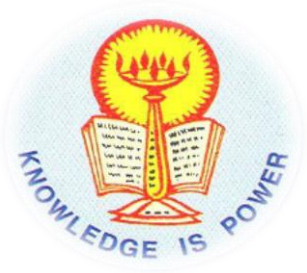
DADA RAMCHAND BAKHRU SINDHU MAHAVIDYALAYA
NAGPUR



Program Outcomes
Program Specific Outcomes and
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Program Outcomes (POs)

Program Outcomes of B. Com.

The commerce graduate will be able to –

PO1: Build a strong foundation of knowledge in different areas of commerce.

PO2: Develop the skill of applying concepts and techniques used in commerce

PO3: Expose students about entrepreneurship.

PO4: Develop an attitude for working effectively and efficiently in business environment.

PO5: Create awareness of Law and Legislations related to commerce and business.

PO6: Integrate knowledge, skill and attitude that will sustain an environment of learning and creativity among the students

PO7: Acquire numerical and practical skills related with banking and other business.

PO8: Imbibed ethical, moral and social values in personal and social life leading to highly cultured and civilized personality.

Program Specific Outcomes of B. Com.

PSO1: Students acquires knowledge about the various types of business organizations, office management and related

PSO2: Learn principles and concepts of Accountancy

PSO3: Student are enabled with the Knowledge in the practical applications of accounting

PSO4: Enable the students to learn the basic concepts of Partnership Accounting, and allied aspects of accounting. After the successful completion of the course the student should have a thorough knowledge on the accounting practice prevailing in partnership firms and other allied aspects.

PSO5: On successful completion of this course, the student should be well versed in basic provisions regarding legal frame work governing the business world.

PSO6: This course aims to develop an understanding of the conceptual framework of Management Accounting. After the successful completion of the course the student acquires the knowledge in the Management Accounting Techniques in business decision making.

PSO7: To keep the students conversant with the ever – enlarging frontiers of Cost Accounting knowledge.

PSO8: This course aims to provide an in-depth knowledge on the provisions of Income Tax. To familiarize the students with recent amendments in Income-tax.

PSO9: On successful completion of this course, the student should be well versed in the fundamental concepts of Auditing.

PSO10: On successful completion of this course the students should have the practical knowledge and he tactics in the marketing.

PSO11: This course enables the students with the knowledge about the Capital budgeting, Working capital, cash management, and better financial management techniques.

PSO12: To inculcate knowledge on various laws relating to business such as law of contract, law of sale of goods, law of agency, Negotiable Instruments Act etc.

Course Outcomes (COs) of B. Com.

Financial Accounting I & II

CO1: To understand the meaning, objectives and principles of Accounting.

CO2: To understand Accounting Standards- AS 1 to AS 10

CO3: To know how the accounting entries are posted in books.

CO4: To know the accounting system for sole trading.

CO5: To understand about distinction between Hire Purchase and Installment System and how to maintain books of recording under hire purchase installment method.

CO6: To understand the concept, Distinctions between Joint venture and Partnership.

CO7: Recording entries of joint venture account.

Business Economics I & II

CO1: Identify and use of economic terminologies.

CO2 Students will apply the basic theories of economics in critical thinking and problem solving of business matters.

CO3: Make decisions wisely using cost-benefit analysis.

CO4: Students will demonstrate an understanding of their personal interests, abilities, strengths and weaknesses as they pertain to professional career fields.

CO5: Students will demonstrate basic understanding of career options available to them and will establish career objectives.

CO6: Students will demonstrate their knowledge of the fundamental and technical concepts of economics.

Business Management &Organization

CO1: Develop the knowledge of business and management principles

CO2: Learn decision thinking and problem skills

CO3: Study effective Organization and Organization structure

CO4: Teach a sense of responsibility and a capacity for business management.

CO5: Enable an awareness of the global environment in which business operate

CO6: Develop the knowledge of business and management principles

CO7: Learn critical thinking and problem skills

CO8: Enable an awareness of the global environment in which business operate

CO9: Develop knowledge of Nature and scope of business, Forms of Business Units, Types of Organization- Line and Staff, Modern types of organizations Project, Matrix, Formal and Informal Organization, Recent Trends in Business Organization

Business Statistics

CO1: Able to understand Meaning, Scope, Importance, Functions and Limitations of Statistics

CO2: Students can make Collection of data, Tabulation and Classification, Frequency distribution. Mean, Median, Mode, Geometric Mean and Harmonic Mean

CO3: Learn Meaning and significance of dispersion Mean Deviation, Standard Deviation, Quartile Deviation etc.

CO4: Able to understand Skewness-Absolute Measures of Skewness, Relative Measures of Skewness, Karl Pearson's Coefficient of Skewness, Bowley's Coefficient of Skewness.

CO5: Develop basic knowledge of Business Mathematics in students.

Corporate Law

CO1: Provide the knowledge of company, shares and Kinds of the company

CO2: It describes the features of private companies in India and development of Indian company act

CO3: This subject also describes the memorandum of association and article of association

CO4: It describes the prospectus and contents of prospectus.

CO5: This subject describes the relationship between company and debenture holders.

Secretarial Practice

CO1: Develop the knowledge about the concept of secretarial practice and its decision making process.

CO2: Learn different techniques and problem skills of secretarial practice.

CO3: Study effective transfer and transmission of shares.

CO4: Teach a sense of responsibility and a capacity for secretarial practice.

CO5: Enable an awareness of the global environment in which secretarial practice operate

Financial Accounting I & II

CO1: Understand meaning, needs, advantages and formalities in consignment and also the difference between a consignment and a sale.

CO2: Know meaning of branch, objectives of branch accounting, maintenance of accounting records, transactions relating to branch. Accounting procedure of branch.

CO3: Know the accounting system for Joint Stock Company.

CO4: To understand about distinction between Proposed Dividend and Interim Dividend

CO5: Understand meaning, distinctions between Joint venture and Partnership.

CO6: knowledge of Final Accounts of Banking Companies

CO7: Maintain books of recording under General Insurance Companies.

CO8: Meaning, Characteristics of Goodwill, Factors influencing the value of goodwill, Need for Valuation of goodwill, Valuation of goodwill etc.

CO9: Preparation of Liquidator's Final Statement of Account

Business Communication& Skill Development

CO1: **U**nderstand techniques of effective communication.

CO2: Make aware about barriers to communication with ethical context.

CO3: Understand the process of e-mail communication &Public Relations Management

CO4: Understand MS-office aided communication.

CO5: Develop & Improve various skills like communication, reading, listing ,note making, persuasive speaking, body language & gestures

CO6: Understand basics of Personality

CO7: **U**nderstand techniques of Personality developments

CO8: Understand skill required for entrepreneur

Monetary Economics I & II

CO1: Identify barter system and evolution of money

CO2: Understand Inflation and Deflation phases of economics

CO3: Students will apply the Quantity Theory of Money

CO4: Make decisions wisely using monetary economics

CO5: Able to understand in depth concept in application of monetary policy and fiscal policy

CO6: Students will demonstrate an understanding Maximum Social Advantages

CO7: Types of Tax System- Proportional, Progressive and Regressive Taxation System, Direct & Indirect Taxes strengths, and weaknesses as they pertain to professional career fields

CO8: Students will demonstrate knowledge of the fundamental and technical banking

Business Law

CO1: Make students aware about various Laws relating to Business.

CO2: Describes the Business law : Meaning, evolution and significance

CO3: Describes Indian Contract Act-1872, Sale of Goods Act- 1930, Negotiable Instrument Act-1881, Prevention of Money Laundering Act-2002, Consumer Protection Act-1986, and Information Technology Act-2000.

CO4: Describes the cyber law, offences and remedies.

CO5: Describes the relationship between business world and legal rules.

Income Tax

CO1: Make aware about Basic Concepts of Income Tax, Meaning & Definition of Assesses, Assessment Year, Previous Year, Gross Total Income, Types of Assesses, Income Exempt from tax, Capital & Revenue Expenditure. Agricultural Income

CO2: Make aware about Residential Status: Residential Status and its effects on Tax incidence: Residential status of Individual, HUF, Firm & Association of Person, Company, Basic Conditions & Additional Conditions

CO3: Understand the provisions and procedure to compute total income under five heads of income i.e. salaries, house property, profits &gains from business and profession, capital gains and other sources.

CO4: **U**nderstand the provision and procedure for clubbing &aggregation of incomes and set-off & carry forward of losses.

CO5: Understand the various deductions to be made from gross total income U/s Deduction under section 80C, 80CCC, 80CCD, 80D, 80DDB, 80E, 80G, 80GG, 80U

Cost and Management Accounting

CO1: Make aware about cost structure and cost elements

CO2: Understand various techniques and methods of cost accounting

CO3: Knowledge of Meaning, Importance, Element of Cost, Cost-Absorption, Allocation of Overheads and Methods of costing, Difference between Cost Accounting and Financial Accounting

CO4: Preparation of reconciliation Statement

CO5: Describes the Methods of costing, advantages and limitations of process costing, difference between job costing and process costing, Normal loss, Abnormal loss

CO6: This subject also provides the knowledge of completed contract, incomplete contract

CO7: Helps students to give practical knowledge of cost accounts

Management Process

CO1: Equip the students with the knowledge of Management Process and inspire them to acquire required quality to face the managerial challenges.

CO2: Understand Differences between Management and Administration

CO3: Study managerial styles X and Y Theory of Macgregor,.

CO4: Teach a sense of responsibility &significance of professional manager in current scenario.

CO5: Enable an awareness of Theories of motivation- Maslow's theory of need hierarchy, Herzberg's theory of motivation, relationship between motivation & productivity etc.

Indian Economics

CO1: Identify Economic Planning for development.

CO2: Understand Natural resources- Land, soil, water, forest, mineral. Infrastructure - Sources of Energy in India. Power, Coal, Oil and Gas, Atomic, Non-conventional Sources, India's Energy Strategy. Transport System in India- Railways, Road, Water and Air Transport.

CO3: Understand Causes of Population Explosion, Consequences on Economic Development & its Remedies.

CO4: Students will demonstrate and understanding of their personal interests, abilities, strengths and weaknesses as they pertain to professional career fields

CO5: Students will demonstrate role of public expenditure in India, sources of public revenue in India, India's fiscal deficit

CO6: Students will demonstrate their knowledge of the fundamental and technical concepts of Indian economics.

Business Finance

CO1: Develop the knowledge of business finance and financial management decision.

CO2: Functions of Financial Executive in an Organization

CO3: Study Equity, Preference shares, Sweat equity shares, Shares with differential rights, debentures and Bonds

CO4: Teach a sense of responsibility and a capacity for financial management.

CO5: Enable an awareness of the global environment in which financial management operate

Advance Statistics

CO1: Able to understand Correlation- Types of correlation, Karl Pearson's coefficient of correlation in Bivariate frequency table, probable error, interpretation of 'r', Rank Correlation Method..

CO2: Students can make Regression Analysis- Lines of Regression/Regressions Equation, Coefficient of regression for a bivariate frequency table. To learn Meaning and significance of dispersion mean Deviation, Standard Deviation, Quartile Deviation etc.

CO3: Able to understand Index Number- Uses of I N, Types of I No. Methods of Index Number. Test of consistency of Index No.- unit test Time Reversed Test, Factor cost of living Index No.

CO4: Develop basic knowledge of Time series Analysis-Introduction components of a Time series- a Trend Short Term Variation irregular variation Measurement of Trend- simple problems graphic methods, methods of seminar, methods of curve by the square methods of moving average

Indirect Tax

CO1: Students will learn Basis of chargeability of duties of central excise-goods, manufacture, classification and valuation of excisable goods; Registration and routine procedures in central excise, payment of duties of excise and removal of goods, Cenvat on inputs and on capital goods, excise and small scale industries.

CO2: Students will acquaint with Nature of customs duty, types of customs duty, classification for customs and rate of duty, valuation for customs duty, procedures for import and export.

CO3: Students will learn Charging of service tax, Services on which tax is payable, registration, records to be maintained by the assessed, returns and payment of tax, Provisions of law and procedures.

CO4: Students will learn Basic Concepts, value added tax on sale or purchase of goods, levy or incidence of tax, goods liable to tax, rate of tax and exemptions, dealer and registration method of computing tax liability, credit, set-off and refunds, documents, records and maintenance of accounts, returns and assessments

CO5: Discuss Central Sales Tax Act, 1956 Definitions, Concepts of inter-state sales, Sale outside the state, sale in the course of export and import, Liability to tax and rate of tax, Registration of dealers.

Computerized Accounting

CO1: Students will learn Basis of Computerized Accounting, Advantages of Computerized Accounting, Manual Vs Computerized Accounting, Need of Computerized Accounting, Accounts Organization, Accounts group, Loans, Liabilities, Assets and Budget. Students will acquaint with Nature of customs duty, types of customs duty, classification for customs and rate of duty, valuation for customs duty, procedures for import and export.

CO2: Students will learn Introduction to Tally Software, Features of Tally, Tally Screen, Company Information, Creating new Company, Gateway, Selection of Company, Selection of Options, Buttons at Gateway, Working with multiple Companies, Company Features, Configuration – General, Numeric Symbols, Voucher Entry, Invoice Order Entry, and Printing.

CO3: Able to Create new group, creation of Primary group. Normal and Advance Information, Ledger Accounts, Cost Categories, Cost Centers. Creation of Budget, Types of Budget. Voucher – Voucher Entry, Creation of Voucher Screen, Types of Voucher, Selection of Voucher Types, Post Dated Voucher, Printing of Vouchers, Cheque Printing, advance Features of account Voucher.

CO4: Get depth knowledge of Inventory Info, Balance Sheet, Audit trail, Ratio Analysis. Display – Accounting Report Display, Inventory report Display, and MIS Report Display. Printing Reports, Export of Data. Maintenance – Bank Reconciliation, House Keeping, Data Maintenance. Security – Users and Password, Security Controls, Types of Security, Creation New Security Levels and Tally Audit

Course Outcomes (COs) of Compulsory English (B. Com.)

CO1: Illustrate the nature of literary forms like prose, poem and short stories.

CO2: Learn to prepare email writeup

CO3: Learn to apply different parts of grammar

CO4: Learn to narrate an experience

CO5: Learn to prepare views and opinions

CO6: Appropriate use of parts of speech

CO7: Learn to weave idea/story

CO8: Learn to prepare speech

CO9: Learn to construct words from root words

CO10: Learn to prepare interview

Course Outcome (COs) of Supplementary English (B.Com.)

CO1: Illustrate the nature and comprehend the short stories

CO2: Improve vocabulary by learning new words

CO3: Enhance listening skills

CO4: Learn emotional intelligence skills

CO5: Improve assertive and learning skills

CO6: Develop teamwork skills

Course Outcome (COs) of Hindi (B.Com.)

CO1: विद्यार्थियो ंका ेहिन्दी भाषा का महत्व बतलाना/हिन्दी साहित्य के प्रति रूचि निर्माण करना। विद्यार्थियों में हिन्दी अध्ययन की रूचि निर्माण होगी। कुछ नया जानने की जिज्ञासा उत्पन्न होगी।

CO2: विद्यार्थी गण परिश्रम, अनुशासन, साहसआदिगुणोंकामहत्व समझेगा तथा अपने जीवन में

क्रियान्वित करने का प्रयत्न करेगा। विद्यार्थियों को सामाजिक मूल्य, नैतिक मूल्य, सामाजिक आदर्श सद्चरित्र का महत्व बतलाना। जिससे उनमें देशभक्ति, सामाजिक जागरूकता, सद्भावना, परोपकार, त्याग की भावना निर्माण होगी तथा उनमें कर्तव्य निर्वाहका बोध होगा।

CO3: समाजिक जागरूकता व कर्तव्य परायणता के भाव उत्पन्न होगे।विद्यार्थियों के मनमें प्रकृति एवंपर्यावरण के प्रति प्रेमभावना उपजेगी। अंधविश्वास, दहेजप्रथा, भ्रष्टाचार आदि सामाजिक बुराइयों के निमूर्लन के प्रतिविद्यार्थियोंमेंचेतनानिर्माणहोगीतथा योगदानदेने के लिए तप्तरहोगे।

CO4: आधुनिक तंत्रज्ञान व साइबर तकनीक के दुष्परिणाम से परिचित होकर उसके उपाय व लाभ को बतापाने में वे समर्थ होगे।

CO5: प्राचीनकवियों की रचना के माध्यम से विद्यार्थियोंमें अध्यात्मिक व नैतिक मूल्यों का निर्माण होगा। उनमेंदेश के प्रतिगर्व एवंगौरव–मूल्योंकानिर्माणहोगा।

CO6: आधुनिक कवियों की रचना के माध्यम से सामाजिक, राजनैतिक समस्या से परिचित कराना तथा निराकरण के लिए प्रोत्साहित करना। विद्यार्थीगण इन समस्याओं के निराकरण के लिए प्रयत्नशील होगे।

CO7: व्यवहारिक हिन्दी के माध्यम से विद्यार्थियों मे हिन्दी लेखन व रचनाकर्म के गुणनिर्माण करना। इससे विद्यार्थी पारिभाषिक शब्दावली व व्यवहारिक उपयोग, अनुवाद,करपानेमें समर्थ होगे। समाचार लेखन, विज्ञापन लेखन, पत्रलेखन, साक्षात्कार कलाकौशलका विकास होगा।

CO8: मुहावरे एव लोकोक्तियों के रसास्वादन की क्षमता उसमे विकसित होगी। कल्पनाविस्तार संकल्पना से परिचित होगे। हिंदी भाषा के शब्दो का ज्ञानकराना, समूहचर्चा व विषय विश्लेषण के प्रति अभिरूचि निर्माण करना जिस से विद्यार्थियो मे वाद–विवाद, भाषणकला, वकृत्वकला के गुण विकसित होगे तथा उन्हे प्रस्तुत करने के लिए सक्षम होगे।

Program Outcomes of B. B. A.

The business administration graduate will be able to –

PO1: Develop basic understanding about management education.

PO2: Develop functional and general management skills.

PO3: Inculcate Entrepreneurial skills.

PO4: Develop appropriate skills in the students so as to make them competent and provide themselves self-employment.

PO5: Develop skills such as communication, leadership and teamwork

effectively.

PO6: Imbibed ethical, moral and social values in personal and social life leading to highly cultured and civilized personality.

Program Specific Outcomes of B.B.A

PSO1: Manage and coordinate people, business processes, and business resources.

PSO2: Develop and implement components of a business plan.

PSO3: Communicate in a variety of domains, including writing, speaking, listening and reading, while respecting the impact of technology on effective communication.

PSO4: Students will learn to use data to engage in effective decision-making in a business

PSO5: Demonstrate knowledge and application of prescribed ethical codes and behaviors in the workplace

Course Outcomes (COs) of B.B.A.

English

CO1: Understand and communicate with English speakers from different parts of the English speaking world.

CO2: Discuss and plan holidays in English and tell jokes and stories.

CO3: Understand the basic tenets of reading and writing effective English

CO4: Discuss elements of popular culture such as TV, radio and music

Fundamentals of Business Management

CO1: knowledge in the process and levels of management in the organization.

CO2: knowledge in planning and decision making activities in the organization

CO3: Students understand types and structure of organization

CO4: knowledge on staffing the employees

CO5: Understand the do's and don'ts in business

Computer Applications for Business

CO1: Learn the usage of word processor and electronic spreadsheet

CO2: Understand the importance of DBMS and its applications in query language.

CO3: Study the concept of EDI and its applications.

CO4: **L**earn Internet Basics and realize the difference between Distributed computing and Client / Server computing.

CO5: Understand IS audit and its applications.

Cost Accounting

CO1: Understand the basic cost concepts, element of cost & Preparation of Cost Sheet.

CO2: Understand the principles and techniques used in recording, analyzing and reporting costs.

Principles of Marketing Management

CO1: Understand about the marketing and its various environmental factors

CO2: Knowledge on buyer behavior and market segmentation

CO3: learn about various stage in Product Life Cycle

CO4: knowledge in the marketing channels and sales management

CO5: knowledge on advertising and sales promotion

Financial and Management Accounting

CO1: knowledge on various source of finance

CO2: Stud knowledge on factors affecting the capital and capital structure formation

CO3: Students understand the concept of cost of capital

CO4: Understand the principles and techniques used in revenues for internal management purposes

CO5: Develop applicable cost concepts in making short term decisions and the application of Spreadsheets in management accounting

Micro-Economic Fundamentals

CO1: The concept of elasticity of demand.

CO2: Apply the supply/demand models for the analysis of economic events.

CO3: Analyze the concept of externalities in macro and micro applications.

CO4: Understand how to evaluate microeconomic conditions.

Principles of Financial Management

CO1: Understand the basic concept of accounting and preparation of ledger

CO2: Knowledge in the preparation of the trading and non-trading organization.

CO3: Knowledge in the settlement of accounts for the admitted and retired partners

CO4: The depreciation calculation on the fixed assets and computation of claim under loss of stock

CO5: Calculation of profit for small traders

Basic Statistical Techniques

CO1: Knowledge on presentation and tabulation of data, the methods of collecting data and summarizing the data using central tendency.

CO2: Knowledge on various measures of dispersion and the method of measuring it.

CO3: Knowledge on measuring the trend or variation existing in a Time Series data.

CO4: Knowledge of measuring the fluctuation or changes in Price and quantity of goods and products using various index numbers.

CO5: Learn to understand the research problem in hand and to apply the appropriate test suitable to the research problem.

Evolution of Business & Commercial Geography

CO1: Students learn Evolution of Business & Economy and Industrial revolution.

CO2: Students learn Evolution of Business in post WWII Scenario: Cold War and its impact on International Business; OPEC Crises

CO3: Students learn Geographical Environment & Commerce - Relationship between geographical environment and Commerce, Economic activities.

CO4: Student learn Role of industries in Economic development; Factors of industrial location – Raw material, power, market, transport and communication

Environment Management

CO1: Knowledge on business environment and its importance

CO2: Learn on political and legal issues in business

CO3: Knowledge on social beliefs, customs and cultural heritage.

CO4: Knowledge on micro and macroeconomic concepts.

CO5: Knowledge on various financial service institutions.

Principles of Human Resource Management

CO1: Knowledge on HRM, its environment, methods of selection, and Interview techniques

CO2: Knowledge on training and career development

CO3: Learn about remuneration and welfare measures

CO4: Learn facts about labour relation and Industrial disputes

CO5: Learn about human resource audit, nature and approaches

Money, Banking & Finance

CO1: Knowledge of Concept and functions of Money, Origin and development of Money, Limitations of Barter System, and Classification of Money.

CO2: Knowledge of Commercial Banking- Role and functions of Commercial Banks, Credit creation and its limitations Central Banking-Functions of Central Bank.

CO3: Knowledge of Method & Difficulties of Measuring National Income, Concept of GDP, GNP, NNP, PI, and DPI. Inflation and Deflation

CO4: Knowledge of Monetary and Fiscal policy, Public Finance- Meaning, Scope and Importance of Public Finance, Public Finance Vs Private Finance.

Introduction to Sociology and Psychology

CO1: Knowledge of Sociology as a science empirical, theoretical, cumulative and non-ethical, Development of Modern Industrial Society – Characteristics, industrialism, capitalism, urbanism, liberal democracy,

CO2: Knowledge of Structural aspects of social system – Institutions, groups, subgroups, roles, norms and values

CO3: Knowledge of Contemporary Perspectives: Biological, Cognitive, Psychoanalytical, Humanistic, Evolutionary and Cross-cultural

CO4: knowledge of Perceiving Others: Forming Impressions; Role of Non-verbal Cues, Group stereotypes, Central Traits; Primary and Recency Effects; Models of Information Integration; Attribution of Causality: Biases and Theories Jones and Davis, Kelley

Business Legislations

CO1: Knowledge on contract Act

CO2: Learn on companies Act and procedures

CO3: Knowledge on consumer rights and duties

CO4: Knowledge on legal system of India

Entrepreneurship Development

CO1: Understand the meaning of entrepreneurship and being an entrepreneur.

CO2: Understand the concept of entrepreneurial development

CO3: Develop a business plan and model that supports the strategy as envisaged by the entrepreneur

CO4: Identify the issues associated with succession planning, and develop plans to address them.

Principles of Operations Management

CO1: Understand the concepts related to business and operations management.

CO2: Understand how planning and control are carried out vis-à-vis production.

CO3: Understand the significance of inventory and quality management.

CO4: Understand elements of production management

International Business Environment

CO1: Knowledge about internal and international Trade

CO2: Acquired wisdom on the theories of the International Trade

CO3: Learn about the Balance of Payment and its concepts in detail

CO4: Knowledge was gained by the students on IMF and IBRD

CO5: Students understood about the World Trade Organization with special reference to India

Research Methodology

CO1: Knowledge in the need of Research, sampling, pilot testing

CO2: Gain knowledge on various types of research and the sampling techniques

CO3: Learn the sources available for the collections of data and to draft the questionnaire

CO4: Acquire knowledge on the application of various statistical tools CO5: Gained knowledge on the preparation of reports

Program Outcomes of B.Sc.

The Science Graduate will be able to –

PO1: Develop the knowledge with facts and figures related to various subjects in sciences.

PO2: Understand the basic concepts, fundamental principles, and the scientific

theories related to various scientific phenomena and their relevancies in the day-to-day life.

PO3: Develop the skills of observations and drawing logical inferences from the scientific experiments.

PO4: Acquire the skills in handling scientific instruments, planning and performing in laboratory experiments.

PO5: Develop scientific outlook not only with respect to science subjects but also in all aspects related to life.

PO6: Analyze the given scientific data critically and systematically and the ability to draw the objective conclusions.

PO7: Develop various communication skills such as reading, listening, speaking, etc., which we will help in expressing ideas and views clearly and effectively.

PO8: Imbibed ethical, moral and social values in personal and social life leading to highly cultured and civilized personality.

Program Specific Outcomes of Physics (Part of B.Sc. Program)

PSO1: Understand the knowledge with the facts and figure related to the physics

PSO2: Apply the fundamental principles and the scientific theories related to various scientific phenomena and their relevancies in day-to-day life

PSO3: Enhance logical thinking

PSO4: Understand the Quantum and classical hypothesis

PSO5: Develop problem solving technique

Course Outcomes (COs) of Physics

Properties of Matter and Mechanics

CO1: Use the basic knowledge of mechanics and properties of matter.

CO2: Understand an equation of motion.

CO3: Apply the Bernoulli's Principle.

CO4: Understand the conservation of rotational motion.

Sound waves, applied acoustics, ultrasonic and power supply

CO1: Use the knowledge of sound waves and applications.

CO2: Understand the specific principles relevant to the acoustics of spaces.

CO3: Understand the different methods for generation of the ultrasonic waves.

CO4: Use a knowledge and apply it to various electronically instruments.

Physical optics and Electromagnetic waves

CO1: Understand the basic concepts in optics.

CO2: Apply the Rayleigh criteria for resolution.

CO3: Understand the principle of Brewster's law.

CO4: Use the knowledge of characteristics of EM waves.

Solid state Physics, X-Ray and laser

CO1: Know about the basic knowledge of crystal structure.

CO2: understand the basic principle of Bragg's law and its applications.

CO3: Understand the different x-ray spectra and the concept of Auger effect.

CO4: Know about the fundamentals of laser, their unique properties and applications

Solid state electronics and molecular physics

CO1: Apply the principle of electronics in day to day life.

CO2: Understand the construction, working and characteristics of JEFT.

CO3: Understand the concept of the molecular bending and molecular energies.

CO4: Use the knowledge of elementary ideas of NMR and ESR.

Atomic physics, free electron theory and Statistical Physics

CO1: Apply the paulis exclusion principle.

CO2: Understand the concept of kroning penny model.

CO3: Use the basic knowledge of free electron theory.

CO4: Understand the various models in statistical physics.

Quantum Mechanics, Nanomaterials and Nanotechnology:

CO1: Apply the Schrödinger equation.

CO2: Understand and apply the principle of wave mechanics.

CO3: Understand the size dependent properties of Nanomaterials.

CO4: Acquire fundamental understanding of integrated multidisciplinary nature of nanotechnology.

Relativity, Nuclear physics and Bio-physics:

CO1: Use a knowledge and apply it to various physical problems.

CO2: Understand the shell model of nucleus.

CO3: Understand the various models in Nuclear physics.

CO4: Acquire the basic knowledge of the membrane potential and Bio-instrumentation.

Electronics, Fiber optics, communication and Digital electronics:

CO1: Understand the classification of amplifiers.

CO2: Apply the principle of optical fiber.

CO3: Understand the concept of frequency modulation.

CO4: Acquire basic knowledge of binary addition and logic gates.

Program Specific Outcomes of Chemistry (Part of B.Sc. Program)

PSO1: Develops scientific temper, observe and understand critically while solving complex problems

PSO2: Acquire knowledge and able to communicate effectively through oral presentation, writing chemical reactions and graphical methods of learning.

PSO3: Develop proficiency during analytical solving of numerical problems, conversions and also in the use of mathematical applications.

PSO4: Helping students to create a better understanding and learning of concepts of chemistry, formulae, chemical relations and chemical reactions, principles and their applications.

PSO5: Exposed to experimental practical methods, their understanding, skill development in various techniques of experimentations.

Course Outcomes (COs) of Chemistry

Inorganic Chemistry I

CO1: Understand structure and write electronic configuration of an elements.

CO2: Interpret variation of periodic properties among groups and periods.

CO3: Bonding in ionic solid and S-Block elements.

CO4: Understand properties of p-Block elements and their changes. Draw the structure of various hydrides and oxides.

Physical Chemistry I

CO1: Understand the concepts of first law of thermodynamics along with their applications.

CO2:Solve the numerical on the thermo chemistry.

CO3:Identify andexplain ideal and non ideal gaseous conditions.

CO4: Differentiate solid, liquid and liquid crystals.

CO5: Understand some properties of liquid like surface tension, viscosity and refractive index.

CO6: Know the concepts and applications of adsorption and catalysis.

Organic Chemistry I

CO1: Understand the structure and bonding in organic molecule on the basis of hybridization. Knows about effects in organic compounds.

CO2: Explain about types of organic reactions. Able to interpret concept of optical activity.

CO3: Write IUPAC names of alkanes. Comes to know alkanes,cycloalkanes, dienes and their reactions.

CO4: Understand aromatic nature and properties of benzene.

Physical Chemistry II

CO1: Understand the concepts of first law of thermodynamics, entropy along with their applications.

CO2: Solve the numerical on free energy function and systems of variable composition.

CO3: Apply phase rule to one component and two components system.

CO4: Understand concepts of ideal and non-ideal liquid mixtures.

CO5: Understand basic concepts of nuclear chemistry along with their applications.

CO6: Identify orders of reaction. Understand concepts of theories of chemical kinetics.

Organic Chemistry II

CO1: Understand the concepts of orientation i.e. activating group and deactivating group and differentiate substitution, addition , elimination and rearrangement reaction.

CO2: Explain the preparation of monohydric alcohol, dihydric alcohol and trihydric alcohol and the effect of different reagent on alcohols.

CO3: Identify the nomenclature and structure of carbonyl compounds and know the different naming reaction in preparation and reaction of carbonyl compounds.

CO4: Explain the preparation of aliphatic and aromatic carboxylic acid and indentify the nomenclature, structure and properties of carboxylic acid.

CO5: Understand the properties and application of carboxylic acid and ester.

Inorganic Chemistry II

CO1: Understand the concepts of covalent bonds, loan pairs, orbital overlapping. Classify the bonding and antibonding molecular orbitals and explain the molecular orbital energy level diagram of C_2,N_2, O_2, HF, and CO.

CO2: Study the preparation of interhalogen compounds and other inorganic compounds. Classify the polyhalides on the basis of halogens.

CO3: Characterized the properties like electronic configuration, atomic and ionic radii, ionization potential, variable oxidation state, magnetic properties, colour, complex formation tendency of first transition series.

CO4: Identify the magnetic properties, colour, complex formation tendency of first transition elements. Classify the co-ordination compound on the basis of isomers.

CO5: Understand basic concepts of nuclear chemistry along with their applications. Identify orders of reaction. Understand concepts of theories of chemical kinetics.

Inorganic Chemistry III

CO1: Understand the nomenclature, structure and classification of coordination compounds.

CO2: Able to explain to explain magnetic properties of the coordination compounds. Explain the stability of Co-ordination compounds

CO3: Draw the Latimer and frost diagram of redox reactions. Identify the Oxidation and reduction reactions.

CO4: Understand the structure and properties of organometallic compounds. Identify the Hard and Soft acids and bases.

CO5: Understand the biological role of Na and K pump. Know the structure of Hemoglobin and Chlorophyll.

Physical Chemistry III

CO1: Understand second law of thermodynamics and Carnot's cycle.

CO2: Know the concepts of free energy functions

CO3: Understand galvanic cell and concentration cell. Get idea of nuclear models.

CO4: Understand rotational and vibrational spectroscopy. Understand ClasiusMosotti equation.

Organic Chemistry III

CO1: Explain preparation, properties of nitroalkane and nitroarenes. Write some named reactions of organic compounds of nitrogen.

CO2: Compare aromaticity and basicity of some heterocyclic compounds like furane, pyrrole,thiophene and pyridine.

CO3: Analyse quantitatively some elements like carbon, nitrogen, hydrogen, sulphur and halogens.

CO4: Get idea about synthesis, chemical reactions of organometallic compound of magneshium andzinc.Know the basic concepts of UV visible spectroscopy and Infrared spectroscopy.

Physical Chemistry IV

CO1: Explain preparation, properties of nitroalkane and nitroarenes. Write some named reactions of organic compounds of nitrogen.

CO2: Compare aromaticity and basicity of some heterocyclic compounds like furane, pyrrole, thiophene and pyridine.

CO3: Analyze quantitatively some elements like carbon, nitrogen, hydrogen, sulphur and halogens.

CO4: Get idea about synthesis, chemical reactions of organ metallic compound of magnesium and zinc. Know the basic concepts of UV visible spectroscopy and Infrared spectroscopy.

Inorganic chemistry IV

CO1: Explain and apply concepts of crystal field theory to the transition elements and their complexes.

CO2: Apply Jahn-Teller effect and selection rules to 3d –block elements and their complex.

CO3: Calculate magnetic moments of transition metal complexes. Understand thermodynamic and kinetic aspects of metal complexes.

CO4: Know basic concepts of colorimetery, spectrophotometry and separation techniques like chromatography, ion-exchange and solvent extraction. Understand preparation, properties of some inorganic polymer like silicones and phosphonitirilic halide

Organic chemistry IV

CO1: Discuss the preparation amino acids and peptides. Explain the physical properties of nucleic acids, fats ,oils and detergents.

CO2: Learned methods of preparations synthetic dyes. Explain thephysical properties of nucleic acids, fats ,oils and detergents.

CO3: Explain synthetic dyes, color and constitution.

CO4: Classification of carbohydrates. Discussed nuclear magnetic resonance.

Program Specific Outcomes of Mathematics (Part of B.Sc. Program)

PSO1: Enhances Logical thinking

PSO2: Develop problem solving technique

PSO3: Formulate and develop mathematical arguments in a logical manner

PSO4: Understand and evaluate hypothesis

PSO5: Apply mathematical methods and knowledge acquired to prove the hypothesis within their proper context.

Course Outcomes (COs) of Mathematics

Algebra and Trigonometry

CO1: Understand rank of matrix, solve system of linear equations by using matrices, find eigen values, eigen vectors and inverse of a matrix

CO2: Able to understand about nature of roots of equations, able to solve cubic equations, biquadratic equations and reciprocal equations

CO3: Able to understand De-Moivre's theorem, able to define circular, hyperbolic and inverse hyperbolic function and find relation between them

CO4: Able to understand concept of group, able to define subgroup, cosets, properties of group, understand Lagrange's theorem, find cycle and transformations of a given permutations

Calculus

CO1: Understand ϵ-δ definition of limit and continuity, apply Leibnit'z rule to find n^{th} derivative of function

CO2: Apply Maclaurin's Theorem and Taylor's Theorem to find series expansion of function, understand L'Hospital's Rule

CO3: Understand the concept of partial derivative of a function, apply Euler's Theorem to find partial derivative of homogenous function

CO4: Handle various methods of integration. Apply Reduction Formula

Geometry, Differential and Difference equation

CO1: Know about and find equations of sphere, cone and cylinder analytically

CO2: Understand types of first order differential equations and various methods of solving them

CO3: Determine solution of Higher order differential equation

CO4: Understand difference equation and find their solution

Vector calculus and Improper Integrals

CO1: Understand vector differentiation and apply their knowledge to find gradient, curl and divergence of a function

CO2: Understand evaluation of double and triple integral and their applications

CO3: Find surface integral, volume integral, understand Green's Theorem, Stoke's Theorem and Divergence Theorem and their applications

CO4: Understand the concept of Improper Integral

Advance Calculus, Sequence and Series

CO1: Understand and apply principles of mean value of theorems, Taylor's Theorem, Iterated Limits for functions of two variables

CO2: Understand the concept and applications of maxima and minima of functions of two variables

CO3: Use the knowledge of sequences

CO4: Use a knowledge of series, Geometric series and alternating series

Differential Equations and Group Homomorphism

CO1: Understand the properties of Bessel's and Legendre's Equations

CO2: Know the working principle of Laplace transform

CO3: Apply the knowledge of Laplace transform to solve differential equations

CO4: Understand the concept of Normal subgroup, Cyclic group, Quotient group and Group homomorphism

Partial Differential Equations and Calculus of Variation

CO1: Understand Pfaffian Equation and to find their solution

CO2: Solve Lagrange's form of Partial differential equation of first order

CO3: Solve Partial differential equations of higher order

CO4: Understand the concept of Functional and apply Euler's differential equation to extremise the functional

Mechanics

CO1: Understand Coplanar forces, virtual work, catenary and apply the knowledge of equilibrium of coplanar forces

CO2: Discuss velocity and acceleration along radial, transverse, tangential and normal directions

CO3: Discuss Mechanics of a particle and system of particles

CO4: Understand central force and its applications. Discuss equivalent one body problem

Analysis

CO1: Understand the concept of Fourier series

CO2: Understand the concept of Riemann-Steiltjes integral and its properties

CO3: Understand about Analytic function and construct analytic function

CO4: Explain about types of elementary transformations

Metric Space, Complex Integration and Algebra

CO1: Understand the concept of countability and metric spaces

CO2: Acquire the knowledge of compactness, connectedness

CO3: Understand the concept of ring

CO4: Acquire the knowledge of working of complex integration

Abstract Algebra

CO1: Acquire the knowledge of Group Automorphism, conjugacy relation

CO2: Understand the concept of vector spaces

CO3: Acquire the knowledge of Linear transformation

CO4: Understand the principle of associating matrix with linear transformation and linear transformation with matrix. Also the concept of Inner product space

Special Theory of Relativity

CO1: Understand basic principle of Newtonian Relativity and Eienstein's theory of relativity

CO2: Concept of relativistic velocity and transformation

CO3: Acquire knowledge of tensor analysis

CO4: Understand the concept of relativistic mass and energy, Maxwell's equations

Program Specific Outcomes of Electronic (Part of B.Sc. Program)

PSO1: The main objective of the Program is to provide enhanced skills to students enabling them to consider Electronics as a career and means of livelihood.

PSO2: The Program aims at familiarizing the students with the basic topics in Electronics

PSO3: The students will also receive inputs on the foundations of Electronics and Communications Technology and also have an exposure to the advancements in related areas

PSO4: To provide teaching-learning process in Electronic science that will make students competitive and innovative to adapt to needs of industry and higher learning

PSO5: At the end of the course, students develop problem solving skills and learn various concepts which help in developing logical tools and models used to solve various real life problems

Course Outcomes (COs) of Electronics

Electronic Components, Network Theorems

CO1: Understanding of basic components for working and applicability, Identification devices and instruments in LAB.

Fundamentals of Digital Electronics

CO1: Concept of Digital electronics, gates their functioning and logical application

Semiconductor Devices

CO1: Understanding of Semiconductor devices for working, characteristics and applicability, concept of amplification, control and power

Advanced Digital Electronics

CO1: Introduction to sequential logic, Flip-flop, registers and counter, IC based digital systems

OP AMP and Power Supply

CO1: Concept of feedback, ideal amplifier characteristics concept of OP-AMP, Design and working of DC regulator power supply

Electronic Circuit Design

CO1: Designing of electronics circuits, its conceptualization designing optimization, component selection and prototyping through Simulation

Analogue and Digital Techniques

CO1: Concept of Oscillators, Analog to Digital convertors and vice versa

Electronic Instrumentation

CO1: Analysis of transducers and standard system for various combination of sensors and processes

Electronics Communication

CO1: Technical know-how of communication system, EM wave propagation, Analog and digital communication

Fundamentals of Microprocessor

CO1: In depth understanding about Microprocessor

Programming in "C"

CO1: Enhancing programming ability and skills through C language

Microcontroller 8051

CO1: In depth understanding about Microcontroller and introduction to embedded systems

Program Specific Outcomes of Computer Science (Part of B.Sc. Program)

PSO1: Apply their knowledge & skills of computer science with an understanding of realistic constraints for the overall benefit of society.

PSO2: Design and analyze precise specifications of algorithms, procedures & interaction behavior.

PSO3: Select appropriate technique to tackle and solve problems in the discipline of information security management.

PSO4: Understand the concept of key area in computer science.

PSO5: Analyze and apply latest technologies to solve problems in the area of computer application.

PSO6: To developed the solution for the individual problems using the coding & or logical techniques and skill sets learnt/acquired in three years.

Course Outcomes (COs) of Computer Science

Programming in C

CO1: Analyse a given problem and develop an algorithm to solve the problem.

CO2: Develop conditional and iterative statements to write C programs

CO3: Use the 'C' language constructs in the right way Design, develop and test programs written in 'C'.

CO4: Understand the basic terminology used in computer programming

CO5: Write, compile and debug programs in C language.

CO6: Use different data types in a computer program.

CO7: Design programs involving decision structures, loops and functions.

CO8: Explain the difference between call by value and call by reference

CO9: Understand the dynamics of memory by the use of pointers and Structures.

CO10: Use different data structures and create/update basic data files.

Fundamentals of Information Technology

CO1: Ability to understand theory of Digital Design and Computer Organization to provide an insight of how basic computer components are specified.

CO2: An ability to understand the functions of various hardware components and their building blocks.

CO3: Ability to understand and appreciate Boolean algebraic expressions to digital design.

CO4: Understanding of sequential! Combinational circuits.

CO5: Understanding of realization of different combinational/sequential circuits.

CO6: Understanding of different stages of an instruction execution.

CO7: An in depth understanding of how different hardware components are related and work in coordination.

CO8: Ability to understand computer buses and input/output peripherals.

Object Oriented Programming using 'C ++'

CO1: Understand the difference between object oriented programming and procedural oriented language and data types in C++.

CO2: Program using C++ features such as composition of objects, Operator overloading, inheritance, Polymorphism etc.

CO3: Simulate the problem in the subjects like Operating system, Computer networks and real world problems.

System Analysis and Design

CO1: Extract and analyze software requirements specifications for different projects.

CO2: Develop some basic level of software architecture/design.

CO3: Define the basic concepts and importance of Software project management concepts like cost estimation, scheduling and reviewing the progress.

CO4: Identify and implement of the software metrics.

CO5: Apply different testing and debugging techniques and analyzing their effectiveness.

Data Structures

CO1: Access how the choices of data structure & algorithm methods impact the performance of program.

CO2: Solve problems based upon different data structure & also write programs.

CO3: Choose an appropriate data structure for a particular problem.

CO4: Implementation of recursive problem solution approach variety of real life application and game programming i.e. ToH, water jug problem etc.

CO5: Implementation for linear data structure like array, stack and linked list for different variety of application along with complexity of algorithm.

CO6: Implementation for non- linear data structure like tree and graph specific objective to different data model i.e. network hierarchical data base etc.

Operating Systems

CO1: Make students able to learn different types of operating systems along with concept of file systems. And used in operating system.

CO2: Students are able to choose appropriate CPU scheduling algorithms primitive & non primitive.

CO3: Provide student knowledge of memory management and deadlock handling algorithms.

CO4: Students are able to choose appropriate Disk scheduling algorithms

CO5: At the end of the course, implement various algorithms required for management, scheduling, allocation and communication used in Operating System.

Java Programming

CO1: Understanding of the principles and practice of object oriented analysis and design in the construction of robust, maintainable programs which satisfy their requirements;

CO2: Ability to implement, compile, test and run Java programs comprising more than oneclass, to address a particular software problem.

CO3: Demonstrate the principles of object oriented programming;

CO4: Demonstrate the ability to use simple data structures like arrays in a Java program.

CO5: Understand the concept of package, interface, multithreading and File handling in java.

Linux Operating System

CO1: Know the basic concepts of Linux operating System.

CO2: Familiar with Linux commands.

CO3: Understand open source and its flexibility of different distribution of operating system.

CO4: Create any type of server such as Apache server, Tomcat etc.

Visual Basic Programming

CO1: Design, create, build, and debug Visual Basic applications.

CO2: Explore Visual Basic‘s Integrated Development Environment IDE.

CO3: Implement syntax rules in Visual Basic programs.

CO4: Explain variables and data types used in program development.

CO5: Apply arithmetic operations for displaying numeric output.

CO6: Write and apply decision structures for determining different operations.

CO7: Write and apply loop structures to perform repetitive tasks.

CO8: Write and apply procedures, sub-procedures, and functions to create manageable.

Database Management System

CO1: Gain a good understanding of the architecture and functioning of database management systems as well as associated tools and techniques, principles of data modelling using entity relationship and develop a good database design and normalization techniques to normalize a database.

CO2: Understand the use of structured query language and its syntax, transactions, database recovery and techniques for query optimization.

CO3: Acquire a good understanding of database systems concepts and to be in a position to use and design databases for different applications.

Compiler Construction

CO1: Enable to understand fundamental aspects of automata theory and its application for compiler constructor.

CO2: Enable to recognize & understood different compiler construction tool available in market.

CO3: Master using lexical analyzer and parser generator tools.

CO4: Master building symbol tables and generating intermediate code.

CO5: Understand generating machine dependent & independent phases of compiler i.e front end, intermediate code generator & back end

CO6: Understand programming in Java.

CO7: Familiar with compiler architecture.

CO8: Familiar with register allocation.

CO9: Exposed to compiler optimization.

SQL AND PL/SQL

CO1: Have a broad understanding of database concepts and database management system software

CO2: Have a high-level understanding of major DBMS components and their function

CO3: Able to model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model.

CO4: Able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.

CO5: Able to program a data-intensive application using DBMS APIs.

Program Specific Outcomes of Botany (Part of B.Sc. Program)

PSO1: Enhance the knowledge of plant kingdom

PSO2: Develop the scientific knowledge of classification of plant

PSO3: Understand the structure and function of plants

PSO4: Understand and evolution of various phenomenon of physiology, ecology, genetics etc.

PSO5: Apply knowledge to solve the various Plant breeding and environmental problems

PSO6: Using scientific knowledge develop entrepreneur skills about biofertilizers, Nursery, gardening, landscaping and agriculture

Course Outcomes (COs) of Botany

Viruses, Prokaryotes, Algae and Biofertilizers

CO 1: Understand the general structure, functions and reproduction of Viruses, prokaryotes, Bacteria and Mycoplasma

CO2: Understand general characteristics, ultrastructure and economic importance of cyanobacteria and algae

CO 3: Life history of various genus of Algae

CO 4: To understand scope, commercial production and importance of Biofertilizer

Fungi, Lichen, Plant pathology, Bryophyta and Mushroom cultivation

CO 1: Understand General characteristics, Classification, economic importance of Fungi. Life history of various genus of fungi

CO 2: Understand the pathogenicity and control measures of various plant diseases and learn about lichens

CO 3: Understand General characteristics, Classification, economic importance of Bryophytes. life history of various genus of Bryophytes

CO 4: Understand techniques of Mushroom cultivation and its economical uses

Palaeobotany, Pteridophytes, Gymnosperms and Soil Analysis

CO 1: Understand concept of palaeobotany, its type and geological time scale

CO 2: Understand general characteristics, Classification and life history of various genus of Pterodophytes. And learn the concept of heterospory and seed habit and types of steel

CO 3: Understand General characteristics, Classification, economic importance of Gymnosperm. Life history of various genus of Gymnosperm

CO 4: Understand the types and physico-chemical properties of soil

Morphology of Angiosperms and Floriculture

CO 1: Understand the concept of root, stem and leaf morphology

CO 2: Understand the structure and types of typical flower and infloresence

CO3: Understand the structure and function of Gynoecium and types of fruits

CO4: Understand the commercial aspects of floriculture and its cultivation.

Angiosperm Systematics, Embryology and Indoor Gardening

CO 1: Understand angiosperms and botanical nomenclature

CO2: Understand the Classification of angiosperm and different families

CO3: Understand the process of pollination and fertilization

CO4: Understand the scope, importance of landscaping and indoor gardening

Angiosperm Anatomy and Horticulture

CO 1: Understand the tissue system

CO 2: Understand the Primary and Secondary growth in stem and roots

CO 3: Understand the concept of stem and leaf anatomy

CO4: Understand Scope and importance of Horticulture

Cell Biology, Plant Breeding, Evolution and Seed Technology

CO 1: Understand about structure and function of prokaryotic and eukaryotic cell

CO 2: Gain the knowledge regarding cell organelles, chromosome organization and cell division

CO 3: Understand the technique of plant breeding, biostatics and evolution

CO4: Understand the structure of seed and commercial aspects of seed technology

Genetics, Molecular Biology and Plant Nursery

CO 1: Understand the concept of Mendalism, interaction of genes, crossing over and linkage

CO 2: Gain the knowledge about mutation, chromosomal aberrations and the concept of DNA damage - repair

CO 3: Understand the structure, Replication of DNA and protein synthesis

CO4: Understand the techniques of preparation of nursery and its management

Biochemistry and plant physiology

CO 1: Able to understand properties, structure, classification and role of carbohydrate, lipids, amino acids and enzymes

CO 2: Able to gain knowledge regarding plant, water relation, water conduction and transport

CO 3: Understand the role and deficiency symptoms of Macro & Micronutrient and the concept of respiration

CO4. Understand concepts and mechanism of photosynthesis and Nitrogen metaboilsm

Plant Ecology I

CO 1: Understand the concept of ecology, climatic and edaphic factor

CO 2: Understand the concept of physiographic and biotic factors

CO 3: Gain the knowledge of Ecosystem, Autecology and synecology

CO 4: Understand the principal of phytogeography, climatic and phyotogegraphic region of India

Plant physiology -II and Biochemistry

CO 1: Understand the concept of growth and growth regulator, circadian rhythms and plants movements

CO 2: Able to gain knowledge about photoperiodism, vernalization, seed dormancy, plant defence and secondary metabolites

CO 3: Understand the process and application of plant tissue culture.

CO 4: Understand the concept of genetic engineering and DNA library

Plant ecology, Technique & Utilization of plants

CO 1: Understand the concept and types of plants succession and plant adaptation

CO 2: Able to understand regarding sources and solution of environmental pollution, natural resources & its conservation

CO 3: Understand principal, types and application of various techniques used in life science studies

CO4: Gain knowledge about morphology, utilization and importance of chemical constituents of some food, oil, fibers, spices, beverages, medicinal properties of important plants. Gain knowledge about branches and importance ethnobotany

Program Specific Outcomes of Zoology (Part of B.Sc. Program)

PSO1: Understand classification and basic concepts of Non-chordates and Chordates.

PSO2: Understand the nature, basic concepts and analyse the relationships among animals, plants and microbes in Ecology.

PSO3: Understand the nature, basic concepts of Physiology, Cell biology, Developmental biology, Genetics, Immunology and Molecular biology.

PSO4: Perform procedures as per laboratory standards in the areas of Biotechniqes, Bioinformatics, Microtechniqes, Biotechnology and Biostatistics.

PSO5: Understand the applications of biological sciences in Aquaculture and Entomology.

Course Outcomes (COs) of Zoology

Life and Diversity of Animals – Non chordates (Protozoa to Annelida)

CO1: Identify the general characters of Phylum Protozoa with its classification up to classes.

CO2: Describe structure, reproduction of Paramoecium and structure, life cycle of Plasmodium.

CO3: Understand mode of infection and control of Parasitic Protozoans of Man – Entamoeba , Trypanosoma, Giardia and Leishmania.

CO4: Classify Phylum Porifera with its general characters.

CO5: Describe structure, reproduction and development of Sycon and canal system in sponges.

CO6: Identifying the general characters of Phylum Coelenterata with its classification up to classes.

CO7: Describe structure, life cycle of Obelia and corals, coral reef formation.

CO8: Identifying the general characters of Phylum Helminthes with its classification up to classes.

CO9: Describing external morphology,reproductive system of Ascaris and life cycle of Ascaris.

CO10: Describing structure, life cycle of Taeniasolium and parasitic adaptations in helminthes.

CO11: Classifying Phylum Annelida and its general characters.

CO12: Describe morphology, digestive, urinogenital system of Leech and Trochophore larva, its significance.

CO13: Describe vermiculture and its importance.

Environmental Biology

CO1: Describe major zones of Atmosphere, its importance and composition of air.

CO2: Write the Global distribution of water and its Physico-chemical characteristics.

CO3: Explain types of rocks and formation of soil in detail.

CO4: Describe renewable and non- renewable energy sources.

CO5: Explain types of Ecosystem and pond ecosystem.

CO6: Write the Food chain, food web and ecological pyramids.

CO7: Describe energy flow in an ecosystem, Single channel, Y – shape and Universal model.

CO8: Describe biodiversity, its conservation and causes of reduction of biodiversity.

CO9: Write the wildlife conservation acts (1972 and 1984), introductory study of national parks and sanctuaries – Tadoba, Kanha, Bharatpur and Nagzira.

CO10: Describe Hot spots of biodiversity in India.

CO11: Write down the sources, effect and control measures of water pollution, noise pollution, air pollution, Acid rain, green house effect, ozone depletion and global warming

CO12: Describe the toxic effect of heavy metals (lead, cadmium and mercury) – Bioaccumulation and biomagnifications

Life and Diversity of Animals – Nonchordates (Arthropoda to Hemichordata)

CO1: Identify the general characters of Phylum Arthropoda and Echinonodermata with its classification up to classes.

CO2: Describe mouth parts, digestive system and reproductive system of Cockroach

CO3: Identify Mosquito, Housefly, Sandfly, Tse-Tse fly as insect vectors.

CO4: Describe crustacean larvae, Nauplius, Zoea, Megalopa and social behavior in honeybees.

CO5: Identify the general characters of Phylum Mollusca with its classification up to classes.

CO6: Describe morphology, digestive, respiratory and reproductive system of Pila.

CO7: Explain the process of pearl formation in Mollusca.

CO8: Describe molluscan larvae, Glochidium, Veliger, Echinoderm larvae, Bipinnaria and Auricularia.

CO9: Describe external features, digestive, water vascular system and locomotion in Starfish

CO10: Describe general characters of phylum Hemichordata, its phylogeny reproduction, Tornaria larva and affinities of Balanoglossus

Cell Biology

CO1: Explain ultra-structure of Prokaryotic and Eukaryotic cell.

CO2: Explain Structure of Fluid mosaic model of plasma membrane and its functions.

CO3: Describe ultra-structure and function of Endoplasmic reticulum and Golgi apparatus.

CO4: Explain ultra-structure of mitochondria and oxidative phosphorylation: Glycolysis, Kreb's Cycle, Electron transport chain and terminal oxidation.

CO5: Describe Structure, polymorphism and functions of Lysososme.

CO6: Describe Ultra-structure of nuclear membrane.

CO7: Explain structure and functions of nucleolus.

CO8: Describe the Structure, types of chromosome and structure of nucleosome, Lamp-brush and polytene chromosome.

CO9: Explain structure, types of Ribosome and Lake's model.

CO10: Write the Cell cycle, Mitosis, Meiosis and synaptonemal complex.

CO11: Describe the cellular ageing and cell death, Elementary idea of cancer and its causative agents.

Life and Diversity of Animals – Chordates (Protochordata to Amphibia)

CO1: Classify protochordata up to order and write down the general characters.

CO2: Write the Structure, digestive system, ascidian tadpole and retrogressive metamorphosis in Herdmania.

CO3: Explain Structure, digestive system, circulatory system, sense organs and protonephridia in Amphioxus.

CO4: Write the General characters of Petromyzon, Myxine, Salient features of Chondrichthyes, Osteichthyes and Origin of paired fins in fishes.

CO5: Describe Migration and Accessory respiratory organs in fishes.

CO6: Write the General characters Amphibia and classify up to order.

CO7: Describe Parental care and Neoteny in Amphibia.

CO8: Describe the Gametogenesis and type of eggs and Fertilization of egg

CO9: Explain Post fertilization development, Types of scales and Development of placoid scales in fishes.

CO10: Describe cleavage, blastulation and gastrulation in frog.

CO11: Describe the Fate map, Morphogenetic movements in gastrula of frog

CO12: Describe Development of respiratory organs and Aortic arches in frog

Life and Diversity of Animals – Chordates (Reptilia, Aves and Mammals)

CO1: Classify Reptiles based on temporal vacuities

CO2: Explain Poison apparatus, biting mechanism, snake venom and its importance

CO3: Describe Comparison of Ratitae and Caranitae, Flight adaptations and migration in birds

CO4: Write the general characters of Prototheria, Metatheria and Eutheria

CO5: Describe Darwinism and Neo-Darwinism

CO6: Write the Cursorial, Aquatic, Terrestrial, Fossorial and Volant adaptation.

CO7: Write the genetic basis of evolution with special reference to species, deme and variation.

CO8: Describe Caucasoid, Negroid, Mongoloid and Australoid races in man.

CO9: Describe Comparative account of aortic arches and heart in Reptiles, Birds and Mammals.

CO10: Explain Structure of hen's egg and development of chick up to premitive streak stage.

CO11: Describe the Development of extra embryonic membranes in chick and functions.

CO12: Describe Blastocyst, implantation in Mammals, Types of placenta on the basis of morphological and histological structure and functions of placenta.

CO13: Explain Sources, types of stem cells and their use in human welfare.

CO14: Write the diurnal and rhythmic behavior in bird, mammals and role of pheromones in reproductive behavior

Molecular Biology and Immunology

CO1: Explain structure of DNA, RNA, forms of DNA, types of RNA and properties of DNA, DNA and RNA as a genetic material

CO2: Describe Prokaryotic and eukaryotic gene structure.

CO3: Describe Bacterial transformation – Griffith's experiment, Conjugation in bacteria, Transduction.

CO4: Explain Semiconservative model, Meselson Stahl experiments.

CO5: Describe origin of replication, concept of replication, directionality of replication and Characteristics of genetic code, Wobble hypothesis.

CO6: Describe Transcription and Translation mechanism of protein synthesis.

CO7: Explain gene regulation model: Lac operon and tryptophan operon.

CO8: Describe Innate and acquired immunity, organs of the immune system.

CO9: Explain Structure, diversity, functions and types of antigen and antibody.

CO10: Explain Antigen-antibody interaction and B cell response, T cell response.

CO11: Describe Complement system and General account on cytokines, Cytokine related diseases.

CO12: Describe Autoimmune diseases and their treatment, AIDS and other immunodeficiency's

Applied Zoology-I(Aquaculture and Economic Entomology)

CO1: Describe the site selection and construction pre stocking and post stocking management of nursery, rearing and stocking ponds.

CO2: Explain breeding of fishes by bund, Chinese hatcheries, Induced breeding by hypophysetion and New generation drugs.

CO3: Explain polyculture, cage culture, sewage fed fish culture, integrated fish farming

CO4: Explain fish products, byproducts and Fish preservation.

CO5: Explain prawn culture and pearl culture.

CO6: Describe fabrication and setting up of aquarium, its maintenance and breeding of aquarium fishes.

CO7: Describe diseases caused by fungi, bacteria, protozoa and helminthes.

CO8: Describe Chemical control mode of action, merits and demerits.

CO9: Explain Biological agents – predators and parasites; merits and demerits.

CO10: Describe Life cycle, damage and control of Cotton spotted boll worm, Sitophilus oryzae, Muscanebulo and Stomoxyscalcitrans

CO11: Explain Types of Silkworm and Life cycle and rearing of mulberry silkworm, Bombyxmori and non mulberry silkworm (Tasar), Antheraeamylitta.

CO12: Explain coccon processing for silk fabric - coccon boiling, reeling, rereeling, winding, doubling, twisting and weaving.

CO13: Explain Types of honey bees. Life cycle, culture, movable frame hive, bee product and its economic Importance

CO14: Explain Lacciferlacca - Life cycle, Lac processing, Lac products and Economic Importance.

General Mammalian Physiology –I

CO1: Describe distribution, chemical nature of enzymes and general properties of enzymes

CO2: Classify the enzymes and explain factors affecting enzyme activity.

CO3: Describe structure and functions of digestive glands such as Salivary, Gastric, Intestinal, Liver and Pancreas

CO4: Explain gastrointestinal hormones and digestion, absorption of proteins, carbohydrates and lipids.

CO5: Describe fat soluble and water soluble vitamins, identifying sources, deficiency and diseases of vitamins.

CO6: Describe types, distribution and properties of respiratory pigments, mechanism of respiration and transport of O2 and CO2 .

CO7: Describing respiratory disorders and effects of smoking.

CO8: Describe composition, functions of blood and intrinsic, extrinsic factors involved in blood clotting.

CO9: Describe blood groups and Rh factor.

CO10: Explaining cardiac cycle, E.C.G. and Blood pressure.,

Applied Zoology –II (Biotechniques, Microtechnique, Biotechnology, Bioinformatics and Biostatistics)

CO1: Explain filtration, autoclaving, dry heat sterilization, wet sterilization and radiation

CO2: Explain Centrifugation and Chromatography.

CO3: Describe Agarose gel electrophoresis, SDS-PAGE.

CO4: Explain Principles of colorimeter and spectrophotometers.

CO5: Describe fixation, dehydration, clearing, embedding, section cutting and difficulties encountered during section cutting.

CO6: Describe double staining with Haematoxylin and Eosin.

CO7: Describe histochemical staining techniques for carbohydrate, proteins and lipids

CO8: Describe Basic concepts in recombinant DNA technology using shotgun cloning and DNA manipulation enzymes.

CO9: Describe Insertion of DNA and ligation using blunt ends, cohesive ends, Cloning vectors.

CO10: Explain Application of biotechnology for Insulin and vaccine production.

CO11: Explain basic concepts in bioinformatics, importance and role of bioinformatics in life sciences and types of databases used in bioinformatics.

CO12: Explain Nucleotide sequence databases, Elementary idea of protein databases.

CO13: Describe Tabulation of data, presentation of data, sampling errors, mean, mode, median, probability, standard error and standard deviation.

Program Specific Outcomes of Microbiology (Part of B.Sc. Program)

PSO1: Perform the basic techniques related to screening, isolation and cultivation of microorganisms from various sources.

PSO2: Study the microorganism with regard to morphology, cultural and biochemical characters. It will help to classify the microbes to certain extent.

PSO3: Follow the aseptic techniques and conduct the process of sterilization as well as perform the techniques to control the microorganism.

PSO4: Understand microorganisms and their relationship with the environment.

PSO5: Produce and analyze the microbial products at laboratory level.

PSO6: Conduct the basic research with these microorganisms and perform the diagnostic procedures required in food, milk and pharmaceutical industries.

Course Outcomes of Microbiology

Fundamentals of Microbiology

CO1: Have developed a good knowledge of the development of the discipline of Microbiology and the contributions made by prominent scientists in this field.

CO2: Describe characteristics of bacterial cells, cell organelles, cell wall composition and various appendages like capsules, flagella or pili.

CO3: Describe the nutritional requirements of bacteria for growth; developed knowledge and understanding that besides common bacteria there are several other microbes which grow under extreme environments

CO4: Understand the concept of microbial growth, its measurement and growth curves

Basic Techniques in Microbiology

CO1: Handling and use of microscopes for the study of microorganisms which are among the basic skills expected from a practicing microbiologist.

CO2: Have developed a very good understanding of the characteristics of different types of microorganisms, methods to organize/classify these into and basic tools to study these in the laboratory.

CO3: Principles which underlies sterilization of culture media, glassware and plastic ware to be used for microbiological work

CO4: Discuss various methods of sterilization and disinfection

Microbial Diversity

CO1: To study the characteristics of prokaryotic organisms

CO2: To study the characteristics of Eukaryotic organisms

CO3: Understood what are viruses and the chemical nature of viruses, different types of viruses infecting animals, plants and bacteria (bacteriophage)

CO4: Have developed a fairly good knowledge and understanding of different types of environments and habitats where microorganisms grow and there association

Food microbiology & Milk microbiology

CO1: Are able to describe the role of microorganisms in the production of food, its spoilage, including their role in homemade fermented foods.

CO2: Gain knowledge of preservation of food and protection aginst food borne diseases

CO3: Developed experimental skills for testing the milk and different foods for the presence of microorganism

CO4: Are able to identify the role of microorganisms in the causation of the diseases and how to protect against food-borne pathogens.

Chemistry of Organic Constituents and Enzymology

CO1: Classification, bonding structures and monomers of carbohydrates and lipids is explained

CO2: Classification of Amino acids, titration curves and their characteristics is explained at organizational level of protein and their characteristics are explained.

CO3: Definition, Nature of enzyme, classification, nomenclature is described in detail

CO4: Structure and various forms of nucleic acids and vitamins and classification are explained

Industrial Microbiology

CO1: Definition, scope and general concept of Industrial Microbiology is explained.

CO2: Student will be able to understand the method of development of strain and factors affecting fermentation process

CO3: Product recovery and quality analysis techniques

CO4: Biochemistry, recovery and uses of various microbial products are explained at industrial level

Metabolism

CO1: Process of Metabolism with various pathways is explained

CO2: Various methods of lipid oxidation Replication of DNA and special reference to prokaryotic transcription is explained

CO3: Various metabolic reactions with reference to amino acids is described Students are able to understand concept of Genetic code Prokaryotic translation is explained

CO4: Energy generation at various level in cellular metabolism is explained

Environmental Microbiology

CO1: Significance of bacteriological analysis of water and various methods use for water treatment are explained.

CO2: Various types of sewage is composition and characteristics along with sewage treatment is explained.

CO3: Student will be able to understand Techniques used for microbial analysis of air. Different microbes used in biofertilizers are explained.

CO4: Concept of bioremediation microbial leaching and biomagnification was studied

Medical Microbiology

CO1: Various definitions, cause of disease and Host-parasite relationship is explained

CO2: Mechanism of pathogenicity is explained with various examples

CO3: Study of systematic identification of microorganisms is explained with reference to Pathogenic microorganisms**.**

CO4: The principal of Drug designing and Drug Delivery system is described with reference to various antibiotics and anti-metabolite drugs.

Molecular Biology and Bioinstrumentation

CO1: Various terms and definitions are explained and mechanism of operon is explained

CO2: Various definition and concept along with methods of genetic recombination are explained

CO3: Principles and application centrifugation and electrophoresis are explained Student will be able to learn Principle, types and application of spectroscopy

CO4: Principle, types and application of chromatography are explained. Student will be able to learn different uses of isotopes Student will be able to understand Detection and Measurement of radioactivity.

Immunology

CO1: Various types of immunity are explained.

CO2: Various types of Immunity at cellular level.

CO3: Definitions, types and reactions of various antigen-antibody.

CO4: Various definitions, classification of hypersensitivity reaction are described.

Biotechnology

CO1: Various methods of gene manipulation are explained. Different types of enzymes are used in recombinant DNA technology are explained

CO2: Student will be able to understand Use of Genetic Engineering in the application of vaccines and hormones

CO3: Various aspects of biotechnology like protoplast fusion, Use of Genetic Engineering in the application of biopesticides and biofertilizer, Student will be able to understand ethics and hazards and biosensors

CO4: Student will be able to understand genetically Modified food Transgenic plants and animals are explained with oriental food like Soya sauce, Miso and sufu.

Program Specific Outcomes of Biochemistry (Part of B.Sc. Program)

PSO1: Chemistry of carbohydrates, lipids, fatty acids, proteins, amino acids, nucleic acids, porphyrins, hormones, cell, blood and it's components, nomenclature, regulation, action, diagnostic enzymes-SGOT, SGPT, LDH, acid and alkaline phosphatase enzymes.

PSO2: Bioenergetics, Laws of thermodynamics

PSO3: Chromatography, Electrophoresis, Spectroscopic and Radio isotopic techniques, application, chemistry of DNA, RNA molecules functions replication, transcription, translation, genetic code, electron transport chain, oxidative phosphorylation, glycolysis, Creb's cycle, Pentose phosphate pathway, Urea cycle, Beta oxidation of fatty acids. Synthesis and utilization of Ketone bodies, Purines and Pyrimidines. Some culture techniques of Viruses, Types of immunity antigen & antibody reactions.

Course Outcomes (COs) of Biochemistry

Biomolecules and human physiology

CO1: Define and describe carbohydrate & lipids and understand structural features along with its classification

CO2: Describe the structure of muscles, neuromuscular junction, and mechanism of membrane transport and calcium pump.

Microbiology and virology

CO1: Understand the basics of microbial world and microscopy applications in discovery of microbial world.

CO2: Apply the principles of different staining procedures for understanding morphological features of bacteria.

Human physiology

CO1: Describe mechanism of excretion and reproduction in detail in human physiology.

CO2: In hematology, able to discover composition of blood, blood groups, its function and structure of hemoglobin.

CO3: Describes the basic concepts of Neurobiology (structure of neuron, nerve fiber and mechanism of synapses)

CO4: In Endocrine, importance of endocrine glands, their hormones functions and secondary hormones.

Microbiology and immunology

CO1: In nutrition, learn about growth and nutritional requirement of bacteria and its classification based on various nutritional requirements and conditions

CO2: learn various modes of microbial control and its mechanism

CO3: Describe antigen, antibodies, monoclonal antibodies and & their applications. Also understand cellular and humoral immunity

Macromolecules

CO1: Able to understand basics of amino acids fundamental blocks of a protein and is importance in organization of primary, secondary, tertiary and quaternary structures.

CO2: Describe DNA structure and its molecular level interactions. Understands the basic principles of DNA sequencing.

CO3: Understand principle, working and applications of UV-Vis spectro-photometry.

Biophysical techniques

CO1: Describe the mechanism of buffer action, buffer capacity and titration curve of acids and amino acids.

CO2: Understand working of chromatography as bio-separation technique along with principle, setup and applications of various partition, adsorption and column chromatography including well advanced HPLC

Enzymology

CO1: Grasp basics of Enzymology and its classification along with the concept of isozymes, allosteric enzymes and metal ion catalysis.

CO2: Understand concept and applications of various enzyme kinetic reactions and assays

Biophysical and biochemical techniques

CO1: Able to understand principle, working and applications of various electrophoresis techniques. Agarose gel electrophoresis, PAGE, SDS-PAGE, Iso-electric focusing and pulsed field gel electrophoresis. Understand principle and applications of agglutination, precipitation, ELISA in disease diagnosis and importance of vaccination in detail

CO2: Brief concept, importance and role of stable and radioactive isotopes in isotopic tracer techniques.

CO3: Understand basic concept, principle and application of preparative and analytical centrifuge in detail as bio-separation technique

Metabolism-1

CO1: Learn bioenergetics specially related to ATP, phosphoenolpyaruate and creatine phosphate

CO2: Build background about various bioenergetic pathways such as glycolysis, gluconeogenesis, TCA cycle and their role in cellular metabolism

Molecular biology

CO1: Figure out Basics of DNA Replication, Transcription and translation processes in prokaryotes and eukaryotes in detail

CO2: Get knowledge of various mutagens and mutations and DNA repair mechanisms in response to it

CO3: Understand regulation of transcription and translation in prokaryotes along with Lac and Trp operon models

CO4: Learn about lipid metabolism related pathways such as β oxidation pathways, ketogenesis and biosynthesis of fatty acid chains

Metabolism -2

CO1: Understand metabolism of nitrogenous compounds by learning urea cycle, transamination and salvage pathway and its mutation related disorders

CO2: Acquire knowledge of recombinant DNA technology with role of various restriction enzymes, Ligases, Polymerases, Reverse Transcription and other DNA Modifying enzymes

Molecular biology and r-DNA Technology

CO1: Understand role of various plasmid, phagemid, cosmid, YAC, BAC vectors for making genomic, cDNA and expression vectors libraries

CO2: Become familiar with basics of PCR and its role as advanced genetic technique

Program Specific Outcomes of Biotechnology (Part of B.Sc. Program)

PSO1: Understanding of various biological systems to the student upto molecular level processes and to develop skill of various microbial, biochemical and advanced genetic techniques for its use in diagnosis, bioestimation and bioanalysis purposes

PSO2: Learn to develop skill of various microbial, biochemical and advanced genetic techniques for its use in diagnosis, bioestimation and bioanalysis purposes

PSO3: Learn biophysical, biostatistics and standard graph analysis that help them for research in their future studies

PSO4: Learn basic skills and knowledge for bioreactor technology, animal and plant tissue cultures and understand use of such techniques for human welfare

Course Outcomes (COs) of Biotechnology

Microscopy and Basics of Micro-organisms

CO1: Understand the basics of microbial world and microscopy applications in discovery of microbial world

CO2: Understand principle and applicability of different staining procedures for understanding different morphological features of bacteria and viruses

CO3: Understand generalized morphological features of bacteria and viruses in detail along with its various classification criteria

CO4: Learn different microbial growth microscopic methods to study bacteria and its different morphological features

Basics of Nucleic Acids and Protein

CO1: Understand basics of genetic organization of chromosome, gene and DNA structure and its molecular level interactions

CO2: Understand basics of amino acids a fundamental blocks of a protein and is importance in organization of primary, secondary, tertiary and quaternary structures

CO3: Learn colorimetric methods for quantitative estimation of proteins, DNA and RNA

Microbial Growth and Control

CO1: Understand growth and nutritional requirement of bacteria and its classification based on various nutritional requirements and conditions

CO2: Learn various modes of microbial control and its mechanism

CO3: Learn microbiological pure culture based methods

CO4: Learn effect of oligodynamics and antibiotic sensitivity assay in pure culture

Eukaryotic Cell

CO1: Understand morphological details of various subcellular structures of eukaryotic cells

CO2: Understand eukaryoticcelldivision along with specialized feature of neuromuscular junction

Basics of Carbohydrates and Lipids

CO1: Understand structural features of carbohydrates and lipids along with its classification in detail

CO2: Learn colorimetric methods for quantitative estimation of sugars

CO3: Learn to estimate acid value and saponification valueof lipids, assay based concentration of alkaline phosphates

CO4: Learn qualitative estimation of sugars

Basics of Enzymology

CO1: Understand basics of Enzymology and its classification along with the concept of isozymes, allostearic enzymes and metal ion catalysis

CO2: Understand various factors affecting enzymatic activity

CO3: Understand concept and applications of various enzyme kinetic reactions and assays

Bioenergetics and Metabolic Pathways

CO1: Learn bioenergetics specially related to ATP, phosphoenolpyaruate and creatine phosphate

CO2: Understand various bioenergetic pathways such as glycolysis, gluconeogenesis, TCA cycle and their role in cellular metabolism

CO3: Understand lipid metabolism related pathways such as β oxidation pathways, ketogenesis and biosynthesis of fatty acid chains

CO4: Understand metabolism of nitrogenous compounds by learning urea cycle, transmission and salvage pathway and its mutation related disorders

CO5: Learn how to use Spectrophotometric analysis for various biomolecules such as NAD and creatinin

Spectrophotometry and Chromatography

CO1: Understand principle, working and applications of UV-Vis spectrophotometry, IR spectroscopy, spectroflurometry, mass spectroscopy and flame spectrophotometry along with its importance as bioanalysis technique

CO2: Understand chromatography as bioseparation technique along with principle, setup and applications of various partition, adsorption and column chromatography including well advanced HPLC

CO3: Learn how to use Spectrophotometric analysis to determine concentration of DNA and protein

CO4: Learn use of Paper Chromatography and TLC use in separation of sugars and amino acids

Immunology

CO1: Understand human immune system with role of various organs and tissues in immunity along with innate and acquired immunity

CO2: Understand hypersensitivity types and immune disorders

CO3: Understand principle and applications of agglutination, precipitation, CFT, ELISA in disease diagnosis and importance of vaccination in detail

CO4: Learn the use of various antigen-antibody reactions such as blood grouping, Pergnancy test, Widal test, ELISA, Radial and Ouchterloney immunodiffusion

Electrophoresis, Radioactivity and Centrifugation as bioseparation and bioanalysis techniques

CO1: Understand principle, working and applications of various electrophoresis techniques such as Cellulose acetate electrophoresis, Agarose gel electrophoresis, PAGE, SDS-PAGE, Isoelectrifocusing and pulsed field gel electrophoresis

CO2: Understand concept, importance and role of stable and radioactive isotopes in isotopic tracer techniques

CO3: Understand basic concept, principle and application of preparative and analytical centrifuge in detail as bioseparation technique

CO4: Learn the skill for separation of proteins using isoelectric precipitation, PAGE and SDS-PAGE

Biostatistics

CO1: Understand concept and role of various central tendency measurements in biostatistics

CO2: Learn various biostatistics calculations such as mean, mode, median and standard deviation

Replication, Transcription and Translation

CO1: Understand DNA Replication, Transcription and translation processes in prokaryotes and eukaryotes in detail

CO2: Get knowledge of various mutagens and mutations and DNA repair mechanisms in response to it

CO3: Understand regulation of transcription and translation in prokaryotes along with Lac and Trp operon models

CO4: Learn the skill of isolation of DNA and RNA and determination of its concentration through UV Vis spectrophotometry

Recombinant DNA Technology

CO1: Understand basics of recombinant DNA technology with role of various restriction enzymes, Ligases, Polymerases, Reverse Transcription and other DNA Modifying enzymes

CO2: Understand role of various plasmid, phagemid, cosmid, YAC, BAC vectors for making genomic, cDNA and expression vectors libraries

CO3: Understand basics of PCR and its role as advanced genetic technique

CO4: Learn the skill of isolation of Genomic, Plasmid DNA and determination of its concentration through UV Vis spectrophotometry

CO5: Learn the skills of restriction digestion and ligation of the DNA

Waste Water Treatment and Industrial Biotechnology

CO1: Understand basics, importance and applications of water treatments and waste water treatment processes along with its assessment parameters

CO2: Understand problems associated with bioaccumulation and biomagnification of xenobiotic compounds towards ecosystem

CO3: Understand basics of industrial and food biotechnology along with cheese and mushroom production and importance and screening of GMOs for it

CO4: Understand quality assessment measures adoped in food and pharmaceutical industries

CO5: Learn microbial assessment methods such as IMViC, MF, DO for waer quality assessment

CO6: Learn methods to isolate azotobacter and Rhizobium

CO7: Learn assay of amylase as quality measure for industrial screening

Tissue Culture Technology: Basics and Application

CO1: Understand basic laboratory setup and establishment of various plant tissue culture and animal tissue culture methods

CO2: Understand use of vectors and genetic engineering technology for production of transgenic animals

CO3: Understand use of vectors and in vitro fertilization technology in production of transgenic animals

CO4: Understand industrial level production of Hepatitis B vaccine and medical important proteins using rDNA technology and Animal Tissue Culture

CO5: Understand basics of gene therapy and in vitro fertilization in humans

CO6: Learn Laboratory setup of callus, suspension and another culture

CO7: Learn skills to develop primary cell culture and maintenance of cell lines

Course Outcomes (COs) of Compulsory English (B.Sc.)

CO1: Illustrate the nature of literary forms like prose, poem and short stories.

CO2: Comprehend and compose the passages

CO3: Learn to apply different parts of grammar

CO4: Develop vocabulary skills

CO5: Learn to edit and summarize passages

CO6: Appropriate use of parts of speech

CO7: Learn to construct sentences from the given words

CO8: Drafting Application and Curriculum vitae

CO9: Learn to construct sentences from given phrasal verbs

Course Outcome (COs) of Supplementary English (B.Sc.)

CO1: Illustrate the nature and comprehend the short stories

CO2: Improve vocabulary by learning one word for a group of words

CO3: Introduction of foreign words in English and their application

CO4: Learn to construct sentences from given idioms and phrases

CO5: Improve essay writing skills

CO6: Learn to prepare email writeup

CO7: Draft official letters like application and complain letters

CO8: Learn to draft reports

CO9: Learn to make story from given guidelines

Course Outcome (COs) of Hindi (B.Sc.)

COS1: विद्यार्थियों मे हिंदी भाषा और उससे जुड़ी विधाओं जैसे कविता, कहानी, निबंध, पत्रलेखन, समाचार लेखन, रिपोर्ताज आदि के प्रति अभिरुचि उत्पन्न करते हुए अध्ययन हेतु प्रेरित करना।

COS2: शुद्ध एवंस्पष्टउच्चारण व शुद्ध वर्तनी के साथ षब्दज्ञानमेंवृद्धि कराना।

COS3: धाराप्रवाह काव्य पठनव गद्य पठन क्षमता में बढ़ोत्तरी का निर्माण कराना।

COS4: वाद–विवाद, भाषण आदि प्रस्तुति की योग्यता का निर्माण।

COS5: साहित्य के प्रति अभिरूचि उत्पन्न कराना।

COS6: विरामचिह्नों का उचित प्रयोग, व्याकरणिक नियमो तथा हिंदी के मानक रूपआदि की जानकारी देते हुए मूल साहित्यिक पाठों के अर्थ अभिग्रहण क्षमता का विकास कराना।

COS7: स्मूह चर्चा तथा विषय विष्लेषण के प्रति अभिरूचि उत्पन्न कराना।

COS8: विद्यार्थियों मे हिंदी भाषा के माध्यम से नैतिक चेतना, सामाजिक दायित्व बोध का निर्माण कराना।

Program Outcomes of M. Com.

Masters of Commerce student will be able to –

PO1: Develop comprehensive knowledge in different areas of commerce such as economics, business and trades.

PO2: Understand finance and other core business content.

PO3: Ability to start entrepreneurial activities.

PO4: Make students ready for employment in functional areas like Accounting, Taxation, Banking, Insurance and Corporate Law.

PO5: Inculcate team work, leadership and managerial skills.

PO6: Create interest towards pursuing professional courses such as CA/ CS/ CMA/CFA etc.

PO7: Provide an environment that facilitates all-round development of the student personality

Program Specific Outcomes of M. Com.

PSO1: To attain Eligibility for Joining Research

PSO2: To attain Eligibility for applying examinations like SET, NET etc.

PSO3: To attain Eligibility for joining professional courses in Teaching.

PSO4: To attain efficiency in accountancy and commercial skills.

PSO5: To Manage and maintain research-oriented activities.

Course Outcomes (COs) of M. Com.

Advanced Financial Accounting

CO1: Enable and equip the basic functions and tools of financial management.

CO2: Prepare students for NET/SET and Banking Exams.

CO3: Equip and train to accept the challenges of 21st Century.

CO4: Study and analyze the new industrial and commercial culture.

CO5: Make aware for acquiring the knowledge of specialized subjects.

Indian Financial System

CO1: Know the financial system and economic development

CO2: Familiarize with stock exchange functions

CO3: Study the merchant banking functions and services

CO4: Analyze the factoring services and depository system in India

CO5: Know the trend in Global financial market

Managerial Economics

CO1: Students will apply the concept of elasticity of demand.

CO2: Students will apply the supply/demand models for the analysis of economic events.

CO3: Student will analyze the concept of externalities in macro and micro applications.

CO4: Understand how to evaluate microeconomic conditions.

Marketing Management

CO1: Know the modern marketing concepts and evaluation

CO2: Study the consumer behavior

CO3: Analyze the product and price

CO4: Analyze the promotion mix

CO5: Explore the place mix and strategies decisions

Research Methodology

CO1: Fulfil the bank requirement of business research

CO2: Evaluate various research decisions

CO3: Know the methods of data collection

CO4: Study the analysis and interpretation of data

CO5: Familiarize report writing

Indirect Taxes

CO1: Know the basic methods and legal provisions of indirect taxes

CO2: Familiarize Central Excise Act 1944

CO3: Know the Tamil Nadu General Sales Tax Act 1959 and VAT

CO4: Study Service Tax Act 1994

CO5: Study Customs Act 1962

Entrepreneurship Development

CO1: Understand the institutional support to entrepreneur

CO2: Describe the Women Entrepreneur

CO3: Classify the challenges of women entrepreneur

CO4: Describe the Project management

CO5: Identify the evaluation of Project

Advanced Cost Accounting

CO1: Study the costing concept and methods

CO2: Analyse the unit cost and job costing

CO3: Know the process costing with normal and abnormal loss

CO4: Update the standard costing methods

CO5: Prepare the reconciliations statements.

Human Resource Management

CO1: Know the basic of human resources management

CO2: Analysis human resources planning

CO3: Familiarize recruitment and selection procedures

CO4: Study the trains methods and career development plan

CO5: Know the methods of wage and salary administration, compensation, plans

International Business Environment

CO1: Know the globalization concept

CO2: Familiarize political and social environment

CO3: Analyze the economic and technological environment

CO4: Study institutional environment

CO5: Identify legal and ecological factors affecting international business

E- Commerce

CO1: Know the E- commerce frame work

CO2: Familiarize with E- commerce and World Wide Web

CO3: Study the application of Electronic Data Interchange

CO4: Know the marketing on the internet¬ to study multimedia and digital video

Services Marketing

CO1: Know the services vision and mission

CO2: Study services positioning and differentiation

CO3: Familiarize service marketing mix

CO4: Analyze the customer focused services

CO5: Study the specific service marketing

Direct Taxes

CO1: Update the current finance tax planning

CO2: Know the provisions of Income tax act

CO3: Study various heads of incomes

CO4: Analyze the profit and gain from business or profession

CO5: Identify the various other serious of income and capital gain

Program Specific Outcomes of M. Sc. Botany

Targeted Graduate Attributes: Disciplinary Knowledge, Critical Thinking, Problem Solving, Analytical Reasoning, Communication Skills, Teamwork, Moral and Ethical Awareness

PSO1: Capable of demonstrating comprehensive knowledge and understanding of one or more branches of Botany (discipline) in detail and ability to think critical and clearly about the plant world.

PSO2: Ability to analyse and critical thinking of the basic concepts of different morphological, anatomical, reproductive, cytological, physiological molecular characters of the plants.

PSO3: After successful completion of the projects ability is developed to undertake supervised research, identification of research questions, critical analysis of the literatures and enhance research related skills in laboratory practices, which are tested in all forms of assessment.

PSO4: Develop the problem-solving capacity to identify and define the problem, generating alternative solutions, evaluating and selecting the best alternative, and implementing the selected solution.

PSO5: Professional skills such as identification and classification of all forms of plant kingdom, Gardening, Farming and other related career competencies that often are not taught (or acquired) as part of the Subject.

PSO6: Acquired the knowledge of biotic and abiotic factors, critical thinking of economics, aesthetic and biological importance of preserving local resources and reducing or eliminating the harmful impacts of manmade alterations and could take a step towards the conservation of nature and environmental awareness

PSO7: Ability to analyse the biological information by using different bio-informatics tools through ICT facilities and can compose the clear information through writing and other media on various digital platforms that can be assessed instantly.

PSO8: Ability to present data clearly in standard, academic language and present the information in a clear and concise manner which helps to improve the communication skills.

PSO9: Field tours and Excursions develop the ability to identify the plants and to know the real

habit and habitat of plant wealth which induces the capacity of working effectively as a team, formulating and inspiring vision.

PSO10: After understanding the plant science in detail, it enhance to think lifelong about the world around us, provide better opportunities and improve our quality of life

PSO11: Field tours and Ethanobotanical survey develop responsible behaviour and ability to engage in the intellectual life of the educational institution, and participate in community by various activities like mushroom cultivation, preparation of biofertilisers and other civic affairs.

PSO12: Capable of demonstrating the ability to identify ethical issues related with lntellectual Property Rights, copyright etc. and an ability to think about well-being of others, public safety.

Course Outcomes (COs) of M. Sc. Botany

(Low Correlation = L/1; Moderate Correlation = M/2; High Correlation = H/3)

	Course outcomes (COs)	**Program Outcomes (POs)**											
		Domain specific PSO				**Domain independent (PO)**							
	Course Name: Microbiology, Algae and Fungi	1	2	3	4	5	6	7	8	9	10	11	12
CO1	Ability to understand at the basic and advance levels of knowledge of general microbiology, bacteria, viruses and archebacteria.	H	L	-	-	-	-	-	-	-	L	-	-
CO2	Capability to critically analyze the criteria for classification of fungi, diversified habitats and its uses.	H	-	-	L	M	-	-	-	-	L	-	-
CO3	Ability to study the classification and identification of Fungi with evolutionary trends	H	-	-	-	M	-	-	-	-	L	-	-
CO4	Ability to study the classification and identification of Fungi with evolutionary trends	H	L	-	L	-	-	-	-	-	L	-	-
	Course Name: Bryophytes & Pteridophytes												
CO1	Understand the distribution and monographic studies of Bryophytes	H	M	-	-	-	-	-	-	-	L	-	-
CO2	Ability to read and analyse the different classes of Bryophytes	H	L	-	L	M	-	-	-	-	L	-	-
CO3	Understand the general characters and different classes of Pteridophytes	H	M	-	-	M	-	-	-	-	L	-	-
CO4	Ability to understand the evolutionary trends of Pteridolyta	H	L	-	L	-	-	-	-	-	L	-	-
	Course Name: Paleobotany and												

	Gymnosperms												
CO1	Ability to think and understand fossils formation, history, preservation and geological time scale	H	-	-	L	-	-	-	-	-	L	-	-
CO2	Understand the origin of gymnosperm, evolution and classification	H	L	-	-	-	-	-	-	-	L	-	-
CO3	Ability to read type studies of gymnosperms and analyze relationship of various gymnosperms	H	M	-	L	-	-	-	-	-	L	-	-
CO4	Ability to classify the gymnosperm. Also get the knowledge about their economic importance	H	L	-	L	M	-	-	-	-	L	-	-
	Course Name: Cytology and Genetics												
CO1	Capable of understanding comprehensive knowledge of major concepts, principles, theories and laws of inheritance and types of chromosomal inheritance patterns	H	L	-	-	-	-	-	-	-	L	-	-
CO2	Develop I earning methods of cytoplasmic inheritance and chromatin organization	H	-	-	-	-	-	-	-	-	L	-	-
CO3	Knowledge of population genetics	H	-	-	-	-	-	-	-	-	L	-	-
CO4	Understand the concept of mutation and epigenetics	H	-	-	-	-	-	-	-	-	L	-	-
	Course Name: Practical I: Algae, Fungi, Bryophytes												
CO1	To develop the skill of identification of Algae, fungi, bacteria, bryophytes	H	M	-	-	M	-	-	H	H	L	-	-
CO2	skill being developed to identify and classify the fungi into different classes	H	M	-	-	M	-	-	H	H	L	-	-
CO3	Capability to identify the disease caused by bacteria and fungi	H	M	-	-	M	-	-	H	H	L	-	-
CO4	Develop the ability to identify the bryophytes and to study its diversity	H	M	-	--	M	-	-	H	H	L	-	-
	Course Name: Practical II: Pteridophytes, Gymnosperms, Paleobotany, Cytology and Genetics												
CO1	Acquire knowledge and skills of identification of pteridophytes	H	M	-	-	H	-	-	H	H	L	-	-
CO2	Develop abilities to identify and classify gymnosperms	H	M	-	-	H	-	-	H	H	L	-	-
CO3	Identification of various types of fossils and their reconstruction	H	L	-	-	H	-	-	H	H	L	-	-
CO4	Enhance the experimental skills in cytology and develop the capacity to solve the genetic problem systematically	H	M	-	M	-	-	-	H	H	L	-	-
	Course Name: Seminar												
S1	Develop communication skills,												

	increase the leading ability and acquainted with the thorough knowledge of the topic												
	Semester II												
	Course Name: Plant Physiology and Biochemistry												
CO1	Ability to understand the concept of photosynthesis and respiration and enhance experimental skills	H	H	-	-	-	-	-	-	-	L	-	-
CO2	Capability to critically analyze the plant hormones and sensory biology	H	H	-	L	-	-	-	-	-	L	-	-
CO3	Develop the abilities on the aspects of enzymatic activities of different components in plants	H	H	-	-	-	-	-	-	-	L	-	-
CO4	Acquire knowledge and skills of different metabolic components	H	H	-	-	-	-	-	-	-	L	-	-
	Course Name: Plant Development and Reproduction												
CO1	Understanding the basic growth kinetics and growth patterns in plants	H	H	-	-	-	-	-	-	-	L	-	-
CO2	Capable to know the developmental processes occur in different parts of the plants	H	H	-	-	-	-	-	-	-	L	-	-
CO3	Learn various steps of the plant reproduction process and barriers in detail	H	H	-	-	-	-	-	-	-	L	-	-
CO4	Understanding the fruit development, senescence and program cell death	H	H	-	-	-	-	-	-	-	L	-	-
	Course Name: Cell and Molecular Biology-I												
CO1	Ability to understand the basic concept of cell wall and membrane architecture structure and their roles	H	H	-	-	-	-	-	-	-	L	-	-
CO2	Understanding of different cellular organelles and problem solving skills under various circumstances	H	H	-	-	-	-	-	-	-	L	-	-
CO3	Ability to know the structure of nucleus and the DNA and critically thinking of their importance in living cells	H	H	-	-	-	-	-	-	-	L	-	-
CO4	Understanding the concept of stress biology and ability to develop practical applications to overcome problems	H	H	-	-	-	-	-	-	-	L	-	-
	Course Name: Angiosperms-l and Ethnobotany												
CO1	Ability to learn and describe the basic structure of flowers, to identify and classify the plants based on their structure	H	H	-	-	L	-	-	-	-	L	-	-

CO2	Understanding and developing research related skills of the angiosperm taxonomy	M	L	-	L	-	-	-	-	-	L	-	-
CO3	Ability to read and analyze the taxonomic evidences and different tools for identification	H	M	-	L	-	-	-	-	-	L	-	-
CO4	Acquired the knowledge of biosystematics and ethnobotany	H	-	-	-	-	-	-	-	-	L	M	L
	Course Name: Practical-l: plant physiology, plant biochemistry, Plant Development & reproduction												
CO1	Ability to perform and test the enzymatic activities of different components	H	H	-	M	-	-	-	H	-	L	-	-
CO2	Develop the ability to isolate and analysis of different plant components	H	H	-	M	-	-	-	H	-	L	-	-
CO3	Ability to know the mechanism of the growth and differentiation of plant parts	H	H	-	L	-	-	-	H	-	L	-	-
CO4	Learn to use biomolecules for flower formation, seed setting and senescence effects and applying this knowledge in daily life	H	H	-	L	-	-	-	H	-	L	-	-
	Course Name: Practical-ll: Cell and Molecular Biology l, Angiosperms I												
CO1	Develop the skills to perform cell and molecular biology experiments	H	H	-	M	-	-	-	H	-	L	-	-
CO2	Develop the ability to apply the techniques of stress related problems in plants	H	H	-	M	-	-	-	H	-	L	-	-
CO3	Ability to identify and describe the morphological characters of different categories of plants	H	H	-	M	L	-	-	H	H	L	L	-
CO4	Develop the capacity to distinguish the plants on the basis of various angiospermic feature	H	H	-	M	L	-	-	H	H	L	L	-
	Course Name: Seminar												
S1	Create ability to manifest ideas and thoughts in writing and orally to communicate confidently their viewpoints	L	L	-	M	-	-	L	M	-	M	-	-
	Semester III												
	Course Name: Plant Ecology and Conservation Biology												
CO1	Understanding the concept of various types of vegetational organization, analysis of communities and their functions.	H	-	-	-	-	H	-	-	-	L	-	-
CO2	Understanding the structure and function of ecosystem and ability	H	-	-	-	-	H	-	-	-	L	-	-

	analyze productivity of various ecosystems												
CO3	Developing skills in environmental impact assessment, critical thinking of sustainable development of ecosystems, environmental	H	-	-	L	-	H	-	-	-	H	-	L
CO4	Use environmental resources with care and protect them from degradation	H	-	-	-	-	H	-	-	-	H	-	L
	Course Name: Angiosperms-ll												
CO1	Ability to read and analyze the different morphological characters for identification of plants at family level	H	H	-	-	-	-	-	-	-	L	-	-
CO2	Capability to critically analyze the characters for distinguishing the angiosperm plant groups	H	M	-	L	L	-	-	-	-	L	-	-
CO3	Study of ancestors of angiosperms and different IUCN categories of threat to bring awareness of their status in nature for conservation point of view	H	M	-	-	-	-	-	-	-	L	-	-
CO4	Understanding and analyzing the concept of plant biodiversity, its role, stability and its importance; to identlfy hotspots of plants	H	-	-	-	-	-	-	-	-	L	-	L
	Course Name: Elective -I												
	Molecular Biology and Plant Biotechnology - |											
CO1	Learning the mechanism of DNA replication, damage and repair at molecular level and factors responsible for damage	H	H	-	-	-	-	-	-	-	L	-	-
CO2	Understanding the recent techniques and tools of recombinant DNA technology and molecular probing	H	H	-	-	-	-	-	-	-	L	-	-
CO3	Learn to know the concept of polymerase chain reaction and rDNA techniques and its applications	H	H	-	L	-	-	-	-	-	L	-	-
CO4	Ability to use and analyse the concept of proteomics, genomics and various bioinformatics tools	H	H	-	-	-	-	H	-	-	L	-	-
	Reproductive biology of Angiosperms - I												
CO1	Understanding the structure of male reproductive parts-anther and its significance as experimental material	H	H	-	-	-	-	-	-	-	L	-	-
CO2	Ability to read, understand and analyze different functional aspects of pollen fertility and sterility and factors which influence them	H	H	-	L	-	-	-	-	-	L	-	-
CO3	Understanding the concept of megasporogenesis, types of embryo	H	H	-	-	-	-	-	-	-	L	-	-

	sac, nutritional aspects for growth of embryo sac												
CO4	Learn to know the different types of pollination and pollen-pistil interactions, ability to overcome Inco ta bil roblems in nts	H	H	-	-	-	-	-	-	-	L	-	-
	Advanced Phycology and Hydrobiology-I												
CO1	Ability to understand the molecular mechanism of biological nitrogen fixation, biofertilizer synthesis and their implications	H	H	-	-	-	-	-	-	-	L	-	-
CO2	Understand the application of biofertilizers using some important species of bacteria and cyanobacteria	H	-	-	-	-	-	-	-	-	L	-	-
CO3	Learn to know the characters of different classes of eukaryotic algae, economic uses of algae	H	L	-	-	-	-	-	-	-	L	-	-
CO4	Understanding about the industrial products from algae of marine and fresh water	H	-	-	-	-	-	-	-	-	L	-	-
	Paleobotany-I												
CO1	Ability to know about the basic of science of petrology	H	L	-	-	-	-	-	-	-	L	-	-
CO2	Understand the geological column, time scale and nomenclature	H	L	-	-	-	-	-	-	-	L	-	-
CO3	Learn to know about how the Land Turned Green and Evolution of Microphyllous plants	H	L	-	-	-	-	-	-	-	L	-	-
CO4	Understanding the Diversity of Devonian time flora	H	-	-	-	-	-	-	-	-	L	-	-
	Mycology and Plant Pathology-I												
CO1	Acquire the knowledge of general microbiology	H	-	-	-	-	-	-	-	-	L	-	-
CO2	Understanding the concept of mycorrhiza and medical mycology.	H	L	-	-	-	-	-	-	-	L	-	-
CO3	Ability to analyse the production of metabolites from fungi	H	L	-	L	-	-	-	-	-	L	-	-
CO4	Understanding the commercial uses of fungi for human welfare.	H	-	-	-	-	-	-	-	-	L	-	L
	Plant Physiology -I												
CO1	Understanding the plant growth and development in detail	H	H	-	-	-	-	-	-	-	L	-	-
CO2	Ability to read and analyse the growth regulators, inhibitors and their commercial applications	H	H	-	-	-	-	-	-	-	L	-	L
CO3	Develop the ability to know the concept of different aspects of seed physiology and its commercial applications	H	H	-	-	-	-	-	-	-	L	-	L

CO4	Ability to understand the basic concepts of stress physiology and its applications	H	H	-	-	-	-	-	-	-	L	-	-
	Palynology-I												
CO1	Understanding the general aspects of palynology	H	M	-	-	-	-	-	-	-	L	-	-
CO2	Learn pollination biology and the concept of paleopalynology and its applications	H	M	-	-	-	-	-	-	-	L	-	-
CO3	Understand the pollen morphology of angiosperms and identifying different types of pollen under light and Electron microscopy	H	M	-	-	-	-	-	-	-	L	-	-
CO4	Learn and analyze the concepts of melittopalynology, analysis of honey quality and adulteration from commercial aspect.	H	M	-	-	L	-	-	-	-	L	-	L
	Course Name: Foundation -I												
CO1	Skills being developed typically form part of the typical vocations requirements	H	-	-	L	M	-	-	-	-	M	M	L
CO2	Enhance understanding the world around us, provide better opportunities and improve our quality of life	H	-	-	-	M	-	-	-	-	M	M	-
CO3	Career competencies that often required as part of the subject	L	-	-	-	M	-	-	-	-	M	M	-
CO4	Creating and maintaining a positive attitude to learning both for personal and professional development	L	-	-	-	-	-	-	-	-	M	M	-
	Course Name: Practical I: Plant Ecology and Conservation Biology and Angiosperms II												
CO1	Develop the ability to perform ecological experiments and build up the skill of solving biostatistical problems systematically	H	-	-	M	-	H	-	H	H	L	-	-
CO2	Ability to learn and apply the knowledge of conservation methods	H	-	-	L	-	H	-	H	M	L	-	-
CO3	Capability to identify and classify plants properly by regular field visits	H	M	-	M	M	-	-	H	H	L	-	-
CO4	Develop the ability to use floras and herbarium for plant identification	H	M	-	M	M	-	-	H	L	L	-	-
	Course Name: Practical-ll : Elective												
	Molecular Biology and Plant Biotechnology-I												
CO1	Ability to develop the skills by performing the techniques of molecular biology experiments	H	H	-	M	-	-	-	H	-	L	-	-
CO2	Ability to use the different bioinformatics tools for analysing	H	H	-	M	-	-	H	H	-	L	-	-

	molecular biological data												
CO3	Developing skills to perform the techniques of rDNA technology	H	H	-	M	-	-	-	H	-	L	-	-
CO4	Ability to develop plants in the laboratory by plant tissue culture techniques and commercial applications for micropropagation	H	L	-	M	-	-	-	H	-	L	-	-
	Reproductive Biology of Angiosperms -l												
CO1	Ability to study the microtome permanent preparations of reproductive parts	H	L	-	M	-	-	-	H	-	L	-	-
CO2	Develop the skill to perform the different techniques of pa lynological experiments	H	L	-	M	-	-	-	H	-	L	-	-
CO3	Develop the skill to perform the different techniques of embryological experiments	H	L	-	M	-	-	-	H	-	L	-	-
CO4	Ability to perform plant tissue culture techniques	H	L	-	M	-	-	-	H	-	L	-	-
	Mycology and Plant Pathology - I												
CO1	Acquired the knowledge of drawing Camera Lucida diagrams and computer-based photomicrography	H	L	-	M	-	-	-	H	-	L	-	-
CO2	Ability to isolate and identify the fungi from mycoflora	H	L	-	M	-	-	-	H	L	L	-	-
CO3	Ability to identify the plant diseases caused by various pathogens and its remedies	H	L	-	M	-	-	-	H	H	L	-	-
CO4	Develop the ability to identify and prepare the herbarium of pathological specimens	H	L	-	M	-	-	-	H	L	L	-	-
	Advanced Phycobiology and Hydrobiology-I												
CO1	Develop the ability to isolate, culture and identify the different types bacteria	H	L	-	M	-	-	-	H	L	L	-	-
CO2	Develop the ability to isolate, culture and identify the different types cyanobacteria	H	L	-	M	M	-	-	H	L	L	-	-
CO3	Develop the ability to identify the different types algae belongs to Protochlorophyta, Chlorophyta, Charophyta, Xanthophyta, Bacillariophyta	H	L	-	L	M	-	-	H	L	L	-	-
CO4	Develop the ability to identify the different types algae belongs to Pheophyta and Rhodophyta	H	L	-	L	M	-	-	H	L	L	-	-
	Paleobotany - I												
CO1	Learn the techniques to study fossils	H	L	-	M	-	-	-	H	L	L	-	-

CO2	Develop the ability to Study of different rocks	H	L	-	M	-	-	-	H	M	L	-	-
CO3	Study of Geological column and time scale	H	L	-	-	-	-	-	H	-	L	-	-
CO4	Ability to observe the different types of fossils.	H	L	-	L	-	-	-	H	M	L	-	-
	Plant Physiology -I												
CO1	Learn the techniques of estimation of different secondary metabolites from plants	H	M	-	M	-	-	-	H	-	L	-	-
CO2	Demonstration of effects of different plant growth regulators for commercial purpose	H	L	-	L	-	-	-	H	-	L	-	-
CO3	Ability to critically analyse the effects of different chemicals on seed germination by breaking seed dormancy	H	M	-	M	-	-	-	H	-	L	-	-
CO4	Ability to critically analyse the effects of different radiations on seed germination and seedling growth	H	M	-	M	-	-	-	H	-	L	-	-
	Palynology – I												
CO1	Skill of field study on different pollination mechanism	H	M	-	L	-	-	-	H	L	-	-	-
CO2	Ability to perform different techniques to study the pollen morphology	H	L	-	M	-	-	-	H	-	L	-	-
CO3	Perform the experiments of aero-palynology, melittopalynology and paleopalynology	H	L	-	M	-	-	-	H	-	L	-	-
CO4	Ability to analyse the different techniques to study the pollen physiology and ecology of various plants	H	L	-	M	-	-	-	H	-	L	-	-
	Course Name: Seminar												
S1	Ability to improve language and subject communicating skills effectively	L	L	-	M	-	-	L	M	-	L	-	-
	Semester IV												
	Course Name: Cell and Molecular Biology-II												
CO1	Ability to understand the concepts of transcription and translation in prokaryotes and eukaryotes at molecular level.	H	H	-	-	-	-	-	-	-	L	-	-
CO2	Understanding and analyzing the different concepts of genes and regulation of gene expression	H	H	-	-	-	-	-	-	-	L	-	-
CO3	Ability to know the genome organization, genetic recombination and mapping in various organisms	H	H	-	-	-	-	-	-	-	L	-	-
CO4	Understanding the concept of signal	H	H	-	-	-	-	-	-	-	L	-	-

	transduction and different techniques in cell biology												
	Course Name: Plant Biotechnology and Plant Breeding												
CO1	Ability to analyse the concept of recombinant DNA technology and genetic engineering of plants	H	H	-	-	L	-	-	-	-	L	-	-
CO2	Understand the concept of genomics and proteomics	H	H	-	-	-	-	-	-	-	L	-	-
CO3	Learn to know the different aspects of Plant tissue culture techniques and transgenics production	H	H	-	L	L	-	-	-	-	M	-	-
CO4	Ability to analyse the different aspects of bioinformatics and methods of plant breeding	H	H	-	L	L	-	H	-	-	H	-	L
	Course Name: Elective -II												
	Molecular Biology and Plant Biotechnology - ll												
CO1	Learn to know the production and applications of transgenics.	H	H	-	L	L	-	-	-	-	M	-	-
CO2	Understanding transgenics and application of transformation and molecular farming	H	H	-	-	-	-	-	-	-	M	-	-
CO3	Learn to know the advanced aspects and techniques of Plant tissue culture in details	H	H	-	-	-	-	-	-	-	M	-	-
CO4	Ability to analyse the concept of DNA fingerprinting, marker assisted breeding and cleaner biotechnology and its applications	H	H	-	-	-	M	-	-	-	M	-	-
	Reproductive Biology of Angiosperms -II												
CO1	Understanding the mechanism of fertilization in angiosperms	H	H	-	-	-	-	-	-	-	L	-	-
CO2	Ability to read and analyse the concept of embryogenesis and polyembryony	H	H	-	-	-	-	-	-	-	L	-	-
CO3	Understanding the concept of apomixes, parthenocarpy and scope of biotechnology	H	H	-	-	-	-	-	-	-	L	-	-
CO4	Learn to know the advanced aspects of Plant tissue culture techniques in reproductive biology	H	H	-	-	L	-	-	-	-	M	-	-
	Advanced Phycology and Hydrobiology - II												
CO1	Ability to understand the basic concept of algal physiology and their cultivation	H	H	-	-	L	-	-	-	-	M	-	-
CO2	Learn to know about different physico-chemical factors of some freshwater and marine ecosystems	H	H	-	-	-	-	-	-	-	L	-	-

CO3	Understand the phytoplanktons and identifying various components of phytoplanktons.	H	L	-	L	-	-	-	-	-	L	-	-
CO4	Ability to read and analyse the ecology and environmental biotechnology of freshwater and marine community	H	L	-	-	-	-	-	-	-	L	-	-
	Paleobotany-II												
CO1	Ability to understand Progymnospermopsida, the characters Gymnospermopsida of and Palaeozoic gymnosperm	H	H	-	-	-	-	-	-	-	-	-	-
CO2	Ability to know about diversification in primitive gymnosperm	H	L	-	-	-	-	-	-	-	-	-	-
CO3	Learn to know about the concept of Deccan lntertrappean flora of lndia and floristic composition in relation to Pteridophytes, Gymnosperms and angiosperms	H	L	-	-	-	-	-	-	-	-	-	-
CO4	Ability to understand about paleopalynology, paleoecology and paleogeography and its commercial applications	H	L	-	-	-	-	-	-	-	-	-	-
	Mycology and Plant Pathology - II												
CO1	Acquired the knowledge of milestones in phytopatyhalogy of India	H	-	-	-	-	-	-	-	-	-	-	-
CO2	Understanding the principles of plant pathology	H	H	-	-	-	-	-	-	-	L	-	-
CO3	Ability to analyse the diseases caused by fungal pathogens with effective control measures.	H	H	-	-	-	-	-	-	-	L	-	-
CO4	Understanding the plant diseases caused by bacteria, virus, mycoplasma and nematode and their remedies.	H	H	-	-	-	-	-	-	-	L	-	-
	Plant physiology -II												
CO1	Ability to analyse the structure and role of secondary metabolites in plants	H	H	-	-	-	-	-	-	-	-	-	-
CO2	Ability to use the knowledge of leaf protein, industrial fermentation and biodiesel fermentation for field applications	H	H	-	-	-	-	-	-	-	M	-	-
CO3	Develop the ability to know the concept of neuro or electro physiology and signal transduction in plants	H	H	-	-	-	-	-	-	-	-	-	-
CO4	Ability to understand the basic concepts of nanobiotechnology and its importance	H	H	-	-	-	-	-	-	-	-	-	-
	Palynology - II												
CO1	Understanding the concept of pollen physiology and biochemistry.	H	H	-	-	-	-	-	-	-	-	-	-

CO2	Learn pollen biotechnology for crop improvement and forensic palynology.	H	M	-	-	-	-	-	-	-	M	-	-
CO3	Understand the concept of aerobiology and its applications	H	L	-	-	-	-	-	-	-	-	-	-
CO4	Learn and analyse the air borne allergens and diagnosis of allergic diseases	H	L	-	-	-	-	-	-	-	-	-	-
	Foundation - II												
CO1	Learn new things which helps in social change and other life-affirming endeavors	H	-	-	-	M	-	-	-	-	L	-	-
CO2	Ability to transfer such skills in other domains of one's life and work	H	-	-	-	M	-	-	-	-	M	-	-
CO3	Ability to retain and build on critical reading skills	L	-	-	-	-	-	-	-	-	L	-	-
CO4	Develop some entirely new skills in plant science that will help in some way to enhance life style.	M	-	-	-	H	-	-	-	-	H	-	-
	Course Name: Practical-l: Cell and Molecular Biology-ll, Plant Biotechnology and Plant Breeding												
CO1	Learn to develop skills in molecular biology experiments for protein and DNA isolation, separation, purification and applications	H	H	-	M	-	-	-	H	-	L	-	-
CO2	Ability to perform in vitro Transcription, Translation and Conjugation	H	H	-	M	-	-	-	H	-	L	-	-
CO3	Abllty to study immunological techniques for diagnosis and disease identification.	H	H	-	M	-	-	-	H	-	L	-	-
CO4	Ability to learn the techniques of chromatography for analyzing biomolecules	H	H	-	M	-	-	-	H	-	L	-	-
	Course Name: Practical-II: Project												
CO1	Capable of self-paced and self-directed learning aimed at improving practical knowledge and research skills and problem solving ability	H	H	H	H	-	-	-	L	-	M	-	-
CO2	Ability of intensive search, investigation, and critical analysis, usually in response to a specific research question or hypothesis.	H	H	H	H	-	-	-	H	L	M	-	-
CO3	Research literature survey and other research tasks are expected to develop a degree of creativity, originality to students are encouraged	H	M	H	H	L	-	L	L	-	M	-	-
CO4	Enhance skills in research and analysis, which are tested in all forms	H	L	H	H	-	-	-	H	-	M	-	-

	of assessment												
	Course Name: Seminar												
S1	Ability to speak and present data clearly in standard academic language form	L	L	-	L	-	-	L	M	-	M	-	-

Program Specific Outcomes of M. Sc. Chemistry

PSO1: Chemistry Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of chemistry, including specialized areas of inorganic chemistry, organic chemistry, physical chemistry, analytical chemistry, and elective subjects of nuclear chemistry, medicinal chemistry, polymer chemistry and environmental chemistry.

PSO2: Problem analysis and Modern tool usage: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions. Find, analyze, evaluate and apply information system atically and to make defosbledec is ion s. Learn, select, and apply appropriate methods and procedures resources, and modern chemistry-related to computing tools with an understanding of the limitations.

PSO3: Environment and sustainability: Understand the impact of the professional chemistry solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development

PSO4: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-access and use feedback effectively from others to identify learn in needs and to satisfy these needs on an ongoing basis

PSO5: Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and teambuilding when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory role as responsible citizens or leadership role appropriate to facilitate improvement in heath and well beings.

PSO6: Professional Identity: Understand, analyze and communicate the value of the in professional roles in society (e.g. environmental professionals, analytical professionals, educators, researchers, employers, employees).

PSO7: Communication: Communicate effectively with the society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

Course Outcomes (COs) of M. Sc. Chemistry

(Low correlation- L/ l, Moderate correlation- M/2, High correlation- H/3)

	Course Outcome	Program Outcome						
		Domain Specific (PSO)				Domain Independent (Po		
	Course name: Inorganic Chemistry (CH-1T1)	1	2	3	4	5	6	7
CO1	Be able to predict the geometry of individual molecules or complexes	H	H	-	M	-	M	-
CO2	Be able to understand the complex formation equilibria in solution and to know unusual methods to the study of reaction rates.	H	L	-	M	-	M	-
CO3	Be informed with boron hydrides, or polyboranes which are the original cluster compounds as well as the first known family of electron-deficient compounds.	H	L	L	M	-	M	-
CO4	Be able to study of clustering of metal atoms.	H	M	L	M	-	M	-
	Course name: Organic Chemistry (CII-lT2)							
CO1	Be able to understand the applicability of concepts like delocalized bonding, conjugation, cross conjugation, resonance, in various carbon containing COM and develop the understanding of the reactive intermediates.	H	M	M	M	-	M	-
CO2	Be able to study optical activity in compounds without chirality and analyse stereochemical aspects involved in various compounds and the corresponding chemical reactions.	H	H	M	M	-	M	-
CO3	Be able to reactions and understand mechanisms of various substitution nucleophillic reaction and get basic knowledge about the anchimcric assistance and isotope effects	H	L	M	M	-	M	-
CO4	Be able to understand mechanisms of various Aromatic nucleophillic and electrophillic substitution reactions and get acquainted with associated outcomes like	H	L	-	M	-	M	-

	resonance, field, steric effects & its quantitative treatment.							
	Course name: Physical Chemistry (CH-lT3)							
CO1	Get acquainted with various laws of thermionics and its applications.	H	H	-	M	-	M	-
CO2	Be able to understand partial molar quantities, its determination and reduced phase rule in various comenttems	H	H	-	M	-	M	-
CO3	Be able to recapitulation of terms of surface tension and different adsorption isotherms and be able to validate the newly developed analytical method as rvcll as rted methods	H	M	L	M	-	M	-
CO4	Able to propose some new methods or modify existing methods of qualitative and quantitative analysis.	H	L	L	M	-	M	-
	Course name: Analytical Chemistry (CH-lT4)							
CO1	Get acquainted with various terminology and fundamentals of analytical chcrris including classical and instrumental methods.	H	H	-	M	-	M	-
CO2	Reca itulate the tion techni ues like chromato h	H	M	L	M	-	M	-
CO3	Be able to explain analytical techniques in terms of the working principles of volumetry , and gravimetry	H	H	-	M	-	M	-
CO4	Able to propose some new methods or modify existing methods of qualitative and quantitative analysis.	H	M	L	M	-	M	-
	Course name: Practical Inorganic Chemistry (CH-1P1)							
CO	Be able to understand the basic principles involved in separation and estimation of acidic and basic radicals and be able to apply the knowledge in real sample analysis for quantitative estimation as well as qualitative detection and also be able to assign a numerical value to variables by the quantitative analvsts is to reflect reality mathematically.	H	H	L	M	-	L	L

	Course name: Practical Physical Chemistry (CH-1P2)							
CO	Be able to understand the principles of physical chemistry and interpret them through small experimental performances.	H	H	L	M	-	M	L
	Course name: Seminar (1Sl)							
CO	On completion of seminar, the student will be in a position to present the topic in front of subject audience that will enhance confidence level and lead to personality development.	H	L	L	H	L	M	H
	Course name: Inorganic Chemistry (CH-2Tl)							
CO1	Will be able to understand the origin of colors in complexes and their magnetic behavior.	H	H	L	M	-	M	-
CO2	Develop ability to understand various reactions of transition metal complexes	H	L	-	M	-	M	-
CO3	Will know the concept of bonding in various metal carbonyls	H	L	-	M	-	M	-
CO4	Will be able to know chemistry behind the metal nitrosyls.	H	L	-	M	-	M	-
	Course name: Organic Chemistry GH-TZ)							
CO1	Be able to acquire knowledge and understand applicability of carbon-carbon multiple bond and carbon-hetero atom multiple bond addition reaction and develop understanding of reaction mechanism in metal hydride reduction	H	M	-	M	-	M	-
CO2	Be able to analyse various mechanism of molecular rearrangement and concept of elimination reactions.	H	H	-	M	-	M	-
CO3	Be able to understand free radical reactions	H	M	L	M	-	M	-
CO4	Be able to comprehend various aspects of green chemistry	H	M	H	M	-	M	-
	Course name : Physical Chemistry (CH-2T3)							

CO1	Be able to understand the eigen value and eigen lunction and application o er wave function to various s I schrodin stems.	H	H	-	M	-	M	-
CO2	Be able to determine the active coefficients and ionic strength.	H	H	-	M	-	M	-
CO3	Able to identify S ITII]'IC elements in tals.	H	H	-	M	-	M	-
CO4	Get the knowledge about various statistics and understand wor counters.	H	M	-	M	-	M	-
	Course name: Analytical Chemistry (CH-?T4							
CO1	Be able to understand the working principles and techniques in methods of analysis.	H	H	-	M	-	M	-
CO2	Be able to explain the advantages of modern methods over the classical ones	H	L	-	M	-	M	-
CO3	Apply the principles of spectroscopic techniques in the qualitative and quantitative anal is of various samples	H	H	M	M	-	M	-
CO4	Be able to develop their own methods for quantitative analysis of metal ions us instrumental methods.	H	H	-	M	-	M	-
	Course name: Practical Organic Chemistry (CH-2Pl)							
CO	Be able to perform the qualitative analysis of organic binary m get hands on training for the synthesis of commercially important organic compounds stn le and lwo s o anlc mixture and be able to	H	H	L	M	-	L	L
	Course name: Practical Analytical Chemistry (CH-2P2)							
co	Get expertise in titrimetric analysis based on neutralization, rcdox, prec and complexometric analysis, gravimetric estimation of barium and calcium, separation technique of paper chromatography and electroanalytical techniques as ipitation Potentiomet . conductometer and optical methods like colormetry	H	H	M	M	-	L	L
	Course name: Seminar (2S 1)							
CO	On completion of seminar, the student will have an	H	M	L	H	L	M	H

	improved knowledge about the subject and will be in a sition to resent the to ic more confidently							
	Course name: Inorganic Chemistry Special paper-I (CH-3Tl)							
CO1	Be able to understand the role of various essential and trace metals in biolochemical and also medicinal use of metals and metal com lexes.	H	L	H	M	-	M	-
CO2	Be able to develop knowledge of energetics involved in bio molecules.	H	L	M	M	-	M	-
CO3	Be able to explain the structure and functions of different biomolecules including storage and transport of dioxygen in them.	H	L	H	M	-	M	-
CO4	Know the principle and role of various metals in coenzyme molecules	H	L	H	M	-	M	-
	Course name: Organic Chemistry Special paper-I (CH-3Tl)							
CO1	Be able to explain what happens when organic molecules are excited by imadiation and be capable to discuss the photochemistry in nature and in various photochemical reactions	H	L	H	M	-	M	-
CO2	Pericyclic reactions are used in a vast way in nature and also by organic chemist. This course gives the student the theoretical basis of this kind of reaction and also helps them to find a way to carry out these types of reaction	H	M	H	M	-	M	-
CO3	Get well versed with the various oxidizing and reducing agents and the stereochemical aspects involved in various chemical reactions.	H	M	M	M	-	M	-
CO4	Acquire knowledge about the chemistry of compounds of phosphours and sulphur and the application of organoboranes and organosilicon compounds in or lcs nthesis.	H	L	M	M	-	M	-
	Course name: Physical Chemistry Special paper-I							

	(CH-3T1)							
CO1	Be able to understand the statistical aspects of thermodynamic functions.	H	L	-	M	-	M	-
CO2	Get acquainted with theory of double layer and get some knowledge about electrocatalysis and electrocardiography.	H	M	-	M	-	M	-
CO3	Acquire knowledge of dynamics of complex reactions and fast reactions.	H	L	L	M	-	M	-
CO4	Able to understand different photophysical phenomenon and photochemical reactions.	H	M	L	M	-	M	-
	Course name: Analytical Chemistry Special paper-I (CH-3Tl)							
CO1	Be able to describe various terminology and fundamentals of radioanalytical and electrochemical methods of analysis.	H	M	M	M	-	M	-
CO2	Be able to differentiate between similar techniques like stripping vs cyclic voltammetry, nephelometry vs turbidimetry etc.	H	H	L	M	-	M	-
CO3	Be able to choose appropriate technique of analysis among these depending on the nature of sample and analyze.	H	H	-	M	-	M	-
CO4	Able to propose new electrochemical sensor for the analysis of environmentally important species and pharmaceutical compounds.	H	H	H	M	-	M	-
	Course name: Inorganic Chemistry Special paper-II (CH-3T2)							
CO1	Be able to acquire detail knowledge of structure of ionic and covalent crystals and also the structures ofAB ABu and ABOI tYPe of compounds.	H	L	-	M	-	M	-
CO2	Be exposed to defects in solids and spinel chemistry.	H	L	-	M	-	M	-
CO3	Be introduced to material chemistry, physical phenomenon and nano materials	H	M	L	M	-	M	-

CO4	Study the chemistry of liquid crystals.	H	M	-	M	-	M	-
	Course name: Organic Chemistry Special paper-Il (CH-3T2)							
CO1	Be able to acquire knowledge about terpenoids and porphyrins, the stereochemistry involved along with the structure determination and synthesis of some representative molecules.	H	H	M	M	-	M	-
CO2	Be able to build a learning about alkaloids, the stereochemistry involved along with the structure determination and acquire brief idea about	H	H	M	M	-	M	-
CO3	Be able to develop the understanding of steroids chemistry and plant pigments.	H	M	H	M	-	M	-
CO4	Be able to quantify the contributions of carbohydrates in nature and get well versed with the properties of amino acids, and structural features of polypeptide.	H	M	M	M	-	M	-
	Course name: Physical Chemistry Special paper-II (CH-3T2)							
CO1	Be able to understand the electronic structure of atoms and application of Huckel theory to various molecules.	H	L	-	M	-	M	-
CO2	Get knowledge about different characterization techniques for nanoparticles.	H	M	L	M	-	M	-
CO3	Able to understand the structure of double layer and different models used lor double layer	H	L	-	M	-	M	-
CO4	Be to get knowledge of different phenomenological equations, to study rate of entropy production and its application to the cases of chemical reactions.	H	L	L	M	-	M	-
	Course name: Analytical Chemistry Special paper-II (CH-3T2)							
CO1	Be able to understand the difference between organic and inorganic quantitative analysis and terminology involved such as micro, semi-micro, ultra micro, proximate, ultimate analysis etc.	H	M	M	M	-	M	-
CO2	Summarize various methods of analysis of	H	M	H	M	-	M	-

	environmental components Like water and air and industrial products like ores and cement							
CO3	Able to calculate percentage of various components in these samples	H	H	H	M	-	M	-
CO4	Summarize the causes and consequences of water and air pollution and the remedies for it.	H	H	H	M	-	M	-
	Course name: Environmental Chemistry Elective paper (CH-3T3)							
CO1	Acquainted with scientific study of the chemical and biochemical phenomenon that occur in natural places.	H	L	H	M	-	M	-
CO2	Be able to understand how water is important to protect ecosystems and it is an integral part of our environment	H	M	H	M	-	M	-
CO3	Able to understand how air is important for the survival of living beings	H	M	H	M	-	M	-
CO4	Able to know various phenomenon occurring in soil and concept of radioactive pollution.	H	M	H	M	-	M	-
	Course name: Medicinal Chemistry Elective paper (CH-3TJ)							
CO1	Become acquainted with various terminology and fundamentals of drug dcs i I I',l inc lud in classical methods used for QSAR.	H	M	M	M	-	M	-
CO2	Be able to study pharmacokinetics & pharmacodynamic aspects of drug metabolism and would be able to acquire knowledge and applicability of diuretic and the anal esics and anti ic drugs.	H	M	M	M	-	M	-
CO3	Be able to get well versed with thc cardiovascular and anti neoplastic agents and their applicability.	H	M	M	M	-	M	-
CO4	Able to develop comprehensive knowledge about various psychoact ive drugs. co lant& anticoa lants	H	M	M	M	-	M	-
	Course name: Polymer Chemistry Elective paper (CH-3T3)							
CO1	Be able to understand differences of I mcrs.	H	L	M	M	-	M	-

CO2	Capable of understand different techniques of molecular mass determination.	H	M	M	M	-	M	-
CO3	Get knoledge about nr holo and order in c stalline I crss	H	M	M	M	-	M	-
CO4	Get acquainted with synthesis and application of commercial I ers.	H	M	M	M	-	M	-
	Course name: Nuclear Chemistry Elective paper (CH-3T3)							
CO1	Able to understand fundamentals of radioactivity, decay ol'radioactive mater ial M etc	H	M	-	M	-	M	-
CO2	Able to evaluate various nuclear ro rtics usln established models.	H	M	-	M	-	M	-
CO3	Be able to examine interaction of high energy radiation with matter and compare between different types ofdetectors for neutral, positive and negative radiations.	H	M	L	M	-	M	-
CO4	Be able to redict fission roduct and ower ou ut of fission reaclors.	H	H	-	M	-	M	-
	Course name: Spectroscopy-I (corc subject centric) paper (CH-3T4)							
CO1	Be able to understand symmetry elements and operations to organic and inorganic molecules.	H	M	-	M	-	M	-
CO2	Learn the mass spectrometry technique and will be able to identify the molecule on the basis of the fragmentation pattern in mass spectrum and learn application of radioactive molecules in Mossbaur s lroscopy	H	H	-	M	-	M	-
CO3	Be able to understand energy changes at very lower level and capable of predicting the satellite patterns of geographical areas. ESR techniques are used to determine thc resence of un ired electron es iall on com lexcs	H	H	-	M	-	M	-
CO4	Elucidate the structure determination of organic molecules by IR spectroscopy. problem based on IR s tra	H	H	-	M	-	M	-
	Course name: Foundation Course: Applied							

	Analytical Chemistry-I (CH-3T4)							
CO1	Get acquainted with various analytical procedures of analysis ofpesticides and fertilizers.	H	H	H	M	-	M	-
CO2	Be able to understand the application of analytical chemistry in forensic labora	H	H	H	M	-	M	-
CO3	Be able to carry out analysis of petroleum and petroleum products	H	H	H	M	-	M	-
CO4	Be able to anayze various alloys commonly used in daily life.	H	H	H	M	-	M	-
	Course name: Practical Inorganic Chemistry Special (CH-3Pl)							
CO	Get hands on training of many instrumentation techniques used for study of inorganic compounds and bioinorganic compounds and also become an expert in handling instruments that will be helptul to him/her while working in research laborat in future	H	H	L	M	-	L	L
	Course name: Practical Organic Chemistry Special (CH-3P1)							
CO	Be able to isolatc natural roducts usin fractional distillations, column	H	H	L	M	-	L	L
	chromatography and extraction methods, get hands on the technique involved for the qualitative analysis of a mixture of three organic compounds and be able to understand application of volumetric analysis in the estimation of organic analyte from given solutions.							
	Course name: Practical Physical Chemistry Special (CH-3Pl)							
CO	Be able to learn the settling up various experiments in Kinetics, 1'hermodynamics, Potentiometry, Conductometry and spectrophotometry.	H	H	L	M	-	L	L
	Course name: Practical Analytical Chemistry Special (CH-3Pl)							
CO	Get hands on training of all of various instrumentation	H	H	L	M	-	L	L

	techniques like conductometry, potentiometry, spectrophotometry, flame photometry, polarography, polarimetry, nephelometry, cyclic voltammetry and radioanal cal techni ues.							
	Course name: Practical Environmental Chemistry Elective (CH-3P2)							
CO	Be uainred with anal is ol various arameters of air, water and soil.	H	H	H	M	-	L	L
	Course name: Practical Medicinal Chemistry Elective (CII-31'2)				M			-
CO	Be able to cstimate the active ingredients of various pharmaceutica I compounds and get acquainted with the strategies involved in the preparation of man (.) ic and moieties.	H	H	M	M	-	L	L
	Course name: Practical Polymer Chemistry Elective (CH-3P2)							-
CO	Be able to synthesize various polymers and get knowledge about characterization of polymers.	H	H	L	M	-	L	L
	Course name: Practical Nuclear Chemistry Elective - 3P2)							
CO	Get hands on training of all of the radiation detection equipment and analyze various types of dosimeters that may lead to some new types of dosimeters.	H	H	L	M	-	L	L
	Course name: Seminar (3S1)							
CO	On completion of seminar, the student will be able to consolidate idea about the subject and thereby develop knowledge about the subject which will boost their confidence.	H	M	-	M	L	M	H
	Course name: Inorganic Chemistry Special paper-[(CI{-4T1)							
CO1	Be able to describe fundamentals of nano chemistry and mechanism of solid state reaction	H	H	M	M	-	M	-
CO2	Be able to illustrate the formation of coordination	H	H	-	M	-	M	-

	polymers and analytical techniques for polymer characterization.							
CO3	Be able to understand detail knowledge of catalysis	H	M	L	M	-	M	-
CO4	Be able to understand the use of inorganic chemistry in electronic world and application of films in various fields.	H	H	-	M	-	M	
	Course name: Organic Chemistry Special paper-I (CH-4Tl)							
CO1	Be able to quantify the applicability of carbanion intermediate in organic synthesis	H	M	-	M	-	M	-
CO2	Be able to understand modern methods of organic synthesis using transition metals and organometallic reagents.	H	H	-	M	-	M	-
CO3	Be able to be well familiar with the advanced terminologies, rules and concepts involved in stereochemistry and will have a deeper knowledge about the applicability of stereochemical and the protection deprotection concepts.	H	H	L	M	-	M	-
	The students will be able to apply logic behind organic synthesis using retro synthetic approach.	H	H	L	M	-	M	-
	Course name: Physical Chemistry Special paper-I (CH-4Tl)							
CO1	Able to understand Arrhenius law and reactions in solution hase	H	M	-	M	-	M	-
CO2	Be able to understand types, reasons and protection from corrosion and corrosion anal ts.	H	H	H	M	-	M	-
CO3	Get knowledge e about interaction of radiation with matter.	H	H	-	M	-	M	-
CO4	Able to understand classical free electron theory and quantum theory for electrons.	H	M	L	M	-	M	-
	Course name: Analytical Chemistry Special paper-I (CH-4Tl)							
CO1	Be able to describe fundamentals of radioanalytical	H	M	-	M	-	M	-

	techniques and applications of them.							
CO2	Be able to illustrate these anal ical techniques of XRF and PIXE.	H	H	L	M	-	M	-
CO3	Be able to com re between similar techniques like TGA. DSC and DTA.	H	H	L	M	-	M	-
CO4	Be able to choose appropriate technique of analysis among these depending on the nature of sam le and analyte	H	H	L	M	-	M	-
	Course name: Inorganic Chemistry Special paper-II (CH-4't2)							
CO1	Get introduced to photochemistry involving excited states of metal complexes.	H	H	-	M	-	M	I
CO2	Acquaint with role of redox reaction in metal complex.	H	M	-	M	-	M	I
CO3	Be introduced to o notransition metaI chemistry	H	M	L	M	-	M	I
CO4	Be able to stud the transition metal Pi com lexes	H	M	-	M	-	M	I
	Course name: Organic Chemistry Special papcr-II (CH-4T2)							
CO1	Get acquainted with basic terminology involved in enzyme chemistry which is lm rtant to understand several life roccsses.	H	L	L	M	-	M	-
CO2	Come to know importance of heterocyclic compounds as a part of many natural products as well as pharmaceutical drugs	H	M	M	M	-	M	-
CO3	Be able to analyze structure of nucleic acids, lipids and vitamins which are ll1l rtant buildi blocks of livin tem	H	M	L	M	-	M	-
CO4	Be able to have a brief idea about the terminologies and concepts involved in dru s,d s and ol mer chemistry	H	M	L	M	-	M	-
	Course name: Physical Chemistry Special paper-II (CH-4T2)							
CO1	Be able to understand types of solids electronic band structures and magnetic pro erties ol solids	H	H	L	M	-	M	-
CO2	Get basic ideas ofelectrostatic interactions	H	L	L	M	-	M	-

CO3	Get acquainted with different theory of liquids and methods of determination of surface tension.	H	L	M	M	-	M	-
CO4	Be able to understand different models of super cooled liquids and working and application of different batteries	H	H	L	M	-	M	-
	Course name: Analytical Chemistry Special paper-II (CH-4T2)							
CO1	Be able to anal various of dru and clinical samples.	H	H	L	M	-	M	-
CO2	Develop various methods of soil and coal anal sls.	H	H	M	M	-	M	-
CO3	Able to work on mitiation of corrosion in real time industrial applications.	H	H	H	M	-	M	-
CO4	Summarize the causes and consequences of corrosion and the remedies lor it.	H	H	H	M	-	M	-
	Course name: Environmental Chemistry Elective paper (CH-4T3)							
CO1	Be able to understand water pollution and different instrumental methods used lor anal sis of various metals and anions	H	H	H	M	-	M	-
CO2	Ile acquainted with air pollution and its control measures.	H	H	H	M	-	M	-
CO3	Be able to understand soil pollution and its control measures	H	H	H	M	-	M	-
CO4	Able to develop knowledge of solid waste pollution.	H	M	H	M	-	M	-
	Course name: Medicinal Chemistry Elcctivc papcr (CH-4T3)							
CO1	Get acquainted with various terminology and fundamentals of drug rules and drug acts	H	H	M	M	-	M	-
CO2	Be able to study and analyse assorted chromatographic separation techniques for drugs: TLC.	H	H	L	M	-	M	-
CO3	Be able to know concepts of analytical and statistical sampling.	H	M	L	M	-	M	-
CO4	Able to know the chemistry of anti-viral, anti-malarial, histamines & antihistamic, antibiotics, anthelminitics,	H	M	L	M	-	M	-

	antiamoebic and anti-inflammatory drugs.							
	Course name: Polymer Chemistry Elective paper (CH-4T3)							
CO1	Get knowledge about types of polymerisation	H	M	-	M	-	M	-
CO2	Get acquainted with different technique of polymerization methods	H	M	L	M	-	M	-
CO3	Be able to understand methods to study characterization of polymers	H	M	L	M	-	M	-
CO4	Get knowledge of synthesis and application of biomedical, inorganic and coordination polymer	H	H	H	M	-	M	-
	Course name: Nuclear Chemistry Elective paper (CH-4T3)							
CO1	Be able to understand various aspects of radiation chemistry	H	M	-	M	-	M	-
CO2	Irxarninc formation offrce radicals and their interaction with various solutes and solvents and various kinetic parameters of nuclear reactions.	H	L	L	M	-	M	-
CO3	Categorize various radioanalytical techniques like NAA, lDA, RlA, IRMA etc	H	H	-	M	-	M	-
CO4	Able to validate and summarize various radiopharmaceuticals depending on diagnostic and therapeutic applications.	H	H	-	M	-	M	-
	Course name: Spectroscopy-II (core subject centric) paper (CH-4T4)							
CO1	Be able to understand theoretical aspects of UV, NMR and electron	H	H	-	M	-	M	-
CO2	Be able to identify various molecular excitations and calculations of wavelengths of absolon.	H	H	-	M	-	M	-
CO3	Be able to elucidate the structure of molecule based on NMR spectra and be in a sition to c out the ctral analysis for structure determination	H	H	-	M	-	M	-
CO4	Com rehend the XRD data for stal structure	H	H	-	M	-	M	-

	determination.							
	Course name: Foundation Course: Applied Analytical Chemistry-Il (CH4T4)							
CO1	Be able to understand the chemistry involved inter treatment for hardness removal and desalination	H	H	H	M	-	M	-
CO2	C out the anal is of leather and ol ITI e rs	H	H	H	M	-	M	-
CO3	Comprehend the various processes involved in the metallurgy and extraction of metals from orcs.	H	H	H	M	-	M	-
CO4	Be able to car out anal sis of clinical samples like blood and urine	H	H	M	M	-	M	-
	Course name: Practical Inorganic Chemistry Special (CH-4P1)							
CO	Get hands on synthesis and electroanalytical characterization techniques, various methods of synthesis of inorganic compounds and be in a condition to carry out quantitative analysis of various s les usllhese techniques	H	H	-	M	-	L	L
	Course name: Practical Organic Chemistry Special (CH-4Pl)							
CO	Be able to carry out elemental analysis of organic compounds, get expertise in the estimation of biomolecules and some organic drug molecules. 'l'he students will get hands on training of multi-step preparation of small organic molecules and will develop ability to identify various unknown organic molecules using NMR, IR, Mass and UV s 1ra	H	H	M	M	-	L	L
	Course name: Practical Physical Chemistry Special (CH-4Pl)							
CO	Be able to apply the theoretical knowledge of subject in actual processes like, adsorption, biological kinetic methods ofanalysis, and experimentally determine the ical arametcrs like h lysis constant, pKa, transport number, etc.	H	H	M	M	-	L	L

	Course name: Practical Analytical Chemistry Special (CH-4Pl)							
CO	Get hands on training of all separation techniques like solvent extraction, paper chromatography, ion exchange etc and organoanalytical techniques of estimation of ni en, sul ur and halo n alo with environmental anal sls	H	H	H	M	-	L	L
	Course Name: Project (CH-4P2)							
CO	Learn how to carry out literature survey in a specific area of research, work on a small idea to develop their own observations, analyze the results obtained from the experiments carried out, validate the methods developed by him/her and develop an overall research attitude so that he can become a good researcher in future	H	H	M	M	L	H	-
	Course name: Seminar (4Sl)							
CO	Aller successful completion these four seminars assigned to them, they will be in a position to explain the concepts they learned from the dais in front of any number of audiences. This will lead to overall personality development of the student for entering into teaching profession	H	H	L	M	L	M	H

Program Outcomes of M. Sc. Zoology

PO1: Students will able to develop aptitude to manifest wide and extensive knowledge in the field of zoology and life science

PO2: They able to understand the importance of conservation and biodiversity rich environment. Based on this knowledge student can achieve the better opportunity in this field as a scientist, conservationist, taxonomist in the related government (ZSI) and non-government institutions

PO3: This programme will help to provide correct information about related condition of the living organisms including human to the pharmacologist to develop accurate drugs. This knowledge will provide job opportunities in the field of research,

pharmaceutical industries, laboratories and teaching.

PO4: Students will understand the detailed structure & function of the cell at molecular level and acquire the knowledge which will help them to work in the field of research, genetic counselling and lab technician.

PO5: Students will gain the knowledge about advance reproductive technique such as cryopreservation, test-tube baby, in-vitro fertilization, MOET, ICSI, GIFT and ZIFT so that they can join the respective laboratories in this field for training and avail better carrier opportunities.

PO6: The study will help them to discover the new species and understand the evolutionary the vertebrates. This study will also help them to know the importance of the local Significance of animals in the ecosystem.

PO7: By acquiring the knowledge of endocrinology students will able to understand hormonal regulation of different systems in the body of different animals so that they and correlate the can work under the guidance of medical endocrinologist and in pathological laboratories.

PO8: With the basic knowledge of molecular biology and biotechnology the students can join the laboratories which provides practical training or workshops for their carrier opportunities and employability in this field.

PO9: Students will be able to identify and classify different types of birds and learn their conservation methods. They will also learn about the radiation and its impact on human and other animals and their biological clock.

Course Outcomes of M. Sc. Zoology

Program Matrix

Name of Program: M. Sc. Zoology

(Low Correlation: L; Moderate Correlation: M; High Correlation : H)

COURSE OUTCOMES (Cos)		**PROGRAMMES OUTCOMES (POs)**								
		DOMAIN SPECIFIC (PSO)								
	Course Name :	1	2	3	4	5	6	7	8	9
	Structure and Function of Invertebrates									
CO1	Students able to classify the animals based	H	H	M	M	M	H	L	L	L

	on morphological and genetic taxonomic parameters.									
CO2	Student will understand ultrastructure of protozoan locomotory organs and modes of locomotion in protozoans	H	M	M	H	M	M	M	M	L
CO3	The students will be able to classify the poriferans based on different types of spicules	H	H	M	M	M	M	M	M	L
CO4	This study will help the students to differentiate between zooids in the coelenterate colonies, classify them accordingly	H	H	M	M	M	M	M	M	L
CO5	The study will help them to discover the new species and understand origin of life on earth and the evolutionary Significance of the metazoans.	H	H	M	M	M	H	M	M	L
CO6	The students will be able gain knowledge the Reproductive systems in Platyhelminthes and Aschelminthes.	H	M	M	M	M	M	M	M	L
CO7	The study of Significance of Coelom, Symmetry and Metamerism in Animal classification helps to classify the animals based on their structural development.	H	M	M	M	M	M	M	M	L
CO8	By Studying Evolution of nephridia students willbe able gain knowledge the mechanism of excretion in Annelids	H	M	M	H	M	M	M	M	L
CO9	Study of taxonomic position of Peripatus will help the student to understand the evolutionary Significance of phylum arthropoda and its affinities with annelida	H	M	M	M	M	H	M	M	L
CO10	Study of taxonomic position of Peripatus will help the student to understand the evolutionary Significance of phylum	H	M	M	M	M	H	M	M	L

	arthropoda and its affinities with annelida.									
CO11	Study of taxonomic position of Neopilina helps the students to understand the connecting link between the annelida and Mollusca	H	M	M	M	M	H	M	M	L
CO12	Neuroanatomy in selected group of Molluscs will help the student to understand the nervous system of mollusca.	H	M	M	H	M	M	M	M	L
CO13	By studying water vascular system in Echinodermata students will be able to understand the locomotion and feeding in Echinodermata	H	M	M	H	M	M	M	M	L
CO14	Students will be able gain knowledge general account and affinities of Ctenophora, Rotifera, Entoprocta and Ectoprocta.	H	M	M	H	M	M	M	M	L
	General Physiology									
CO1	Students will understand the classification, mechanism of action of enzymes and regulation of enzyme activity.	H	M	M	H	M	M	M	M	L
CO2	The students will able to understand the respiratory mechanism of animals at cellular level	H	M	M	H	M	M	M	M	L
CO3	Students will be able to understand the chemical nature, biosynthesis and mechanism of action of neurotransmitters	M	M	H	M	M	M	M	M	L
CO4	Gain knowledge and understand the colour change mechanism in different groups of anima	H	M	H	M	M	M	M	M	L
CO5	To understand the mechanism of bioluminescence in invertebrates and	H	M	H	M	M	M	M	M	L

	vertebrates									
CO6	Able gain knowledge the mechanism of thermoregulation in poikiotherms and homeotherms	H	M	M	H	M	M	M	M	L
CO7	To gain the knowledge about the process of osmoregulation in Pisces and amphibians	H	M	M	H	M	M	M	M	L
CO8	Learn and understand the molecular mechanism of peptide and steroid hormonal action and signal transduction	H	M	M	H	M	M	M	M	L
CO9	Learn and able to understand the myogenic and neurogenic heart and cardiac cycle.	H	M	M	H	M	M	M	M	L
CO10	Able gain knowledge the mechanism of digestion and absorption of carbohydrates, proteins and lipids along GI tract	H	M	M	H	M	M	M	M	L
CO11	Student will acquire the knowledge of physiology of carbohydrate and lipid metabolism.	H	M	M	H	M	M	M	M	L
CO12	To understand the physiology of hydromineral metabolism.	H	M	M	H	M	M	M	M	L
CO13	Learn and understand the chemistry and function of cerebrospinal fluid	H	M	M	H	M	M	M	M	L
CO14	To evaluate and learn the mechanism of reflex action	H	M	M	H	M	M	M	M	L
CO15	Student will able gain knowledge the physiology environmental stress and strain	H	M	M	H	M	M	M	M	L
	Cell biology and Genetics									
CO1	To understand the structure and function of biological membranes	H	M	M	H	M	M	M	M	L
CO2	To understand and learn structure and the function of cell organelles.	H	M	M	H	M	M	M	M	L

CO3	Student will able gain knowledge the structure and function of cytoskeleton.	H	M	M	H	M	M	M	M	L
CO4	Learn and gain the knowledge of cell division and cell cycle	H	M	M	H	M	M	M	M	L
CO5	Learn and gain the knowledge of cell signaling, receptor proteins	H	M	M	H	M	M	M	M	L
CO6	Learn and gain the knowledge of signal transduction pathways and its regulation	H	M	M	H	M	M	M	M	L
CO7	Learn and gain the knowledge of Cellular communication	H	M	M	H	M	M	M	M	L
CO8	Gain knowledge and understand the genetics of cancer	H	M	M	H	M	M	M	H	L
CO9	Student will be able gain knowledge the mendelian and non mendelian genetics	H	M	M	H	M	M	M	M	L
CO10	Able gain knowledge the extension of Mendelian principles and Quantitative genetics.	H	M	M	H	M	M	M	M	L
CO11	Learn and gain the knowledge of Types, causes and detections of Mutations	H	M	M	H	M	M	M	H	L
CO12	Student will able to understand the structural and numerical alterations of chromosomes	H	M	M	H	M	M	M	M	L
CO13	Student will able to understand the extra chromosomal inheritance	H	M	M	H	M	M	M	M	L
C O14	Learn and gain the knowledge of Microbial genetics	H	M	M	H	M	M	M		L
CO15	Learn and gain the knowledge of Human genetics	H	M	M	M	M	M	M	M	L
	Advanced Reproductive Biology									
CO1	Learn the different methods of asexual and sexual reproduction in protozoans	H	M	M	M	M	M	M	M	L
CO2	Learn the process of regeneration in Hydra, Dugesia and Annelid worms	H	M	M	M	M	M	M	M	L

CO3	Learn the process of metamorphosis and vitellogenesis in insects	H	M	M	M	M	M	H	M	L
CO4	To understand mechanism of spermatogenesis and oogenesis	H	M	M	M	H	M	H	M	L
CO5	Gain knowledge the mechanism of cytological and molecular events of fertilization.	H	M	M	M	H	M	H	M	L
CO6	To understand the process of cleavage, blastulation, gastrulation and embryonic induction.	H	M	M	M	H	M	H	M	L
CO7	Gain knowledge and understand the male accessory sex glands	H	M	M	M	H	M	H	M	L
CO8	To understand the biochemical composition of semen and abnormality of sperm	H	M	M	M	H	M	H	M	L
CO9	Gain knowledge the mechanism of sperm capacitation and decapacitation	H	M	M	M	H	M	H	M	L
CO10	To understand the pheromones and sexual behaviour of mammals	H	M	M	M	H	M	H	M	L
CO11	To able gain knowledge the neurohormonal control of fish reproduction and mechanism of vitellogenesis in fishes	H	M	M	M	M	M	H	M	L
CO12	Gain knowledge the mechanism of morphogenetic gradient and organizer concept	H	M	M	M	M	M	H	M	L
CO13	Gain knowledge the mechanism of cryopreservation of gametes, embryo, and test tube baby	H	M	M	M	H	M	M	M	L
CO14	Gain knowledge the mechanism of in vitro fertilization and its significance	H	M	M	M	M	M	H	M	L
	Structure and function of vertebrates									
CO1	Students will be able to understand the	H	M	M	M	M	H	M	M	L

	origin and ancestry of chordate									
CO2	Students will be able to understand general organization and affinities of cephalochordate	H	M	M	H	M	M	M	M	L
CO3	Students will understand structure, development and metamorphosis of amoecoetus and characters and affinities of dipnoi	H	M	M	H	M	M	M	M	L
CO4	Students will be able to understand organs and mechanism of respiration in pisces and amphibia	H	M	M	H	M	M	M	M	L
CO5	Gain knowledge vertebrate integument and its derivatives	H	M	M	H	M	M	M	M	L
CO6	The students will be able to understand that what are appendicular skeleton in amphibia, reptilia, aves and mammals	H	M	M	H	M	M	M	M	L
CO7	The students will be able to understand general body organisation and classification in chelonian	H	M	M	M	M	M	M	M	L
CO8	The students will be able to understand the evolution of urinogenital organs in vertebrates	H	M	M	M	M	H	M	M	L
CO9	To understand the origin of birds and adaptations in cetacean	H	M	M	M	M	M	M	M	H
CO10	To understand the complex anatomy of the brain in teleost, frog, lizard, fowl and rat	H	M	M	M	M	M	M	M	L
CO11	The students will be able to understand the evolution of man	H	M	M	M	M	M	H	M	L
CO12	The students will be able to understand the evolution of heart and sense organ in vertebrates	H	M	M	M	M	M	H	M	L
	Comparative Endocrinology									

CO1	To understand the hormones and functions in Coelentereta and Helminths.	H	M	M	M	M	M	L	M	L
CO2	To understand the neurosecretory system in Annelida & Mollusca	H	M	M	H	M	M	M	M	L
CO3	The students will be able to understand about the hormones and functions in Echinodermata.	H	M	M	M	M	M	M	M	L
CO4	To understand about the neuroendocrine system in crustacean.	H	M	M	M	M	M	M	M	L
CO5	Students will be able to explain the Endocrine control of metamorphosis, reproduction and colour change mechanisms in Crustacean..	H	M	M	M	M	M	H	M	L
CO6	The students will be able to understand cephalic neuroendocrine system in insects	H	M	M	M	M	M	H	M	L
CO7	To understand the endocrine control of metamorphosis and reproduction in insects	H	M	M	M	M	M	H	M	L
CO8	Students will be able to explain about the pineal organ.	H	M	M	M	M	M	H	M	L
CO9	Gain knowledge about the hypothalamo-hypophysial system	H	M	M	M	M	M	H	M	L
CO10	To understand the To evaluate pituitary gland, thyroid gland, parathyroid gland and adrenal gland.	H	M	M	M	M	M	H	M	L
CO11	To understand the gastro-entero-pancreatic endocrine system	H	M	M	M	M	M	H	M	L
CO12	Gain knowledge the gonadal hormones in vertebrates and their hormonal actions, feedback mechanisms	H	M	M	M	M	M	H	M	L
	Molecular Biology and Biotechnology									
CO1	To understand the CotYrand Rot %values, organelle genome, DNA structure, forms	H	M	M	M	M	M	M	H	L

	of DNA.									
CO2	To understand the molecular mechanisms of replication and its regulation in prokaryotes and eukaryotes.	H	M	M	H	M	M	M	H	L
CO3	Gain knowledge the DNA damage and repair - types of DNA damages, excision repair system; mismatch repair, recombination repair, double strand break repair, and transcription coupled repair.	H	M	M	H	M	M	M	H	L
CO4	Gain knowledge the mechanism and regulation of prokaryotic and eukaryotic transcription.	H	M	M	H	M	M	M	H	L
CO5	To understand the prokaryotic and eukaryotic translation, genetic code, altered code in elongation, termination factors, fidelity of translation, post translational modifications.	H	M	M	H	M	M	M	H	L
CO6	Gain knowledge about mobile DNA elements - transposable elements, IS elements, P elements, retroviruses, retrotansposons.	H	M	M	H	M	M	M	H	L
CO7	To understand the antisense and ribozyme technology - initiation of splicing, polyadenylation, molecular mechanisms of antisense molecules, miRNA, siRNA, gene silencing	H	M	M	H	M	M	M	H	L
CO8	To understand isolation and sequencing of DNA, gene amplification, PCR, RAPD, RFLP, MaxamGilbert, Sanger's dideoxy methods	H	M	M	M	M	M	M	H	L
CO9	To understand the splicing and cloning - cloning vectors for recombinant DNA technology- plasmids, cosmids,	H	M	M	M	M	M	M	H	L

	phagemids, YACS, gene replacement, restriction enzymes									
CO10	Understand the hybridization techniques - Southern- Northern hybridization, microarray.	H	M	M	M	M	M	M	H	L
CO11	Gain knowledge the application of restriction fragment length polymorphism (RFLP) in forensic science, disease prognosis and genetic counseling.	H	M	M	M	M	M	M	H	L
CO12	To understand the agricultural biotechnology.	H	M	M	M	M	M	M	H	L
CO13	To understand Hybridoma technology and monoclonal antibodies.	H	M	M	M	M	M	M	H	L
	Advanced Developmental Biology									
CO1	To understand the types, structure and functions of Foetal membranes & implantation in mammals.	H	M	M	M	H	M	H	M	L
CO2	Gain knowledge about the placenta-types, structure, functions of Placenta.	H	M	M	M	H	M	H	M	L
CO3	Gain knowledge about metamorphosis in Amphibia and regeneration in vertebrates.	H	M	M	H		H		M	L
CO4	To understand the mechanism and Significance of Apoptosis	H	M	M	H	M	M	M	M	L
CO5	Gain knowledge about the ageing-mechanism, concepts and models	H	M	M	H	M	M	M	M	L
CO6	Students will understand about the polymorphism in insect	H	M	M	M	M	M	M	M	L
CO7	To understand the multiple ovulation and embryo transfer technolosy (MOET).	H	M	M	M	H	M	M	M	L
CO8	Gain knowledge about the animal cloning	H	M	M	M	M	M	M	H	L
CO9	Gain knowledge about the lmmuno contraception. classical contraceptive techniques.	H	M	M	M	M	M	H	M	L

CO10	Gain knowledge about the anti-androgen and antispermiogenic compounds (LDH-CY and SP-10)	H	M	M	M	M	M	H	M	L
CO11	Gain knowledge about the role of mutants and transgenics in human welfare	H	M	M	M	M	M	M	H	L
	Parasitology and Immunology									
CO1	To understand life cycle, mode of transmission, infection of Vibrio cholera, Yersinia pestis and Clostridium titani and treatment of Cholera, Plague and Tetanus.	H	M	M	M	M	M	M	M	L
	To understand the life cycle, mode of transmission, infection of Influenza, H1 N1 viruses, Dengue virus and Hepatitis viruses and treatment of Influenza, Dengue and hepatitis.	H	M	M	M	M	M	M	M	L
CO2	Gain knowledge about the Trypanosoma and Entomoeba - Life cycle, mode of transmission, infection of hypanosoma , Entomoeba, Leishmania and Plasmodium and treatment of diseases caused by these protozoan parasites.	H	M	M	M	M	M	M	M	L
CO3	Gain knowledge about the life cycle, mode of transmission, infection of Wuchereria and Trichinellaand treatment of diseases caused by these parasites.	H	M	M	M	M	M	M	M	L
CO4	Gain knowledge about the toxin and antitoxins.	M	H	H	M	M	M	M	M	L
CO5	Immune system- innate and adaptive immunity; Antigens and antibodies and its interaction.	H	M	M	M	M	M	M	H	L
CO6	Gain knowledge about the cells and organs of immune system	H	M	M	M	M	M	M	H	L
CO7	Gain knowledge Maior Histocompatibility		M	M	M	M	M	M		L

	Complex (MHC).									
CO8	To understand complement system and its regulation, biological consequences of complement activation.	H	M	M	M	M	M	M	H	L
CO9	Gain knowledge about cytokine and cytokine receptors, Cell mediated cytotoxic responses and leukocyte activation and migration.	H	M	M	M	M	M	M	H	L
CO10	To understand types and mechanism of Hypersensitivity reactions and autoimmunity	H	M	M	M	M	M	M	H	L
CO11	To understand transplantation immunology	H	M	M	M	M	M	M	H	L
CO12	Gain knowledge about the tumour immunology and immunotechniques.	H	M	M	M	M	M	M		L
	Biotechniques, Biostatistics, Ethology, Toxicology and Bioinformatics									
CO1	Gain knowledge about the sterilization techniques, media for microbial culture, inoculation methods	H	M	H	M	M	M	M	H	L
CO2	To understand the primary culture, cell lines, cell quantification, growth kinetics of cells in culture, cryopreservation of cells	H	M	H	M	M	M	M	H	L
CO3	To understand the basic principle of sedimentation and centrifugation along with Radioactive isotopes.	H	M	M	M	M	M	M	H	L
CO4	to understand thin layer chromatography , gas chromatography and electrophoretic separation techniques	H	M	M	M	M	M	M	H	L
CO5	To understand the Central tendency, Dispersion and Variance.	L	M	M	H	M	M	M	M	L
CO6	To understand the probability and	L	M	M	H	M	M	M	M	L

	probability distribution.									
CO7	Gain knowledge the types of sampling , standard error (SE), standard deviation (SD) and tests of Significance (t- test, ztest, Chi square test)	L	M	M	H	M	M	M	M	L
CO8	To understand the neuronal control, genetic and environmental components in development of animal behaviour	H	M	M	M	M	M	H		L
CO9	To understand the animal ethics- introduction, concept, organizations and their functions	H	M	M	M	M	M	M	M	L
CO10	To understand the toxicology, environmental toxicology. tran CO slocation of toxicants	H	H	H	M	M	M	M	M	L
CO11	Gain knowledge about the toxicity tests, calculation of LC50 and LD 50 and Antidotal Therapy.	H	H	H	M	M	M	M	M	L
CO12	Introduction and scope of bioinformatics.	H	M	M	M	M	M	M	H	L
CO13	Gain knowledge about the Biological databases- Basic local alignment search tool (BLAST), and FASTA, Variants of BLAST, PSI-BLAST.	H	M	M	M	M	M	M	H	L
CO14	Gain knowledge about the phylogenetic analysis- Tree style, tree building methods.	H	M	M	M	M	M	M	H	L
	Animal Physiolosy									
	Physiology of Digestion and Excretion									
CO1	To understand the specialized functions of the organs involved in processing food in the body.	H	M	M	M	M	M	M	M	L
CO2	To understand the structure and function of digestive glands, salivary gland and stomach in the digestion and its regulation	H	M	M	M	M	M	M	M	L

	of secretion.									
CO3	To have a comprehensive knowledge about structure, function of liver, its role in detoxification and structure, function pancreas and its role in the regulation of glucose level and indigestion.	H		H	H	M	M	M	M	L
CO4	To understand the ways in which organs work together to digest food and absorb nutrients.	H	M	M	H	M	M	M	M	L
CO5& CO6	To understand the processes of digestion and absorption and role of the intestine.	H	M	M	H	M	M	M	M	L
CO7	To understand the neural and chemical regulation of secretion GIT secretion and movement.	H	M	M		M	M	M	M	L
CO8	To understand the structure, function of kidney and its role in the urine formation.	H	M	M	H	M	M	M	M	L
CO9	To understand the mechanism of concentration and dilution of urine in addition to normal and abnormal constituents of urine this will help to understand the physiology of kidney in normal and pathological conditions.	H	M	M	H	M	M	M	M	L
CO10	To understand the physiology of Regulation of urine and body fluid concentration and volume and its hormonal control.	H	M	M	H	M	M	M	M	L
CO11	To understand the physiology of Regulation of water, electrolytes and acid base and renal clearance		M	M	H	M	M	M	M	L
CO12	To understand physiology of nitrogen excretion and causes of Renal failure, its complication and treatments.	H	M	M	H	M	M	M	M	L
	Physiology of Circulation									

CO1	To understand the types (Myogenic and Neurogenic), anatomy, histology and nerve innervations of the heart, heart valves.	H	M	M	H	M	M	M	M	L
CO2	To understand the different types of Pace maker and specialized conducting fibres.	H	M	M	H	M	M	M	M	L
CO3	To understand the physiology of Blood pressure and factors affecting blood pressure, Cardiac cycle, Electrocardiogram (ECG).	H	M	M	H	M	M	M	M	L
CO4	To understand the Cardiac output, heart sound, Haemodynam ics, Cardiac Failure.	H	M	M	H	M	M	M	M	L
CO5	To understand the physiology Cellular composition and functions of blood, Blood groups and Blood transfusion Causes and control of hypoglycaemia and hyperglycaemia.	H	M	M	H	M	M	M	M	L
CO6	To understand the causes and control of hypolipidimia and hyperlipidemia, Plasma proteins, Haemostasis	H	M	M	H	M	M	M	M	L
CO7	To understand Cascade of biochemical reactions involved in coagulation of blood, transport of 02 & CO2 by blood and composition, formation and functions of lymph.	H	M	M	H	M	M	M	M	L
	Physiology of Brain, Nerve and Muscle									
CO1	To understand morphological differentiation of mammalian brain, Brain stem, Cerebellum	H	M	M	H	M	M	M	M	L
CO2	To understand the physiology of learning, memory and sleep	H	M	M	H	M	M	M	M	L
CO3	To understand the types and functional properties of neurons, Ultrastructure of	H	M	M	H	M	M	M	M	L

	neuron.									
CO4	To understand the ultrastructure of synapse and molecular mechanism of synaptic transmission, bioelectrical properties of neurons.	H	M	M	H	M	M	M	M	L
CO5	To understand the physiology of Biosynthesis, storage and release of various neurotransmitters and neuropeptides.	H	M	M	H	M	M	H	M	L
CO6	To understand the Receptor physiology- Mechanoreception, photoreception, phonoreception, chemoreception	H	M	M	H	M	M	M	M	L
CO7	To understand Disorders of nervous system: Alzheimer's disease, Parkinson's disease.	H	M	M	H	M	M	H	M	L
CO8	To understand the Ultrastructure of skeletal muscle, Molecular mechanism of muscle contraction and chemistry and role of ATP in muscle contraction.	H	M	M	H	M	M	M	M	L
CO9	To understand the Properties of muscle (twitch, tetanus, summation, tonus, all or none principle fatigue), muscular disorders and Ultrastructure of Neuromuscular Junction.	H	M	M	H	M	M	M	M	L
	Physiology of Respiration and Reproduction									
CO1	To understand the Physiological anatomy of respiratory system and Mechanism of respiration	H	M	M	H	M	M	M	M	L
CO2	To understand the Transport of respiratory gases by blood and Lung volumes and capacities, partial pressure of gases.	H	M	M	H	M	M	M	M	L
CO3	To understand the Oxygen dissociation	H	M	M	H	M	M	M	M	L

	curve, Carbon -dioxide dissociation curve. To understand the physiology of Neural and chemical regulation of respiration and Hypoxia, Cyanosis.									
CO4	To understand the endocrine control of spermatogenesis and oogenesis	H	M	M	H	M	M	H	M	L
CO5	To understand the physiology of Leydig cells, sertoli cells and their hormones. To understand the structure and functions of Follicular and luteal cells and their hormones.	H	M	M	H	M	M	H	M	L
CO6	To understand the physiology of corpus luteum and Placenta	H	M	M	H	M	M	H	M	L
CO7	To understand the physiology of lactation and Role of hormones and pheromones in reproduction.	H	M	M	H	M	M	H	M	L
CO8	To understand the Causes of infertility in male and female and In vitro fertilization (lVF) and Test Tube Baby.	H	M	M	M	H	M	M	M	L
	Fish and Fisheries									
	Fish and Fisheries-I General studies									
CO1	To understand the Origin and Evolution of fishes.	H		M	M	M	H		M	L
CO2	To understand the development ofjaws and limbs in fishes.			M	M	M	H		M	L
CO3	To understand Classification and General characters and affinities of Placoderm and fossil record.	H	H	M	M	M	H		M	L
CO4	To understand Classification and general characters along with Affinities and specialized characters of Elasmobranchs.	H	H	M	M	M	H		M	L
CO5	To interpret Classification and general	H	H	M	M	M	H		M	L

	characters with affinities of Actinopterygiians.									
CO6	To understand general characters, classification, origin, fossil Dipnoian, distribution and specialized characters and affinities of Dipnoians and blood vascular system of Protopterus.	H	H	M	M	M	H		M	L
CO7	To understand the respiratory system.	H			H				M	L
CO8	To understand blood supply and mode of respiratory gaseous exchange in teleost.	H	M	M	H	M	M	M	M	L
CO9	To understand accessory respiratory organs.		M	M		M	M	M	M	L
C010	To evaluate mechanism of air breathing, function of accessory respiratory organ	H	M	M	H	M	M	M	M	L
C011 &CO12	To understand Air Bladder and gain knowledge blood supply to air bladder and function of air bladder.	H	M	M	H	M	M	M	M	L
	Fish and Fisheries- II Applied fisheries									
CO1	To understand fresh water fisheries of India, riverine and reservoir fisheries.	H	M	M		M	M	M	M	L
CO2	To understand Esturine and Marine fisheries of India.	H	M	M		M	M	M	M	L
CO3& CO4	To evaluate breeding of Indian Major carps To understand neuroendocrine control of carp reproduction.	H	M	M				H		L
CO5	To understand culture of Exotic fishes.	H	M	M	M	M	M	M	M	L
CO6	To interpret monoculture and monosex culture	H	M	M	M	M	M	M	M	L
CO7	To understand integrated fish farming	H	M	M	M	M	M	M	M	L
CO8& CO9	To understand Catfish culture and Trout culture	H	M	M	M	M	M	M	M	L
CO10	To understand Ornamental fish culture	H	M	M	M	M	M	M	M	L

CO11	To understand Culture of sea weeds and Spirulina.	H	M	M					H	L
CO12	To understand pearl culture, Oyster culture, prawn culture, Frog culture.	H	M	M		M	M	M	M	L
	Fish and Fisheries- I General studies									
CO1	To understand Structure of alimentary canal in teleosts.	H	M	M	H	M	M	M	M	L
CO2	To evaluate modification of alimentary canal in relation to feeding habits, digestion and absorption of food.	H	M	M	H	M	M	M	M	L
CO3	To understand Structure of kidney in teleosts.	H	M	M	H	M	M	M	M	L
CO4	To interpret osmoregulation in fresh water forms, marine forms, Rays and Skates, Diadromous fishes. To understand mechanism of spermatogenesis and its hormonal control.	H	M	M	H	M	M	M	M	L
CO5	To understand chemoreceptors	H	M	M	H	M	M	M	M	L
CO6	To understand Structure and function of taste buds.	H	M	M	H	M	M	M	M	L
CO7	To evaluate the migration in fishes	H	M	M		M	M	M	M	L
CO8	To evaluate role of hormones in migration, orientation and navigation during migration.	H	M	M				H		L
CO9& CO10	To understand Structure of male reproductive system and mechanism of sis and its hormonal control	H	M	M	M	M	M	M		L
CO11 &CO12	To understand female reproductive system and oogenesis, egg development, hormonal control of oogenesis.	H	M	M	M	M	M	M		L
CO13	To evaluate the structure, hormone and function of pituitary and gland other	H	M	M	M	M	M	M		L

	endocrine in fishes.									
CO14	To evaluate hypothalamo-hypophysial system in fishes	H	M	M	M	M	M	M		L
CO15	To understand neurohormones and their functions.	H	M	M	M	M	M	M		L
	Fish and Fisheries- II Fish technology and fish pathology									
CO1	To understand Pond management	H	M	M	M	M	M	M	M	L
CO2	To evaluate and craft in inland water	H	M	M	M	M	M	M	M	L
CO3	To understand Conservation of fish, Fish legislation and their importance	H	M	M	M	M	M	M	M	L
CO4	To evaluate water pollution and inland fisheries	H	M	M	M	M	M	M	M	L
CO5	To understand Plankton in relation fish production	H	M	M	M	M	M	M	M	L
CO6	To evaluate Culture of Phytoplankton and Zooplankton	H	M	M	M	M	M	M	M	L
CO7	To understand manufacture and maintenance of Aquarium	H	M	M	M	M	M	M	M	L
CO8	To evaluate Hybridization and transgenic fish.	H	M	M	M	M	M		H	L
CO9& CO10	Gain knowledge the Fish marketing; Domestic and export and marketing	H	M	M	M	M	M			L
CO11	To understand Sex control and sex reversal under condition and chromosome set manipulation in fish	H	M	M	M	M	M	M	H	L
CO12	To evaluate Gamete preservation	H	M	M			H	M	M	L
CO13	To evaluate Methods of curing and preservation of fish	H	M	M	M	M	M	M	M	L
CO14	To understand fish products and by products	H	M	M	M	M	M	M	M	L
CO15	To understand fish pathology	H	M	M	M	M	M	M	M	L
CO16	To evaluate Fish diseases and its control	H	M	M	M	M	M	M	M	L

Program Specific Outcomes of M. Sc. Mathematics

PSO 1:	Disciplinary Knowledge	Understand the basic and advanced knowledge in the field of Mathematics
PSO 2:	Communication Skills	Effectively communicate and explore ideas of mathematics for propagation of knowledge and popularization of mathematics in society
PSO 3:	Critical Thinking	identify, analyse, formulate various problems with scientific approach
PSO 4:	Problem Solving	identify and apply the most effective method to solve and evaluate the appropriate solution within a stipulated time
PSO 5:	Professional Skills	Explain/ demonstrate accurate and efficient use of advanced Mathematical techniques
PSO 6:	Team Work	Participate constructively in classroom discussion
PSO 7:	Digitally literacy	Have sound knowledge of mathematical modelling, programming and computational techniques as required for research or employment in industry
PSO 8:	Ethical and Social awareness	Capable of demonstrating the ethical issues related with the intellectual Property Rights, copyright etc. and demonstrate highest standards of ethical issues in mathematics
PSO 9:	Lifelong learning	Continue to acquire mathematical knowledge and skills appropriate to professional activities
PSO10:	Research related skills	Pursue research in challenging areas of pure/applied Mathematics.
PSO11:	Self-Directed Learning	Work independently to explore new ideas and solutions to mathematical problems
PSO 12:	Analytical Reasoning	Think logically and analytically over the information to evaluate solution for the mathematical theorems or problems
PSO 13:	Leadership Quality	Listen and understand the ideas and suggestions of others to improve quality of learning
PSO 14:	Scientific Reasoning	Solve mathematical problems systematically with scientific approach
PSO 15:	Reflective Thinking	Identify the importance of information provided in theorems, axioms and problems for further justification and application

Course Outcomes of M. Sc. Mathematics

Program Matrix

Name of Program: M.Sc. Mathematics
(Low Correlation = Ll7 ; Moderate Correlation = Ml2; High Correlation = H/3)

Course Outcomes (Cos)		Program Specific Outcomes(PSO)														
	Course Name: Algebra-I	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Co1	Students apply the knowledge of different types of Groups to prove the theorem and solve examples.	H	M	M	M					M		L	M			
Co2	Students recognize various types of Groups. students solve some examples of different types of Groups	H	M	H	L		L			M			M			
Co3	Students apply the knowledge to prove the theorem and solve some examples.	H	M	H	L					M		L	M			
Co4	Students interpreted deals in ring and modules to prove various theorems.	H	L	M	L					M		L	M		H	M
	Course Name: Real Analysis-I															
Co5	Students apply the concept of Uniform convergence to Stone-Weierstrass theorem	H	L	L	L					M		L	M			
Co6	Students apply the knowledge of convergence and continuity of a function to prove some theorems in real analysis	H	M	L	L					M		L	M			
Co7	Students observe the various manifolds and apply their knowledge to differentiable functions and mappings	H	M	L	L					M		L	M			
Co8	Students solve some examples of Lie groups	H	M	L	L					M		L	M			
	Course Name: Topology-I															
Co9	Students recognised countable and uncountable sets and solve some examples in Topological spaces	H	M		L					M		L	M			
Co10	Students recognised the terminologies in Topological spaces and can define bases of topology	H	M		L					M			M			
Co11	Students understood the connectedness and compactness and apply it to continuous functions and homomorphism	H	M		L					M		L	M			
Co12	Students apply the axioms of countability and separbility to understand regular and normal spaces	H			L		L			M		L	M			M
	Course Name: Ordinary Differential Equations															
Co13	Students solve some examples	H	M		M					M		L	H			

	to find Linear Equations with variable coefficients: Initial value problems for the homogeneous equations															
Co14	Students can identify various linear equations and able to find Regular singular points	H	M	M	M					M		L	H			
Co15	Students can solve the examples based on Existence and uniqueness of solutions to first order equations with help of successive approximation.	H	M		M					M		L	M			
Co16	students deal with Existence and Uniqueness of Solutions to System of first order ordinary differential equations:	H	M		M		L			M		L	M			
	Course Name: Integral Equations															
Co17	Students solve problems to convert ordinary differential equations into integral equations	H	M		H					M		L	H			
Co18	Students identifies various kernels like Green's function type and solve the integral equations	H	M		H					M		L	H			
Co19	Students recognised types of Voltera equations and solve nonlinear Voltera equations, problems on real integral equations and Laplace integral equations	H	M		H					M	L	L	H		H	
Co20	Students apply the various types of kernels to study the applications of Hilbert transform and finite Hilbert transform	H	M		H					M		L	H		H	M
	Course Name: Algebra-II															
Co21	Students apply the knowledge of unique factorization and etc.) ideal domain.	H	M		L		L			M		L	M			
Co22	Students develop the knowledge of extension fields and apply it to prove relevant theorems.	H	M		L					M		L	M			M
Co23	Students analysed fundamental theorem of Galois theory 10 solve various examples	H	M		M		L			M		L	M			M
Co24	Students apply the Galois	H	M		L		L			M		L	M			M

	theory to solve the classical problems															
	Course Name: Real Analysis-II															
Co25	Students analyse whether given sets /functions are measurable or non-measurable by illustrating their properties	H	M							M			M			
Co26	Students recognizes the importance of Riemann and Lebesgue integral of a bounded function	H	M	M						M			M		H	
Co27	Students analyse and apply I{older and Minkowski inequalities to Lp-spaces and bounded linear functional on Lp-spaces	H	M							M		L	M			
Co28	Students illustrate their knowledge of compact metric spaces and their types	H	M			L				M		L	M		H	
Co29	Students apply Urysohn's lemma, Tietze extension theorem to study other results of normal spaces, study the properties of completely regular spaces and with the help of compactness for metric spaces they can study countably compactness and sequentially compactness	H	M		L					M		L	M			M
Co30	Students use the definition of quotient topology to analyse many related results. Net is the generalization of sequence, in that point of view, student can study many results of nets by generalizing the results of sequences. Student can also develop rtany examples of filters from its definition	H	M		L					M			M			M
Co31	Students can distinguish this product topology into two parts, finite product topology and topology on the product of any number of topological spaces and they justify the nature of these two topologies	H	M		L		M			M		L	M			M
Co32	Students can recognize that paracompactness is the	H	M		L					M		L	M			M

	generalization of compactness and therefore students can generalized the results of compactness into the results of paracompactness with the help of locally finite and discrete families of subsets															
	Course Name: Topology – II															
Co33	Students understood the concept of continuous functions and the product topology	H	M		L					M		L	M			M
Co34	Students use the definition of Connected spaces to analyse many related results.	H	M		L					M		L	M			M
Co35	Students illustrate their knowledge of Compact spaces Limit Point Compactness	H	M		L					M		L	M			M
Co36	Student can generalized the results of Countability And Separation Axiom	H	M		L					M		L	M			M
	Course Name: Differential Geometry															
C37	Students recognizes concepts of families of curves, their properties and equations	H	M		L					M			M			
Co38	Students will be comfortably familiar with orientation, Gauss map, Geodesic and parallel transport on oriented surfaces.	H	M		L					M			M			
Co39	Students recognize concepts of surfaces, their properties and equations	H	M		L					M			M			
Co40	Students discuss and understand the importance of concepts of compact surfaces, Hilbert's lemma, two dimensional Riemannian manifolds and solve problems of metrization and continuation	H	M		L					M			M			M
	Course Name: Classical Mechanics															
Co41	Students summaries the fundamental concepts of analytical mechanics	H	M		M					M			H			
Co42	Students illustrate various terminologies in classical mechanics	H	M			L	M			M	L		H			
Co43	Students apply knowledge of	H	M		M					M	L		H			

	the action principle to formulate the problem															
Co44	Students formulate & evaluate solutions of transformation equations	H	M	M	M					M	L		H	H		
	Course Name: Complex Analysis															
Co45	Students apply knowledge of complex function and illustrate the problems.	H	M		L					M	L		H			
Co46	Students interpret the concepts of analyticity, Cauchy-Riemann relations by solving problems and also discuss about zeros of a complex function and represent complex function in Mobius transformation and power series	H	M	M	L					M	L		M			
Co47	Students apply the concept of Cauchy integral theorem and Residue theorem to solve complex integration and recognizes singularity and residue of complex function	H	M		L		L			M	L		H			
Co48	Students recognised the theory of maximum principle, convex function and hadmards three circle theorem and pharagmen-lindelof theorem.	H	M		L					M			M			
	Course Name: Functional Analysis															
Co49	Students illustrate examples of Normed spaces and Banach spaces and also develop the examples of their subspaces	H	M		L	L				M		L	M			M
Co50	Students discussed the idea of linear functional and elaborate theory behind various spaces like dual, Inner product, Hilbert spaces.	H	M		L					M		L	M			M
Co51	Students illustrate concepts and theory of Hilbert spaces, complex vector space, normed space and reflexive space	H	M		L	L				M		L	M			M

Co52	Students recognised the theory of Category theorem, Uniform boundedness theorem, Open mapping theorem and closed graph theorem	H	M		L					M			M			M
	Course Name: Mathematical Methods															
Co53	Students implement concepts and formulae of Fourier Integrals, Fourier Transform to obtain solution of problems and also able to obtain solution of Partial differential equation by Fourier Transform	H	M		M					M		L	H			
Co54	Students apply knowledge of Laplace transform, its properties and inverse Laplace transform to find solution of ordinary differential equations	H	M	M	M					M		L	H			
Co55	Students evaluate solution of some problems by finite Fourier transform, finite Sturm-Liouville transform	H	M	M	M					M		L	H			
Co56	Students implement knowledge of Finite Hankel transform, finite Legendre transform and finite Mellin transform to solve typical problem:	H	M	M	M					M		L	H			M
	Course Name General Relativity															
Co57	Students evaluate and justify the differential forms of tensors	H	M		L					M	L		M			
Co58	Students recognizes the application of the fundamental principles of the general theory of relativity	H	M		L					M			M			
Co59	Students construct important field equations	H	M		L					M	L		M			
Co60	Students evaluate & summaries the solutions of field equations	H	M	M	L					M	L	L	M		H	M
	Course Name: Operation Research-I															
Co61	Students construct a Primal linear programming problem into standard form and evaluate the solution using Simplex method or dual	H	M		M					M		L	M		H	

	Simplex method														
Co62	Students formulate a number of classical assignment problem and transportation problem to evaluate the solutions	H	M		M					M		L	M		H	
Co63	Students understand the best strategy using decision making methods under uncertainty and game theory and determine the best choice using decision tree to evaluate solution of the zero-sum two-person games	H	M		M					M		L	M		H	
Co64	Students illustrate fundamentals of dynamic programming and evaluate the solution of multi-level decision problems using dynamic programming method	H	M		M	L				M		L	M		H	
	Course Name: Dynamical Systems															
Co65	Students develop the knowledge of different theorem on dynamical system	H	M		L					M		L	M			
Co66	Students recognise the theory and concepts of field of stability of an equilibrium points of dynamical system.	H	M		L					M		L	M			
Co67	Students analysed Poincare theorem and its application.	H	M		L					M		L	M			
Co68	Students apply the knowledge of asymptotic stability of closed orbits, discrete dynamical system and structural stability.	H	M		L					M		L	M			
	Course Name: Partial Differential Equations															
C69	Students evaluate solutions of first order PDE by relevant methods	H	M		M					M		L	H			
Co70	Students obtain solution of particular types of second order PDE	H	M		M					M		L	H			
Co71	Students implement the concepts of Dit'fusion and parabolic differential equation to obtain their solution	H	M	H	M					M		L	H			
Co72	Students implement the concept of Wave equation to	H	M	H	M					M		L	H			

	obtain the solutions under given conditions														
	Course Name: Advance Numerical Methods														
Co73	Students analyse the error present in any numerical approximation and apply different approaches to the numerical solution of non-linear equations	H	M		H				M		L	H			
Co74	Students apply specific formulae to obtain the numerical solution of various interpolation problems	H	M	H	H				M		L	H			
Co75	Students apply the concepts of Weierstrass and Taylor's theorem to evaluate solution of approximation problems	H	M	H	H				M		L	H			
Co76	Students apply different numerical integration methods to obtain solution of integration problems	H	M	H	H				M		L	H			
	Course Name: Cosmology														
Co77	Students apply the knowledge of physics and geometry of the universe to study structure of the universe	H	M		M				M		L	H			
Co78	Students apply various laws and principles of the universe which are basis of standard cosmology.	H	M		M				M		L	H			
Co79	Students are able to differentiate between present and early stage of the universe.	H	M		M				M		L	H			
Co80	Students formulate and evaluate basic cosmological models of the universe.	H	M	H	M				M	L	L	H			
	Course Name: Operation Research-II														
Co81	Students distinguish and formulate integer programming problems and evaluate the solution by cutting plane methods	H	M	H	H				M		L	H		H	
Co82	Students apply the concepts of of queuing theory to evaluate solution of real life problems	H	M	H	H				M		L	H		H	
Co83	Students solve the nonlinear optimization problems using	H	M	H	H				M		L	H		H	