphyrins, Haemoglobin structure and biological function. Myoglobin-mechanism of oxygen transfer through haemoglobin and myoglobin, Relation between haemoglobin and myoglobin, Biological role of alkali and alkaline earth metal ions with special reference to  $Ca^{2+}$ , Nitrogen Fixation
- Metal Nitrosyl Complex: Nitrosyl agents, synthesis, structure Properties and bonding.
- And also students to understand the practical skills of Inorganic Chemistry like Gravimetric Analysis (Estimation), Complex Compound Preparation and Effluent water Analysis, Water Analysis, etc.

## Paper III : Organic Chemistry

- Nuclear Magnetic Resonance Spectroscopy (NMR), Explanation of  $^1H$  NMR spectra of simple organic molecules eg. ethanol, ethyl bromide, acetaldehyde, 1,1,2-tribromo





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ethane, ethylacetate, Toluene, and acetophenone, Application of UV, IR, and PNMR spectroscopy for simple organic compounds.

- Organo-mettalic Compounds: Organo-magnesium compounds: Grignard Reagent, Preparation, structure and chemical reactions, Organo-zinc compounds: preparation and chemical reactions, Organo-sulphur compounds: Nomenclature, Structural characteristics thiol, thio-ether, sulphonic acid, sulphonamide and sulphaguanidine method of preparation and chemical reactions.
- Organic synthesis by enolates: Synthesis of ethylacetoacetate, Keto-enoltoutomerism form in ethylacetoacetate, alkylation of diethyl malonate and ethyl acetoacetate,
- Chemistry of Carbohydrates :Classification and nomenclature of monosaccharide, Mechanism, Inter conversion of glucose into fructose. Disaccharides introductory idea of maltose, sucrose, and lactose (excluding structure) Polysaccharides introductory idea of starch and cellulose (Excluding Structure).
- Fat, Oil and Detergents: Natural fat, edible and industrial oil of plant origin, Hydrogenation of unsaturated oil Sponification value, iodine value and acid value, Synthetic Detergents: Alkyl and aryl sulphonate
- Amino Acids and Nucleic Acid: Classification of Amino Acid, Structure, Acid base behavior isoelectric point and electrophoresis, Preparation and chemical reaction of alpha amino acids.
- Peptide and Proteins: nomenclature and structure, classification of proteins, determination of peptide structure, end group analysis, Structure of peptide and proteins, Nucleic Acids: constitution of nucleic acid, Double helix structure of DNA.
- Synthetic Dyes: Colour and constitution (electronic concept), Classification of dyes and their chemical reaction and applications.
- Chemistry of Heterocyclic compounds: Introduction, Classification nomenclature, Aromatic Character and molecular orbital picture of Pyrrole, Furan, Thiophene and Pyridine , Furan: Preparation, Properties, Structure, Thiophene: Preparation, Properties, Thiophene as a Resonance hybrid, Pyrrole: Preparation, Properties,





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Orbital Structure, Orientation in pyrrole in electrophilic substitution reaction Six atom heterocyclic compounds: Pyridine, synthesis, orientation in pyridine substitution reactions, properties, uses, structure Quinoline: Preparation, Properties, uses and constitution of quinoline Isoquinoline: Preparation, Properties, uses and constitution of Isoquinoline, Exercises.

- Also students to understand the practical skills of Organic Chemistry like to separate and identify organic mixture having two solids organic compounds and also prepare their derivatives and Organic Reactions and synthesis like: Acetylation, Benzoylation, m-dinitrobenzene, Picric Acid.





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Department of Physics

Course Outcomes

I YEAR

## Mathematical Physics, Mechanics and Properties of matter Paper I

- Physical significance & uses of gradient divergence and curl also about the uses of theorem's based on linear, surface & volume integral.
- Learn: about planetary motion in universe. The concept of gravitational field and change in energy & momentum in collision of particles.
- Concepts of centripetal force, centrifugal force, centre of mass, reduced mass etc.
- Basic concept of elasticity. Some notable applications of surface tension of liquid, properties of fluid, also the concept of motion of bodies, relativity.
- It also explains behavior of objects in space and time.

## Thermodynamics and statistical physics Paper II

- How to deal with heat and temperature in thermodynamics physics Conversion of energy by using engines & refrigerator.
- An overview of entropy. Principle of increase in entropy
- To understand the behavior of large collection of interacting objects using statistical physics.
- Contribution of classical and quantum statistics.
- Contribution of physicist.

II YEAR

## OPTICS Paper I

- To study the propagation of light in straight line through a geometrical optics, reflection and refraction of light in various medium, properties of light experimentally with the help of optical instruments.





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- Principle of superposition of light, to understand the interference of light by many experiments.
- Learnt about diffraction of light through Fresnel's theory and Fraunhofer diffraction, study about telescope, grating element etc.
- Studied about transverse nature of light waves, polarization of electromagnetic wave, double refraction, Huygens's principle etc.
- They will study about laser and its characteristics, relationship between Einstein's coefficients.

### Electrostatics, Magnetostatics and electro dynamics Paper II

- Students will know more about Coulomb's law, relationship between electric field and electric potential, also about Di-electric constant.
- They will study Lorentz force, ampere's law and Biot-Savart law, Kirchhoff's law etc., LCR circuits, series and parallel networks, bioelectricity etc.
- They will know about the electric field as an accelerating field, what is CRO, cyclotron.
- Learn about Faraday's law, Poynting's vector, total internal vector, ionosphere etc.

### III YEAR

#### Quantum mechanics and spectroscopy Paper I

- Students will know about black body radiation and its energy curve, De Broglie hypothesis, Heisenberg's uncertainty principle, Schrödinger equation etc.
- They will learn tunneling effect in quantum phenomenon alpha decay, simple harmonic oscillator with zero point energy.
- Concepts of Bohr's atomic model and its postulates, Pauli's exclusion principle, orbital and spin angular momentum etc.
- Vibrational energy of a diatomic molecule and zero point energy, Raman Effect.





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- Concept of mass, mass defect and packing fraction, binding energy, beta decay, also the concept of nuclear fusion and fission, and nuclear models etc.

### Solid state physics and devices Paper II

- Students learnt about Miller indices, Bravais lattice with its packing fraction, Bragg's equation, bonding and band theory.
- They will learn about the Einstein's quantum theory and Debye theory of specific heat and its limitations, Hall Effect, Para-magnetism, Ferro-magnetism, Curie law etc.
- Study about semiconductor and its types, transistor and its types.
- They will know about transistor as an amplifier, also about transistor as an oscillator etc.
- Basic concept on nano materials and its properties.





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## Course Outcomes Department of Electronics

### I YEAR

#### Basic of semiconductor and Devices Paper-1

- Student will understand the basic concepts of electronics, components and its behaviour
- Students will understand the semiconductor material behavior
- Student will Understand the operation of semiconductor devices like diode and transistor it's V-I characteristics electronics
- Student will develop ability to design and analyze electronic Circuit.
- Student can apply concept of electrical, electronic network topology and understand the basic concept of graph and basic electrical Circuit.

#### Electronic Circuit and fundamental of digital electronics Paper-2

- Student will Understand the working of rectifier and filter circuit regulated power supply
- Students will able to design and analyze the basic operation of BJT and MOSFET. Also develop knowledge about multistage amplifier using BJT and FET.
- Student will Classification of different amplifier and analyze the concepts of different types of amplifier. Describe the positive and negative feedback and advantages of positive Feedback.
- Students will understand the action and application of counter and get a deep knowledge of various memories use in computers
- Perform the binary addition, subtraction, multiplication, division of and Convert the number in various number systems and codes.





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## II YEAR

### Digital Electronics and Microprocessor Paper-1

- Student will improve ability to develop a digital logic and apply it to real life problems.
- Student will analyze design and implement sequential logic circuit. Also analyze design and implement combinational logic.
- Student can describe different types of ADC, DAC and sample and hold circuit Design and explain A to D and D to A convertors
- Student can describe architecture of 8085 write assembly language program for microprocessor. Students can interface various peripheral devices.

### Operational Amplifier and Instrumentation Paper-2

- Students will know the concept of amplifier feedback amplifiers and their characteristics.
- Student will Design the different oscillator circuit for various frequencies
- Student will able to study the instrument with its principle and observe the method their functioning
- Students will able to provide knowledge of the behavior of instruments.
- Students will get the knowledge of bio medical instrument like ECG X-ray machine.
- Understand working and block diagram of biomedical instruments





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## III YEAR

### Thyristor IC Technology Microprocessor and Electrical Motor Paper1

- Students will get the knowledge about power electronics scr, ujt, triac diac and controlling industrial process.
- Learn about phase controlled rectifier and invertors.
- Students will get knowledge about types of motor like DC motor, Induction motor, synchronous motor
- Student will get idea about process of electronics grad si and ge material and process of manufacturing of IC.
- Student can describe architecture of 8086 write assembly language program arithmetic for microprocessor.

### Communication Electronics Paper-2

- Students will able know the basic principle and working of Fiber optics, Importance of optical fiber, Propagation of light waves in optical fiber and its importance in communication.
- Student can analyze the principles, generation, reconstruction and applications of amplitude modulation
- Student will examine the types of noise that are encountered in communication systems Frequency modulation and pulse code modulation





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## Course Outcomes Department of Mathematics

### I YEAR

#### Algebra and Trigonometry Paper –I

- Rank of matrix, Eigen Values and Eigen Vectors of matrix, Cayley Hamilton theorem, Consistency and inconsistency of Linear equations.
- Theory of equations.
- Boolean Algebra, Boolean functions and Algebra of electric circuits.
- De-Moivre's theorem and its applications, Direct and inverse circular functions, hyperbolic functions.
- Expansion of trigonometric functions, logarithm of complex quantities.

#### Calculus and Differential Equation Paper-II

- Successive differentiation, Series expansion and asymptotes.
- Curvature and tracing of curves in Cartesian coordinates.
- Integration of transcendental functions, definite integral and reduction formulae, use of integral to find quadrature and rectification.
- Differential equation of order one and degree one, Order one and degree high, geometrical meaning of differential equation.
- Linear differential equation with constant coefficients, homogeneous linear ordinary differential equations, Linear differential equation of order two and variation of parameters.

#### Vector analysis and Geometry Paper-III

- To be able to do Vector Differentiation, will learn about Gradient, divergence and curl of vector function.





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- Learn about Vector Integration and simple application of Gauss's, Green and Stoke's theorem.
- Learn about General equation of second degree and trace conics and polar equation of conics.
- Knowledge about Cone and cylinder.
- Study about central conicoids, paraboloids and generating lines

## II year

### Abstract Algebra Paper – I

- An insight about Group, Subgroup, Cyclic Group and their properties.
- To gain knowledge of Coset decomposition, Lagrange's theorem, Normal Subgroups, Quotient Groups.
- Will learn about Homomorphism and Isomorphism of groups, fundamental theorem of homomorphism and Permutation group.
- To learn about automorphism, Inner automorphism, normalize, Cauchy's theorem for finite Abelian and non Abelian group.
- Gain knowledge about Ring, Homomorphism between rings, ideals, Quotient ring, Polynomial ring, Integral domain and field.

### Advanced Calculus Paper-II

- Students are introduced about convergence of sequence, Cauchy sequence, absolute and conditional convergence of sequence.
- An insight about continuity and uniform continuity of functions of single variable.
- Students will also gain knowledge of differentiability of function of one variable.
- To enable students gain knowledge about continuity of function of two variables, partial differentiation and jacobian.
- Insight about envelope, evolute, maxima and minima of function of two variables Beta and Gamma function.





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- To learn about multiple integrals, volume and surface integral and Dirichlet's integral.

## Differential Equation Paper- III

- An insight about series solution of differential equation, Bessel and Legendre function.
- Introduction to Laplace transformation.
- Knowledge about inverse Laplace transformation and application of Laplace transformation to solve differential equation.
- An overview about partial differential equations.
- Knowledge about partial differential equations of second and higher order.

## III YEAR

### Linear Algebra and Numerical Analysis Paper-I

- Insight about Vector space, basis of vector space and quotient space.
- Knowledge about linear transformation, eigen values and eigen vectors of linear transformation and matrices.
- Detail about inner product space.
- Application of numerical analysis to find solution of equation and interpolation.
- Learn about direct and iterative methods to find solution of equations and ordinary differential equations.

### Real and Complex analysis Paper-II

- Students will gain knowledge about Riemann integral, partial differentiation, Schwarz's and Young's theorem.
- Learn about improper integrals and their convergence, Fourier series.
- Insight about metric space, real numbers as a complete ordered field.
- An overview of continuous function, compactness and connectedness in metric space.





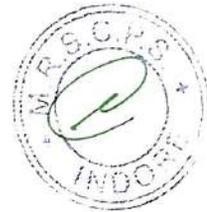
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- Students will learn about continuity and differentiability of complex functions, analytic functions and Mobius transformation.

### **Discrete Mathematics (Optional) Paper-III**

- Students will be introduced to Boolean functions, relations and equivalence relations.
- Insight about partial order relations and lattice theory.
- Basics of graph theory.
- Knowledge about tree and their properties.
- Learn about matrix representation of graph, cutset and planer graphs.





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## Department of Biosciences

### Program Outcomes

M. Sc.

- ★ Students shall be eligible for working in various departments of pharmaceutical, food, beverages, biopharmaceutical and other related industries.
- ★ Students can take up research for perusing doctoral degree in biological sciences or any interdisciplinary field.
- ★ Students can choose to be entrepreneurs and can get engaged in production of various bioactive, biological, biotechnological, biochemical or any related product.

### Program Specific Outcomes

M. Sc. Microbiology

- ★ Trained for skills required in quality control department, research and development, process development, production etc. in a pharmaceutical company.
- ★ Students can gain proficiency in analytical skills in microbiology, molecular biology, biochemistry, immunology and genetic engineering.
- ★ Student shall be able to plan meticulously the experiments for microbiology research.
- ★ Students shall be skilled in working for medical diagnostic procedures.
- ★ Proficient in working for industrial quality control and production of food, beverages, biopharmaceutical products, vaccinology etc.





# Maharaja Ranjit Singh College of Professional Sciences-Indore

## Program Specific Outcomes

### M. Sc. Biotechnology

- ★ Students shall develop expertise in molecular biology, microbiology, biochemical, immunological and plant tissue culture techniques.
- ★ They shall develop understanding for intricate cellular process, microbial metabolism and applications of enzyme technology.
- ★ Students shall develop proficiency in biostatistics and computational techniques.
- ★ They will be able to plan and organize their experimental work meticulously.
- ★ They will be able to understand the importance of intellectual property and biosafety.
- ★ Shall be proficient in genomics and proteomics.





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## Department of Biosciences

### M.Sc. Microbiology Course Outcomes

#### Semester – I

##### Paper 1: Bacteriology

**On completion of the course students will be able**

- To understand the different concepts and methods of microorganisms classification.
- To understand the culture techniques for study of microbial diversity.
- To understand the mechanisms of bacterial growth and impact of environmental factors of microorganisms growth rate.
- To understand about different types of cultivations e.g. batch, continuous, synchronous culture.
- To explain the principle and methods of control of microorganisms.

##### Paper 2: Virology, Mycology and Phycology

**On completion of the course students will be able**

- To understand general character of viruses, nomenclature and classification of viruses
- To explain about lytic and lysogenic cycles.
- To understand about application of bacteriophages in Genetic Engineering.
- To explain the different methods used for estimation of viruses.
- To understand about the structure, classification and importance of fungi.
- To explain different types of algae, their structure and reproduction.





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## Paper 3: Immunology

**On completion of the course students will be able**

- To understand structure, composition and types of cells and organ involved in the immune system.
- To understand about the modern methods of vaccine production.
- To explain about structure, properties, types and subtypes of Immunoglobulins.
- To understand about Antigen-Antibody interactions.
- To understand about Cancer: origin and terminology, oncogenes, tumor antigens, immune response to tumors, tumor evasion of the immune system, immunodiagnosis of tumors.
- To understand about Immunofluorescence, ELISA, Radioimmunoassays, Immuno blotting methods.

## Paper 4: Microbial Biochemistry

- To understand chemical processes those occur in and between cells.
- To explain the structure of proteins, lipids, nucleic acids, and carbohydrates and their role in metabolic pathways.
- To understand the regulation of enzymes and relevance to metabolism.
- To understand about basic principle of bioenergetics and its importance in metabolic pathways.
- To understand about Enzyme classification, mechanisms of enzyme action enzyme kinetics : michaelis- menton equation, determination of kinetic parameters, multi-step reactions.
- To explain properties and function of fat soluble and water soluble vitamins.





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## Semester – II

### Paper 1 -Microbial Genetics

**On completion of the course students will be able**

- To explain genome organization of prokaryotic and eukaryotic organisms
- To understand DNA structure and replication mechanisms in Eukaryotes and Prokaryotes.
- To explain different mechanisms of DNA repair systems.
- To understand prokaryotic and Eukaryotic transcription and their regulation.
- To understand post transcriptional modification systems.
- To understand the mutation, types of mutagens, mechanisms of mutagens action.
- To understand the Gene transfer mechanisms-Transformation, conjugation, transduction: mechanisms and their applications.

### Paper 2-Microbial Physiology

- To understand about bacterial photosynthesis: scope, electron carriers.
- To understand the mechanisms of carbohydrate, protein, lipid catabolism and anabolisms.
- To explain the concept of Metagenomics and their application in study of Unculturable and culturable bacteria
- To explain about Conventional and molecular methods for the study of microbial diversity.
- To explain about adaptation mechanism of extremophiles viz. acidophilic, alkalophilic, psychrophilic, thermophilic, barophilic, osmophilic and halophilic microorganisms and their applications.





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## Paper 3- Instrumentation

- To understand about instrumentation and applications of Light, Phase-contrast, Interference, Polarization and Fluorescence microscopes. Transmission and Scanning electron microscopy, scanning transmission electron microscope (STEM).
- To explain principle and applications of different types of spectroscopy techniques.
- To understand practical aspects of protein and nucleic acid separation techniques.
- To learn principle, methodology and applications of various types of chromatography.
- To know about the principle, technique and application of electrophoresis techniques.
- To understand protein crystallization; theory and method of API-electrospray, MADI-TOF, enzyme and cell immobilization techniques, DNA and peptide synthesis.

## Paper 4-Bioprocess Technology

- To understand isolation, screening and maintenance of industrially important microbes and its strain improvement.
- To understand media formulation sterilization and bioseparation in bioprocess.
- To understand design and types of bioreactors and basic mode of fermentation process.
- To understand microbial process for production of primary and secondary metabolites.
- To understand industrial production of enzymes and use of microorganisms as biofertilizers and bioinsecticides.

## Semester – III

### Paper 1: Molecular Biology & Genetic Engineering

On completion of the course students will be able

- To understand overall concept of r-DNA technology, cloning vectors, animal based & plant based vectors & cloning strategies.





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- To learn about basic features of expression vectors & fusion vectors, recombinants protein purification- methods & advantages.
- To know about various processes like DNA sequencing methods, gene amplification, DNA microarray technique.
- To understand expression of cloned DNA, hybridization techniques & modification of cloned DNA.
- To learn about applications of r-DNA technology, transgenic animals, gene therapy.
- To explore ethical and safety issues associated with recombinant DNA technology, IPR and patenting.

## Paper 2: Medical Microbiology

On completion of the course students will be able

- To understand epidemiology of infectious diseases, infection and its types, control measures for diseases & epidemiological methods.
- To learn about normal microbial flora of human body, identification of medically important microorganisms & microbial pathogenicity.
- To know about various multi drug resistant organisms, related antibiotics, their guidelines & insight to emerging diseases.
- To learn about the clinical features, pathogenesis, laboratory diagnosis & control of diseases of various gram positive & gram negative bacteria.
- To learn about the clinical features, pathogenesis, laboratory diagnosis & control of diseases of various organisms like actinomycetes, fungi, virus, protozoa etc.

## Paper 3: Biostatistics & Bioinformatics

On completion of the course students will be able

- To understand about statistics in biological research, sampling, data collection & representation, measures of central tendency & variability.
- To learn about test for significance, analysis of variance, correlation and regression.
- To know about methods used for database concept, nucleotide & protein sequence database, genome & specialised databases.





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- To understand the sequence comparison & identity, sequence database searching tools.
- To discover the phylogenetic analysis & tree construction, introduction to operational taxonomic units.

## **Paper 4: Applied Microbiology**

**On completion of the course students will be able**

- To learn the details of production of biofertilizers and bioinsecticides- methods & applications.
- To know about the biofuel , biogas, bioethanol, biohydrogen & biodiesel production.
- To understand the concept of bioremediation and biosensors, microbiology of degradation of xenobiotics in the environment.
- To know about the microbes and mineral recovery, petroleum microbiology (MEOR).
- To understand the bioplastics and biosurfactants- production & applications.

## **Semester – IV**

### **Paper 1: Pharmaceutical Microbiology**

**On completion of the course students will be able**

- To understand overall concept of pharmaceutical industry, introduction to pharmacopoeia & quality assurance and quality management in pharmaceuticals.
- To learn about basic features of designing of microbiology laboratory, standard operating procedures for microbiological assay, microbial contamination and spoilage of pharmaceutical products.
- To know about antibiotics and synthetic antimicrobial agents, Chemosynthetic, antifungal and antiviral drugs.
- To understand the concept of gene therapy & penetrating defences.





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- To learn about applications of drug development in pharmaceutical process, production of biopharmaceuticals by genetically engineered cells & new vaccine technology.

## Paper 2 : Food & Dairy Microbiology

On completion of the course students will be able

- To understand the concept of food fermentations, probiotics and prebiotics.
- To learn about the details of food infections, microbiological examination of food & quality assurance.
- To know about various preservation techniques, spoilage of food & general principles of food preservation.
- To learn about the normal flora of milk & milk borne diseases, microbiological analysis of milk.
- To learn about the fermented milk products, utilization and disposal of dairy by-product.

## Paper 3: Environmental Microbiology and Phytopathology

On completion of the course students will be able

- To understand about aerobiology, assessment of air quality, associated disease & preventive measures.
- To learn about soil microbiology, micro flora of various soil types & biogeochemical cycles.
- To know about aquatic microbiology, water borne diseases & Waste Water treatment.
- To understand plant pathology, plant diseases and their etiological studies, viral & fungal plant diseases.
- To discover the microbial control of plant diseases, mechanisms involved in biocontrol & integrated Control.





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## Paper 4: Bio-Nanotechnology and Stem Cell Technology

On completion of the course students will be able

- To learn the details of nano technology & potential uses of nano materials.
- To know about the nano particles & their synthesis, biological synthesis of nano particles using plant extracts and microorganisms.
- To understand the concept of drug delivery system, quantum dots & Nano biosensors.
- To know about the stem cells- properties, types, advantages & disadvantages.
- To understand the importance of stem cell research, production and harvesting of stem cells.





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## Department of Biosciences

### M.Sc. Biotechnology Course Outcomes

#### Semester – I

##### **Paper I : Biochemistry**

**On completion of the course students will be able**

- To understand chemical processes those occur in and between cells.
- To explain the structure of proteins, lipids, nucleic acids, and carbohydrates and their role in metabolic pathways.
- To understand tools to characterize express proteins.
- To understand the regulation of enzymes and relevance to metabolism.
- To understand about basic principle of bioenergetics and its importance in metabolic pathways.

##### **Paper II : Cell and Development Biology**

**On completion of the course students will be able**

- To understand about cell structure and its importance
- To understand the mechanism of different type of cell division
- To understand about cell organelles and their structure.
- To understand about the different type of microscope used for cell study.
- To understand about different types of mechanisms occurring in the cell.

##### **Paper III: Microbiology**

**On completion of the course students will be able**

- To understand the different concepts and methods of microorganisms classification.
- To understand the culture techniques for study of microbial diversity.





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- To understand the mechanisms of bacterial growth and impact of environmental factors of microorganisms growth rate.
- To understand about the mechanism of pathogenesis and their effect on host cell.
- To explain the structure, properties and classification of bacterial, plant and animal viruses.

## **Paper IV: Biostatistics & Bioinformatics**

**On completion of the course students will be able**

- To know about the Interaction of Computer and Biology
- To understand the Knowledge about Protein and Genome databases
- To understand about the data retrieval tools and its Utilization
- To understand Bio-statistical analysis of the Biological Experiments
- To learn the methodologies of Biostatistics and its application in selection of the Biological samples.
- To explain the use of X-ray crystallography and NMR spectroscopy in structure determination.
- To understand about protein structure determination and about homology modeling.

## **Semester – II**

### **Paper I: Molecular Biology**

**On completion of the course students will be able**

- To explain genome organization in organisms
- To understand DNA structure and replication mechanisms in Eukaryotes and Prokaryotes.
- To explain different mechanisms of DNA repair systems.
- To understand prokaryotic and Eukaryotic transcription and their regulation.
- To understand post transcriptional modification systems.
- To understand the mutation, types of mutagens, mechanisms of mutagens action.





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## Paper II : Bacterial Genetics and Genetic Engineering

On completion of the course students will be able

- To know mechanisms of genetic recombination and their significance in Genetic Engineering.
- To understand about the plasmid vectors, their properties and regulation.
- To explain restriction modification system and their significance in Genetic Engineering.
- To learn about the hybridization techniques.
- To understand the principle of cloning technology and their implementation in gene expression.
- To know about the different types of libraries e.g. cDNA library, Genomic library.

## Paper III: Immunology

On completion of the course students will be able

- To understand about the basic concept of immunity and anatomy of immune system.
- To explain antigen-antibody reaction, types of immunoglobulins.
- To explain about different types of immune responses.
- To learn Immuno assays e.g. RIA, ELISA, Western blotting, ELISPOT assay, immunofluorescence, and immunoelectron microscopy.
- To understand immunization, types of vaccines and their mechanisms.
- To explain basic concept of clinical immunology, types of auto immune diseases, tumor immunology.

## Paper IV: Analytical Techniques

On completion of the course students will be able

- To understand basic principle buffers preparation and significance of enzyme assays and controls
- To explain principle and applications of different types of spectroscopy techniques.





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- To understand practical aspects of protein and nucleic acid separation techniques.
- To learn principle, methodology and applications of various types of chromatography.
- To know about the principle, technique and application of electrophoresis techniques.
- To understand protein crystallization; theory and method of API-electrospray, MADI-TOF, enzyme and cell immobilization techniques, DNA and peptide synthesis.

## Semester – III

### Paper I: Enzyme Technology

**On completion of the course students will be able**

- To understand overall concept of enzymes and its classification followed by techniques of isolation and determination of various factors affecting enzyme activity.
- To learn about basic principle of identification, separation and purification of enzymes.
- To know about various mechanisms like catalysis, bioenergetics and kinetics.
- To understand enzyme inhibition and thermal kinetics.
- To learn about allosteric properties, various forms and its application as biosensors & ribozyme.

### Paper II: Food Biotechnology

**On completion of the course students will be able**

- To understand micro-organisms and their value in food industries.
- To learn about biological processing of food products like dairy, meat, fisheries, vegetables etc. along with new preservation techniques.
- To know about various infections resulting due to microbial spoilage of food.
- To learn about the applications of organisms in fermentation of food and its consumption as food in the form of prebiotics, probiotics etc.
- To understand the aspects of quality control and food standards.





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## **Paper III: Environmental Biotechnology**

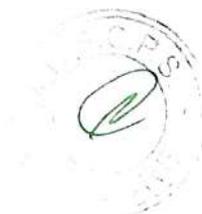
**On completion of the course students will be able**

- To understand about problems related to environment, its measurement and various approaches to resolve them.
- To learn about types of pollutions and scheme of treatment of waste water.
- To know about methods used for the water management along with the treatment schemes of different industrial waste water.
- To understand the microbial significance used for degradation of xenobiotic and issues related to environment such as pesticides, oil pollution etc.
- To discover the global environmental problems and use of biotechnology to combat them in eco friendly way.

## **Paper IV: Plant Biotechnology**

**On completion of the course students will be able**

- To learn the details of various parts related to plant tissue culture which includes media, callus culture, suspension culture, embryo culture etc.
- To know about the techniques used to produce novel plants along with the concept of protoplast isolation, fusion and regeneration for production of hybrid plants.
- To understand the role of vectors used for plant and chloroplast transformation. To study gene transfer & stability.
- To know about the applications of transformation to produce resistant plants with higher yield and shelf life.
- To understand the production and control of plant based secondary metabolites & their applications.





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## Semester – IV

### Paper I : Bioprocess Technology

On completion of the course students will be able

- To understand isolation, screening and maintenance of industrially important microbes and its strain improvement
- To understand media formulation sterilization and bioseparation in bioprocess.
- To understand design and types of bioreactors and basic mode of fermentation process.
- To understand microbial process for production of primary and secondary metabolites.
- To understand industrial production of enzymes and use of microorganisms as biofertilizers and bioinsecticides.

### Paper II: Genomics, Proteomics, IPR & Biosafety

On completion of the course students will be able

- To understand principles of DNA and RNA sequencing.
- To understand tools for genome analysis and gene silencing techniques.
- To understand concept of protein analysis, functional genomics and proteomics.
- To understand basic concept of IPR and various types of patent application.
- To understand about biosafety, biohazards and general concepts about GMOs and LMOs..

### Paper III: Animal Biotechnology

On completion of the course students will be able

- To understand structural and organization of animal cell and concepts of animal cell culture technology.
- To understand characterization of cultured cells and basic techniques of mammalian cell culture.
- To understand scaling up of animal cell culture its synchronization, micromanipulation and transformation.





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- To understand organ and histotypic culture and measurement of cell death.
- To understand transfection of mammalian cells and its application.





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## M.Sc. Chemistry

### Programme outcomes :

- To demonstrate broad knowledge of descriptive Chemistry.
- To impart the basic analytical and technical skills to work effectively in the various fields of Chemistry.
- To motivate critical thinking and analysis skills to solve complex chemical problems, e.g., analysis of data, synthetic logic, spectroscopy, structure and modeling, team-based problem solving, etc.
- To demonstrate an ability to conduct experiments in the above sub-disciplines with mastery of appropriate techniques and proficiency using core chemical instrumentation and modelling methods.
- To demonstrate the ability to perform accurate quantitative measurements with an understanding of the theory and use of contemporary chemical instrumentation, interpret experimental results, perform calculations on these results and draw reasonable, accurate conclusions.
- To develop skills in quantitative modeling of static and dynamic chemical systems.
- To develop laboratory competence in relating chemical structure to spectroscopic phenomena.
- To demonstrate the ability to synthesize, separate and characterize compounds using published reactions, protocols, standard laboratory equipment, and modern instrumentation.

## M. Sc. Chemistry

### Program Specific outcomes

On successful completion of this Programme, students will have the ability to:

- Think critically and analyse chemical problems.
- present scientific and technical information resulting from laboratory Experimentation in both written and oral formats.
- Work effectively and safely in a laboratory environment.
- Use technologies/instrumentation to gather and analyse data.
- Work in teams as well as independently.





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- Apply modern methods of analysis to chemical systems in a laboratory setting. Easily assess the properties of all elements discovered.
- Apply appropriate techniques for the qualitative and quantitative analysis of chemicals in laboratories and in industries.
- Will become familiar with the different branches of Chemistry like analytical, organic, inorganic, physical, environmental, polymer and biochemistry.
- Helps in understanding the causes of environmental pollution and can open up new methods for environmental pollution control.
- Develops analytical skills and problem solving skills requiring application of chemical principles. Acquires the ability to synthesise, separate and characterize compounds using laboratory and instrumentation techniques.

## Course outcomes:

### SEMESTER 1

#### Paper I : Inorganic Chemistry

Students will have a firm foundation in the fundamentals and application of basic knowledge of co-ordination compounds.

- Understand the structure of molecule, their energy level, bonding and theoretical application. And study of different type of chemical reaction.
- Knowledge of the metal ligand equilibrium concept, how to reaction is proceed stepwise and overall formation of complex and study of their spectroscopic experimental determination.
- Analyse the reaction mechanism of metal complex formation including their properties, effects type of reactions and theories.
- Understand the theories of metal ligand bonding for octahedral tetrahedral and square planer complex and pi bonding.
- Knowledge about the Acid base concept on their theoretical aspects and application.

#### Paper II: Organic Chemistry

Upon successful completion of the course, students will be able to:

- Nature of bonding in organic molecules.





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- Stereochemistry.
- Conformational analysis and linear free energy relationship.
- Reaction mechanism: structure and reactivity.
- Aliphatic nucleophile substitution.

## Paper III : Physical Chemistry I

After successfully completing this course, students will be able to:

- This course develops concepts in quantum mechanics such that the behaviour of the physical universe can be understood from a fundamental point of view. It provides a basis for further study of quantum mechanics. Content will include:
- Review of the Schrodinger equation, operators, eigenfunctions, compatible observables, infinite well in one and three dimensions, degeneracy; Fourier methods and momentum space; Hermiticity; scalar products of wave functions, completeness relations, matrix mechanics; harmonic oscillator in one and three dimensions; sudden approximation; central potentials, quantisation of angular momentum, separation of radial and angular variables, spherical harmonics, hydrogen atom, spin.
- Explain the basic concepts of thermodynamics like system, properties, equilibrium, pressure, and specific volume, and temperature, zeroth law of thermodynamics, temperature measurement and temperature scales.
- Explain the concept of thermodynamic work. Calculate and compare work in case of a closed system executing different thermodynamic processes or different thermodynamic cycles.
- Understand the reversible process and state the propositions regarding efficiency of Carnot cycle.

## Paper IV : Group Theory and Spectroscopy I

- Recognize symmetry elements in a molecule, state the point group a molecule belongs to, represent group by matrices.
- Understand group theory and great orthogonally theorem.
- Make students aware of the basics of spectroscopy and their applications.
- Recognize spectroscopy in microwave, rotational spectra of rigid diatomic molecules, selection rules, interaction of spectral lines.





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- Study of vibrating diatomic molecule, energy levels of diatomic molecule, simple harmonic oscillator and an harmonic oscillator.
- Understand scattering of light and Raman Spectrum.
- Learn Electronic spectra of polyatomic molecules, Morse potential energy curve, Frank-Condon Principle and spectra of transition metal complex.
- Learn basic concepts of Auger electron spectroscopy.
- Understand the principle and application of Photo electron spectroscopy.
- After completion of course students are able to apply their knowledge to solve the problem related to topics covered in lectures.

## **Paper V (a): Mathematics for Chemist ( For students without biology in B.Sc.)**

Students will be able to know –

- Matrix and its types, Determinant and its properties.
- Define the derivative and integral of the trigonometric, logarithmic and inverse trigonometric and rational functions.
- Recognize the different techniques of integration (by parts, trigonometric integrals, partial fractions). -definite integrals.
- Calculate the rank of matrix.
- Determine derivatives of function using different techniques.

## **Paper-V (b): Biology for Chemist (For students without biology in B.Sc.)**

- Understands the chemical basis for biological phenomena and cellular Structure.
- Gain knowledge about the chemical properties of amino acids, cofactor and sugars.
- Understand the basic principles of protein and polysaccharide structure.
- Gain knowledge about enzymatic kinetics and their application to the Elucidation of catalytic mechanisms.
- Understands the constructing reasonable electron pushing mechanism For enzyme catalysed reactions
- Gain knowledge about how health, disease and modern medicine are all rooted in biological Chemistry.
- Gain knowledge about carbohydrate their role and importance in biological System.





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- Understands the fats, lipids their structure types and importance.
- Understands the difference between RNA and DNA.
- Gain knowledge about structure of DNA and RNA, their role and importance in biological system.

## SEMESTER 2

### Paper -I: Inorganic Chemistry- II

- Understand the fundamental requirements for interpretation of electronic spectra of metal compound for prediction of their properties.
- Analyse the properties of transition metal complexes like magnetic moment, orbital contribution and exchange coupling.
- To understand the properties of metal complex their vibrational spectra, structure and bonding and its important reactions.
- To analyse the structure, bonding and properties of metal clusters.
- Understand the optical properties, absolute configuration, and isomerism due to non-planarity of chelate ring of complexes.

### Paper –II: Organic Chemistry- II

- Aromatic electrophilic substitution.
- Aromatic nucleophilic substitution.
- Free radical reactions.
- Addition reaction.
- Addition to carbon-hetero multiple bonds.
- Elimination reaction.
- Pericyclic reactions.

### Paper –III: Physical Chemistry- II

- To understand the theories for the determination of the rate of the reactions.
- Understanding of the kinetics of the explosive photochemical and unimolecular reactions.
- To Understand of the laws of thermodynamics and their applications





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- Know the phase diagram of single component systems and binary mixtures.
- To understand of the applications statistical thermodynamics.
- To understand of the quantum Chemistry of free electron and H- atom
- To understands the basic concepts of thermodynamics along with the Non-ideal systems including the basic Debye Huckel theory.
- Students will be guided to apply phase rule to various systems (2 and 3 component systems) and introduction to the basic concepts of non-equilibrium thermodynamics along with the applications is another purpose.
- This course aims at acquainting students with the knowledge of various concepts and theories related to physical Chemistry. The present syllabus has been framed as per the latest UGC guidelines and recent research trends in the subject.
- To equip students with necessary chemical knowledge concerning the concept of reaction rates and electro analytical techniques and to bring forth the importance of academic and laboratory skill for the students.

## **Paper –IV: Spectroscopy- II and Diffraction Methods**

- NMR Spectroscopy
- NQR Spectroscopy
- ESR Spectroscopy
- X-Ray Diffraction
- Electron and Neutron Diffraction.

## **Paper – V : Computer for Chemist**

- Knowledge and understanding: Basic understanding about Computer
- Understanding the basic concept associated with C- Language and program designing
- Students will develop different programs, Run and Retrieve results.
- Intellectual (Cognitive/Analytical) skills: Design program in C-language on the basis of given query.
- Use of data structures in C C.
- Practical skills: Use of standard input (scanf) and standard output (printf) functions use of variables, keywords, arithmetic operators, relational operators, logical





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operators, unary operators, assignment operator, arithmetic assignment operators and conditional operator.

## Semester I + II

### Practical-I : Physical Chemistry Practical

- Prepare the solution of the desired concentration and the desired volume.
- Know the principle and handling of pH meter, Potentiometer, conduct meter, colorimeter, viscometer, etc.
- Plot accurate graphs of the desired scale for the calculations.
- Maintain laboratory ethics, safety and cleanliness.
- Understand waste management of the laboratory.

### Practical –II Organic Chemistry Practical

- Students understand the qualitative analysis: Separation, purification , Identification of tertiary mixture.
- Organic Synthesis: Acetylation, Nitration, Halogenation etc.
- Organic synthesis involving Name reactions Like Sandmeyer, Cannizaro's reaction, Dial's Alder reaction , etc.
- Learn the synthesis of Dyes like Phenolphthalein, Fluorescein, and Diazotization.
- Quantitative estimation: Determination of percentage composition by acetylation method.
- Saponification value of oil and fats.

### Practical- III Inorganic Chemistry Practical

- To understand the Qualitative analysis of less common metal ion and insoluble residue.
- Knowledge about Quantitative determination of two metal ions.
- Understand the paper Chromatographic method.
- Analyse the Preparation of Co-ordination Compounds.
- Understand the column Chromatographic method.
- Analyse the Preparation of Co-ordination Compounds





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## SEMESTER 3

### Paper-I : Application of Spectroscopy – I

- To understand the fundamental requirements for interpretation of electronic spectra of metal compound for prediction of their properties and their electronic spectra.
- To knowledge about the symmetry shape and bonding of molecule their linkage with different types of ligand and study of their vibrational spectra.
- To understand the concept of NMR spectroscopy their properties and mechanism and measurement of chemical shift values of different types of carbon molecule.
- Knowledge about the advance NMR spectroscopy including 1st order spectra, stereochemistry and different type of effects on complex.
- To understand the basic knowledge of Mossbauer spectroscopy and their spectral parameter study.

### Paper-II : Organometallic Chemistry (Optional)

After successfully completing this course, students will be able to:

- To know and understand the different properties and structures for organometallic compounds from different parts of the periodic table and their trends.
- To know principal synthetic routes to various classes of organometallic compounds.
- To know and understand the reactivity of organometallic compounds including their application in synthesis.
- To know methods and examples for the study of organometallic compounds in the gas phase, solution phase and solid state.
- To know common ligand classes in organometallic Chemistry, their effects on organometallic compounds, and influence on reactivity and catalysis.
- To know and understand key mechanistic steps in reactions involving organometallic compounds.
- Students will learn about synthetically useful transformations including oxidations, reductions, enolate reactions, pericyclic reactions, organometallic reactions, and reactions of electron deficient species. The emphasis will be on developing a mechanistic understanding of selectivity and synthetic strategy.





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## Paper –III : Photochemistry

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

- To understand the fundamentals of photo and laws governing it such as Beer Lambert law.
- To understand the distinguish between radiative and non- radiative transitions with the help of Jablonski diagram.
- Understand photophysical kinetics of unimolecular and bimolecular processes and Stern-Volmer.
- To understand the Laws of photochemistry, life time measurement of quantum yields of inorganic compounds.
- Explains the physical properties of electronic excited states and photo physical processes.
- To identify the photo reactive excited states, charge transfer excitation in transition metal complexes.
- Understands the photochemical properties the selected transition metal complexes and its various photochemical reaction.
- Describe the concept and role of sensitizer molecule and photosensitized reaction.
- To describe Pericyclic reactions and Cyclo-addition.
- To describe stereo-chemical problems in relation to chemical transformations.

## Paper IV: Polymer (Optional)

- Describe the principles and concepts of contemporary polymer Chemistry.
- Explain the basic concepts of polymer synthetic techniques.
- Analyse the basic reactions in polymer Chemistry.
- Describe the physical properties of different polymers.
- Characterize the polymers using various experimental techniques.
- Learn the techniques for inorganic polymer characterization.





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## Paper-V: Environmental Chemistry

- Gain knowledge about air, water pollution by different industry, pesticides, and micro-organism.
- Understands the chemical and biochemical principles of environmental processes in air, water and soil.
- Recognize different types of toxic substances and responses and analyse toxicological information.
- Able to describe experimental method for analysis of water and soil analysis and pollution awareness to society.
- Understands the effects of toxic elements on environmental and biological system.
- Gain knowledge about acid rain, causes of acid rain and their effects on environment,
- Understand the global warming , green house effects their reason effects and control.
- Gain knowledge about aquatic Chemistry, DO, BOD, COD etc.
- Understands the heavy metals, toxic heavy metals their effects.
- Gain knowledge about environmental disasters.

## Paper – VI: Heterocyclic Chemistry (Optional)

- Students will understand the importance heterocycles in biological systems and in pharmaceuticals.
- Students will be able to draw mechanisms for reactions involving heterocycles as starting materials, intermediates and products, and be able to propose syntheses of heterocycles from the major classes.
- Students will be able to relate significant chemical properties to structure.
- Students will be made familiar with particular properties, reactions, and applications of the most important as well as less common heterocycles.





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## Paper – VII: Physical Organic Chemistry (Optional)

- Describe molecular structure by the use of the valence bonding theory and molecular orbital theory.
  - Predict stereoselectivity in reaction involving the attack of nucleophiles on the carbonyl group (Cram's rule and the Felkin-Ahn model).
  - Use kinetics as a tool for understanding reaction mechanisms.
  - Use kinetic data for interpretation of reaction mechanisms.
  - Calculate a reaction's activation energy, enthalpy of activation and entropy of activation by help of Arrhenius and Eyring's equations
  - Determine if a reaction is acid or base catalyzed (specific or general catalysis) from kinetic data.
  - They can also feel comfortable in making estimates on reaction mechanisms by
    - use of the Hammett equation as a tool in studies of organic reactions
    - interpret data for the inclusion of isotopes and how this can be used in mechanistically studies of organic reactions
    - explaining steric and electronic effects in several important reactions
- Finally the students can demonstrate the ability to
- choose a suitable solvent for a reaction based on the solvent physical properties and knowledge about the mechanism of the reaction.

## Paper – VIII: Chemistry of Material (Optional)

- Given a type of material, be able to qualitatively describe the bonding scheme and its general physical properties, as well as possible applications.
- Given a type of bond, be able to describe its physical origin, as well as strength.
- Be able to qualitatively derive a material's Young's modulus from a potential energy curve.
- Given the structure of a metal, be able to describe resultant elastic properties in terms of its 1D and 2D defects. Given a simple set of diffraction data, be able to index the peaks and infer the structure.





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- Be able to describe a polymer's elastic behavior above and below the glass transition.
- Be able to do simple diffusion problems.

## SEMESTER 4

### Paper- I : Application of Spectroscopy - II

After successfully completing this course, students will be able:

- To learn about the Mean ionic activity and mean ionic activity coefficient and concepts ionic strength.
- To understand Nernst equation and Kohlraush's law and its applications.
- To know about the concepts of Debye- Huckel theory of strong electrolytes, DebyeHuckel limiting law, Huckel equation and Debye- Huckel –Bronsted equation.
- To familiarize the Electrode –electrolyte interface, electrical double layer, Electro capillary phenomenon and Lippmann Equation.
- To learn about the Polarisation and over potential and the Butler-Volmer equation.
- To study the concept of transfer coefficient and its significance – Mechanism of the hydrogen and oxygen evolution reactions.
- To learn the Einstein's theory of transition probability and rotation spectroscopy.
- To know about the Vibrational spectroscopy, Vibrational coupling overtones and Fermi resonance. Raman Spectra.
- To know the detail study of NMR Spectroscopy.
- To study the brief discussion of Fourier transforms resonance Spectroscopy

### Paper-II : Solid State Chemistry

- Identify the type of crystal structure exist in ionic solids
- Describe the type of defects in metals, band theory and solid state reaction.
- To understand metal insulator and semiconductor.
- To understand the basic fundamental of SEM & TEM.
- Understand the magnetic properties of material and classification of materials.
- Understand the electrical conductivity of organic solids and learns about types of liquid crystals and new materials.





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## Paper- III Biochemistry

- Analyse the biological system of metal ions, bioenergetics and transport and storage of Dioxides (Hem protein).
- Understand the structure and function of metal of proteins in electron transport processes and synthetic models. It also understands the environmental cycles biologically and chemically.
- Understand the basic knowledge of enzymes their classification, properties, enzyme kinetics, enzyme mechanism and different types of enzymatic reaction.
- Analyse the Chemistry of co-enzymes, enzyme models, crypt ands and biotechnological applications of enzymes and different technology.
- To understand the study of cell and its constituents, bioenergetics, biopolymer interactions, structure and function of cell membrane transport of ions.

## Paper-IV : Analytical Chemistry (Optional)

- To describe the basic concept of analytical Chemistry. Qualitative and quantitative analysis.
- To use/apply the basic statistical treatment of the analytical data for getting a correct result.
- Describe the different separation techniques such as distillation, Solvent and Solid Phase extraction.
- Explain the basic of chromatography.
- To understand the basics of various instrumentation techniques.
- Understand the Preparation of sample for instrumental analysis.
- To interpret data obtained from instrumental analysis.
- Analyse the accuracy and precision of the statistical data.
- Describe the different thermal methods and radiometric titrations.





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## Paper- V: Medicinal Chemistry

- Gain knowledge about correlation between pharmacology of a disease and its cure.
- Understand the drug metabolic pathways, adverse effect and Therapeutic values of drugs.
- Well acquainted with the synthesis of some important class of drugs
- Gain knowledge about structural activity relationship of different Class of drugs
- Gain knowledge about mechanism pathways of different class of Medicinal compounds.
- Understand the Chemistry of drugs with respect to their Pharmacological activity
- Gain knowledge about antibiotics and antibacterial drugs, their synthesis and effect.
- Understand the antifungal and antimalarials drugs, their SAR, synthesis etc.
- Understands the non-steroidal anti inflammatory drugs.
- Gain knowledge about antihistaminic and antiasthmatic agents.

## Paper – VI : Organic Synthesis (Optional )

- Students will have an understanding of chemical and molecular processes that take place in organic chemical reactions.
- Students will have research-based in-depth understanding in the field of design and production (synthesis) of complex molecules.
- Students will be able to use modern methods when planning strategies for synthesis of new substances and characterisation of products.
- Students will master and use modern methods of synthesis and conduct sometimes extremely advanced experiments, the synthesis of complex molecular structures and handling sensitive chemicals.
- Students will be able to use complicated analytical and spectroscopic methods and advanced program packages





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## Paper – VII : Chemistry of Natural Products (Optional)

After completing the course the student will be able to:

- Provide an overview of the field of natural product Chemistry.
- To identify different types of natural products, their occurrence, structure, biosynthesis and properties.
- To discuss the use of natural products as starting materials for medicines.
- To carry out independent investigations of plant materials and natural products.

## Paper – VIII: Electrochemistry (Optional)

- Apply Nernst equation and the Tafel equation to different electrochemical systems.
- Define the term over potential, explain its origin and the relationship between current and potential for some types of electrochemical cells.
- Predict how the conductivity of an electrolyte depends on the electrolyte concentration and type and explain the origin of ion conductivity in some solid electrolytes.
- Apply some common electrochemical methods to electrochemical systems and explain which type of information that can be obtained with these techniques.
- Describe different types of corrosion as well as explain the origin and course of the corrosion processes.
- Record polarisation curves for different materials and explain which type of information that can be obtained with this technique.
- Calculate corrosion rates and describe some common methods used to prevent or control corrosion processes.
- Explain the function of batteries and fuel cells.

## SEMESTER III+ IV

### Practical –I : Organic Chemistry Practical

- Multistep synthesis of organic compounds
- Quantitative estimation.
- Water sample analysis.





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- Biosynthesis of ethanol from sucrose.
- Preparation of soap from fat.
- Identification of organic compound by different theoretical Spectra.
- Isolation of different product of milk.

## Practical –II : Inorganic Chemistry Practical

- Knowledge about Quantitative determination of three metal ions.
- Understand the Chromatographic determination via thin layer / paper/ column chromatography.
- Analyse the Preparation of Co-ordination Compounds.
- Understand the ion exchange Chromatographic method.
- To understand the spectroscopic identification of recorded spectra and Flame photometric determination of alkali metals.

## Practical –III: Physical Chemistry Practical

- Understand the spectroscopic interpretation and numerical problem of compounds.
- Knowledge about the spectrophotometry/ colorimetric technique.
- Analyse the chemical kinetics.
- To understand the electronics.
- Knowledge about the conductometry and pH metre.
- To understand the spectroscopy via different technique.
- Knowledge about Polarography/ electronics
- Analyse the chemical kinetics.
- Understand the thermodynamic technique.





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## M.Sc. Pharmaceutical Chemistry

### Program outcomes:

- Demonstrate, solve and have an understanding of major concepts in all disciplines of Pharmaceutical Chemistry independently and in a group as well as draw logical conclusions through Project and Seminar Presentation.
- Present scientific and technical information resulting from the laboratory as well as Industrial/pharmaceutical experimentation in both written and oral formats would make them perfect.
- To impart the basic analytical and technical skills to work effectively in the various fields of Pharmaceutical chemistry.
- To motivate critical thinking and analysis skills to solve complex chemical problems, e.g., analysis of data, synthetic logic, spectroscopy, structure and modeling, team-based problem solving, etc.
- To demonstrate an ability to conduct experiments in the above sub-disciplines with mastery of appropriate techniques and proficiency using core chemical instrumentation and modeling methods.
- To demonstrate the ability to perform accurate quantitative measurements with an understanding of the theory and use of contemporary chemical instrumentation, interpret experimental results, perform calculations on these results and draw reasonable, accurate conclusions.
- To develop skills in quantitative modeling of static and dynamic chemical systems.
- Encourage students to make critical thinking and the scientific knowledge gained would help them to design, carry out, record, and analyze the results of Chemistry as well as pharmaceutical experiments.
- To demonstrate the ability to synthesize, separate, and characterize compounds using published reactions, protocols, standard laboratory equipment, and modern instrumentation.
- The students will become well versed in the mechanisms and also the mode of action of drugs.





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- The present course content will build confidence in students and the students will improve their competencies on par with their counterparts in premier institutions across the nation.

## Program Specific outcomes

- Students will be able to understand the basic concepts of Pharmaceutical inorganic, Pharmaceutical organic, physical Pharmacy, drug formulation, drug design, and development.
- Present scientific and technical information resulting from laboratory experimentation in both written and oral formats.
- Students will develop the ability to present pharmaceutical Chemistry research by means of an oral presentation, a scientific poster, or a written report.
- Students will be able to demonstrate knowledge to develop pharmaceutically important molecules, new drug delivery systems, etc.
- Apply modern methods of analysis to chemical systems in a laboratory setting. Easily assess the properties of all elements discovered.
- Apply appropriate techniques for the qualitative and quantitative analysis of chemicals in laboratories and industries.
- Students will be able to apply analytical tools for the determination of Pharmaceutical molecules.
- Will become familiar with the different branches of Chemistry like analytical, organic, inorganic, physical, environmental, polymer and biochemistry.
- Develops analytical skills and problem-solving skills requiring the application of chemical principles. Acquires the ability to synthesize, separate, and characterize compounds using laboratory and instrumentation.
- Students will be able to generate validation protocols for all pharmaceutical operations.
- Starting from drug research to development to formulation.
- Learn the Role of drugs to inhibit the particular enzymes and treatment of disease
- Learn the Mode of action of different drugs.





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## Course outcomes

### SEMESTER I

#### Paper –I: Principles of Inorganic Pharmaceutical Chemistry- I

Upon successful completion of the course, students will be able to:

- Explain the history of Indian pharmacopeia
- Discuss types of water and methods for reducing the hardness of water
- Classify GIT agents
- Write a note on Saline cathartics
- Discuss properties, method of preparation, and uses of some GIT agents
- Write a note on the Physiology of acid-base balance
- Explain the physiological role of trace elements
- Write an essay on hydrogen peroxide
- Explain cyanide poisoning and any one inorganic compound as an antidote
- Explain different pharmaceutical buffers, their preparations, uses in the pharmaceutical system, and measurement of tonicity.
- Explain the medicinal importance of pharmaceutical inorganic compounds.
- Discuss the principles and methodology of assay of several inorganic drugs.

#### Paper-II: Principles of organic Pharmaceutical Chemistry- I

Upon successful completion of the course, students will be able to:

- Illustrate the relevance & significance of Organic Chemistry to
- Pharmaceutical Sciences and clarify basic principles and concepts of organic chemistry, and explain the factors affecting the strength of acid & base.
- Explain basic functional groups & IUPAC Nomenclature of Organic Compounds.
- Clarify Isomerism & apply that knowledge in understanding the Structure-Property
- Relationship.





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- Explain different reaction intermediates; clarify different reagents & their application in the reaction mechanism.
- Comprehend & explain how addition & elimination reactions are performed concerning alkenes and alkynes.
- Explain the meaning of the term 'aromaticity' & different reactions involved in the formation of aromatic compounds.

## Paper-III: Principles of Physical pharmacy- I

Upon successful completion of the course, students will be able to:

- Understand the basics of chemical and physical phenomena that govern the in vivo and in vitro actions of pharmaceutical products.
- Acquire knowledge of key physical concepts of states of matter, phase rule, solubility and dissolution, partitioning phenomena, surface phenomena, and thermodynamics essential for pharmaceutical applications.
- Know various gas laws and theories in correlation with the formation of aerosols, crystallization & its parameters, colligative properties of non-electrolytic and electrolytic solutions, solubility and distribution phenomenon, and apply them in the pharmaceutical practices.
- Articulate the interrelationships between the physicochemical properties of a drug, its dosage form, route of administration, and bioavailability.

## Paper-IV: Pharmaceutical Analysis-I

Upon successful completion of the course, students will be able to:

- Illuminate the relevance & significance of Analytical Chemistry to Pharmaceutical Sciences.
- Clarify basic principles of data treatment and data handling.
- Explain basic concepts and principles of aqueous acid-base titrations and clarify the need for non-aqueous acid-base titrations.
- Clarify different terms, basic principles, and reaction conditions of precipitation, Complexation, and redox reaction.





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- Understand and explain the difference between precipitation and gravimetric analysis.
- Know various sampling techniques employed in the analysis of solid, semisolid, and liquids dosage forms
- Brief knowledge about the electromagnetic spectrum and its interaction with matter.
- Understand the principal, instrumentation, and working of different instrumental analytical techniques available for quality control.

### **Paper-V (a): Mathematics for Pharmaceutical Chemistry ( for Students without mathematics in B.Sc.)**

Upon successful completion of the course, students will be able to:

- Apply mathematical concepts and principles to perform computations for Pharmaceutical Sciences.
- Create, use and analyze mathematical representations and mathematical relationships
- Communicate mathematical knowledge and understanding to help in the field of Clinical Pharmacy Perform abstract mathematical reasoning
- Explains the principles of matrix algebra, analytical geometry, differential and Integral calculus, Differential Equations, and Laplace Transforms.
- Solve simple problems associated with functions, Limits, continuity, and partial fractions.
- Apply the appropriate standard form of matrix algebra and differential equation in solving problems in applications of Pharmaceutical equations.
- Solve simple mathematical problems associated with matrix algebra, differential equations and Laplace transforms.
- Solve complex mathematical problems associated with matrix algebra, differential and integral calculus, as well as Laplace Transforms.

### **Paper-V (b) : Biology for Pharmaceutical Chemistry (for Students without Biology in B.Sc.)**

Upon successful completion of the course, students will be able to:

- Identify a given animal, or plant's part based on its macroscopic and microscopic characteristics.





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- Explain the classification of plants, plant cells, and their organelles.
- Describe the physiological processes in plants and humans.
- Explain the type of tissues present in the human body.
- Discuss the anatomy and functions of systems of the human body.
- Appraise the coordinated working pattern of different organs of the human body.
- Students would have studied the gross morphology, structure, and functions of a cell, skeletal, muscular, and cardiovascular system of the human body.
- They would have understood the various homeostatic mechanisms and their imbalances.
- Students would be able to identify the different types of bones in the human body.
- Students would be able to identify the various tissues of different systems of the human body.
- Students would learn about the various experimental techniques related to physiology.

## Laboratory Course-I and II

Upon successful completion of the course, students will be able to:

- Understand the construction, working, care, and handling of instruments, glassware, and equipment required for practical.
- Students will be able to demonstrate an ability to plan and strategize a scientific problem and implement it within a reasonable time frame.
- The students will become familiar with the inorganic coordination compounds and transition elements and will also be able to prepare various inorganic complexes.
- Students will be able to understand methods for the separation and purification of organic compounds and chromatographic techniques for their separation.
- Students will understand how to recrystallize organic compounds.
- Students will be able to perform two-step organic preparations involving different organic reactions such as Acetylation, Oxidation, Grignard reaction, Aldol
- Understand the medicinal and pharmaceutical importance of inorganic Compounds.
- Gain knowledge about the preparation of pharmaceutical Inorganic Compounds.
- Perform qualitative analysis of given inorganic mixtures.





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- Carry out identification test of given inorganic compounds
- Perform limit test for chlorides, sulfates, etc.
- Prepare inorganic compounds

## Semester- II

### Paper - I Principles of Inorganic Pharmaceutical Chemistry- II

Upon successful completion of the course, students will be able to:

- Explain the effects of impurities in pharmaceuticals.
- Describe the principles and methods of limit tests to control common impurities in pharmaceutical substances.
- Knowledge about the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
- Explain different pharmaceutical buffers, their preparations, uses in the pharmaceutical system, and measurement of tonicity.
- Explain the medicinal importance of pharmaceutical inorganic compounds.
- Discuss the principles and methodology of assay of several inorganic drugs.
- Familiar with different classes of inorganic pharmaceuticals and their analysis
- Identification of different anions, cations, and different inorganic pharmaceuticals.
- To have been introduced to a variety of inorganic drug classes

### Paper-II Principles of organic Pharmaceutical Chemistry- II

Upon successful completion of the course, students will be able to:

- Explain Chemistry, method of preparation & chemical reactions of aldehyde and ketones.
- Clarify Chemistry, method of preparation & chemical reactions of phenols, and sulphonic acid derivatives.
- Explain and clarify common and IUPAC nomenclatures of different alcohols and ethers.
- Chemistry of amines, separation of amines. Outline the synthesis, and chemical reactions of amines use.





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- Classification and synthesis of cyanide and isocyanides, reactions related to esters and amide.
- Explain substitution nucleophilic reactions.
- Synthesis, chemical reactions of carboxylic acid along with mechanism.

### Paper – III Principles of Physical pharmacy- II

Upon successful completion of the course, students will be able to:

- Explain the concepts of rheological sciences and flow properties of pharmaceutical preparations
- Describe the factors leading to the instability of dispersion systems
- Discuss the effect of the particle size distribution of powders on the manufacture of dosage forms
- Outline the principles of chemical kinetics instability testing
- Apply the principles of micropolitics, rheology, chemical kinetics, stability, and course dispersion in the formulation development and evaluation of dosage forms
- State the physicochemical properties of drug molecules, pH, and solubility
- Explain the role of surfactants, interfacial phenomenon, and thermodynamics
- Describe the flow behavior of fluids and the concept of complexation
- Analyze the chemical stability tests of various drug products
- Understand the physical properties of solutions, buffers, isotonicity, disperse systems, and rheology.
- Understand of physicochemical properties of drugs including solubility, distribution, adsorption, and stability.
- Have basic knowledge of pharmaceutical suspensions and colloids.
- Have a basic understanding of the pharmaceutical applications of
- Various physical principles such as lyophilization, aerosols, condensed systems, and phase diagram.

### Paper – IV Pharmaceutical Analysis-II

Upon successful completion of the course, students will be able to:

- Understand the basic principles of analytical techniques





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- Apply the analytical techniques to study bulk-drug pharmaceuticals and quality control.
- Develop an in-depth knowledge and critical awareness of the application of modern methods of instrumental analysis
- Know preparation and standardization of various concentrations of acids and bases.
- Understand the basic concepts involved in electro-analytical techniques and their types.
- Explain the types, apparatus used, and applications of potentiometric titration.
- Define and compare the terms used in pharmaceutical analysis like potentiometry, conductometry, amperometry, etc.
- Discuss conductometric titrations, conductometric curves, and their applications.
- Illustrate principle, instrumentation, and applications of polarography and polarimetry
- Understand the theory, principle, types, and techniques of coulometric titration and compare between amperostatic and potentiostatic coulometry.
- Know instrumentation and applications of refractometry and calculate RI.
- Compare and contrast various techniques used in the analysis of moisture, halogens, and nitrogen, etc.

### Paper – V Computer for Pharmaceutical Chemistry

Upon successful completion of the course, students will be able to:

- Apply the knowledge of mathematics and computing fundamentals to pharmaceutical applications for any given requirement
- Design and develop solutions to analyze pharmaceutical problems using computers.
- Integrate and apply efficiently the contemporary IT tools to all Pharmaceutical related activities.
- Solve and work with a professional context pertaining to ethics, social, cultural and regulations with regard to Pharmacy .





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- Recall and infer the fundamentals of Computer, its components, structure and types.
- Recall, infer and use the knowledge of MS-Word.
- Identify and apply the knowledge of MS- Excel and MS- Power Point.
- Identify and apply the knowledge of Internet, Graphics and Multimedia

## Laboratory Course-I and II

Upon successful completion of the course, students will be able to:

- Understand the apparatus and glassware used in analytical Chemistry.
- Know the importance of calibration in analysis of compound
- Understand the principle, reaction condition and factor calculation for data analysis for various volumetric methods of analysis.
- Study the interpretation of data and computing the results.
- Explain and understand the principal behind various qualitative tests and analyze the given unknown organic compound having different functional groups.
- Explain and understand the principal, reaction mechanism and illustrate application of every experiment in the pharmacy.
- Understand, explain and apply various laboratory techniques for the synthesis of organic compounds, various techniques of purification of the synthesized compounds using precipitation or recrystallization.
- Explain and understand the volumetric gravimetric assay

## Semester- III

### Paper- I Medicinal Chemistry

Upon successful completion of the course, students will be able to:

- Classify medicinal compounds according to their chemical structure
- Identify the effect of physicochemical properties on biological action and drug metabolic pathways
- Explain the mode of action, synthesis and therapeutic uses and side effects of drugs
- Discuss the relationship between the structures of medicinal compounds and their biological activity





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- Discuss the pharmacological actions and adverse effects of medicinal compounds
- Apply the principles of synthetic Chemistry to predict the synthesis of drug molecules
- Helps in correlating between pharmacology of a disease and its mitigation or cure
- To know the structural activity relationship of different class of drugs
- Well acquainted with the synthesis of some important class of drugs
- Knowledge about the mechanism pathways of different class of medicinal compounds
- To understand the Chemistry of drugs with respect to their pharmacological activity.

### **Paper- II Chemistry of Natural products**

Upon successful completion of the course, students will be able to:

- The recognition, collection and preservation of medicinal plants
- Analyses and dosage of active ingredients
- The biological effects of medicinal plants
- The toxicological aspects of active ingredients and finished products
- The study, design, management, control and conduction of the processing systems of medicinal plants and derivatives
- Management of quality of medicinal plant products and derivatives
- The possible application of medicinal plants and derivatives as health Products, including the food and cosmetics sectors
- Technical -scientific consulting in the specialized press for the herbal sector, the promotion of information in the medicinal plants and derivatives sector.

### **Paper- III Toxicology**

Upon successful completion of the course, students will be able to:

- Demonstrate the basic principles of toxicology
- Illustrate toxicity risk assessment and fate of toxicants in humans
- Evaluate acute and chronic toxicity of environmental chemicals
- Develop competence in handling drugs and toxic materials





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- Define and differentiate between natural chemicals and synthetic chemicals, compare how wide spread they are and discuss perceptions of their effects.
- Describe attributes and characteristics of chemicals that make them harmful
- Demonstrate an understanding of the core concepts of the science of toxicology, including hazard identification, exposure assessment, dose-response assessment and an understanding of the mechanisms of action and effects of toxic chemicals at multiple levels of biological organization
- List and discuss factors influencing the toxic effects of chemicals
- Analyze, interpret, and evaluate health risk from exposure to variety chemical hazards.
- Describe technical aspects and experimental approaches in toxicological research, testing and risk assessment.

### **Paper- IV Pharmaceutical Biotechnology**

Upon successful completion of the course, students will be able to:

- Describe the applications of immobilized enzymes and microbes in Pharmaceutical industries
- Explain the aspects of genetic engineering in relation to production of pharmaceuticals
- Illustrate the applications of Recombinant DNA technology
- Explain the process of production of products by fermentation
- Discuss the significance of immunology and monoclonal antibodies in Pharmaceutical Sciences
- Identify the market samples containing biotechnological products
- Understand the various techniques used in modern biotechnology
- Design research strategy with step -by -step instructions to address a research problem
- Provide examples of current applications of biotechnology and advances in the different areas like medical, microbial, environmental, bioremediation, agricultural, plant, animal, and forensic





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- Demonstrate and provide examples on how to use microbes and mammalian cells for the production of pharmaceutical products
- Explain the general principles of generating transgenic plants, animals and microbes

### Paper- V Pharmacognosy

Upon successful completion of the course, students will be able to:

- Describe the scope and evolution of Pharmacognosy
- Explain the chemical nature, uses and evaluation of crude drugs
- Explain the cultivation, collection and processing of drugs of natural origin
- Describe the role of herbal drugs in traditional systems of medicine
- Discuss the medicinal importance of marine drugs
- Compare the morphological characteristics of market samples with the authentic drugs
- Herbs and their Science
- Classification of Medicinal Plants, Phytochemistry, Carbohydrates, Lipids, Terpenes, Polyphenols, Alkaloids, Pharmacology, Toxicity
- Formulations and Preparations of Herbal Medicines
- How herbs influence our physiology and can be helpful against several disorders
- Relations between Phyto -therapy and the Elderly, Phytotherapy and Children, Understanding Herbal Action, and Understanding the Materia Medica
- The recognition of medicinal plants, identification of adulteration and Contamination
- Ethnobotany & Ethnopharmacology in drug discovery process

### Laboratory Course-I and II

Upon successful completion of the course, students will be able to:

- Understand the construction, working, care and handling of instruments
- Understand the chromatographic techniques in organic Chemistry.
- Explain the principle and procedure involved in column chromatographic separation techniques and TLC.





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- Develop skills and techniques those are parts of pharmaceutical procedures through the actual use of equipment and instruments. Clarify theoretical concepts learned in physical pharmaceutics-I.
- Determine the effect of temperature, pH, solvent, co-solvent on solubility.
- Calculate energy of activation of acid hydrolysis, order of given reaction, relative strength of two acids
- Find out composition of binary mixture by viscosity method.
- Explain types, apparatus used and applications of potentiometric titration.
- Define and compare the terms used in pharmaceutical analysis like potentiometry, conductometry, amperometry, etc.
- Discuss conductometric titrations, conductometric curves and their applications.
- Illustrate principle, instrumentation and applications of polarography and polarimetry
- Understand theory, principle, types and techniques of coulometric titration and compare between amperostatic and potentiostatic coulometry.
- Understand principles, instrumentation, working and applications of UV-VIS, Fluorimetry, Atomic absorption, Atomic Emission Spectroscopy, Flame Photometry, Phosphorimetry and Nepheloturbidimetry.

## Semester- IV

### Paper – I Advanced Medicinal Chemistry

Upon successful completion of the course, students will be able to:

- Explain the relationship between structure and biological activity of various drug molecules
- Discuss the most of various classes of drug molecules
- Depict synthetic routes of important medicinal agents
- Synthetic strategies of important medicinal agents
- Discuss the mechanism of action of various medicinal agents studied including their therapeutic use
- Discuss various strategies involved in drug design and drug discovery





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- To write the chemical synthesis of some drugs
- To develop an understanding of the physico-chemical properties of drugs
- To understand how current drugs were developed by using pharmacophore modeling and docking technique
- To acquire knowledge in the chemotherapy for cancer and microbial diseases and different anti-viral agents
- To acquire knowledge about the mechanism pathways of different class of medicinal compounds
- To have been introduced to a variety of drug classes and some pharmacological properties
- To design around the various market approved drug molecules
- To understand the mechanism of action of drugs belonging to the classes of Antihypertensive, Psychoactive, Anticonvulsant, H1/H2 receptor, Aantagonistic, COX1 & COX2 inhibiting, Adrenergic & Cholinergic, Antineoplastic and Antiviral agents
- A detailed understanding of the processes involved in the design, development and discovery of medicinal compounds.

### **Paper – II Drug Design**

Upon successful completion of the course, students will be able to:

- Explain the methodology involved in Design and discovery of lead molecules
- Identify the Objectives: of QSAR , molecular modeling and virtual screening methods
- Discuss the concepts of QSAR and docking
- Apply the strategies of drug design to develop new molecules with therapeutic activity
- Design new drugs using informatics and databases
- To utilize various molecular modeling softwares in the design of novel drug-like molecules
- To apply the various software's for physicochemical property prediction





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- To understand how current drugs were developed by using pharmacophores modelling and docking technique
- The students would appreciate the knowledge on the basics of drug discovery
- They would have better understanding on the various stages of drug discovery
- They would have studied the importance of the role of genomics, proteomics and bioinformatics in drug discovery
- They would have studied on the various targets for drug discovery
- They would have better understanding on the lead seeking method and lead optimization
- They would have learnt the importance of the role of computer aided drug design in drug discovery

### **Paper – III Modern Analytical Techniques**

Upon successful completion of the course, students will be able to:

- Explain the importance of modern instrumentation in pharmaceutical analysis
- Describe the fundamental principles and applications of spectroscopic techniques viz., UV- Visible, IR, FTIR, Flame photometry and Nephelo-turbidimetry
- Discuss the principle and applications of chromatographic and Electrophoretic techniques
- Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage forms
- Understand significance and concept of advanced instrumentation
- Become proficient in advanced instruments
- Implement the knowledge of choosing the right instruments
- The basic theoretical knowledge of the instrumentation techniques available
- Theoretically understand the aspects of separation for multi components
- Practical skills for the analysis of drugs and excipients using various instrumentation techniques
- To make accurate analysis and report the results in defined formats
- To learn documentation and express the observations with clarity





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- To understand the professional and safety responsibilities for working in the analysis laboratory
- To understand the importance of analysis in pharmaceutical industry
- To understand the knowledge about assay of pharmaceutical substance and product
- To develop basic practical skills using instrumental techniques
- To inculcate theoretical knowledge on various instrumental techniques adopted for analysis of pharmaceuticals
- To develop various methodologies for assay of drugs and pharmaceuticals with the skills and knowledge gained
- To understand and gain knowledge on trouble shooting by adopting various methodologies using instrumental techniques

## **Paper – IV Biopharmaceutical and pharmacokinetics**

Upon successful completion of the course, students will be able to:

- Explain the importance of modern instrumentation in pharmaceutical analysis
- Describe the fundamental principles and applications of spectroscopic techniques viz., UV- Visible, IR, FTIR, Flame photometry and Nephelo-turbidimetry
- Discuss the principle and applications of chromatographic and Electrophoretic techniques
- Identify appropriate instrumental techniques for the analysis of drugs in bulk or in various dosage forms
- Understand significance and concept of advanced instrumentation
- Become proficient in advanced instruments
- Implement the knowledge of choosing the right instruments
- The basic theoretical knowledge of the instrumentation techniques available
- Theoretically understand the aspects of separation for multi components
- Practical skills for the analysis of drugs and excipients using various instrumentation techniques
- To make accurate analysis and report the results in defined formats
- To learn documentation and express the observations with clarity





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- To understand the professional and safety responsibilities for working in the analysis laboratory
- To understand the importance of analysis in pharmaceutical industry
- To understand the knowledge about assay of pharmaceutical substance and product
- To develop basic practical skills using instrumental techniques
- To inculcate theoretical knowledge on various instrumental techniques adopted for the analysis of pharmaceuticals
- To develop various methodologies for assay of drugs and pharmaceuticals with the skills and knowledge gained
- To understand and gain knowledge on troubleshooting in adopting various methodologies using an instrumental technique.

### **Paper – V Pharmacology**

Upon successful completion of the course, students will be able to:

- Define the terminologies used in pharmacology
- Explain the pharmacokinetics and mechanism of drug action at organ system/sub cellular/macromolecular levels
- Outline the stages of drug development
- Recognize adverse drug reactions and drug interactions
- Describe the principles, applications, and types of bioassay
- Discuss drug mechanisms and their relevance in the treatment of diseases
- Classify drugs based on their therapeutic utility
- Explain the pharmacology of drugs
- Explain the principles of toxicology and treatment of poisoning
- Discuss the significance of the biological clock in diseases and chronotherapy
- Students would have understood the pharmacological actions of different categories of drugs
- They would have understood the application of basic pharmacological knowledge in the prevention and treatment of various diseases
- They would get an idea about the correlation of pharmacology with other biomedical sciences





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- They would have understood the signal transduction mechanism of various receptors
- Isolation of different organs/tissues from the laboratory animals by simulated experiments
- They would have observed the various receptor actions using isolated tissue
- They would have understood the cell communication mechanism
- They came across the methods of toxicity studies
- They studied about symptoms and treatment of several poisonings
- Students understood the toxicity profile of each drug

### Laboratory Course-I and II

- Understand the construction, working, care, and handling of instruments
- Develop skills and techniques that are parts of pharmaceutical procedures through the actual use of equipment and instruments. Clarify theoretical concepts learned in physical pharmaceutics-I.
- Explain and understand the principle behind various qualitative tests and analyze the given unknown organic compound having different functional groups.
- Explain and understand the principal, reaction mechanism and illustrate the application of every experiment in the pharmacy.
- Understand, explain and apply various laboratory techniques for the synthesis of organic compounds, and various techniques of purification of the synthesized compounds using precipitation or recrystallization.
- Know the various process of solvent extraction
- Know about pH, BOD, COD, DO, TDS, etc
- Gain knowledge about Water analysis, and water treatment.





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## Master of Commerce (M. Com) Program Outcome

- To acquaint a student with conventional as well as contemporary areas in the discipline of Commerce.
- To train the student to develop conceptual, applied and research skills as well as competencies required for effective problem solving and right decision making in routine and special activities relevant to financial management and Banking Transactions of a business
- To facilitate 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 a systematic and rigorous learning and exposure to Banking and Finance related disciplines.
- To provide in-depth understanding of all core areas specifically Advanced Accounting, Marketing , Management, Business Environment, Research Methodology and Tax planning.

## Program Specific Outcome

Completing Master of Commerce will enable students to :-

- Develop an ability to apply knowledge acquired in problem solving after Completing Masters in Commerce.
- Create an ability to work in teams with enhanced interpersonal skills and communication.
- Work in different domains like Accounting, Taxation, HRM, Banking and Administration.
- To create an ability to start their own business.
- To enable students to work in MNCs as well as private and public companies.
- Develop team work, leadership and managerial and administrative skills.
- Students can go further for professional courses like CA/ CS/CMA/CFA





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## Course Outcomes M.Com Semester I

### Paper – 1: Management Concepts

- To provide basic knowledge & understanding about business management concept.
- To provide an understanding about various functions of management.
- Learning about the need of planning organising, Directing and controlling in management.
- To understand the need of motivation and various theories related to motivation.
- To understand the importance and need of leadership and various types of leadership.

### Paper -2: Business Environment

- To understand and know the impact of globalization on trade, commerce and industry
- To understand the various industrial policies, fiscal policies, monetary policies etc
- To study political and legal environment of the business by studying MRTP and FEMA act.
- Examine and analyse impact of technological environment on business decision.

### Paper – 3: Advanced Accounting

- To give an insight into the basics of Accounting Concepts and Principles and to prepare to Students to have the foot hold in Accounts
- To impart knowledge of a theoretical foundation for the preparation and presentation of financial statements.
- To inculcate the understanding of rules of measurement and reporting relating to various types of business entities.
- To inculcate the competency to the students to solve problems relating Special areas in accounting including accounting for Services Sector.





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## Paper -4: Cost Analysis and control

- Describe the importance of materials management function in an organization, and how it can help in integrating various plans and reduce the material related costs.
- To impart knowledge about various concepts and elements of Cost.
- To install the knowledge about accounting procedures, methods and techniques.
- The Cost Accounting procedures in various types of industries like process industries, Transport Industries, industries on contractual basis etc.

## M.Com Semester II

### Paper – 1: Corporate Legal Framework

- To help the students to understand the basic laws related with business and corporate.
- Make the students understand about companies and its types.
- To equip the students with proper knowledge about Foreign exchange Management Act, MRTP and Consumer Protection Act.
- To study the regulatory environment for International Business.

### Paper -2: Organisational Behaviour

- To introduce the students the various behaviours of the organizations and their processes to compete in the business world.
- To equip the students with the basic idea and introduction on organizational behaviour as a concept.
- To give a light on the concept and difference theories on motivation.
- To explain and help the students to gain more knowledge on Group behaviour





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- To introduce the concept of leadership and conflict management

## Paper – 3: Advanced Statistical Analysis

- To impart the basis in Statistics to help students acquire new skills on the application of statistical tools and techniques in Business decision-making.
- To familiarizes the concept of statistics.
- To provide practical exposure on calculation of measures of average, correlation and regression.
- To introduce to the students about the concept of probability and calculation of trend analysis.

## Paper -4: Functional Management

- To help the students to develop cognizance of the importance of Financial Management in corporate valuation
- To enable students to synthesize related information and evaluate options for most logical and optimal solution such that they would be able to predict and control Debt Equity incurrence and improve results.
- To analyze and examine the implementation of marketing concepts and strategy to firm.
- To give an insight into the various processes of recruitment, selection and training.

## M.Com III Sem

### Paper – 1: Managerial Economics

- To understand and appreciate the basic Micro and Macroeconomics and their application to the business.
- To understand the basic elements of managerial economics aspects, nature and decision making
- To understand the law of demand , supply forecasting , consumer durable





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- To understand theories of profit, profit maximization and analysis of Break Even Point.
- To know law of diminishing proportion , product function , Economies of scale
- To understand Pricing policy under Perfect Competition Monopoly, Monopolistic Competition Oligopoly and Pricing Objectives and Methods for production to minimize the cost and maximum the profit.

## **Paper -2: Tax Planning and Management**

- Students learn computing the total taxable income of oneself and analyze the tax payable.
- To impart deep knowledge about the latest provisions of Income Tax Act.
- To develop application and analytical skill of the provisions of Income Tax Law for Income Tax planning and Management.
- To enable students to get expert knowledge regarding the legitimate way of Tax Planning and Management under different Financial and managerial decisions after considering the impact of Direct Tax Laws.

## **Paper – 3: Entrepreneurship Skill Development**

- To enable students understand entrepreneurial culture and various theories of entrepreneurship.
- To discuss distinct entrepreneurial traits and the role of entrepreneurship in the economic development of a country.
- To give knowledge about the institutional support available to entrepreneurs and the role of the government in organising entrepreneurial development programmes
- To enable students to learn business idea, formulation of project and feasibility analysis.

## **Paper -4: Accounting for Managerial decisions**

- To enlighten the students thought and knowledge on management Accounting.





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- To give proper idea on financial statement analysis in practical point of view.
- To introduce the concept of fund flow and cash flow statement
- To provide knowledge about budget control keeping in mind the scope of the concept.
- To develop the know-how and concept of marginal costing with practical problems

## M.com IV Sem

### Taxation Group

#### **Paper-1: Direct Tax in India**

- To enable the students to learn principles and concepts of Taxation.
- Students will be versed in the fundamental concepts of Income Tax and different aspects of tax.
- Students can understand Income Tax system properly, and can get the knowledge of different tax provisions.
- Students will be able to demonstrate progressive learning of various tax issues and tax forms related to individuals.
- To understand Basic concepts regarding Income, Previous & Assessment Year.
- Providing knowledge about difference between Direct and Indirect Tax.
- Student's Capability to apply theoretical knowledge in practical situation will be increased.

#### **Paper-2: Business Taxation**

- To study Computation of Total Income and Tax liability of Hindu Undivided Family.
- To study Computation of partnership firm and association of persons and their tax liabilities.
- To understand the Procedure of Computation of Income of a Company
- To study assessment of Co operative society, charitable and other trust.





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- To study the provision related to double taxation relief and assessment of non resident.

## **Paper-3: Indirect Tax**

- To acquaint the students with basic principles underlying the provisions of indirect tax laws and to develop a broad understanding of the tax laws and accepted tax practices.
- To give an understanding of the relevant provisions of indirect tax.
- Expose the participants to real life situations involving taxation and to equip them with techniques for taking tax-sensitive decisions.
- Students will learn to define various aspect of indirect taxes (GST) like, Registration, Concept of Supply etc.
- Students will acquaint with the sources of revenues of the government.
- Students will learn to analyse and evaluate the effect of an indirect tax on consumers, producers and the government.

## **Paper 4: Sales and Service Tax**

- To study various provisions related to CST and learn preparation of registration process under CST
- To study rules related to MP VAT ,to understand computation of taxable turnover assessment and other provision
- To understand the scope of service tax.
- To study provisions related to computation of service tax.
- To give an idea about collection of services tax appeal and revision.

## **Marketing Group**

### **Paper-1: Advertising and Sales Management**

- Evaluate results of marketing activities using criteria related to budgeted sales, costs and profits.
- Prepare and deliver a sales presentation.
- Communicate marketing information persuasively and accurately in oral, written and graphic formats.





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- Identify and respond to clients' advertising and marketing communications objectives by applying principles of marketing and communications.
- Learn to distinguish misleading and deceptive advertisements from truthful, ethical and responsible advertising.
- Develop an advertising plan and present and defend it persuasively.
- Contribute to evaluating the effectiveness of advertising and marketing communications initiatives.
- Participate in the development of creative solutions to address advertising and marketing communications challenges

## **Paper -2: Consumer Behaviour**

- To understand consumer behaviour in an informed and systematic way.
- To analyse personal, socio-cultural, and environmental dimensions that influence consumer decisions making.
- To enable students in designing and evaluating the marketing strategies based on fundamentals of consumer buying behaviour.
- To give the students a perspective to understand the application of market research in framing effective marketing strategies.
- Demonstrate how knowledge of consumer behaviour can be applied to marketing.
- Identify and explain factors which influence consumer behaviour.

## **Paper -3: Rural and agricultural marketing Management**

- Enable students to gain knowledge on agricultural marketing, challenges and prospects for improving agricultural marketing system
- Gain skills to analyze Marketing Functions, Market Information and Intelligence
- Understand the importance of Rural Markets
- Sensitize to the needs and behaviour of consumers and channels





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- Utilize the understanding on peculiarities of rural markets, channels and competition in marketing decision making
- Understand the Rural Market Segmentation and Rural Products
- Expose the students to Rural Market Distribution and services

## **Paper-4: International Marketing**

- This will helpful to know requirement of decision making in international Marketing.
- The role of marketing mix and market selection in international marketing.
- Imparting knowledge about International Marketing Strategies And Elements of International Marketing Mix.
- It will teach us about market segmentation, targeting and positioning of product.
- It plays an important role to know cultural issue in international market

## **Financial Analysis and Control Group**

### **Paper-1: Security Analysis and portfolio management**

- To provide a theoretical and practical background in the field of investments.
- Designing and managing the bond as well as equity portfolios in the real word.
- Students would be acquainted with various technical analysis tools like Charts, Patterns and other mathematical and market indicators.
- Students would be aware of various efficient market theories to managing a portfolio.
- Analyze investment opportunities in stock markets.

### **Paper -2:Strategic Financial Management**

- Understand the basic concepts and principles of strategic management analyse the internal and external environment of business.
- To enable the students, understand the components which formulate a strategic intent.





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- To aware the students about principles and functions of strategic management.
- Apply the Leverage and EBIT EPS Analysis associate with Financial Data in the corporate.
- Analyse the complexities associated with management of cost of funds in the capital Structure.
- Demonstrate how the concepts of strategic management and investment, financing and dividend policy decisions could integrate while identification and resolution of problems pertaining to LSCM Sector.

## **Paper-3: Project Planning and Management**

- Understand project characteristics and various stages of a project.
- Understand the conceptual clarity about project organization and feasibility analyses – Market, Technical, Financial and Economic.
- Analyze the learning and understand techniques for Project planning, scheduling and Execution Control.
- Apply the risk management plan and analyse the role of stakeholders.
- Understand the various aspects of project finance.
- Understand the various aspects of project implementation including project management system and project management information system.
- Analyse the various techniques of project audit.

## **Paper-4: Indian Financial System**

- Students will be able to describe financial market operations.
- Students will be able to explain the various concepts related to financial markets and services. Students will be able to solve various investment related issues facing the investors.
- Students will be able to examine how the overall financial system works and various aspects associated with it
- Students will be able to evaluate the best sources feasible for fulfilling their financial requirements related to the business
- Students will be able to formulate different financial plans for the organisations with the help of different services provided by the financial markets





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## Accounting Group

### **Paper -1: Corporate Accounting**

- To Impact Company Accounts to understand and appreciate the Provisions of the companies act 1956.
- To give them an exposure to calculate the value of Goodwill and shares.
- To enable the students to develop awareness about Corporate Accounting in conformity with the provisions of Companies Act and Accounting as per Indian Accounting Standards
- To make students aware about the conceptual aspect of corporate accounting
- To enable the students to develop skills related to Valuation of Shares and Goodwill of Companies.
- To enable students to understand accounting of Banking and Insurance Companies.
- To enable students to understand concepts of Holding and subsidiary companies.

### **Paper-2: Cost Administration and Control**

- To enlighten the students thought and knowledge on management Accounting.
- To give proper idea on financial statement analysis in practical point of view and to introduce the concept of Fund flow statement
- The study Cost Accounting procedures like Process Costing and Standard Costing.
- To provide knowledge about budget control keeping in mind the scope of the concept.
- To develop the know-how and concept of marginal costing with practical problems

### **Paper -3: Accounting Theory**

- Understanding the principles of accrual accounting.
- Describe the purpose of accounting and explain its role in business and society.





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- Analyze and interpret professional accounting literature to prepare financial statements according to generally accepted accounting principles
- Students achieve a deeper understanding of selected contemporary issues in accounting;
- Student can developed an ability to critically analyse these issues within the theoretical framework developed earlier in the course.

## **Paper -4: Institutional Accounting**

- Explain the fundamental concepts and theories in corporate finance.
- Develop the application skills to calculate profit and loss account, consolidated balance sheet of holding companies, preparation of balance sheet of banking and insurance companies.
- Evaluate the techniques of valuation of consolidated balance sheet of holding company, bank accounts, and insurance company accounts.
- Gain confidence in preparation of company accounts, bank accounts, insurance company accounts, cooperative society, and various government accounting.

## **Paper -5: Employment Oriented Project Work**

Practical training any organisation, firm, business etc and preparation of report regarding the experience and difficulties faced during training process.



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## ALUMINI LIST

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