

Programme Specific Outcomes and Course Outcomes

Under Graduate Programme In Chemistry

Programme Outcomes of the B. Sc. Chemistry programme

The Programme enable the students

- To understand basic facts and concepts in Chemistry while retaining the exciting aspects of Chemistry so as to develop interest in the study of chemistry as a discipline.
- To develop the ability to apply the principles of Chemistry.
- To appreciate the achievements in Chemistry and to know the role of Chemistry in nature and in society.
- To develop problem solving skills.
- To be familiarised with the emerging areas of Chemistry and their applications in various spheres of Chemical sciences and to apprise the students of its relevance in future studies.
- To develop skills in the proper handling of apparatus and chemicals.
- To be exposed to the different processes used in industries and their applications.

Semester – I

CH1BO1 - Methodology of Chemistry as a discipline of Science

Course outcome

- To impart students a broad outline of the methodology of science in general and Chemistry in particular. The students will learn the important analytical and instrumental tools used for practicing chemistry. They will learn computer based presentation and statistical analysis of data using spreadsheet software.

Semester – II

CH2B01.Theoretical and Inorganic Chemistry

Course Outcome

To develop interest among students in various branches of inorganic chemistry.
To impart essential theoretical knowledge on atomic structure, periodic properties, chemical bonding, and nuclear chemistry.

Practical: Volumetric Analysis

Course outcome

To develop skills for quantitative estimation using the different branches of volumetric Analysis .

Semester – III

Fundamentals of Organic Chemistry

Course outcome

To make students capable of understanding and studying nomenclature and classification of organic compounds, organic reactions .To have exposure to various emerging new areas of organic chemistry.

Practical: CH3B01- Qualitative Organic Analysis

Course outcomes

To develop skills required for the qualitative analysis of organic compounds, determination of physical constants.

Semester – IV

CH4B01 - Basic Organic Chemistry -I

Course outcomes

To impart the students a thorough knowledge about the chemistry of some selected functional groups with a view to develop proper aptitude towards the study of organic compounds and their reactions. To enable the students to understand and study Organic reaction mechanisms.

Semester – V

CH5B01 –Chemistry of d and f block elements

Course outcomes

To understand the general characteristics of the d and f block elements To give the students a thorough knowledge of the different theories to explain the bonding in coordination compounds. To improve the level of understanding of the chemistry of organometallic compounds, metal carbonyls and metal clusters.

Practical-Qualitative Inorganic Analysis

Course outcomes

To impart the students a thorough knowledge of Systematic qualitative analysis of mixtures containing two acid and two basic radicals with interfering radical by Semi-micro method

CH5B02- Basic Organic Chemistry-II

Course outcome

To impart the students a thorough knowledge about the mechanisms of reactions of some selected functional groups in organic compounds and also to give an outline of applied organic chemistry and the applications of organic chemistry in various spheres of chemical sciences. To give an elementary idea of chemotherapy, organic spectroscopy and photochemistry. To identify organic compound using UV, IR and PMR spectroscopic techniques.

CH5B03-States of matter

Course outcomes

To understand the general characteristics of different states of matter. To impart knowledge to the students about the intermolecular forces in gases and liquids, the structure of solids, Defects in solids .

CH5B04-Quantum Mechanics and Spectroscopy

Course outcomes

To impart the students concepts of the fundamentals of quantum

mechanics and its applications in the study of structure of atoms, bonding in molecules and molecular spectroscopy. To learn valence bond and molecular orbital theory. To impart a thorough knowledge of the fundamentals of microwave, infra red, Raman, electronic and magnetic resonance spectroscopy, mass spectrometry and photochemistry.

CH6B01-APPLIED INORGANIC CHEMISTRY

Course outcomes

The aim of the course is to sensitise the students to the spectrum of applications of chemical methods and materials. To give awareness of the principle of inorganic qualitative analysis, applications of radioactivity and radioisotopes the different Analytical techniques, preparation and applications of inorganic polymers and nanomaterials.

Practical CH6 B01 Qualitative Inorganic Analysis

Course outcomes

To impart skill to students in the systematic qualitative analysis of mixtures containing two acid and two basic radicals with one interfering radical by semi-micro method.

CH 6B02 – Chemistry of Natural products and Biomolecules

Course outcomes

To impart the students thorough idea in in the chemistry of carbohydrates, heterocyclic compounds, amino acids, proteins and nucleic acids. To study the fundamentals of terpenoids, alkaloids, vitamins, lipids and steroids. To have an elementary idea of supramolecular chemistry and Green Fluorescent Proteins.

CH6B02: Preparation and Basic Laboratory Skills

Course outcomes

The students will develop basic skills in the techniques of crystallisation,

distillation, solvent extraction, TLC and column chromatography and in quantitative dilution. Enable the students in Organic preparations.

CH6B03-Equilibrium and Kinetics

Course outcomes

To provide an insight into the thermodynamic and kinetic aspects of chemical reactions and phase equilibria. To derive some thermochemical equations and kinetic equations. To study phase diagrams and elementary idea of catalysis.

CH6 B03 : Physical Chemistry Practicals

Course outcomes

To develop skills in doing experiments in kinetics, Potentiometry and phase rule. Enable the students to prepare data analysis using spreadsheet program.

CH6B04-SOLUTION CHEMISTRY

Course outcome

To provide an insight into the characteristics of different types of solutions and electrochemical phenomena. To learn ionic equilibria and electrical properties of ions in solution. To learn the concepts of acids and bases, pH and buffer solutions.

Practical: CH6B05- Gravimetric Analysis

Course outcome

The students will get training in the quantitative analysis of metal ions and anions using gravimetric method.

CHOICE BASED COURSE

CH6B06.1 : Nanochemistry and Nanotechnology

Course outcome

The students will get a basic understanding of nanochemistry and nanotechnology. The course will give idea of Synthesis, characterisation, Electrical and optical properties and applications of nano systems.

OPEN COURSE

CH5D01.5: Chemistry in Everyday life

Course outcome

Chemistry is an integral part of everyday life. Whether it is the food we eat, the clothes we wear, the drugs we consume or the cosmetics we apply- there is chemistry in it. A general information of the chemistry behind these will create an awareness as to what is good and what is bad and to be discarded. This course will give insight into the processes involved in the production of soaps, detergents, cosmetics ...etc. this will give us information regarding what is the difference between the various types of soaps, their mode of action, why the disparity in their prices and why soaps are preferred over detergents. A student can also become enlightened about the pros and cons of using processed food stuff, which is in vogue today. The above mentioned points are some of the benefits a student who opts to study this subject offered as a common course will receive.

COMPLEMENTARY COURSES IN CHEMISTRY

I-SEMESTER

CH1C01 : Basic Theoretical and Analytical Chemistry

Course outcome

This course will provide an insight into some of the fundamental concepts and principles that are very essential in the study of chemistry. To learn atomic structure, basics of thermodynamics and the concept of equilibrium. The students will understand the fundamentals of principles of analytical chemistry and chromatographic techniques.

CH2C01: Basic Organic Chemistry

Course outcome

The students will understand some fundamental aspects of organic chemistry. They will learn mechanism of some organic reactions, classification of polymers, structure and uses of some commercial and natural polymers.

CH2C02: Volumetric Analysis

Course outcome

The students will get skill in the quantitative analysis by doing titrations in the

different branches of volumetric analysis.

CH3C01.1 :Advanced Physical Chemistry – I

(For students who have opted Physical Sciences and Geology as Main)

Course outcome

To enable the students to get a clear idea about the molecular structure. To make students capable of understanding and studying electrical and nuclear properties of molecules.

CH3C01.2: Advanced Inorganic and Organic Chemistry

**(For students who have opted Biological Sciences
and Family and Community Science as main)**

Course outcome

This course will promote understanding facts and concepts in inorganic and organic chemistry. This will give the students a basic understanding of nuclear chemistry and heterocyclic compounds and various types of food additives.

CH4C02.2 : Organic Chemistry Practicals

(For students who have opted Biological Sciences and Community Science as Main)

The students will get training for systematic qualitative analysis of simple organic compounds.

PROGRAMME OUTCOME OF M. Sc. CHEMISTRY

The objectives of the program are as follows

- To give students a comprehensive understanding of the principles of Chemistry
- To gain the skill to design and carry out scientific experiments and interpret the data
- To understand the interdisciplinary nature of Chemistry and to be aware of the emerging fields in Chemistry
- To build a scientific temper and to learn the necessary skills to succeed in research or industrial field.
- To be able to define and resolve new problems in Chemistry and participate in the future development of Chemistry

COURSE OUTCOMES

SEMESTER 1

CH1C01 Organometallics and Nuclear chemistry

- To study the structure, synthesis and reactions of commonly known organometallic compounds
- To know the important applications of organometallic compounds in catalysis
- To study the important aspects of organometallic polymers
- To understand the functions and applications of bioorganic compounds
- To have a basic idea about nuclear Chemistry and its applications

CH1C02 Structural and Molecular Organic chemistry

- To understand the basic concepts and mechanism in organic chemistry
- To get an idea about the various kinetic and thermodynamic factors which control the organic reactions
- To know stereochemistry and various possible conformations of organic compounds and how it affects the reaction outcome
- To be familiarise with the important photochemical reactions in Organic Chemistry

CH1C03 Quantum chemistry and Group Theory

- To study the basic postulates of quantum mechanics
- To enable the students to solve the simple quantum mechanical models such as simple harmonic oscillator, particle in a 1D- box, rigid rotor, H atom etc.
- To understand the quantum mechanical aspect of angular momentum and spin.
- Enable the students to predict the point group of important molecules and to know how they are classified
- To understand the idea of space groups and to learn the theory of molecular symmetry.
- To gain skill to apply group theory to vibrational and electronic spectroscopy

CH1C04 Classical and Statistical Thermodynamics

- To know the basic concepts in classical thermodynamics and to learn the thermodynamic aspects of various processes and reactions
- To understand the different aspects of statistical thermodynamics and its applications.

SEMESTER 2

CH2C05 Coordination chemistry

- To know the structure and bonding of important coordination compounds
- To understand the magnetic properties of complexes and to know how magnetic moments can be employed for the interpretation of their structure
- To get an overview about the stereochemistry of coordination compounds

- To study the reaction mechanisms of metal complexes.
- Enable the students to elucidate the structure of metal complexes using various spectroscopic methods
- To get an idea about the basic coordination chemistry of Lanthanides and Actinides

CH2C06 Organic Reaction Mechanism

- To be familiarise with the mechanism of organic reactions and different factors which affect the reaction rate.
- To understand the role of various reaction intermediates like carbanion, carbocation, carbenes, radicals etc. in organic reactions
- To get insight into the chemistry of carbonyl compounds.
- To know the different types of concerted reactions in organic chemistry and orbital correlation approaches

CH2C07 Chemical Bonding and Computational chemistry

- To understand the requirement of approximation methods in quantum mechanics
- To gain the knowledge to apply important approximation methods to problems in quantum mechanics
- To gain insight in to valance bond theory molecular orbital theory and the concept of hybridisation
- To know the applications of group theory in chemical bonding
- To get an exposure to the emerging world of computational chemistry
- To have a basic idea about computational chemistry calculations

CH2C08 Molecular Spectroscopy

- To know the basics principle of different techniques employed in molecular spectroscopy
- To study the origin, instrumentation and important applications of Microwave, IR, Raman, UV, NMR, EPR and EQR techniques

SEMESTERS 1 & 2 PRACTICAL

CH2P01 Inorganic chemistry Practical-1

- To be able to identify and separate less familiar ions such as Tl, W, Se, Mo, Ce, Th, Ti, Zr, V, U etc.
- To be able to estimate colorimetrically ions such as Fe, Cu, Ni, Mn, Cr etc.

CH2P02 Organic chemistry Practical-1

- To learn the separation and purification of an organic mixture by chemical/solvent separation methods.
- To gain the knowledge to draw the structure of compounds using Chemdraw software

CH2P03 Physical chemistry Practical-1

- To verify the some important principles in physical chemistry and to determine various physical properties
- To learn to carry out some simple computational chemistry calculations

SEMESTER 3

CH3C09 Structural Inorganic chemistry

- To understand the structure and different properties of solids
- To learn the important aspects of inorganic chains, rings, cages and metal clusters.
- To understand the chemistry and applications of materials such as glasses, ceramics, composites, nanomaterials etc.

CH3C10 Organic Syntheses

- To know the various methods employed for reactions like oxidation, reduction, carbocyclic and heterocyclic ring formation etc.
- To get insights into novel reactions and reagents in organic synthesis
- To know the utility of protecting group strategy in organic synthesis
- To be familiarise the students with the basic principles of retro syntheses, biosynthesis and biomimetic synthesis

CH3C11 Chemical Kinetics, Surface chemistry and Photochemistry

- To learn the different theories of reaction rates and factors affecting reaction rates
- To have an idea about the different types of catalysis and their mechanisms
- To study the chemistry of surfaces and different types of surface phenomena
- To get an idea about the various techniques employed for the characterisation of surfaces
- To know the general properties of colloids and macromolecules
- To have an idea about the important aspects of photochemistry

CH3C12 Spectroscopic Methods in chemistry

- To get a deep insight into the various spectroscopic methods used for the characterisation of organic compounds.
- Enable the students to elucidate the structure of compounds by analysing the spectral data

SEMESTER 4

ELECTIVE COURSES

CH4E01 Advanced Inorganic chemistry

- To understand the applicability of group theory in coordination chemistry
- To know the utility of spectroscopic methods such as IR, Raman, EPR and Mossbauer techniques for the characterisation of inorganic complexes
- To understand the photochemistry of inorganic compounds
- Introduce the students the emerging field of nanochemistry and its fascinating aspects
- To study the acid –base concept in non-aqueous media and reactions in non-aqueous media

CH4E02 Advanced Organic chemistry

- To get a brief idea about emerging branches in chemistry like supramolecular chemistry, nanochemistry, medicinal chemistry, polymer chemistry and its applications
- To learn the principles of green chemistry and to know the various green protocols in organic synthesis
- To study the important stereoselective transformations in organic synthesis
- To know the basic aspects of natural product chemistry.
- To get an overview about research process and to gain the ability to apply various research methods and techniques.

CH4E03 Advanced Physical chemistry

- To get an overview about the structure and properties of solid crystals and liquid crystals
- To know the characterisation of crystals using X-Ray diffraction
- To learn the important aspects of gaseous state and electrochemistry
- To study the principle, instrumentation and applications of diffraction method, fluorescence spectroscopy, atomic spectroscopy and electroanalytical techniques.

PRACTICAL- SEMESTERS 3 AND 4

CH4P04 Inorganic chemistry practical-2

- Enable the students to estimate the binary mixtures of metallic ions by volumetric and gravimetric methods
- To acquire the skill to analyse some common alloys and ores.

CH4P05 Organic chemistry practical-2

- To gain the skill to prepare organic compounds using greener protocols
- Enable the students to prepare organic compounds via two step synthetic sequences
- To know about enzyme/coenzyme catalysed reactions

CH4P05 Physical chemistry practical-2

- Enable the students to determine the various physical properties using simple instrumental methods like polarimetry, refractometry etc.

B.com Model I Finance and Taxation

Programme Specific Outcomes

- Ø To build a strong foundation in accounting, management and business subjects
- Ø To prepare students for a variety of career options in accounting, management and business related fields
- Ø To equip students with skills and knowledge to excel in their future careers
- Ø To develop critical thinking skills in students
- Ø To prepare students enter Masters programmes like M.Com, M.B.A and pursue professional programmes like C.A, CMA, C.S. etc.
- Ø To develop entrepreneurial skills in students

Course outcomes

CORE-1 BUSINESS STATISTICS

- 1) To provide basic knowledge of statistical techniques as are applicable to business.
- 2) To enable the students to apply statistical techniques for quantification of data in business.

CORE-2 MODERN BANKING

- 1) To provide basic knowledge of banking.
- 2) To familiarize the students with the changing scenario of Indian Banking.
- 3) To familiarise students, regarding innovations in banking technology.

CORE-3 BUSINESS REGULATORY FRAMEWORK

- 1) To provide a brief idea about the framework of Indian Business Laws.
- 2) To enable the students to apply the provisions of business laws in business activities.

3) To provide knowledge regarding Indian Contract Act-1872

COMMON -1 PERSPECTIVES AND METHODOLOGY OF BUSINESS STUDIES

- 1) To understand business and its role in society
- 2) To understand entrepreneurship and its heuristics
- 3) To comprehend the business environment
- 4) To enable the student to undertake business activities

CORE-4 QUANTITATIVE TECHNIQUES FOR BUSINESS RESEARCH

- 1) To impart basic knowledge of research
- 2) To enable the students to apply the simple statistical tools in business research

CORE-5 PRINCIPLES OF INSURANCE

- 1) To make the students explore with the fundamental principles of insurance
- 2) To impart knowledge on practice of insurance business
- 3) To increase the span of knowledge regarding various types of insurance policies & their benefits

CORE-6 CORPORATE REGULATIONS AND GOVERNANCE

- 1) To provide an understanding regarding the administration and management of corporate form of business and to give a first hand Exposure to corporate laws especially Indian Companies Act 1956.
- 2) To develop a clear idea regarding the Indian Companies Act 2013 and its various provisions.

COMMON -2 BUSINESS COMMUNICATIONS AND MANAGEMENT INFORMATION SYSTEM

1) To familiarise the importance of communication in business and methods of communication relevant to various business situations and to build up communication skill among students.

2) To make the students understand about management Information System and its functioning in an organisation.

CORE-7 MARKETING MANAGEMENT

1)To help students to understand the concept of marketing and its applications.

2. To make the students aware of modern methods and techniques of marketing.

3) To develop a passion for improving marketing skills and innovations in marketing.

CORE-8 FINANCIAL ACCOUNTING

To familiarize the students with the accounting principles and practices of various types of business other than company

CORE-3 E-COMMERCE AND GENERAL INFORMATICS

The objective of this course is to make the students familiar with the mechanism of conducting business transactions through electronic media.

CORE-9 BUSINESS MANAGEMENT

1) To familiarise the students with concepts and principles of Management

2) To provide the students with an overall idea of different management techniques.

3) To provide knowledge regarding practical aspects of business management.

CORE-10. CAPITAL MARKET

1) Students should an overall idea about Capital market..

2) To familiarise the students with capital market operations in India.

CORE-11 CORPORATE ACCOUNTING

To provide a thorough knowledge about the accounting of companies

COMMON -4 ENTREPRENEURSHIP DEVELOPMENT AND PROJECT MANAGEMENT

To equip the students a craving for individual freedom, initiative and enterprise by pursuing self employment and small business entrepreneurship as a viable alternative to salaried employment.

CORE-12 FINANCIAL SERVICES

1. To provide the students with an overall idea of financial services available in the country.
2. To create an understanding about recent trends in financial services sector.

CORE-13 COST ACCOUNTING

- 1) To familiarise the students with cost concepts
- 2) To make the students learn the fundamentals of cost accounting as a separate system of accounting.

COMPLEMENTARY COURSE -1 ADVERTISING AND SALES PROMOTION

- 1) To make the students aware of the strategy, concept and methods of advertising and sales promotion.

CORE-14 SPECIAL ACCOUNTING

- 1) The purpose of the paper is to acquaint the students with advanced accounting principles and procedures.
- 2) To develop practical knowledge in managing the accounts of banking, insurance and investments accounts.

CORE-15 APPLIED COST ACCOUNTING

1. To acquaint the students with different methods and techniques of Costing.
2. To enable the students to identify the methods and techniques applicable for different types of industries.

COMPLEMENTARY COURSE-2 PRINCIPLES OF BUSINESS DECISIONS

1. To familiarise the students with the economic principles and theories Underlying various business decisions.
2. To equip the students to apply the economic theories in different business Situations.

CORE-16 PRACTICAL AUDITING

1. To familiarize the students with the principles and procedure of auditing.
2. To enable the students to understand the duties and responsibilities of auditors and to undertake the work of auditing.
3. To aware about a thorough understanding of different types of audit work

CORE-17 ACCOUNTING FOR MANAGERIAL DECISIONS

1. To equip the students to interpret financial statements.
2. To enable the students to have a thorough knowledge on the Management accounting techniques in business decision making.

CORE (OPTIONAL)-1 FINANCIAL MANAGEMENT

1. To build a thorough understanding of the central ideas and theories of modern finance
2. To relate theory to practice so that students learn the practical applications of Financial Management concepts.
3. To provide students basic knowledge in cost of capital, working capital management and dividend policy decisions

CORE (OPTIONAL)-2 VALUES ADDED TAX-CONCEPTS AND PRACTICES

The objective of the course is to provide an understanding of the concept of Value Added Tax Scheme and provide an insight into the aspects and procedures in connection with Kerala Value Added Tax Act and Rules, which are useful to the emerging entrepreneurs. The course also aims to enable the students to practice as tax consultants after graduation.

CORE (OPTIONAL)-3 INCOME TAX LAW AND PRACTICE

- 1) To familiarise the students with Income Tax Act 1961 and to enable the students to compute Income taxable under the first three heads of Income.
- 2) To provide an insight regarding e-filing of Income Tax return .
- 3) To enable the students to plan and manage income tax.

CORE (OPTIONAL)-3 INCOME TAX ASSESSMENT AND PROCEDURE

To have an understanding of determination of Total Income and tax payable and to get an overview regarding returns to be filed by an individual and also assessment procedure.

Core Course 15: ENVIRONMENT MANAGEMENT AND HUMAN RIGHTS

- 1)To make students aware about importance of protecting our environment , concept of sustainable development and Human rights.
- 2) To propagate the idea of environmental conservatism and philanthropy

A New Course Introduced in Fourth Semester GST (Goods and Service Tax)

To give the students a general understanding of the GST law in the country and provide an insight into practical aspects of GST and equip them to become tax practitioner.

M.Com. Finance Programme

Programme Specific Outcomes

- Ø To impart advanced knowledge to students in Accounting, Taxation and Financial Management.
- Ø To prepare students to enter into careers in a range of fields like Accounting, Taxation, Finance and Teaching.
- Ø To prepare students to excel in competitive examinations and in UGC NET and JRF examinations.
- Ø To further critical thinking and communication skills in students
- Ø To inculcate research skills and aptitude in students.

Course Outcomes

SEMESTER 1

ADVANCED FINANCIAL ACCOUNTING-1(Code: AF01C01)

- 1)To know the methods of valuation of goodwill and share
- 2) To acquaint with the amalgamation and reconstruction procedures of companies
- 3) To learn the proceedings of insolvency of an individual and international reporting standards.

PRINCIPLES OF MANAGEMENT AND ORGANISATIONAL BEHAVIOUR(PM01C02)

- 1)To help the students to understand the conceptual frame work of management and organizational behaviour
- 2) To understand the managerial applicability of the concept.

FINANCIAL MANAGEMENT PRINCIPLES(FM01C03)

- 1) To introduce the subject of financial management
- 2) To acquaint the student with various methods and techniques of financial management.
- 3) To provide fundamental knowledge base in the various concepts and principles of financial management.

RESEARCH METHODOLOGY (RM01C04)

- 1) To help the students to understand how to do research in the area of commerce and management.
- 2) To give an insight regarding socio science research process
- 3) To equip the students to undertake sample surveys and prepare research articles.

QUANTITATIVE TECHNIQUES (QT01C05)

- 1) To understand statistical tools for quantitative analysis
- 2) To understand the statistical tools for research and business decision making.
- 3) This paper gives emphasis the practical applications of statistical analysis and hence it enables the students to do research work /projects without any assistance from statisticians

SEMESTER 11

ADVANCED FINANCIAL ACCOUNTING-(AF02C06)

- 1) To understand the proceedings of the preparation of consolidated balance sheet
- 2) To get an idea about Green accounting, Double accounts, Farm accounts, voyage accounts, and liquidation proceedings of companies

HUMAN RESOURCE MANAGEMENT(HR02C07)

- 1) To help the students to understand the human resource functions in an organization.
- 2) To enrich level of knowledge regarding managerial leadership skills.
- 3) To enhance knowledge regarding employee recruitment ,selection , placement and training

FINANCIAL MANAGEMENT STRATEGIES (FM02C08)

- 1 To acquaint students with the advanced concept of financial management and to develop financial strategies for the organization.
- 2 To provide practical understanding in computation of cost of capital, time value of money and liquidity management.

- 3) To strengthen the practical knowledge regarding financing ,investment ,dividend policies.

STRATEGIC MANAGEMENT (SM02C09)

- 1) To understand the frame work across strategic analysis, strategy formulation, and strategic implementation
- 2) To impart knowledge in designing and effectively implementing business strategies
- 3) To understand the various methods to analyse the internal and external business environment.

OPERATIONS RESEARCH (OR02C10)

- 1) To enable the students to understand various techniques used in operation management decisions.
- 2) study of operations research enables the students to solve complicated decision making situations in relation to job assignments , projects management ,inventory management ,transportation of goods etc.

SEMESTER 11I

MANAGEMENT ACCOUNTING (MA02C11)

- 1) To enable students understand accounting methods and techniques used for decision making.
- 2) To provide students advanced knowledge in management accounting tools like ratio analysis ,fund flow analysis and cash flow analysis
- 3) To provide through understanding of price level accounting

DIRECT TAXES- LAW AND PRACTICE (DT02C12)

- 1) To make the students familiar with the direct tax law of the country and to give advanced level of knowledge on direct tax laws and computation and assessment.
- 2) To provide indepth practical knowledge in computation of taxable income and net tax liability of individuals

INTERNATIONAL BUSINESS (IB03C13)

- 1) To understand different aspects of international business.
- 2) To provide knowledge regarding theories of internalisation, FDI , FPI
- 3) To impart knowledge regarding functioning of MNCs, global companies ,transnational companies.

CORPORATE GOVERNANCE (CG03C14)

- 1) To understand the importance of corporate governance

BUSINESS ENVIRONMENT (BE03C15)

- 1) To understand the impact of environment in business
- 2) To understand the external environment forces which influences the business decision

ADVANCED COST ACCOUNTING(AC04C16)

- 1) To learn about the higher application of cost accounting techniques and methods.
- 2) To know the application of cost control techniques.

SEMESTER 1V

DIRECT TAXES-ASSESSMENT & PROCEDURES(DT04C17)

- 1) To make the students familiar with the assessment and procedures of direct taxes in the country.
- 2) To enable the students to effectively plan and administer tax liabilities of concerned assesses.

INTERNATIONAL FINANCE (IF04E01)

- To give a detailed idea about macro environment on which financial transactions are carried out.
- To give a comprehensive knowledge about ways and means of raising of finance by MNCs'.

FINANCIAL MARKETS & DERIVATIVES(FM04E02)

1. To make the students familiar with the financial system of the country in general and capital market operations in particular.
2. To provide the students advanced knowledge in derivative instruments like forwards, futures, options and swaps.
3. To develop analytical skills in students in pricing derivative instruments
4. To give good understanding of commodity trading

SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT (SA04E03)

- 1) To give a detailed idea about techniques of Security analysis.
- 2) To familiarise students with economy –industry –company.

Bachelor of Computer Application (BCA)

Program Objectives

The BCA Programme is designed with the following specific objectives.

- (a) To attract young minds to the potentially rich & employable field of computer applications.
- (b) To be a foundation graduate programme which will act as a feeder course for higher studies in the area of Computer Science/Applications.
- (c) To develop skills in software development so as to enable the BCA graduates to take up self-employment in Indian & global software market.
- (d) To Train & Equip the students to meet the requirements of the Industrial standards.

Course Outcomes

BCA 101 ENGLISH (Common Course)

- Mastering the art of a professional business presentation
- Distinguishing different communication process and its practical application
- More effective written communication

BCA102 MATHEMATICS (Complementary)

- Reason mathematically about basic discrete structures such as numbers, sets, used in computer science.
- Familiarity with Determinant and Matrices.
- Formulate Limit, Continuity and Differentiability.
- Demonstrate a working knowledge Definite and Indefinite Integrals.

BCA 103 : BASIC STATISTICS (Complementary)

- Knowledge about Sampling Methods.
- Basic idea of Permutations and Combinations, and Probability Concepts.

- Familiarity with Measures of Central Tendency and Measures of Dispersion Range.
- An ability to apply knowledge of mathematics, science, and engineering.
- An ability to design and conduct experiments, as well as to analyze and interpret data.
- Evaluate the probabilities and conditional probabilities.
- Evaluate expectations and conditional expectations of random variables.
- Approximate the distribution of sum of random variables using CLT.
- Construct point estimators using the method of maximum likelihood.
- Calculate the number of samples needed to construct confidence levels on the mean and variance of a normal distribution.
- Use linear regression analysis to develop an empirical model of experimental data.

BCA104 : INTRODUCTION TO COMPUTERS (CORE)

- Familiarity with parts of computer
- Understand the input and output devices.
- Basic ideas of storage devices, computer Networks and Operating System.

BCA105 : METHODOLOGY OF PROGRAMMING AND PROGRAMMING IN C (CORE)

- Analyze a given problem and develop an algorithm to solve the problem
- Improve upon a solution to a problem
- Use the 'C' language constructs in the right way
- Design, develop and test programs written in 'C'
- Use different data types in a computer program.
- Design programs involving decision structures, loops and functions.
- Understand the dynamics of memory by the use of pointers and Structures.

BCA106 SOFTWARE LAB I (CORE)

- Understand the basic terminology used in computer programming.
- Write, compile and debug programs in C language.
- Create programs involving decision structures, loops, strings and functions.
- Design programs involving structures and pointers.

BCA 201: ENGLISH (Common)

- To sensitize students to the aesthetic, cultural and social aspects of literature.
- To develop in the learners an appreciation of the subtle nuances of literary expression.
- To enable the learners to revalue literature as cultural and communicative events.
- To improve the learners' use of language as a means of subjective expression.

BCA 202: MATHEMATICS(Complementary)

- Mastering the basic set theory.
- Familiarity with propositional calculus.
- Knowledge about Graphs and algorithms.

BCA203: ACCOUNTING AND PROGRAMMING IN COBOL (CORE)

- Understand basic concepts of Accounting.
- Knowledge regarding how to create ledgers , journals and balance sheet.
- To create programs in COBOL.
- Knowledge about different type of files and file programs.

BCA204 : DATA STRUCTURES (CORE)

- To access how the choices of data structure & algorithm methods impact the performance of program.
- To Solve problems based upon different data structure & also write programs.
- Choose an appropriate data structure for a particular problem.

BCA205 : FUNDAMENTALS OF DIGITAL SYSTEMS (CORE)

- Perform conversions among different number systems, became familiar with basic logic gates and understand Boolean algebra and simplify simple Boolean functions by using basic Boolean properties & design of combinational circuits such as MUX, DEMUX, Encoder and Decoder etc.
- Understand the design of sequential Circuits such as Flip-Flops, Registers, and Counters.
- Obtain a basic level of Digital Electronics knowledge and set the stage to perform the analysis and design of Complex Digital electronic Circuits

BCA206 : SOFTWARE LAB II (CORE)

- Know about the basic concepts of Function, Array and Link-list.
- Understand how several fundamental algorithms work particularly those concerned with Stack, Queues, Trees and various Sorting algorithms.
- Ability to create basic COBOL Programs and File programs.

BCA301 : ADVANCED STATISTICAL METHODS (COMPLEMENTARY)

- Knowledge about different types of distributions.
- Ability to Estimate different distributions
- Knowledge regarding how to conduct hypothesis Testing.

BCA302 : DESIGN AND ANALYSIS OF ALGORITHMS (CORE)

- Be able to design and analyze the time and space efficiency of the data structure
- Be able to design an algorithm by selecting appropriate design strategies.
- Be capable to identify the appropriate data structure for given problem
- Have practical knowledge on the application of data structures
- Apply graph and tree traverse technique to various applications.
- Implement Dijkstra's algorithm, Binary Trees ,Travelling Sales person Problem.

BCA303: COMPUTER ORGANIZATION AND ARCHITECTURE (CORE)

- Understand the fundamentals of different instruction set architectures and their relationship to the CPU design.
- Understand the principles and the implementation of computer arithmetic.
- Knowledge about Primary and Secondary storage System.
- Basic knowledge about parallel computer structure and Pipelining.

BCA304: COMPUTER GRAPHICS (CORE)

- To provide comprehensive introduction about computer graphics system, design algorithms and two dimensional transformations.
- To make the students familiar with techniques of clipping, three dimensional graphics and three dimensional transformations.

BCA305 :OBJECT ORIENTED PROGRAMMING AND C++ (CORE)

- Be able to understand the difference between object oriented programming and procedural oriented language and data types in C++.
- Be able to program using C++ features such as composition of objects, Operator overloading, inheritance, Polymorphism etc.
- At the end of the course students will able to simulate the problem in the subjects like Operating system, Computer networks and real world problems

BCA306 : SOFTWARE LAB III (CORE)

- To familiarize the students with OOPs concept
- Be able to create programs for various real world problems.

BCA401: OPERATIONAL RESEARCH (COMPLEMENTARY)

- Formulate a real-world problem as a mathematical programming model
- Understand the theoretical workings of the simplex method for linear programming and perform iterations of it by hand
- Understand the relationship between a linear program and its dual, including strong duality and complementary slackness
- Solve specialized linear programming problems like the transportation and assignment problems

BCA402 : MICROPROCESSORS AND PC HARDWARE (CORE)

- Introduction to the Architecture and programming of the microprocessor 8085 and 8086.
- Know the basic concepts of Motherboard and hard disk.

BCA403 : SYSTEM ANALYSIS AND DESIGN (CORE)

- Students will be able to understand the steps in Software Development.
- Know the tools for System Analysis and Design.

BCA404 : DATA BASE MANAGEMENT SYSTEM (CORE)

- Gain a good understanding of the architecture and functioning of database management systems as well as associated tools and techniques, principles of data modeling using entity relationship and develop a good database design and normalization techniques to normalize a database.
- Understand the use of structured query language and its syntax, transactions, database recovery and techniques for query optimization.
- Acquire a good understanding of database systems concepts and to be in a position to use and design databases for different applications.

BCA405 : VISUAL PROGRAMMING TECHNIQUES (CORE)

- Design, create, build, and debug Visual Basic applications.
- Explore Visual Basic's Integrated Development Environment (IDE).
- Implement syntax rules in Visual Basic programs.
- Explain variables and data types used in program development.
- Apply arithmetic operations for displaying numeric output.
- Write and apply decision structures for determining different operations.
- Write and apply loop structures to perform repetitive tasks.
- Write and apply procedures, sub-procedures, and functions to create manageable code.

BCA406: SOFTWARE LAB IV (CORE)

- Design, create, build, and debug Visual Basic applications.
- Apply arithmetic operations for displaying numeric output.
- Apply decision structures and loop structures for determining different operations.
- Write and apply procedures, sub-procedures, and functions to create manageable code.
- Create one and two dimensional arrays for sorting, calculating, and displaying of data.
- Write Visual Basic programs using object-oriented programming techniques including classes, objects, methods, instance variables, composition, and inheritance, and polymorphism.
- Write Windows applications using forms, controls, and events
- Be able to Write SQL Queries in DDL, DML and DC commands for complex applications.

BCA501 : COMPUTER NETWORKS

- To explain how communication works in computer networks and to understand the basic terminology of computer networks

- To explain the role of protocols in networking and to analyze the services and features of the various layers in the protocol stack.
- To understand design issues in Network Security and to understand security threats, security services and mechanisms to counter.

BCA 502 : OPERATING SYSTEMS

- To make students able to learn different types of operating systems along with concept of file systems and CPU scheduling algorithms used in operating system.
- To provide students knowledge of memory management and deadlock handling algorithms.
- At the end of the course, students will be able to implement various algorithms required for management, scheduling, allocation and communication used in Operating System.

BCA 503: JAVA PROGRAMMING

- Understanding of the principles and practice of object oriented analysis and design in the construction of robust, maintainable programs which satisfy their requirements;
- Ability to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem.
- Demonstrate the principles of object oriented programming;
- Demonstrate the ability to use simple data structures like arrays in a Java program.
- Understand the concept of package, interface, multithreading and File handling in java.
- Ability to make use of members of classes found in the Java API (such as the Math class).

BCA504: OPEN COURSE -INTERNET, WEB DESIGNING and CYBER LAWS

- Understand the basic working of Internet and its main services.
- Ability to create web pages using HTML.
- Acquire knowledge about Cyber Crime and the facilities for secure communication.

BCA505: SOFTWARE LAB V

- Ability to create programs of the following type:-
 1. Programs using classes and methods
 2. Programs using one dimensional and two dimensional arrays.
 3. Programs using strings and inheritance.
 4. Generate the program using interfaces and Packages.
 5. Programs to implement the exception handling mechanism
 6. Programs using multithreading

BCA506: SOFTWARE DEVELOPMENT LAB I (Mini Project)

- To make the student confident in designing a system based on **System Analysis & Design** course, using **VB** and **SQL Server/ ORACLE**

BCA601: WEB TECHNOLOGY

- Understand, analyze and apply the role of languages like HTML, DHTML, CSS, XML, Javascript, VBScript, ASP, PHP and protocols in the workings of the web and web applications.
- Analyze a web project and identify its elements and attributes in comparison to traditional projects.
- Understand, analyze and create web pages using HTML, DHTML and Cascading Styles Sheets.
- Understand, analyze and build dynamic web pages using JavaScript and VBScript (client side programming).
- Understand, analyze and build interactive web applications.
- Understand, analyze and build web applications using PHP.
- Understand, analyze and create XML documents and XML Schema.

BCA602: SOFTWARE ENGINEERING

- Select and implement different software development process models.
- Extract and analyze software requirements specifications for different projects.
- Develop some basic level of software architecture/design.
- Apply standard coding practices.
- Define the basic concepts and importance of Software project management concepts like cost estimation, scheduling and reviewing the progress.
- Identify and implement of the software metrics.
- Apply different testing and debugging techniques and analyzing their effectiveness.

BCA603(B): LINUX OPERATING SYSTEM

- To know the basic concepts of Linux operating System.
- Familiarity with Linux commands.

BCA 604 : SEMINAR

- Provides opportunity for students to develop skills in presentation and discussion of research topics in a public forum.
- Provides students with exposure to a variety of research projects and activities in order to enrich their academic experience.

BCA 605: SOFTWARE DEVELOPMENT LAB II (MAIN PROJECT)

- To make the student confident in designing an Online Project
- Students are trained to meet the requirements of the Industry.

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

- Reason mathematically about basic discrete structures such as numbers, sets, used in computer science.
- Familiarity with Determinant and Matrices.
- Formulate Limit, Continuity and Differentiability.
- Demonstrate a working knowledge Definite and Indefinite Integrals.

CA1CRT01 -Computer Fundamentals and Digital Principles

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

- An ability to understand theory of Digital Design and Computer Organization to provide an insight of how basic computer components are specified.
- An ability to understand the functions of various hardware components and their building blocks
- An ability to understand and appreciate Boolean algebraic expressions to digital design
- An in depth understanding of sequential! Combinational circuits
- An in depth understanding of realization of different combinational/sequential circuits
- An in depth understanding of different stages of an instruction execution
- An in depth understanding of how different hardware components are related and work in coordination
- An ability to understand computer buses and input/output peripherals

CA1CRT02-Methodology of Programming and C Language

- Analyze a given problem and develop an algorithm to solve the problem
- Improve upon a solution to a problem
- Use the 'C' language constructs in the right way
- Design, develop and test programs written in 'C'
- Understand the basic terminology used in computer programming
- Write, compile and debug programs in C language.
- Use different data types in a computer program.
- Design programs involving decision structures, loops and functions.
- Explain the difference between call by value and call by reference
- Understand the dynamics of memory by the use of pointers and Structures.
- Use different data structures and create/update basic data files.

CA1CRP01-Software Lab I (Core)

- To demonstrate use of data types, simple operators (expressions)
- To demonstrate decision making statements (if and if-else, nested structures)
- To demonstrate decision making statements (switch case)
- To demonstrate use of simple loops

- To demonstrate use of nested loops
- To demonstrate menu driven programs and use of standard library functions.
- To demonstrate writing C programs in modular way (use of user defined functions)
- To demonstrate recursive functions.
- To demonstrate use of arrays (1-d arrays) and functions
- To demonstrate use of multidimensional array(2-d arrays) and functions
- To demonstrate use of pointers
- To demonstrate concept of strings (strings and pointers)
- To demonstrate array of strings.
- To demonstrate structures (using array and functions)
- To demonstrate nested structures and Unions
- To demonstrate file handling (text files

CA2CRT03 -Data Base Management Systems

- Able to master the basic concepts and understand the applications of database systems.
- Able to construct an Entity-Relationship (E-R) model from specifications and to transform to relational model.
- Able to construct unary/binary/set/aggregate queries in Relational Algebra.
- Understand and apply database normalization principles.
- Able to construct SQL queries to perform CRUD operations on database. (Create, Retrieve, Update, Delete)
- Understand principles of database transaction management, database recovery, security.
- To analyze Data Base design methodology.
- Acquire knowledge in fundamentals of Data Base Management System.
- Be able to analyze the difference between traditional file system and DBMS.
- Able to handle with different Data Base languages.
- Draw various data models for Data Base and Write queries mathematically

CA2CRT04-Computer Organization and Architecture

- On successful completion of this course, the students will be able to Master the binary and hexadecimal number systems including computer arithmetic.
- Be familiar with the history and development of modern computers
- Understand the fundamentals of different instruction set architectures and their relationship to the CPU design.
- Understand the principles and the implementation of computer arithmetic.

CA2CRT05-Object oriented programming using C++

- Understand fundamental constructs of OOP.
- Get the knowledge of UML with skills to draw UML diagrams.
- Get the knowledge of different forms of OO Implementation.
- Apply object oriented programming concepts in problem solving through C++.
- Gain the basic knowledge on Object Oriented concepts.
- Ability to develop applications using Object Oriented Programming Concepts
- To demonstrate the differences between traditional imperative design and object-oriented design
- To explain class structures as fundamental, modular building blocks
- To understand the role of inheritance, polymorphism, dynamic binding and generic structures in building reusable code
- To write small/medium scale C++ programs with simple graphical user interface

- Understand the file handling and error handling mechanisms in C++

CA2CRP02-Software Lab- II OOPS LAB

- Programs using Control Structures
- Programs using Functions
- Programs using Arrays
- Programs using Inline Functions
- Programs using Classes
- Programs using Constructors and Destructors
- Programs using Friend Functions
- Programs using Operator Overloading
- Programs using Inheritance
- Programs using Virtual Functions
- Programs using Files
- Programs using Strings

DBMS LAB

- Brief knowledge about SQL Fundamentals.
- Unary & Binary table operations.
- Able to handle with different Data Base languages.
- Table View, Log & Triggers.
- Introduction to different Database packages(Oracle/ MySql/ DB2/ etc)Commit & Rollback.
- Handling online Transactions.
- Database connectivity with front-end.
- Queries Using DDL- DML commands
- Queries using AND- OR- NOT operation, Union- Intersection and Projection,Join Operation
- Sorting and Grouping
- Nested queries using SQL
- Built-in functions of SQL
- Update operations using SQL
- Use of SQL forms

PROGRAMME SPECIFIC OUTCOME OF

B. Sc. BOTANY PROGRAMME

Undergraduate Botany course offered by Department of Botany, Nirmala College, Muvattupuzha follows the syllabus prescribed by M. G. university, Kottayam. The course is a combination of general and specialized education, simultaneously introducing the concepts of breadth and depth in learning. It also stresses learning to learn rather than learning of specific lessons. The attempt is to prepare the students for lifelong learning by drawing attention to the vast world of knowledge of plants and introducing him/her to the methodology of

systematic academic enquiry. With this in mind, we aim to provide a firm foundation in every aspect of Botany and to explain a broad spectrum of modern trends in Botany and to develop experimental, observational, computational skills also which lead him as an ambassador of sustainable development of our country.

1. Know the importance and scope of the discipline
2. Inculcate interest in and love of nature with its myriad living forms
3. Impart knowledge of Science as the basic objective of Education
4. Develop a scientific attitude to make students open minded, critical and curious
5. Develop an ability to work on their own and to make them fit for the society
6. Expose themselves to the diversity amongst life forms
7. To develop skill in practical work, experiments, equipments and laboratory use along with collection and interpretation of biological materials and data
8. Make aware of natural resources and environment and the importance of conserving it.
9. Develop ability for the application of the acquired knowledge in the fields of life so as to make our country self reliant and self sufficient
10. Appreciate and apply ethical principles to biological science research and studies.

COURSE OUTCOMES OF B. Sc. BOTANY PROGRAMME

Course Names		Outcome
1	BO1B01U	Methodology and Perspectives of Science & Introduction to the World of Plant Diversity PRACTICAL 1 (Internal)
2	BO2B02U	General Informatics and Methodologies in Plant Sciences PRACTICAL 2 (External) Microbiology and Phycology
3	BO3B03U	PRACTICAL 3(Internal) Anatomy & Reproductive Botany of
4	BO4B04U	Angiosperms PRACTICAL 4 (External)
	BO5B05U	Mycology, Lichenology and Pathology PRACTICAL 5(Internal)
	BO5B06U	Environmental Studies and Ecotourism

5	BO5B07U	PRACTICAL 6(Internal) Genetics, Plant Breeding and Horticulture PRACTICAL 7 (Internal)
	BO5B08U	Cell and Molecular Biology and Evolution PRACTICAL 8 (Internal)
	BO5D01U	OPEN COUESE: <i>Horticulture and Nursery Management/ Ecotourism/ Agribased Microenterprises/ Biotechnology/Bioinformatics</i>
	BO6B09U	Plant Physiology and Biochemistry PRACTICAL 9 (External)
	BO6B10U	Bryology, Pteridology, Gymnosperms and Palaeobotany PRACTICAL 10 (External)
	BO6B11U	Angiosperm Morphology, Taxonomy and Eco. Botany PRACTICAL 11 (External)
	BO6B12 U	Biotechnology and Bioinformatics PRACTICAL 12 (External)
6	BO6B13 U	CORE- CHOICE BASED COURSE :- <i>Plant Genetic Resource / Phytochemistry / Agribusiness</i>
		Project & Viva

Course outcomes of B. Sc. Botany Programme

SEMESTER I, Course 1 BO1B01U

Methodology and Perspectives of Science &An Introduction to the World of Plant Diversity

This course aims to provide students with an overview of the subject and introduce them to different methods and methodologies in botany. The course also provide a brief introduction about the research methodologies and scientific writing.

SEMESTER II Course 2 BO2B02U

General Informatics and Methodologies in Plant Sciences

Introduction to the features of the modern personal computers and peripherals. Internet asknowledge repository, e-mail, search engines (Google,), study of educational sites related to life sciences (DNAi, Scitable), academic search techniques, (Science direct and INFLIBNET.)Introduction to the use of information technology in teaching and learning.

Semester III Course-3 BO3B03U

MICROBIOLOGY AND PHYCOLOGY

Enable the student to understand the world of microbes. Understand the identifying characters of the lower groups of plants. Have an idea on diverse groups of plants. Understand the application of microbiology in different fields.

Semester IV Course-4 BO4B04U

ANATOMY AND REPRODUCTIVE BOTANY OF ANGIOSPERMS

This course aims to impart an insight into the internal structure and reproduction of the most evolved group of plants, the Angiosperm. Identifies role of anatomy in solving taxonomic and phylogenetic problems. Understand the structural adaptations in plants growing in different environment. Understand the life cycle pattern of Angiosperms. Understand the morphology and development of reproductive parts. Get an insight in to the fruit and seed development.

Semester V Course-5 BO5B05U

MYCOLOGY, LICHENOLOGY AND PLANT PATHOLOGY

The course aims to provide an understanding the diversity of fungal and lichen world and its significance.

Understand the various plant diseases and their impact on agriculture. Familiarize with the various measures adopted to control plant diseases.

Semester V Course 6 BO5B06U

ENVIRONMENTAL SCIENCE AND ECOTOURISM

The aim of this course is to acquaint the student with the significance of Environmental Science. Help the students to understand the extent, limitations and depletion of natural resources. Help the student to design novel mechanism for the sustainable utilization of natural resources. Enable the students to understand the structure and function of the Ecosystems. Make the students to identify the nature and interactions of populations in the ecosystem. Enable the students to understand various kinds of pollution in the environment, their impacts on the ecosystem and their control measures. Make the students aware about the nature and structure of various environmental laws in India. Make the students aware about the role of various movements in the protection of nature and natural resources. Make the students aware about the extent of the total biodiversity and their conservation. Make the students to assess the positive and negative impacts of Ecotourism and its role in the sustainable utilization of resources for tourism.

Semester V Course 7 BO5B07U

GENETICS, PLANT BREEDING AND HORTICULTURE

The aim of the course is to impart a basic understanding about the basic principles of heredity.

Understand the inheritance pattern of nuclear and extra nuclear genes. Understand the methods of crop improvement. Understand the importance of horticulture in human welfare.

Semester V Course 8 BO5B08U

CELL MOLECULAR BIOLOGY AND EVOLUTION

The course aims to develop and understanding the Ultra structure and functioning of cell in the submicroscopic and molecular level. Get an idea of origin, concept of continuity and complexity of

life activities. Familiarization of life process. Understand the basic and scientific aspect of diversity. Understand the cytological aspects of growth and development. Understand DNA as the basis of heredity and variation. Understand the concept of evolution as the basis of biodiversity.

Semester VI Course 9 BO6B09U

PLANT PHYSIOLOGY AND BIOCHEMISTRY

To development an understanding about the basic principles related to various physiological functions in plant life. Familiarize with the basic skills and techniques related to plant physiology. Understand the role, structure and importance of the bio molecules associated with plant life. Familiarize with the recent trends in the field of plant physiology. Familiarize with applied aspects of plant physiology in other fields like agriculture.

Semester VI Course 10 BO6B010U

BRYOLOGY, PTERIDOLOGY, GYMNOSPERMS & PALEOBOTANY

The course aims to develop an understanding about the diversity in habits, habitats and organization of various groups of plants. Understand the evolutionary trends in plants. Identify the anatomical variations in lower groups of plants. Understand the significance of Paleobotany.

Semester VI Course 11 BO6B011U

ANGIOSPERM MORPHOLOGY, SYSTEMATIC BOTANY AND ECONOMIC BOTANY

Acquaint with the aims, objectives and significance of taxonomy. Identify the common species of plants growing in Kerala and their systematic position. Develop inductive and deductive reasoning ability. Acquaint with the basic technique in the preparation of herbarium. Familiarizing with the plants having immense economic importance.

Semester VI Course 12 BO6B012

BIOTECHNOLOGY AND BIOINFORMATICS

Familiarize with the fundamental principles of biotechnology, various developments in biotechnology and potential applications. Make aware that the life forms and activities can be exploited for human advancement. Impart an introductory knowledge about bioinformatics to the students. Use of computers to handle biological data base.

Bachelor of tourism and travel management (BTTM)

Programme Specific Outcomes and Course outcomes

This programme is to create professional managers, leaders and researchers in the tourism or hospitality sector. Specific objective of this Programme includes:

1. To get a thorough understanding of the components of tourism industry and to acquire knowledge and information pertaining to tourism industry.
2. To develop the communication skill.
3. To create an industry awareness.
4. To help students acquire practical skills in all the major areas of the tourism industry.

5. To orient and equip students with information technology skills through age.
6. To get an awareness about Guest relations.
7. To equip students with managerial skills and help in entrepreneurial development.
8. To develop hospitality culture and behaviour and to enhance student competencies.

BTTM is a three year full time under graduate programme aimed at developing professionals in Tourism and Hospitality Industry. Spread across six semesters the course offers wide exposure to the students to the industry through its curricular and co-curricular activities.

Eligibility: Any candidate who has passed the plus two of the Higher Secondary Board of Kerala or Pre- degree of Mahatma Gandhi university or that of any other university or Board of examinations in any state recognized as equivalent to the Plus Two of the Higher Secondary Board of Kerala is eligible for admission. Eligible candidates shall be required to appear for an Entrance test conducted by the colleges concerned. For the purpose, 60% weightage may be given for marks in Plus two or equivalent examination, 20% for aptitude test and 20% for group discussion and interview.

Course Highlights

- 6 semester full time programme
- Interaction with professionals from the industry
- Internship in leading Hotels/Resorts/Tour operators/Travel Agencies
- Soft skill training by experts
- 100% placement support

Duration of the programme

The duration of the BTTM programme of study is 3 academic years with six semesters. There shall be at least 90 working days inclusive of examinations and a minimum of 450 instructional hours in a semester.

Courses of Study

Total number of Courses for the BTTM programme are 30. It is divided in to the following 3 heads.

- (a) Common Courses
- (b) Core and Complementary courses and

(c) Generic Elective Courses.

Course outcomes

Semester 1

Paper 1: ENGLISH 1

- Ø To get a basic awareness about English grammar
- Ø To increase the communication skills
- Ø To know about the types and barriers in English communications.
- Ø To train proper pronunciation in English.
- Ø To get a skill in preparation of formal communication.

Paper 2TT1CRT01:Methodology for Tourism

- Ø To know the basics of Indian tourism
- Ø To know the new trends in tourism sector
- Ø To familiar with tourism statistics
- Ø To know the methods of measurement in Tourism statics
- Ø To know the inbound and outbound tourism in India

Paper 3TT1CRT02: Cultural Heritage of India

- Ø To familiarize the cultural setup in India and its contribution to tourism
- Ø To get a basic knowledge about Indian Cultural diversity
- Ø To know about different architectural styles in India
- Ø To get a knowledge about Indian Music and Art forms
- Ø To familiarize with fairs and festivals in India

Paper 4TT1CRT03: Principles of Management

- Ø To understand the various functional areas of Management in Tourism Industry
- Ø To enable the students to analysis the management process in Tourism organizations.
- Ø To know the management function in every business organization.
- Ø To familiarize with the organization hierarchy in tourism sector.

- Ø To identify the scope of “delegation and decentralization” in tourism

Paper 5TT1CRT04: Economics and Banking for Tourism

- Ø To familiarize with the banking activities
- Ø To understand the banking rules followed.
- Ø To know about the basics of economics
- Ø To analyse the economic impact of tourism
- Ø To identify the economic changes in India.

SEMESTER 2

Paper 1: English 2

- Ø To get a basic awareness about English grammar
- Ø To increase the communication skills
- Ø To know about the types and barriers in English communications.
- Ø To train proper pronunciation in English.
- Ø To get a skill in preparation of formal communication.

Paper 2 TT2CRT05: Tourism Principles and Practices

- Ø To realize the potential of tourism industry in India
- Ø To understand various elements of tourism management
- Ø To evaluate the role of various organizations of tourism
- Ø To know about the impact of tourism in social, cultural and environment

Paper 3TT2CRT06: Geography for Tourism

- Ø To understand different geographical features of tourism
- Ø To understand the process and linkage responsible for generation of tourism flow
- Ø To get a basic knowledge about Indian Geography
- Ø To know about Maps and its types

Paper 4 TT2CRT07: Accounting and Finance for Tourism

- Ø To know the basic concept of accountancy and its relation to tourism
- Ø To be able to understand the key factors of Financial Management

- Ø To integrate and use concept of accounting and financial management in tourism.
- Ø To be able to prepare financial accounts of a business.

Paper 5TT2CRT08: Tourism Resources of Kerala

- Ø To study in brief important tourism destinations in Kerala as well as the rich Cultural heritage of the state.
- Ø To know about the geographical advantage of Kerala.
- Ø To get an idea about natural tourism resources in Kerala.
- Ø To know about Rituals, customs and Traditions of Kerala.

SEMESTER 3

Paper 1TT3CRT09: Tourism Products

- Ø To familiarize different types of tourism products in India
- Ø To understand the cultural tourism resources in India

Paper 2 TT2CRT10: TOURISM POLICY AND PLANNING

- Ø To learn about policy making and planning in tourism

Paper 3 TT3CRT11: TRANSPORTATION MANAGEMENT

- Ø To learn about the various types of transportation networks
- Ø To understand the relationship between transportation and tourism

Paper 4 TT3CRT12: MANAGEMENT INFORMATION SYSTEMS FOR TOURISM

- Ø To enable the students to work with different computation process and analysis.
- Ø To understand the need of MIS in tourism related industries.

Paper 5 TT3CRT13: STRATEGIC TOURISM MANAGEMENT AND ENTREPRENEURIAL DEVELOPMENT

- Ø To develop the necessary input for inculcating new ideas for creating new ventures

SEMESTER 4

Paper 1 TT4CRT14: GUIDING AND NEGOTIATION SKILLS FOR TOURISM

- Ø To acquire an in-depth knowledge about the profession of tour guiding and escorting

Paper 2 TT4CRT15: **TRAVEL AGENCY AND TOUR OPERATION BUSINESS**

- Ø To understand the inner working mechanism of the travel agency
- Ø To understand various skills necessary for tour operation business

Paper 3 TT4CRT16: **WEB DESIGNING AND ONLINE BUSINESS FOR TOURISM**

- Ø To learn the basics of web designing and its use in tourism

Paper 4 TT4CRT17: **BASICS OF BUSINESS COMMUNICATION**

- Ø To learn the basics of communication needed for tourism industry
- Ø To understand the basics of business correspondence

Paper 5 TT4CRT18: **E – TOURISM**

- Ø To study in detail the use of information technology in tourism organizations
- Ø To learn how modern technology has revolutionized the travel and tourism industry

Paper 6 TT4OJP01 **TOURISM PRACTICAL – 1 AND INDUSTRY TRAINING REPORT**

- Ø To know about the overall functions in a travel agency of any other tourism related business.
- Ø To get an idea about working of a Firm.

SEMESTER 5

Paper 1 TT5CRT19: **ECONOMICS AND BANKING FOR MANAGERS**

- Ø To obtain basic idea relating to economics and banking

Paper 2 TT5CRT20: **HUMAN RESOURCE MANAGEMENT**

- Ø To learn various managerial skills necessary for the success of tourism industry
- Ø To learn the students about the procedures and practices applied for the manpower training and placement

Paper 3 TT5CRT21: **AIR FARES AND TICKETING**

- Ø To study the international airfares, and to equip the students the mechanism of airfare ticketing exercise.

Paper 4 TT5CRT22: **MICE TOURISM**

- Ø To enable the students to understand the essentials of Event management

Paper 5 TT5GET01: **PUBLIC RELATIONS AND TOURISM JOURNALISM**

- Ø To study about Public relations and Travel Journalism as a career option

TT5GET02: **FRONT OFFICE MANAGEMENT**

- Ø To equip the students about the details of front office management as a career opportunity

TT5GET03: **COMPUTERIZED OFFICE MANAGEMENT FOR TOURISM**

- Ø To make the students learn the basics of computers and its use in office management

SEMESTER 6

Paper 1 TT6CRT23: **TOURISM MARKETING**

- Ø To equip the students the basics of marketing with special reference to tourism

Paper 2 TT6CRT24: **PRINCIPLES OF INTERNATIONAL BUSINESS FOR TOURISM**

- Ø To learn the basics of today's international business

Paper 3TT6CRT25: **HOSPITALITY MANAGEMENT**

- Ø To enable the students to understand the essentials hospitality management
- Ø To understand different public relation techniques used for the promotion of hospitality business

Paper 4 TT6CRT26 : **ENVIROMENTAL STUDIES AND ECOTOURISM**

- Ø To enable the students to understand new trends in travel and tourism industry
- Ø To understand different managerial technique adopted for sustainable eco tourism development

Paper 5TT6PET0: **TOURISM LAW AND REGULATORY FRAME WORK**

- Ø To give the students a general awareness about laws relating to tourism

Paper 6 TT6PET02: **TOUR PACKAGING AND ITINERARY PLANNING**

- Ø To make the students proficient in tour packages and itinerary planning

TT6PET03 **NATURAL HAZARDS AND DISASTER MANAGEMENT**

- Ø To study about the various natural hazards and disasters
- Ø To learn how to mitigate hazards and disasters and its management

TT6STP02: **TOURISM PRACTICAL – 2 AND STUDY TOUR REPORT**

- Ø Study Tour Report Each student has to submit the Study Tour Report during the Practical Examination for external evaluation. Preparation of study tour report include two parts: pre tour phase and post tour phase. Pre tour phase involves itinerary preparation, costing etc. Post tour phase involves detailed report on the tour. The external to internal marks for the practical examination will be in the ratio 80:20. Out of eighty marks for the practical examination, thirty marks will be for Study Tour report and fifty marks for questions. For practical examination, four questions have to be answered (two questions with ten marks and two questions with fifteen marks each).

MASTER OF TOURISM AND TRAVEL MANAGEMENT (MTTM)

Programme Specific Outcomes and Course outcomes

MTTM is a two year full time management programme aimed at developing professionals in the growing industry of tourism. Spread across four semesters the course offers wide exposure to the students to the industry through its curricular and co-curricular activities.

Course Highlights

- 4semester full time programme
- Interaction with professionals from the industry
- Internship in leading Hotels/Resorts/Tour operators/Travel Agencies
- Foreign language
- Soft skill training by experts
- 100% placement support

Duration of Programme

The duration of MTTM program shall be of 4 semesters. Each semester consisting of a minimum of 90 working days, inclusive of examination, distributed over a minimum of 18 weeks of 5 working days each. A student may be permitted to complete the program on valid reasons within a period of eight continuous semesters from the date of commencement of the first semester of the programme.

Minimum eligibility for admission

An undergraduate in any subject with a minimum of 45% in part III is eligible to apply.

Nature of the Programme

Being a service industry, Tourism is growing at a faster pace which is standing next to IT sector. Hence there is an increased demand for competent professionals to manage the diverse forms of tourism business. Master of Tourism and Travel Administration (MTTM) is designed in such a way to prepare students for managerial positions in Destination planning, Consultancies, Policy making, Tour operations, Travel agencies, Small and Medium Enterprises (SME), Hospitality and Aviation. After completing the program, the students should be able to work in, travel and tourism related organizations, at various capacities in government levels, Event and Entertainment industry, Hotels, Food & Beverages services etc. The programme also bestows entrepreneurial skills among the students to start new businesses in the above areas.

Objective of the Programme

The objective of the MTA programme is to create professionals with leadership skills to administer and manage business units in different tourism and hospitality sectors.

The objectives of the programme are as follows: -

- Analyse the various components of Tourism and to describe how they coincide each other.
- Depicts the interrelationship between travel, tourism and hospitality industries.
- Develop leadership skills and to provide necessary Managerial, Communicative, IT, product and Resource skills to effectively handle Tourism activities.
- Mould career paths and equip students to face professional challenges.
- Chalk out a research oriented approach.
- Enhance the ability and skills to build long lasting business relationships.

- Be able to target and position the tourism resources.

Course no	Name of course
MTA 07	Heritage Tourism
MTA 08	World Tourism geography

- Be able to frame a better and viable marketing and product innovation strategies to increase the profitability and stability of an organisation.

Semester I

Course no	Name of course
MTA 01	Introduction to Tourism Administration & Management
MTA 02	Tourism Products of India
MTA 03	Hospitality Operations and Management
MTA 04	Research Applications in Tourism
MTA 05	Communicative English for Tourism and Hospitality
MTA 06	Project Internship in Hotel/ Resort and Viva Voce

Semester II

Semester III

MTA 09	Human resource Management for tourism
MTA 10	Travel agency and tour operation business
MTA 11	Information technology for tourism
MTA 12	Project Internship in Travel agency/ Tour operation Company and Viva voce

Course no	Name of course
MTA 13	Eco Tourism and Environment Management
MTA 14	Organisational Behaviour and Management Process
MTA 15	Tourism Marketing and Public Relations
MTA 16	Accounting and Finance for Tourism
MTA 17	French/ German
MTA 18	Project:- Study Tour and Viva Voce

Semester IV

Course no	Name of course
MTA 19	Event Management
MTA 20	Customer Relationship and Service Management
MTA 21	Entrepreneurship for Tourism and Hospitality Business
MTA 22	Destination Planning and Development
MTA 23	Airfares and Ticketing (Elective)
MTA 24	Cargo Management (Elective)
MTA 25	Project Report and Viva

Career Opportunities for BTTM and MTTM

Technical Research and Development

- Social Scientists
- Research Coordinators/Project Officers/Assistants of various welfare Programmes of Government /NGOs, agencies of National & International repute

Education

- Teaching faculty in Colleges, National and state Institutes in Travel & Tourism
- Special Educators and Instructors in Vocational Higher Secondary Schools (VHSE) which offer Tourism as a Vocational Course
- Resource persons for various firms/institutes/colleges/university centres

Administrators

- Tourism Information Officers (TIO) in Department of Tourism (DOT)-Kerala and other state/ central ministries
- Hospitality Managers/ Hospitality assistants in KTDC like wise
- Extension Officers or Officers on Special duties assisting Tourism projects
- Information Assistants
- District Tourism Promotion Council (DTPC) Secretaries

Tour Operations and Travel Agency Business

- Senior Tour Consultant
- Junior Tour Consultant
- Information assistants
- Marketing executives/ sales executives
- General sales agents (GSA)

Product Design & Development

- Product developers
- Interior /Landscape Designers of Firm/ Hotels/Spas
- Consultancy Services
- Event management
- Entertainment

Marketing and Sales

- Sales promotion personnel
- Trusted Cost Accountants (TCA) of Government's Promotional campaigns (domestic and Overseas)
- Consumer awareness campaigners

Hospitality/ Service Jobs

- Front Officers managers
- Restaurant/ bread and breakfast inns managers/ HR managers
- Spa attendants/ health assistants in Spas/ health resorts

- Professional Guides
- Service personnel in Home stays/ House boats like wise

MASTER OF TOURISM ADMINISTRATION (MTA)

Programme outcome

There is tremendous growth for tourism and hospitality industries in the world. Hence there is the increased need for competent professionals to manage the Business units in these industries. Master of tourism administration designed in such a way to prepare students for management positions in tourism and hospitality industries After this program the students should be able to work in hotels and food-service facilities, travel and tourism related organizations, healthcare institutions, entertainment industry, airlines etc. The programme also gives entrepreneurial skills to start new businesses in the above areas. Master of tourism administration is an innovative programme that aims at creating competencies in hospitality and tourism sectors. Hence for students who come from the industry can enhance their career advancement possibilities significantly.

Objective of the Programme

The objective of the programmed is creating professionals with leadership to administer and manage business units in different and tourism and hospitality sectors

For this the programmed includes the following

- Ø Analyze the various components of the tourism industry and describe how they interrelate.
- Ø Describe the interrelationship between travel, tourism and hospitality industries
- Ø Discuss the issues and trends facing and tourism industries today
- Ø Provide necessary I T skills to manage tourism industry and tourism organizations
- Ø Discuss career paths and professional challenges characteristic of tourism industry.
- Ø Develop competencies in creative and critical analyses through research linked explorations

- Ø Be able to effective market destinations and tourism organizations
- Ø Be able to utilize financial management strategies to increase the profitability of an organization
- Ø necessary skills to manage people and teams within the organization

Course outcomes of MTTM programme

MTA01-INTRODUCTION TO TOURISM ADMINISTRATION

- Ø Understand the basic principles of Management of tourism organization
- Ø Realize the interrelationship between travel and tourism
- Ø To understand the element of tourism management
- Ø To understand the tourism policies and regulations
- Ø To understand the tourism organizations and its functions

MTA02- TOURISM PRODUCT OF INDIA

- Ø Understand the interrelatedness of culture and tourism
- Ø To understand the nature of different tourism products
- Ø Understand the importance of culture in tourism and to analyze how they are interconnected.
- Ø Appreciate and understand Indian Architecture and different art forms
- Ø Interpret the basic madras in the dance and understand the traditional theatre forms.
- Ø Explain the different food traditions unique to India
- Ø Understand the two classical music forms and must be able to explain the use of different traditional musical instruments unique to India
- Ø Understand folklore and evaluate the Indian folk arts.

MTA-03- HOSPITALITY OPERATIONS MANAGEMENT

- Ø TO UNDERSTAND VARIOUS DEPARTMENT OF HOT
- Ø TO UNDERSTAND VARIOUS HOTEL OPERATIONS
- Ø TO UNDERSTAND THE CALSSIFICATION OF HOTELS

Ø TO DO PROJECT WORK IN THE ABOVE AREA

MTA-04- RESEARCH APPLICATIONS FOR TOURISM

- Ø To know the role of research as means to more effective decision –making
- Ø To familiarize the student with the fundamental concepts and various techniques of research that can be used in business and management
- Ø To assist students to develop an understanding of the research process and to conduct research leading to successful completion of their dissertation

MTA-05 COMMUNICATIVE ENGLISH FOR TOURISM

- Ø To enables students to have analytical ,critical ,and communicative minds
- Ø To encourage students to develop learning autonomy and enhance their intellectual self esteem
- Ø Enhance their listening and speaking skills
- Ø Write persuasive business messages and letters
- Ø Develop their presentations skills

MTA-07 HERITAGE TOURISM

- Ø Acquire knowledge and demonstrate an understanding of a relationship between culture and tourism
- Ø Concepts and theories of cultural tourism
- Ø Analyze how heritage tourism works in India
- Ø Understand the larger forces behind the shaping of Indian Cultural Heritage

MTA08- WORLD TOURISM GEOGRAPHY

- Ø To understand the spatial distribution of tourist activities
- Ø Acquire knowledge the relationships of tourism with elements of human and physical environment

- Ø To appreciate the role of tourism the past, present and future in terms of its importance to places, countries,
- Ø To gain basic knowledge about world tourism attraction
- Ø To study about the role and importance of geography in tourism development

MTA09- HUMAN RESOURCE MANAGEMENT FOR TOURISM

- Ø To provide basic knowledge about the concepts of human resource management
- Ø To study the role and importance of human resources in tourism industry
- Ø Understand the recruitment and selection methodologies and its strategies setting
- Ø Recognize and understand importance of performance management system and its process
- Ø Understand and analyze the various motivational theories that affect the people productivity
- Ø Examine the labor relations issues and its management

MTA10- TRAVEL AGENCY AND TOUR OPERATION BUSINESS

- Ø To understand the level of theoretical and applied knowledge in subjects concerning with the business of travel agency and tour operator
- Ø To gain knowledge to define the relationship between travel agencies and tour operators
- Ø Know various transport system through which tourism operates
- Ø Understand the operations and regulations governing travel agency and tour operation business

MTA11- INFORMATION TECHNOLOGY FOR TOURISM

- Ø To have an overview of the technology in tourism industry
- Ø To appreciate the role of e-commerce in tourism
- Ø To understand and basics of world wide web
- Ø To know the electronic payment system in tourism and hospitality industry

MTA13-ECOTOURISM AND ENVIORNMENT MANAGEMENT

- Ø Interpret and clarify the patterns and process that generate biodiversity and current threats to conservation
- Ø Identify and explain the role of sustainable tourism development of conservation
- Ø Use a business framework to plan and implement sustainable tourism
- Ø Understand the role of ecotourism for sustainable development

MTA14- ORGANIZATIONAL BEHAVIOR AND MANAGEMENT PROCESS

- Ø To analyze and compare different models used to explain individual behavior related to motivation and rewards identify the process used in developing communication and resolving conflicts
- Ø To explain group dynamics and demonstrate skills required for working in groups
- Ø To identify the various leadership styles and the role of leaders in a decision making process
- Ø To explainorganizationalculture and describe its dimension and to examine various organizational design to discuss the organizational change
- Ø To develop the skills and traits needed for hospitality manager

MTA15- TOURISM MARKETING AND PUBLIC RELATIONS

- Ø Understand the concepts and principles of marketing examine .examine the role of marketing in tourism management
- Ø Analyze the importance of the marketing and service mix in travel and tourism industry
- Ø Discuss the role of marketing in the tourism industry
- Ø Demonstrate an understanding of the buyer behavior analysis and related models
- Ø Understand social factors that influence the buyer
- Ø Demonstrate a clear understanding of market segmentation and targeting processes

MTA-16- ACCOUNTING AND FINANCE FOR TOURISM

- Ø To understand application of fundamental concept of finance and revenue management in the tourism industry
- Ø To read and understand the components of income statement and balance sheet
- Ø To perform various financial statement analysis
- Ø To prepare budgets and implement forecasting techniques

MTA17- GERMAN

- Ø To equip the student to interact with a foreigner in tourism industry.

MTA -19 – EVENT MANAGEMENT

- Ø Plan ,design, and coordinate effective site and facility operations
- Ø Apply the principles marketing to events

- Ø Apply the strategies for effective human resource management to events
- Ø Create, plan, and implement effective programming for events
- Ø Apply business administration skills to the operation of events

MTA-20 CUSTOMER RELATIONSHIP AND SERVICE MANAGEMENT

- Ø To create insight and new learning in the area of customer relationship management
- Ø To equip students with both a conceptual understanding and the knowledge pertaining to practical application of critical skills necessary for building and managing partnering relationships with customer and suppliers
- Ø To discuss the conceptual foundations of relationship marketing and its implications for further knowledge development in the field of business.
- Ø To receive a proper and better understanding of customer service management of in a local and global context.
- Ø To be able to manage a market oriented service organization.
- Ø To take up the challenge of good customer relationship management.

MTA -21- ENTREPRENEURSHIP FOR TOURISM AND HOSPITALITY BUSINESS.

- Ø Demonstrate an understanding of entrepreneurship/ intra preneurship and the role played in the hospitality industry.
- Ø Develop work place skills ,knowledge,and attitudes that may lead to successful employment ;
- Ø Gain a knowledge of preparation and service within the food industry in order to fulfill the requirements of an entry level employee within the industry;
- Ø Provide service excellence within a business setting ;

MTA-22-DESTINATION PLANNING AND DEVELOPMENT

- Ø Define and explain key concepts and issues concerning sustainable tourism planning ,tourism public policy and tourism management
- Ø Critically evaluate several important tourism planning approaches and models
- Ø Identify key stake holdersinvolved in tourism panning and policy –marketing.
- Ø Assess government and industry roles and responsibilities in tourism planning and policy-marketing.
- Ø To enable students to plan and develop destinations .

MTA24- CARGO MANAGEMENT

- Ø Relate relevant regulatory frame works and the roles of governmental air cargo security regulations to a range of industry actor perspectives
- Ø Apply ground handling principles of air cargo
- Ø Critically analyze the technical characteristics of air craft as they relate to air cargo planning and operations and air cargo revenue management
- Ø To provide an outline history of air cargo industry.
- Ø To identify the key developments in the field concerned

BA English Literature and Communication Studies

Programme Specific Outcomes

The course provides the learner with immense opportunities to plunge into the pool of Language, Literature, Communication and Journalism which ultimately makes him/her competent enough to perform well in the global arena. Learning linguistics provide him/her the wisdom for the accurate expression of ideas. Literature steers him through models of umpteen life situations and makes him/her emotionally and intellectually solid.

Performance oriented language learning bestows him with the mastery of adept language use coupled with remarkable interpersonal skills.

The student shall possess a testable knowledge on the various fields and branches of knowledge in accordance with the syllabus prescribed highlighting language, literature, and communicative studies.

By the completion of the course students attain competence in the functional use of English during both academic and non-academic life situations.

The study of literature polishes their literary/artistic/imaginative skills and make them better thinkers and good critics and moreover responsible social beings.

The course also provides with an ample room for the students to know about the principles and practices of Journalism. By unleashing the relatively obscure world of print and broadcast journalism, students will awaken into the new world opened in front of them. It is considered as the applied field of Literature, where one can find immense opportunities for the application of their linguistic abilities. It equips the learner as a journalist who could persuade, influence, and motivate the society.

The course will also bestow the learners with a tremendous vocabulary which will allow him/her to strike the right note while reporting an event or writing articles in a newspaper.

In this way the course provides with ample opportunities for the student to learn language through literature and apply that learning through journalism. Press, being the fourth estate of democracy enjoys a considerable part in the proper functioning of the government machinery. The course builds good journalists who think, speak and act in a more humane way.

Course Outcomes

Semester V

1. Language and Linguistics

Get a scientific information and training on Language and Linguistics, theory and practice.

1. Characteristics of language- Arbitrariness, Interchangeability, Cultural transmission
2. Linguistics- basic concepts, Branches of linguistics, Semantics
3. Syntax: PS Grammar, Transformational Generative Grammar
4. Organs of speech and speech mechanism
5. Detailed study on phonology, morphology and phonetics (All components of R P, Suprasegmentals and Cardinal Vowels, G I E and Mother tongue influence) equips to speak correct English with right accent.

2. Creative Writing and Translation Studies

With the completion of the course a student gains reasonable competency in:

1. Communication in all situations with emphasis on figurative uses of words, idioms and phrases, culture-bound idioms and rhetorical devices.
2. Proficiency in sentence constructions, use of figures of speech etc.
3. Know-how in various types of formal and informal writing (Letter writing, paraphrasing, critical appreciation, types of essays and report writing)

4. Translation studies enable the students with nuances of translation such as
 - a. Aids and tools of translation
 - b. Text analysis, transfer and restructuring
 - c. Word for word translation and sense for sense translation.
 - d. Types of Equivalence
 - e. Decoding and recoding
 - f. Transliteration
 - g. Types of translation
5. Achieve improvement in Creativity in translation

3. Mass Communication and Broadcasting Media – Radio

Mass media have become an indispensable part in our daily life. So it is worth learning about the texture and terrain and the modus operandi of various mass media. A student who had undergone this course is informed of /possess;

1. Principles of broadcasting and will identify himself as part of the journalism community
2. A practical understanding of the underlying principles of Mass Communication and Journalism Industry.
3. The skill to write a variety of mass media products, including news stories, TV/Radio news scripts and press releases, following accepted journalistic standards.
4. A hands-on experience on radio programme production.
5. A thorough knowledge about the history comprising the origin, development and future of mass media, in a global as well as in an Indian perspective.
6. An understanding on the necessity of practicing ethical journalism.
7. The history of cinema in global and Indian perspectives.
8. Different genres of cinema.
9. The process of film production with its various steps.
10. A skill to appreciate a movie based on its various factors like its genre, action, screenplay and technical parameters.

4. Public Relations I

The graduate is able to:

1. Demonstrate the understanding of the fundamentals of public relations.
2. Possess a thorough understanding on the history of PR in a global as well as in an Indian perspective.
3. Identify the various tools for facilitating PR activity in different situations.
4. Identify the roles and responsibilities of PR department in an establishment and to plot its organisational structure.
5. Pinpoint the desirable professional qualifications required to become a PR practitioner.
6. Enumerate the various qualities and soft skills deemed desirable for a PR practitioner.

5. English for careers

- Students will demonstrate the skills needed to participate in a conversation that builds knowledge collaboratively: listening carefully and respectfully to others' viewpoints; articulating their own ideas and questions clearly; and situating their own ideas in relation to other voices and ideas. Students will be able to prepare, organize, and deliver an engaging oral presentation.

- Develop communicative skills, which will enable them to prepare for a career and function effectively in it.
- To equip themselves in oral and written communication to enhance their academic and professional use of language.
- To train themselves in making effective presentations
- Make the students competent in their job-seeking, job-getting, and job-holding needs.
- Equip the students in Comprehensive Language Enhancement

Semester VI

○ **VISUAL MEDIA: TELEVISION AND CINEMA**

This course focuses exclusively on visual media and sheds light on the technical dimensions of TV ad cinema production. The course makes the student competent enough to perform in the visual media arena through its detailed fashion of instruction. A student after the completion of this course is informed of/possess wisdom on:

1. The characteristics, principles and functions of visual media.
2. A concrete knowledge on the history of visual media, both in a Global as well as in an Indian perspective.
3. Doordarshan and its contributions.
4. The persuasive power of visual media and how it sways public opinion.
5. Identifying various genres of TV programmes based on the several elements at play in their formats.
6. The structure and operation of a TV studio, control rooms and the paraphernalia for broadcast video production.
7. About the fundamentals of motion picture editing such as Cut, Fade, Mix, Dissolve, Wipe and Superimpose.
8. The creative side of broadcast video production comprising script and storyboard preparation.
9. An inventory of jargons exclusive to broadcast journalism.
10. History of Indian cinema and various types of cinema in India.
11. Film censorship and its criteria.
12. Theoretical and practical knowledge about the various steps and processes involved in film making.
13. The elasticity of the subject and the need for constant learning to keep him/herself from obsolescence.

○ **Public Relations II**

After the course the graduate is able to:

1. Apply basic public relations concepts into practice.
2. Have a hands-on experience on organizing PR campaigns
3. Coordinate and contribute to the planning of public relations activities like campaigns, exhibitions and trade fairs, and selection of tools and resources to achieve organisational objectives.
4. Take PR interventions by producing effective and timely print, digital and multimedia communications to manage specific issues.
5. Demonstrate an understanding on managing various organizational emergencies based on their practical knowledge.
6. Comply with relevant public relations professional standards and code of ethics.

○

○ **Travel and Tourism**

Tourism industry has made rapid advances in recent years throughout the world. Efforts are to be taken to train students in the diverse areas of tourism industry and create awareness among them towards tourism and its impact on our lives. Travel and Tourism course thereby helps students to:

- familiarise with varied aspects of tourism and understand the tourism phenomena
- analyse the factors that determine the relationship between motivation, destination and tourism products
- understand the historical evolution of tourism and how modern tourism came into existence
- map out various skills required for a career in tourism industry
- list out diverse emerging trends in the industry

4. Entrepreneurship Development

The graduate is able to demonstrate his/her understanding on the fundamental aspects of Entrepreneurship such as:

- Role of an Entrepreneur in Economic development
- Difference between an Entrepreneur and self-employed Person.
- Characteristics of an Entrepreneur.
- State financial corporations and Small scale and Export industries.
- Activities and functions of District Industries Centers.
- Project feasibility study, Project selection, classification and appraisal.

5. Office Administration and Human Resource Management

Semester III

1. Print Media Journalism I

The student is able to demonstrate his/her understanding on

1. The history of journalism from its inception.
2. The history of Indian journalism and its pioneers.
3. The role of journalism in Indian freedom struggle.
4. The context of the imposition of press censorship in India
5. Legislative interferences on Indian press
6. Journalism in Kerala
7. The role of Christian Missionaries in Indian Journalism.
8. Modern trends in Journalism

2. Advertising

Students learning Advertising will be able to:

- Understand meaning and nature of advertising,
- Appreciate the importance of advertising in business.

- Apply basic advertising theories and principles to practice
- Synthesize broader liberal arts knowledge with the principles of advertising in order to create effective advertising campaigns
- Create and conduct ethically sound and socially responsible advertising strategies and campaigns
- Develop an advertising plan and present and defend it persuasively
- Distinguish various career opportunities

3. Evolution of Literary Movements - The Shapers Of Destiny

- Gain a comprehensive overview of the history of Britain including the major wars, invasions and dynasties from the Early settlers till the end of seventeenth century
- Possess a thorough knowledge on the major geographical and scientific innovations, momentous movements, universities etc
- Understand English literature in the light of historical events including
 - Language – growth and development of East Midland dialect into standard English
 - Literary ages and major writers of each age
- Analyse the manner in which people and society are moulded by historical events

4. Literature and Informatics

The graduate is able to express his understanding on;

- Computers, its history, development and future.
- Notions like hardware, software, information technology etc.
- A general awareness on computer networks such as LAN and WAN
- Using the potentialities of information technology for the effective learning of literature.
- The operations on MS Office.
- Innovative knowledge gathering openings such as INFLIBNET, NICNET, BRNET etc.
- ICT skills for higher education.
- Ideas like Teleconferencing, Telemedicine and E-classrooms.
- The frontiers of academic fair use and plagiarism.
- Cyber ethics and Cybercrime.
- Social networking.

Semester IV

○ Print Media Journalism II

The graduate is able to

1. Able to identify himself as a member of the global community of journalists by knowing the various qualities, responsibilities and work profiles of them.
2. Draft a news story sticking on to the inverted pyramid style of news writing.
3. Identify various types of news story based on its theme and content.
4. Have a know-how on the making of a newspaper.
5. See the importance of editing and the role of the editor and his crew in the flawless publication of a newspaper.
6. Differentiate between magazine and newspaper journalism.

7. Possess a thorough knowledge on the page setting and layout of a typical tabloid and broadsheet newspaper.
8. Develop a know-how of the editorial and journalistic practices used in gathering and publishing articles for print media
9. Complete publishable assignments for newspapers
10. Acquire entry level positions as professionals within communication related fields.

○ **Evolution of Literary Movements – The Crosscurrents of Change**

- Possess an awareness of alternatively defined traditions and/or genres, such as women's literature, postcolonial literature, Third world literature etc.
- Have a notion of the evolution of literature and perceive the interplay of social processes and literature
- Understand literature against the backdrop of history and inspire students to contribute dynamically to historical and literary processes
- Figure out the interaction between the French Revolution, the Russian Revolution and the literature of the age
- Impart a subtle idea that black writing is a struggle in disguise
- The social context of the burgeoning of literature in Latin America
- Recognize the main elements of different literary movements and assess their significance.
- A student identifies the immense potential of literature to influence the mass like
 - Feminist literature steers the marginalised women folk to the mainstream
 - Dalit literature, navigating the domain of the downtrodden, bringing them up to the forefront

Semester I

1. An Introduction to Sociology

A graduate will possess a testable knowledge on

1. Their sound understanding of the society.
2. Develop sociological knowledge and skills that enable them to think critically and imaginatively about society and social issues.
3. Basic concepts of sociology like society, culture, socialization, social change etc.
4. The primary institutions of family, education, religion, politics etc.
5. The link between individual and society and to understand how both of them shape each other.
6. Different sociological perspectives.
7. The Micro sociological foundation.
8. The mechanism of Social Dynamics.
9. The interpretations and analysis of the principles of deviance.

2. Methodology of Humanities And Literature

- Methodology of Humanities and Literature is intended to introduce the student to the inter relationship between paradigms of social formation.

- On completion of the course, the student should be able to know and appreciate the location of literature within humanities.
- Should establish connections across frontiers of disciplines.
- Should critically engage with culture, gender and marginality.
- Should be acquainted with narration and representation.
- Should be familiar with the culture and identity, class, race and gender and the history of language as a whole.
- The student should be well versed in narration and representation, narrative modes of thinking, narration in literature, philosophy and historical reading.

3. Conversational Skills in English

- Students are sensitized to the nuances of spoken forms of English.
- Familiarized with speech sounds and phonological aspects of the language.
- Develop a neutral accent and improve the general standard of pronunciation.
- Develop the conversational skills in various situations.

4. English in Informal Situations

- Able to speak English with a high degree of confidence, accuracy and fluency.
- Capable of answering questions of a conversational nature.
- Have a command of a range of questions to elicit information from other people with an awareness of contextual appropriateness.
- Take part with confidence in conversations, to initiate, sustain and close a conversation.

Semester II

§ Development of Sociological theories

The graduate is acquainted with:

1. The fundamentals of sociology as a relatively new branch of knowledge and the trajectory of social thinking.
2. An epistemological know-how of celebrated social philosophies of the world.
3. A historical awareness on the factors that triggered the development of sociological theories.
4. The pioneers of sociological thought like Auguste Comte, Herbert Spencer, Emile Durkheim and Max Weber.
5. Comtean Sociology with his Positivism, Law of Three Stages and Hierarchy of Sciences.
6. Herbert Spencer through his theories like Social Darwinism, Social Evolution and Organic Analogy.
7. The contributions of Emile Durkheim like Social facts, Social Solidarity and Theory of suicide.
8. An understanding of the theories of Max Weber like Social Action and Protestant Ethics and Spirit of Capitalism.

§ Introduction to communication

- Become conversant with key terms, models, concepts and a range of theories about communication.
- Deliver effective messages based on audience and context.

- Demonstrate elementary knowledge of the key forms of communication and media platforms.
- Demonstrate a general sense of how communication theory relates to the practice of communication.

- **Business Communication**

- Use current technology related to the communication field.
- the effective use of various types of oral, written and digital communication modes geared to a range of business audiences
- effective business writing
- Provide examples of experiential learning opportunities that you have participated in that have helped develop your communication skills in a professional environment

**DEPARTMENT OF ECONOMICS
NIRMALA COLLEGE MUVATTUPUZHA**

Course outcomes of B. A. Economics Programme

COURSE	LEARNING OUTCOME
PERSPECTIVES AND METHODOLOGY OF ECONOMICS	<ol style="list-style-type: none"> 1. Students will familiarise different branches of Social Sciences 2. Knowhow on Methodology of Social sciences 3. Know how to conduct Social and Economic Researches. 4. Understand various quantitative and qualitative economic models. 5. Learn to apply methods and theories of Social Sciences to contemporary Issues.
MICRO ECONOMIC ANALYSIS I	<ol style="list-style-type: none"> 1. It gives the foundation for economic analysis and problem solving. 2. Able to analyse consumer behaviour and consumer decisions. 3. A thorough understanding on firm's production processes and decisions. 4. Know how to solve basic micro

	economic problems.
INTERNATIONAL ECONOMICS	<ol style="list-style-type: none"> 1. Thorough understanding on International Economic System. 2. Learn global economic issues and role of international institutions in tackling them. 3. Study fundamental theories in International Economics and examine the relative economic problems in the light of models and theories.
ECONOMICS OF GROWTH AND DEVELOPMENT	<ol style="list-style-type: none"> 1. Student acquaint with the basic concepts and issues of growth and development. 2. Provide an insight into the modern approaches to economic development. 3. Know how to measure National Income. 4. An insight into the need for sustainable economic development. 5. Study about Human Development Indicators and their role in designing development programmes.
INDIAN ECONOMY	<ol style="list-style-type: none"> 1. A thorough understanding on Indian Economic System. 2. Know about the policy issues relating to economy of India.
MODERN BANKING	<ol style="list-style-type: none"> 1. Acquaint the students with the working of banks 2. Familiarize basic principles and concepts in banking
MICRO ECONOMIC ANALYSIS II	<ol style="list-style-type: none"> 1. understand market and factor pricing patterns

	2. Familiarise Welfare Economics
ECONOMICS OF FINANCIAL MARKETS	<ol style="list-style-type: none"> 1. understand basic concepts about financial institutions and markets. 2 .Know the changing role of financial sector of the economy. 3. Understand the role of financial institutions and markets in the modern economies.
FOUNDATIONS OF ENVIRONMENTAL ECONOMICS	<ol style="list-style-type: none"> 1. Achieve a mission of sustainable society. 2. Acquire the skills of solving environmental problems. 3. How to protect the environment while promoting development
PUBLIC ECONOMICS	<ol style="list-style-type: none"> 1. Know about the budget and fiscal policies. 2. To analyse various issues between centre and state governments.
AN INTRODUCTION TO POLITICAL SCIENCE	<ol style="list-style-type: none"> 1. The course inculcate awareness about the principles of Political Science 2. Familiarise with major political ideologies and related theories 3. Gets a general idea about Indian Constitution
GOVERNMENTAL MACHINERY AND PROCESS	<ol style="list-style-type: none"> 1. Gets a idea about different Political Systems and its working . 2. Understands about the social and political issues of Indian Society 3. Familiarise Human Rights and Environmental Issues

DEPARTMENT OF ECONOMICS
NIRMALA COLLEGE MUVATTUPUZHA

Course outcomes of M. A. Economics Programme

Ist SEMESTER	
COURSE	LEARNING OUTCOME
<p>MICRO ECONOMICS: THEORY OF CONSUMER BEHAVIOUR AND FIRM</p>	<ol style="list-style-type: none"> 5. Able to analyse consumer behaviour and consumer decisions. 6. A thorough understanding on firm's production processes and decisions. 7. Study about the applications of economic techniques on various policy issues. 8. Know how to solve basic micro economic problems. 9. Study how to apply concepts and methods of micro economics in the practical field. 10. Equip the students about various aspects of the micro economic theory and the latest developments in the field. 11. Able to analyse current economic problems. 12. Develop the ability to synthesise knowledge. 13. An understanding of the theory of production and costs and theory of firm and institutions.
<p>MACRO ECONOMIC THEORY AND POLICY</p>	<ol style="list-style-type: none"> 1. Understand macroeconomic principles, concepts, and theories. 2. Able to integrate theoretical knowledge to evaluate policy measures.

<p style="text-align: center;">INDIAN ECONOMY: ISSUES AND POLICIES- I & II</p>	<ol style="list-style-type: none"> 1. To provide the students with a critical understanding of the Indian economy so that they may be able to engage meaningfully in debates regarding the country's economy 2. To help students contribute to the formulation of its policies. in order to achieve this, 3. To introduces the students to broad contours like the status, issues and policies of the Indian economy at the aggregated (macro) as well as sectoral levels. 4. To help to understand the experiences in the pre as well as post reform years, keeping the colonial experience at the background.
<p style="text-align: center;">ECONOMICS OF GROWTH AND DEVELOPMENT- I & II</p>	<ol style="list-style-type: none"> 1 To develop conceptual clarity on the various dimensions of development and to identify the strategic factors in the development of the less developed countries. 2 Enable the student to evolve new strategies for achieving sustainable development and inclusive growth 3 Equip the student community with the theoretical and empirical material for enhancing their capability to address the basic problems confronted by the society.
<p style="text-align: center;">MICRO ECONOMICS: MARKETS, INFORMATION AND WELFARE</p>	<ul style="list-style-type: none"> • Develops skill in formulating business strategy in the context of market imperfections • Develops skill in using game theory models in decision making • Learns to use the concept of price elasticity in calculating marginal revenue • Acquires knowledge of reaction curve approach and its application in other branches of economics <ul style="list-style-type: none"> • The student develops the understanding of the economic level of information search possible under different situations and the concept of bounded rationality • Learns why inefficiencies and

	<p>social costs arise in imperfect markets in the context of adverse selection, moral hazard and principal agent problem</p> <ul style="list-style-type: none"> • Learns the institutional arrangements in the society to overcome asymmetric information and Develops skill in designing incentive mechanism under information asymmetry
<p>ADVANCED MACRO ECONOMICS THEORY AND POLICY</p>	<ol style="list-style-type: none"> 1. Able to identify macroeconomic implications of decisions by diverse economic entities. 2. Understand about macroeconomic policy formulations.
<p>INTERNATIONAL ECONOMICS</p>	<ol style="list-style-type: none"> 4. Thorough understanding on International Economic System. 5. Deep knowledge on international flow of goods and services and nation's BOP. 6. Know the significance of international economic relations. 7. Learn global economic issues and role of international institutions in tackling them. 8. Study fundamental theories in International Economics and examine the relative economic problems in the light of models and theories.
<p>GLOBAL TRADING AND MONETARY SYSTEM</p>	<ol style="list-style-type: none"> 1. Know about functions in the foreign exchange market. 2. Understanding on the speculation and hedging operations. 3. Understanding on the role of WTO, IMF etc.
<p>ECONOMICS OF GROWTH AND DEVELOPMENT</p>	<ol style="list-style-type: none"> 6. Student acquaint with the basic concepts and issues of growth and development. 7. Provide an insight into the modern

	<p>approaches to economic development.</p> <ol style="list-style-type: none"> 8. Know how to measure National Income. 9. An insight into the need for sustainable economic development. 10. Study about Human Development Indicators and their role in designing development programmes.
INDIAN ECONOMY	<ol style="list-style-type: none"> 3. A thorough understanding on Indian Economic System. 4. Know about the policy issues relating to economy of India. 5.
MONETARY THEORY AND POLICY (Elective Paper: Group A)	<ol style="list-style-type: none"> 1. Understand the basic concepts regarding money and functioning of a pecuniary economy 2. Capable to understand theoretical approaches to the determinants and measures of money supply and its role in causing the business cycles 3. Get insight in to the different schools of thought regarding the demand for money. 4. Get awareness of the monetary policy formulations, its targets and objectives and to create an interest in the recent monetary reforms initiated in India
CAPITAL MARKET (Elective Paper: Group B)	<ol style="list-style-type: none"> 1. Acquire Comprehensive knowledge of capital markets 2. Understand the basics of savings and investment. 3. Calculate the Risk, Return and Liquidity of various investment instruments.
SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT (Elective Paper: Group B)	<ol style="list-style-type: none"> 1. Aware about the risk- return trade-off in investment decisions. 2. Get theoretical knowledge about stock market investment. 3. Methods of maintaining a diversified portfolio.

<p style="text-align: center;">MANAGEMENT THEORY AND PRACTICE (Elective Paper: Group B)</p>	<ol style="list-style-type: none"> 1. To get a variety of skills and concepts in management. 1. Know about management techniques that prevail in the corporate world. 2. Understand the process of planning, organizing and controlling different resources
<p>ECONOMICS OF ENVIRONMENT AND SOCIAL SECTOR</p>	<ol style="list-style-type: none"> 1. Get knowledge about economy environment inter relationships. 2. To achieve a mission of sustainable society. 3. How to protect the environment while promoting development
<p>Public Economics</p>	<ol style="list-style-type: none"> 1. The students acquaint with the issues relating to the role of Government in the changing era and the justification for Government intervention. 2. The students shall be informed with the nature and theories of Public Goods. 3. Familiarize the students with the various aspects of the theory of Public Choice 4. The students shall be aware about of the recent trends in taxations and budgetary policy.
	<ol style="list-style-type: none"> 1. To make the students aware of the emerging trends in public expenditure and the criteria for Public Investment 2. To familiarize the students with the various processes involved in the preparation and execution of the Budget and the problems and trends in Public Debt in India. 3. To make the students aware of the

<p style="text-align: center;">Indian Public Finance</p>	<p>Economics of Public Enterprises and the current concepts like Public Private Participation (PPP).</p> <p>4. To enable the students to have a thorough understanding of the Key Issues centering around Fiscal, Federal relations in India and to impart an advanced level knowledge of the emerging trends in local self Government Institutions in the backdrop of the LPG process</p>
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B. A. HINDI

Programme outcomes

Hindi is not only the national language of India, but the official language too. Above that, it's most important role is as the link language of the country. Hence this course helps the students to broaden the outlook and raises the responsibility and confidence in them. Second, it make them understand the society well and ready them to fulfil their responsibilities and duties towards the society in a better way. Third, it improves their creative writing skills towards writing in Hindi to enable them to contribute towards Indian literature. Fourth, another benefit is that this course includes journalism and functional Hindi as the complimentary courses; hence the students can choose them as professional option after course completion. Different job opportunities like teacher, language officer, translator, interpreter and customer cantered jobs are there for Hindi students.

Sl.no:	COURSE CATEGORY	Course name	Course outcome
1.	CORE COURSE	DEVELOPMENT OF HINDI LANGUAGE	Being our National language ,to know the development of Hindi language holds great importance to the Hindi students
2.	CORE COURSE	METHODOLOGY SPECIFIC TO THE AREA OF SPECIALISATION- DEVELOPMENT OF HINDI LITERATURE UP TO REETIKAL	Knowing history of literature is knowing and familiarising the past. And for any student, who is learning language, it is important to get connected to the history of the language.
3.	CORE COURSE	INFORMATION TECHNOLOGY,MASS COMMUNICATION AND PUBLIC RELATION	Information technology, masscommunication and public relation is the main tool in this information era. So it's quite important to equip students with these information
4.	CORE COURSE	DEVELOPMENT OF MODERN HINDI LITERATURE	Study about the developments of modern Hindi literature give students the awareness of present happenings in the Hindi literature
5.	CORE COURSE	HINDI LANGUAGE AND LITERATURE-PROSE	Prose occupies a major part of any literature. Hence awareness about the same gives the students an idea about major part of literature.
6.	CORE COURSE	AUTHENTIC STUDY OF POETRY	Poetry is that part and parcel of Hindi language. Authentic studies of poetry enable students to understand the poetry literature.
7.	CORE COURSE	LITERARY CRITICISM	Literary criticisms enable students to evaluate the eastern and western criticism.
8.	CORE COURSE	FEMINIST LITERATURE IN HINDI	It uses feminist principles and ideology to critique the language of literature. This school of thought seeks to analyse and

			which literature portrays the narrative of male domination by exploring the economic, social, political, and psychological forces embedded within literature.
9.	CORE COURSE	COMPARATIVE LITERATURE	Comparing literature across the culture and language gives an idea to students about developments and cultural back ground of other civilizations
10.	CORE COURSE	FICTION –NOVEL AND SHORT STORIES	Fictional Novels and short stories are the wings of imagination. Study about these enables students to develop their imagination.
11.	CORE COURSE	DRAMA AND ONE ACT PLAY	Drama and one act play give student theatre experience.
12.	CORE COURSE	THEORETICAL AND APPLIED GRAMMER	Study about theoretical and applied grammar enable students to use the language correctly and effectively
13.	CORE COURSE	ELECTIVE PAPER- LYRICAL POETRY OF HINDI WITH SPECIAL REFERENCE TO BHRAMAR GEETH AND MADHUSALA	Study BhramarGeet and Madusalagive the students about metaphysical and momentary pleasures of the life.
14.	COMPLIMENTARY COURSE	HINDI JOURNALISM	Study about Hindi journalism gives the students an idea about technicality of journalism.
15.	COMPLIMENTARY COURSE	FUNCTIONAL HINDI	Study about Fictional Hindi give students an idea about fictional Hindi literature.
16.	OPEN COURSE	FILM STUDIES	This introduces the students to the world of Cinema.
17.	COMMON COURSE- BA/BSC MODEL I-	PROSE AND ONE ACT PLAY	Prose and one act play ignites human mind and enable the students to develop theatre ability.

18.	COMMON COURSE- BA/BSC MODEL I -	TRANSLATION COMMUNICATIVE SKILLS AND APPLIED GRAMMAR	This exposes students to application level of study of language.
19.	COMMON COURSE- BA/BSC MODEL I –	POETRY AND FICTION	Poetry and fiction enable the students to explore the beautiful world of imagination.
20.	COMMON COURSE- BA/BSC MODEL I –	CULTURE AND CIVILIZATION OF INDIA	These enable the students to understand the cultural background of India.
21.	COMMON COURSE- BA/BSC MODEL II	POETRY AND COMMUNICATIVE HINDI	This enables the students to use the language in an eloquent manner.
22.	COMMON COURSE- BA/BSC MODEL II	PROSE AND SHORT STORIES	This give awareness to students about greater part of Hindi literature
23.	COMMON COURSE-BCOM MODEL I-	PROSE AND APPLIED HINDI	This gives the students an idea about literature and its level of application.
24.	COMMON COURSE-BCOM MODEL I-	POETRY, COMMUNICATIVE HINDI AND TRANSLATION	This gives the students an idea about application level of the language as well as about the literary works.
25.	CORE COURSE	ECOLOGY AND HUMAN RIGHTS IN HINDI	This enable the students to understand the world we live, the ecology, our human rights and the literature which emphasises on human values
26.	CHOICE BASED CORE COURSE	HINDI SATIRE LITERATURE	This enables the students to develop the humour sense.

M. A. HINDI

Programme outcomes

It helps the students to get into different jobs like Asst. Professor in colleges, teacher in plus two, translator posts, official language officer posts etc...its advanced courses are M.Phil. and Ph. D in Hindi.

Course Outcomes

Sl.no:	Course name	Course outcome
1.	ANCIENT POETRY	Study of ancient poetry enables the students to understand history and evolution of the literature and the language.
2.	PROSE	Prose being the major part of the literature, its study makes the students aware of literature as a whole.
3.	HISTORY OF HINDI LITERATURE	Enable the students to understand about previous happenings and the evolution of literature from ancient to modern.
4.	BHASHAVIGYAN	As linguistics is the scientific study of the language, it enables the students to understand the form and meaning of language.
5.	DRAMA AND THEATRE	The study of drama and theatre enable the students to have theatrical experience of the language and in-depth knowledge of the language.
6.	FICTION	The study of Fiction helps the students to fly in the wings of imagination and develop their skills of imagination and creativity.
7.	HISTORY OF HINDI LANGUAGE AND GRAMMATICAL STRUCTURE	This helps the students to understand the technical aspects of the language.
8.	BHARATHIYA KAVYASASTRA AUR HINDI ALOCHANA	Study of criticism of poetry enables the students to analyse poetry and understand it well.
9.	MODERN POETRY	Study of modern poetry makes the students to understand the latest trends prevailing in the literature, especially in poetry.
10.	INDIAN LITERATURE	Study of Indian literature helps the students to understand the Indian culture and civilization.
11.	TRANSLATION STUDIES	Translation studies enable the students to use the language in the application level.
12.	WESTERN LITERARY CRITICISM	This enable the students to understand and analyse western theory of literature.
13.	POETRY	Study of the poetry makes the students to improve the eloquence of their language and encourage their creative abilities
14.	DALIT VIMARSH(ELECTIVE)	Dalit literature helps the students to develop concern for the marginalized and

		to develop empathy for them. It emphasises on the equality in human rights.
15.	NAREE VIMARSH AUR HINDI SAHITYA (ELECTIVE)	Feminist criticism has been closely associated with the birth and growth of queer studies. Modern feminist literary theory seeks to understand both the literary portrayals and representation of both women and people in the queer community, expanding the role of a variety of identities and analysis within feminist literary criticism.
16.	SPECIAL AUTHOR NIRMAL VARMA AND BHISMA SAHINI (ELECTIVE)	This course help to learn about these writers and their contributions to the Hindi literature thoroughly .

DEPARTMENT OF MALAYALAM

PROGRAMME OUTCOMES OF B. A. and M. A. Programmes

B.A. Malayalam Programme - Impact of the Course

The Syllabi designed for B.A. Program is intended to trains the imagination and capacity to think critically and creatively about the world and their own country through the study of poetry, prose, dramatic, linguistics, narratology, and aesthetics in Malayalam Language and Literature. B. A. Malayalam program tries to make the student community to study Post Colonial Theories of Literature as well as Cultural Studies, World Poetry, Epistemology, Sanskrit Language and Literature, and Eco-Criticism. In the First Year student sample a wide variety of literature and cultural theory and develop a solid basis of knowledge and skill which they then build on in years of two and three.

The varied fact in curriculum encourage engagement with significant range of literacy –non literacy genres, including firm, theatre and popular art form which may lead our students towards universal concept. The character making and responsibility making syllabi develops student power of critically or analytical thinking alongside and appreciation of crafting of written utterances and enabling them to carry the quality of response into future reading.

The program employs a variety of forms of assessment and includes unseen and revealed written course work essay, seminars, workshops, research reports, oral

presentations. So the program can develop skill for employment future study both discipline related and transformable.

M. A. Malayalam Programme - Impact of the Course

The Syllabi of M.A. Malayalam Program aims at mastery in Malayalam Language and Literature. The students are inculcated to acquire the experiential knowledge about the pros and cons of issues in research activities according to the curriculum vitae. The learning process of books recommended in the program may enrich human mind with linguistic, cultural aesthetic, episteme.

The epistemology of Bhagavathgeetha Comparative literature mass and folklore Culture oriental and oxibental aesthetics are subjected to the study of P.G Program which lead the student community for strengthening their mental Faculty

The Syllabi designed for M.A. Program is intended to trains the imagination and capacity to think critically and creatively about the world and their own country through the study of poetry, prose, dramatic, linguistics, narratology, and aesthetics in Malayalam Language and Literature. B. A. Malayalam program tries to make the student community to study Post Colonial Theories of Literature as well as Cultural Studies, World Poetry, Epistemology, Sanskrit Language and Literature, and Eco-Criticism. In the First Year student sample a wide variety of literature and cultural theory and develop a solid basis of knowledge and skill which they then build on in years of two and three.

COURSE OUTCOMES OF B. A. MALAYALAM PROGRAMME

I B. A. MALAYALAM - Main

1	ML1B01U- Kavithasamkram	The course helped to know the modern poetry of Malayalam literature and to realize the social and political reality behind modernity in India
2	ML1C01U- Folklore Padanam	Helped to identify the culture of the ethnic groups and of the place Learned the traditions and the practices of various folks and to value them and how they contribute to the diversity and pluralism

3	ML1CO2U Nadakavum Cinemayum	The course led the students to the history of theatre and to know the various streams of drama and acting
4	ML2BO1U- Cherusserimuthal kavithrayamvare	The course is designed in a way to know the poetic history of mal. Literature from the time of Ancient to modern great poets. It provided deep knowledge how romanticism came to Malayalam
5	ML2CO1U- Lokakavyamathrakakal	The course help to know the present day world poetry and the main thrusts behind the writing such as dalithism, feminism and environmentalism
6	ML2CO2U- Reethisasthram	This course helped to how to study the Malayalam language and literature systematically

Additional Language

7	I BA/BSc MAL1AO1U – Katha, Novel	This course is meant to learn the famous short story writers and their style and the history of Malayalam short story.
9	BSC Model II I MAL1AO1U – Kathayum Kavithayum	The course helped to identify the famous poems and short stories of Malayalam literature and the writers
10	BSC Model II -MAL2AO4U- Gadhyam, Rachana	The course was helpful in knowing the compositional writing and its methods.
11	I BCOM-MAL1AO1U – Kathayum Kavithayum	The course helped to identify the famous poems and short stories of Malayalam literature and the different style of writing
12	I BCOM K- MAL2AO1U- Gadhyam, Rachanayum Prayogavum	The course was helpful in knowing the compositional writing and its methods

II BA Malayalam

1	ML3BO1U- Samoohaparinamavum samskakaravum adhunikapoorvvakeralam	The course helped to know the ancient culture and history of Kerala And to realize the social and political developments in Kerala
2	ML3CO1U- Keralathinte VynjanikaparambaryavumVynjanikasahithyavum	Helped to identify the ancient culture and the various streams of knowledge prevailed in Kerala. It also gave knowledge about the Mal. Prose written on academic matters in ancient times also of the martial arts of ancient Kerala

3	ML3CO2U- Sanskrit I	The course is designed to learn the mother of Indian languages and to know the classic literature of India in its original language
4	ML4BO1U- Samskaracharithram Adhunika Keralam	The course gave knowledge of the modern culture and history of Kerala And to realize the social and political developments in Kerala. Its in view of better understanding of literary forms and its context
5	ML4CO1U- Oru Sahithyakari	The course envisages an in-depth study of a known literary figure of Malayalam language- Lalithambika Antharjanam, who was a versatile genius. Being lived at a time of patriarchy where upper caste women are given little freedom, she is a person worth studying. It's a study of the role of women culture and history
6	ML4CO2U- Sanskrit II	This course aims an advanced study of Sanskrit language and literature and to compare how much Malayalam is indebted to Sanskrit literature.

Additional Language

7	MAL3AO1U- Arangum Porulum I	This course is meant to learn the Theatre history of Kerala and its various Art forms like Drama, Kathakali and Cinema
8	MAL4AO1U- Gadhyam , Rachana Parichayam	The course is designed to train students in creative writing such as News for dailies' and Essays the course also Deals the features of languages in E-media.

III BA MALAYALAM

1	ML5BO1U- Samanya Bhashasasthram	It's a course about the science of Language as well as the theories of language regarding meaning and the structure of language. Pronunciations and the facts behind communication are also analyzed in this
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		course. Gives the students the scientific knowledge of the language.
2	ML5BO2U- Bharatheeya Sahithya Sidhanthangal	Helped the students to know the literary theories of the Sanskrit literature and to make literary criticism based on the theories.
3	ML5BO3U- Bharatheeyethara Sahithya Sindhanthangal	The course helped the students to know the Western literary theories and to make critical thinking and academic criticism.
4	ML5BO4U – Keraleeya Rangakala	The course is designed in a way to know the history performing arts of Malayalam literature both classical and folk. It gives insight to the cultural diversity and history of Kerala.
5	OPEN COURSE ML5D01U – Paristhithiyum Sahithyavum	The course help to know the literature where Nature and its well being is focussed in view of loving and protecting the environment and fostering echo criticism.

6	ML6BO1U- Kathasahithyam	The course helps the students to know the style and trends in Malayalam short story right from the ancient to the postmodern era. It's a learning based on the literary history of Malayalam
7	ML6BO2U- Gadhyasahithyam, Niroopanam	This course envisages to learn the style of Malayalam prose and to foster critical thinking and academic criticism and history of Mal. Prose and Mal.Criticism.
8	ML6BO3U- Pracheena Malayalam Padhyavum Gadhyavum	An indepth study of ancient Mal. literature is done through the course. It gives clear knowledge about the prose and poem of ancient Mal. Literature and the language analysis is also done in relation to Tamil and Sanskrit
9	ML6BO4U- Vyakaranam, Bhashacharithram	It's a course that helps to learn systematically the history of Mal. Language and its Grammar.
10	ML6BO5 – Malayalathile Sthreerachanakal	The course aims to learn the thrusts of Feminism and its expressions in its various dimensions of various time in Malayalam literature. Well known female writers and their works are taught in view of women rights and equality

COURSE OUTCOMES OF M. A. MALAYALAM PROGRAMME

I M. A. MALAYALAM

1	PC 1 – Kavitha- Pracheenam, Madhyakalm	An indepth study of ancient Mal. Poem is done through the course. It gives clear knowledge about the poem of Medieval time of Mal. Literature and the language analysis is also done in relation to Tamil and Sanskrit
2	PC 2 –Malayalabhasha Charithravum Varthamanavum	This course learns the history of Malayalam language and its present trends to ensure a bright future for the language. The factors, historical, social and cultural, that affect the language and its expressions are also analysed here..
3	PC 3- Kathasahithyam	It's a study of the styles and trends in Malayalam short story right from the ancient to the postmodern era is done here. The well known short story writers and their works along with cultural and social background are dealt in this course. the language, narration techniques and style analysis are also done
4	PC 4- Sahithyacharithravijnjaniam	The course is a deep study regarding the literary history and the factors that determine various forms of literature in Malayalam.
5	PC 5 –Sanskrit- Bhashayum Sahithyavum	Here the classical language and some great works n Sanskrit literature is taught. It's a learning about the culture and traditions of the great nation, India

SEMESTER II

6	PC6 Malayala Kavitha Adhunika, Randam Ghattam	The Romantic period and its poetry of Malayalam al analysed here. Famous poets and their poems are d
7	PC 7 –Bhashasasthram	The course studies about the science of Language a regarding meaning and the structure. Pronunciation also analyzed in this course. Makes the students to components that constitute the language.
8	PC 8- Bharatheeya Sahithya Sindhanthangal	Helped the students to know the literary theories of literary criticism based on the theories. It's a course Eastern Aesthetics and its importance
9	PC 9 –Bharatheeyethara Sahithya Sindhanthangal	The course helped the students to know the Weste critical thinking and academic criticism. It helped the
10	PC 10 – Novel Sahithyam	The course is a deep study regarding the literary history ; all over the world. Novel and its style narration and the v along with well known Novels of all the time all over the

SEMESTER III & IV

1	PC 11 - Malayalakavitha- Adhunikam- Random Ghattam	The course helps to learn the dynamism behind mo Malayalam literature and all over the world. Famous literature and their poems are dealt here
2	PC 12 – Malayala Bhashavyakaranam	The course studies about the origin of Malayalam a scientifically. Makes the students well aware of the language.
3	PC 13 – Malayala Niroopanam	The course is designed to know the history of Mal.Pi social factors behind the Academic criticism is clearl
4	PC 14- Drisyakalasaahithyam	The history of performing Arts of Malayalam is expl forms are studied here in detail, in view of gatherin culture of Kerala
5	PC 15 –Keralasamskara Padanam	The cultural and historical study of Kerala is done along v view of better understanding of Malayalam literature an developments.
6	PC16- Nadakavum Cinemayum	The history of theatre and its various trends and sty and cinema in a better way. The course helps to le all over the world. Famous films and drama are dea
7	PE 1 – Janasamskara Padanam	The cultural study and the factors that constitute culture thinking is well analysed here. It will enable to value an plurality and to find how much we are determined by th
8	PE 2 – Paribhasha – Sindhantavum Prayogavum	The course is designed to know dynamics of translat The theories of translation and the practical ways ar
9	PE 3- Sthreepaksha Rachanakal	The feminine theories and its history along with we in Novel Story and Poems are are dealt here in view women rights.
10	PE 4- Puthusahithya Sameepangal	The Present day literary theories of Dalithism, Feminism course. It will enable to understand the rights of the unc nature and to make better living .

II MA 2013-14

1	Vyakaranam and Bhasha Charithram	The course studies about the origin of Malayalam a scientifically. Makes the students well aware of the language
2	Novel, Katha	The course is a deep study regarding the literary history and short storyall over the world. The style, narration an story are taught along with well known Novels and sho
3	Adhunikakavitha	The course helps to learn the dynamism behind mo Malayalam literature and all over the world. Famous literature and their poems are dealt here.
4	Nadodi Vinjaneeyam	Helped to identify the culture of the ethnic groups a Learned the traditions and the practices of various f contribute and shape the diversity and pluralism. He dealt here

5	Samskara Padanam	The cultural and historical study of Kerala is done along with view of better understanding of Malayalam literature and social developments.
6	Tharathamya Sahithyam	The history and dynamics of comparison of literature the various styles and trends in different languages
7	Lokaclassickukal -Paribhasha	It's a detailed study of well known classics of literature the literary expressions and its glory. And how and
8	Thakazhi Sivasankara Pillai	The course is designed to know the famous writer and influence in Mal. Literature. It enables to learn the contribution of Kuttanadu
9	Feminism	The feminine theories and its history along with women in Novel Story and Poems are dealt here in view of women rights.
10	Theatre and Cinema	. The history of theatre and its various trends and styles drama and cinema in a better way. The course helps to know theatre all over the world. Famous films and drama

I B. A. MALAYALAM PROGRAMME (2017- June onwards)

1	ML1CRT01- Naveenakavitha	The course helped to know the modern poetry in Mal.Literature And to realize the social and political reality behind modernity
2	ML1CMTO1- Malayala Padanathinte Reethisasthram	This course helped to how to study the Malayalam language and literature systematically
3	ML1CMTO2- Nadakavum cinemayam	The course led the students to history of theatre and to know the various types of drama and cinema and the factors behind them
4	ML2CRT02 –Malayalakavitha Ezhuthachan muthal Kavithrayam vare	The course help to know the history of Mal. Poetry right from Ezhuthachan to Modern Kavithrayam. Shows how Malayalam poetry and its style evolved.
5	ML2CMTO3 – Adhunika Lokakavitha	This course helped to know the trends and styles of poetry all over the world and learn well known poets and their poems in world Literature.
6	ML2CMTO4 – Folklore Vijnjanam	Helped to identify the culture of the ethnic groups of the place Learned the traditions and the practices of various folks and to value them and how they contribute to the diversity and pluralism

Additional Language

7	ML1CCTO1 Katha sahithyam	Gives insight into Malayalam short story writing and the style of different writers and their stories
8	I Bcom- ML1CCT05 –Kathayum Kavithayum	The course is all about the well known poems and short stories of Malayalam Literature and the style of story writing.
9	I BSc Model II-ML1CCT09– Katha, Kavitha	The course is all about the well known poems and short stories of Malayalam Literature and their articulation and the social background behind them
10	I BA/ BScML2CCMTO2 Kavitha	The course is designed in a way to know the poetic history of Mal. Literature and to know the famous writers and their poems.
11	I BCom- ML2CCT06- Athmakatha, Lekhanam	This course is meant to learn the famous prose writers and their style along with the art of Biography writing.
12	BSC Model II- ML2CCT10-	The course is helpful in knowing the compositional writing and its methods

MATHEMATICS

B. Sc. Mathematics

PROGRAM SPECIFIC OUTCOMES

After the successful completion of this course, the student will:

- Be able to explain the core ideas and the techniques of mathematics at the college level.
- Be able to recognize the power of abstraction and generalization, and to carry out investigative mathematical work with independent judgment.
- Be able to setup mathematical models of real world problems and obtain solutions in structured and analytical approaches with independent judgement.
- Be able to carry out objective analysis and prediction of quantitative information with independent judgment.
- Be able to communicate effectively about mathematics to both lay and expert audiences utilizing appropriate information and communication technology.
- Be able to work independently, and to collaborate effectively in team work and team building.
- Be able to conduct self-evaluation, and continuously enrich themselves through lifelong learning.

- Be able to communicate to lay audiences and arouse their interest in the beauty and precision of mathematical arguments and science.
- Be able to recognize the importance of compliance with the ethics of science and being a responsible citizen towards their community and a sustainable environment.
- Be able to cultivate a mathematical attitude and nurture the interests.

Course outcomes

FIRST SEMESTER

MM1B01: FOUNDATION OF MATHEMATICS

On completion of this course, successful students will be able to:

- prove statements about sets and functions;
- analyze statements using truth tables;
- Construct simple proofs.
- Familiarize mathematical Symbols and standard methods of proofs.

SECOND SEMESTER

MM2B01: ANALYTIC GEOMETRY, TRIGONOMETRY AND MATRICES

On completion of this course, successful students will be able to:

- find the equation to tangent, normal at a point on a conic;
- find the polar equation of a line, circle, tangent and normal to conics
- familiarize real and imaginary parts of a circular and hyperbolic functions of a complex variable
- solve a System of Linear equations using the inverse of a matrix
- familiarize characteristic roots and characteristic vectors.
- to find the inverse of a matrix by Cayley-Hamilton theorem

THIRD SEMESTER

MM3B01: CALCULUS

After completing this course the learner should be able to

- Find the higher order derivative of the product of two functions.
- Expand a function using Taylor's and Maclaurin's series.

- Conceive the concept of asymptotes and obtain their equations.
- Learn about partial derivatives and its applications.
- Find the area under a given curve, length of an arc of a curve when the equations are given in parametric and polar form.
- Find the area and volume by applying the techniques of double and triple integrals

FOURTH SEMESTER

MM4B01 : Vector Calculus, Theory of Equations and Numerical Methods

After completing this course the learner should be able to

- Represent vectors analytically and geometrically, and compute dot and cross products for presentations of lines and planes,
- Analyze vector functions to find derivatives, tangent lines, integrals, arc length, and curvature,
- Compute limits and derivatives of functions of 2 and 3 variables,
- Apply derivative concepts to find tangent lines to level curves and to solve optimization problems,
- Evaluate double and triple integrals for area and volume,
- Differentiate vector fields
- Determine gradient vector fields and find potential functions
- Analyse the fundamental theorem of calculus and see their relation to the fundamental theorems of calculus in calculus , leading to the more generalised version of Stokes' theorem in the setting of differential forms.
- Evaluate line integrals directly and by the fundamental theorem
- Analyse different forms of equations and finding their roots
- Understand relation between roots and coefficients
- Derive numerical methods for approximating the solution of problems of continuous mathematics,
- Analyze the error incumbent in any such numerical approximation,
- Implement a variety of numerical algorithms using appropriate technology
- Compare the viability of different approaches to the numerical solution of problems arising in roots of solution of non-linear equations, interpolation and approximation, numerical differentiation and integration, solution of linear systems.

FIFTH SEMESTER

MM5B01: MATHEMATICAL ANALYSIS

After completing this course the learner should be able to

- Describe the real line as a complete, ordered field
- Determine the basic topological properties of subsets of the real numbers
- Use the definitions of convergence as they apply to sequences, and functions,
- Determine the continuity, differentiability, and integrability of functions defined on subsets of the real line

- Apply the Mean Value Theorem and the Fundamental Theorem of Calculus to problems in the context of real analysis
- Produce rigorous proofs of results that arise in the context of real analysis.
- Write solutions to problems and proofs of theorems that meet rigorous standards based on content, organization and coherence, argument and support, and style

MM5B02: DIFFERENTIAL EQUATIONS

After studying this course the students should be able to

- Obtain an integrating factor which may reduce a given differential equation into an exact one and eventually provide its solution.
- Identify and obtain the solution of Clairaut's equation.
- Find the complementary function and particular integrals of linear differential equation.
- Familiarize the orthogonal trajectory of the system of curves on a given surface.

$$\frac{dx}{P} = \frac{dy}{Q} = \frac{dz}{R}$$

- Method of solution of the differential equation
- Describe the origin of partial differential equation and distinguish the integrals of first order linear partial differential equation into complete, general and singular integrals.
- Use Lagrange's method for solving the first order linear partial differential equation
- Solve differential equations of first order using graphical, numerical, and analytical methods,
- Solve and apply linear differential equations of second order (and higher),
- Solve linear differential equations using the Laplace transform technique,
- Find power series solutions of differential equations, and
- Develop the ability to apply differential equations to significant applied and/or theoretical problems.
- Demonstrate their ability to write coherent mathematical proofs and scientific arguments needed to communicate the results obtained from differential equation models
- Demonstrate their understanding of how physical phenomena are modeled by differential equations and dynamical systems
- Implement solution methods using appropriate technology.

MM5B03: ABSTRACT ALGEBRA

After completing this course the learner should be able to

- Assess properties implied by the definitions of groups and rings,
- Use various canonical types of groups (including cyclic groups and groups of permutations) and canonical types of rings (including polynomial rings and modular rings),
- Analyze and demonstrate examples of subgroups, normal subgroups and quotient groups,
- Analyze and demonstrate examples of ideals and quotient rings,

- Use the concepts of isomorphism and homomorphism for groups and rings
- Produce rigorous proofs of propositions arising in the context of abstract algebra.

MM5B04 : FUZZY MATHEMATICS

After the completion of this course the student will be able to:

- Understand fuzzy sets and fuzzy set operations
- To construct the appropriate fuzzy numbers corresponding to uncertain and imprecise collected data.
- To handle the real world problem in engineering having uncertain and imprecise data.
- To find the optimal solution of mathematical programming problems having uncertain and imprecise data.

Open course

MM5D02: APPLICABLE MATHEMATICS

After the completion of this course the student will be able to

- Understanding the basic operations of Mathematics
- Applies shortcut methods for solving problems
- Apply mathematical concepts and principles to perform computations
- Apply mathematics to solve real life problems
- Create, use and analyze graphical representations of mathematical relationships
- Communicate mathematical knowledge and understanding
- Apply technology tools to solve problems
- Perform abstract mathematical reasoning
- Learn independently
- Compute limits, derivatives, and definite & indefinite integrals of algebraic, logarithmic and exponential functions
- Analyze functions and their graphs as informed by limits and derivatives
- Familiarize with basic operations on real numbers, logarithms and quadratic equations
- Identify the definitions of trigonometric ratios and their applications to problems involving heights and distance
- Get basic ideas of two dimensional geometry and graphing straight lines
- Use various methods to compute the probabilities of events
- Acquires basic ideas of derivatives, standard results and various rules for finding the derivatives of functions
- Differentiate integration from differentiation and integration of simple functions
- Acquires the basic arithmetic skills involving percentages, averages, time and rates, elementary algebra and geometry

SIXTH SEMESTER

MM6B01: REAL ANALYSIS

After the completion of this course the student will be able to:

- Understand the term convergence
- Applies this term into problems
- Illustrate the convergence properties of power series
- Identifies Continuity and Discontinuity of various functions in different contexts
- Distinguish Uniform continuity from continuity and related theorems
- Understand partitions and their refinement
- Understand Integrability and theorems on integrability
- Recognize the difference between pointwise and uniform convergence of a sequence of functions
- Illustrate the effect of uniform convergence on the limit function with respect to continuity, differentiability, and integrability
- Develops a knowledge about Riemann Integration and applies into problems
- Determine the Riemann integrability and the Riemann
- Stieltjesintegrability of a bounded function and prove a selection of theorems concerning integration

MM6B02: COMPLEX ANALYSIS

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

- Compute sums, products, quotients, conjugate, modulus, and argument of complex numbers
- Define and analyze limits and continuity for complex functions as well as consequences of continuity
- Conceive the concepts of analytic functions and will be familiar with the elementary complex functions and their properties
- Determine whether a given function is differentiable, and if so find its derivative
- Use differentiation rules to compute derivatives
- Write complex numbers in polar form
- Evaluate exponentials and integral powers of complex numbers
- Find all integral roots and all logarithms of nonzero complex numbers
- Apply the concept and consequences of analyticity and the Cauchy-Riemann equations and of results on harmonic and entire functions including the fundamental theorem of algebra
- Find parameterizations of curves, and compute complex line integrals directly
- Understand the theory and techniques of complex integration
- Applies the theory into application of the power series expansion of analytic functions
- Understand the basic methods of complex integration and its application in contour integration.
- Analyze sequences and series of analytic functions and types of convergence,
- Evaluate complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula

- Represent functions as Taylor, power and Laurent series, classify singularities and poles, find residues and evaluate complex integrals using the residue theorem
- Use the Cauchy Residue Theorem to evaluate integrals and sum series
- Identify the isolated singularities of a function and determine whether they are removable, poles, or essential
- Compute Laurent series at an isolated singularity, and determine the residue
- Understand uses of improper integrals in various situations
- Use the residue theorem to compute complex line integrals and real integrals

MM6B03: DISCRETE MATHEMATICS

After the completion of this course the student will be able to

- Understand the new topics Graph Theory, Cryptography, Poset and Lattices
- Understand the basic concepts of graphs, directed graphs, and weighted graphs and able to present a graph by matrices
- Understand the properties of trees and able to find a minimal spanning tree for a given weighted graph
- Understand Eulerian and Hamiltonian graphs
- Applies the basic logic of Cryptography into various problems
- Compare and contrast a range of different cryptosystems from an applied viewpoint
- List and elaborate the differences between secret key and public key cryptosystems
- Identify the different approaches to quantifying secrecy
- Recognize the different modes of operation for block ciphers and their applications
- Explain the role of hash functions in Information Security
- Discuss the place of ethics in the Information Security Area
- Recognize lattices, complete ordered sets and their varieties
- Know the standard tools of lattice theory
- Know the main representation theorems of lattices
- Be able to make use all the above both inside the theory and applications

MM6B04: LINEAR ALGEBRA AND METRIC SPACES

Upon completion of this course, students should be able to:

- Understand the idea about vector space and metric space
- Analyze finite and infinite dimensional vector spaces and subspaces over a field and their properties, including the basis structure of vector spaces
- Use the definition and properties of linear transformations and matrices of linear transformations and change of basis, including kernel, range and isomorphism
- Compute with the characteristic polynomial, eigenvectors, eigenvalues and Eigen spaces, as well as the geometric and the algebraic multiplicities of an eigen value and apply the basic diagonalization result
- Recall the defining properties of a metric space, and determine whether a given function defines a metric
- Determine how that a function is or is not a metric
- Show that a set in a metric space is or is not open and/or closed
- Show that a function between metric spaces is or is not continuous

- Show that a sequence in a metric space is or is not convergent
- Show that a metric space is or is not complete
- Familiarize with open sets, closed sets and Cantor set

MM6D01 : OPERATIONS RESEARCH

Upon completion of this course, students should be able to:

- Understand the new term LPP
- Applies the theory into different types of problems
- Understand Transportation Problem, Assignment problem and Queuing models
- Solving problems using different methods
- Formulate and model a linear programming problem from a word problem and solve them graphically in 2 and 3 dimensions, while employing some convex analysis
- Place a Primal linear programming problem into standard form and use the Simplex Method or Revised Simplex Method to solve it
- Find the dual, and identify and interpret the solution of the Dual Problem from the final tableau of the Primal problem
- Be able to modify a Primal Problem, and use the Fundamental Insight of Linear Programming to identify the new solution, or use the Dual Simplex Method to restore feasibility
- Interpret the dual variables and perform sensitivity analysis in the context of economics problems as shadow prices, input values, marginal values, or replacement values
- Explain the concept of complementary slackness and its role in solving primal/dual problem pairs
- Classify and formulate integer programming problems and solve them with cutting plane methods, or branch and bound methods
- Formulate and solve a number of classical linear programming problems and such as the minimum spanning tree problem, the assignment problem, (deterministic) dynamic programming problem, the knapsack problem, the XOR problem, the transportation problem, the maximal flow problem, or the shortestpath problem, while taking advantage of the special structures of certain problems
- Understands duality theorems and dual simplex method
- Uses dual simplex method to find optimal solutions
- Explains the Transportation Problem and formulate it as an LPP and hence solve the problem
- Determine that an Assignment Problem is a special case of LPP and hence solve by Hungarian method
- Identifies the Queuing models, their various forms and methods of solutions

Project

- Demonstrate library research skills in the area of mathematics,
- Critique mathematical presentations, and
- Produce a mature oral presentation of a non-trivial mathematical topic.

M. Sc. Mathematics

After the successful completion of this course, the student be able

- To motivate for research in mathematical sciences.

- To train computational scientists who can work on real life challenging problem.
- To have an in-depth knowledge of a broad range of methods and techniques for analysing and solving problems within applicable fields.
- To have a Good theoretical insight and the ability to apply theory to the development of methods and techniques for solving a problem.
- To have an in-depth knowledge within a specific mathematical primary field.
- To tackle complex problems, reveal structures and clarify problems, discover suitable analytical and/or numerical methods and interpret solutions.
- To communicate clearly in writing and orally knowledge, ideas and conclusions about mathematics, including formulating complex mathematical arguments, using abstract mathematical thinking synthesising intuition about mathematical ideas and their applications.
- To demonstrate an advanced knowledge and fundamental understanding of a number of specialist mathematical topics, including the ability to solve problems related to those topics using appropriate tools and techniques.
- To produce a mature oral presentation of a non-trivial mathematical topic.

To apply rigorous, analytic, highly numerate approach to analyze, execute tasks and solve problems in daily life and at work.

Course Outcomes

Semester – 1

MT01C01LINEAR ALGEBRA

- Analyze finite and infinite dimensional vector spaces and subspaces over a field and their properties, including the basis structure of vector spaces,
- Use the definition and properties of linear transformations and matrices of linear transformations and change of basis, including kernel, range and isomorphism,
- Compute with the characteristic polynomial, eigenvectors, eigenvalues and Eigen spaces, as well as the geometric and the algebraic multiplicities of an eigenvalue and apply the basic diagonalization result,
- Compute inner products and determine orthogonality on vector spaces, including Gram-Schmidt orthogonalization, and

- Identify self-adjoint transformations and apply the spectral theorem and orthogonal decomposition of inner product spaces, the Jordan canonical form to solving systems of ordinary differential equations.

MT01C02 BASIC TOPOLOGY

Upon completion of this course, students should be able to:

- Define and illustrate the concept of topological spaces and continuous functions,
 - Define and illustrate the concept of product topology and quotient topology,
 - Prove a selection of theorems concerning topological spaces, continuous functions, product topologies, and quotient topologies,
 - Define and illustrate the concepts of the separation axioms,
 - Define connectedness and compactness, and prove a selection of related theorems, and
 - Describe different examples distinguishing general, geometric, and algebraic topology.

MT01C03 MEASURE THEORY AND INTEGRATION

Upon completion of this course, students should be able to:

- To understand the fundamental concepts of Mathematical Analysis.
- To state some of the classical theorems in of Advanced Real Analysis.
- To be familiar with measurable sets and functions.
- To integrate a measurable function.
- To understand the properties of Classical Banach Spaces.

MT01C04 GRAPH THEORY

Upon completion of this course, students should be able to:

- Students will understand the language of graphs and trees.
- Students will understand the use of graphs as modes
- Students will understand various types of trees and methods for traversing trees
- Solve problems using basic graph theory
- Identify induced subgraphs, cliques, matchings, covers in graphs
- Determine whether graphs are Hamiltonian and/or Eulerian
- Solve problems involving vertex and edge connectivity, planarity and crossing numbers
- Solve problems involving vertex and edge coloring
- Model real world problems using graph theory

MT01C05Complex analysis

Upon completion of this course, students should be able to:

- Represent complex numbers algebraically and geometrically,
- Define and analyze limits and continuity for complex functions as well as consequences of continuity,
- Apply the concept and consequences of analyticity and the Cauchy-Riemann equations and of results on harmonic and entire functions including the fundamental theorem of algebra,
- Analyze sequences and series of analytic functions and types of convergence,
- Evaluate complex contour integrals directly and by the fundamental theorem, apply the Cauchy integral theorem in its various versions, and the Cauchy integral formula, and
- Represent functions as Taylor, power and Laurent series, classify singularities and poles, find residues and evaluate complex integrals using the residue theorem.

SEMESTER 2

MT02C05 ABSTRACT ALGEBRA

Upon completion of this course, students should be able to:

- Demonstrate knowledge of group homomorphism, isomorphism and automorphism.
- Derive and apply the First Isomorphism Theorem.
- Demonstrate knowledge of conjugates, the Class Equation and Sylow theorems.
- Derive and apply Sylow Theorems.
- Solvable groups and associated properties, finite abelian groups.
- Demonstrate knowledge of polynomial rings and associated properties.
- Derive and apply Gauss Lemma, Eisenstein criterion for irreducibility of rationals.
- Understand the characteristic of a field and the prime subfield.
- Understand Factorization and ideal theory in the polynomial ring; the structure of a primitive polynomials
- Understand Field extensions and characterization of finite normal extensions as splitting fields.
- Understand the structure and construction of finite fields.
- Understand radical field extensions.
- Understand Galois group and Galois theory.

MT02C07 ADVANCED TOPOLOGY

Upon completion of this course, students should be able to:

- Understand product topology
- Understand Tietze Characterisation of Normality.
- Able to Evaluate Functions in to Products
- Use The Urysohn Metrisation Theorem.
- Familiar with Nets and Filters
- Familiar with compactness
- Students will understand the concept of derivative in n dimensions and the implicit and inverse function theorems which give a bridge between suitably nondegenerate infinitesimal information about mappings and local information.

- They will understand the concept of manifold and see some examples such as matrix groups.

ADVANCED COMPLEX ANALYSIS

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

- Manipulate complex numbers in various representations, define fundamental topological concepts in the context of the complex plane, and define and calculate limits and derivatives of functions of a complex variable.
- Use fundamental results, including: Cauchy's Theorem and Cauchy's Integral Formula, the Fundamental Theorem of Algebra, Morera's Theorem and Liouville's Theorem.
- Represent analytic functions as power series on their domains and verify that they are well-defined.
- Define a branch of the complex logarithm. Classify singularities and find Laurent series for meromorphic functions

MT02C09 PARTIAL DIFFERENTIAL EQUATIONS

Upon completion of this course, students should be able to:

- Be familiar with the modeling assumptions and derivations that lead to PDEs,
- Recognize the major classification of PDEs and the qualitative differences between the classes of equations, and
- Be competent in solving linear PDEs using classical solution methods.

MT02C10 REAL ANALYSIS

On completion of this unit successful students will be able to:

- evaluate the limits of a wide class of real sequences;
- determine whether or not real series are convergent by comparison with standard series or using the Ratio Test;
- understand the concept of continuity and be familiar with the statements and some proofs of the standard results about continuous real functions;
- understand the concept of the differentiability of a real valued function and be familiar with the statements of the standard results about differentiable real functions.

MT03C11 MULTIVARIATE CALCULUS AND INTEGRAL TRANSFORMS

On completion of this unit successful students will be able to:

- Students will gain a range of techniques employing the Laplace and Fourier Transforms in the solution of ordinary and partial differential equations. They will also have an appreciation of generalized functions, their calculus and applications.

- Students will gain a range of techniques employing Laplace and Fourier transform in the solution of ordinary differential equation and partial differential equation.

MT03C12 FUNCTIONAL ANALYSIS

On completion of this unit successful students will be able to:

- Discuss various problems in different space: vector space, inner product space and Hilbert Spaces.
- Explain the fundamental concepts of functional analysis.
- Understand the approximation of continuous functions.
- Understand concepts of Hilbert and Banach spaces with l_2 and l_p spaces serving as examples.
- Understand the definitions of linear functional and prove the Hahn-Banach theorem, open mapping theorem, uniform boundedness theorem, etc.
- Define linear operators, self adjoint, isometric and unitary operators on Hilbert spaces.

MT03C13 DIFFERENTIAL GEOMETRY

On satisfying the requirements of this course, students will have the knowledge and skills to

- Explain the concepts and language of differential geometry and its role in modern mathematics
- Analyze and solve complex problems using appropriate techniques from differential geometry
- Apply problem-solving with differential geometry to diverse situations in physics, engineering or other mathematical contexts
- Apply differential geometry techniques to specific research problems in mathematics or other fields
 - To obtain sound knowledge in understanding the basic concepts in geometry of curves and surfaces in Euclidean space, especially.
 - To acquire mastery in solving typical problems associated with the theory.
 - To gain sufficient knowledge for generalizing these concepts to higher dimensions.

MT03C14 NUMBER THEORY AND CRYPTOGRAPHY

On completion of this unit successful students will be able to:

- Learn the foundational Number Theory required for encryption and decryption.
- Encrypt and Decrypt message.
- Know the difference between private key and public key cryptographies.
- Understand a number of privacy mechanisms.

MT03C15 OPTIMIZATION TECHNIQUES

On completion of this unit successful students will be able to:

- Formulate optimization problems;

- Understand and apply the concept of optimality criteria for various type of optimization problems;
- Solve various constrained and unconstrained problems in single variable as well as multivariable;
- Apply the methods of optimization in real life situation.
- Identify strategic situations and represent them as games
- Solve simple games using various techniques
- Analyse economic situations using game theoretic techniques
- Recommend and prescribe which strategies to implement

Semester – 4

MT04C16SPECTRAL THEORY

On satisfying the requirements of this course, students will have the knowledge and skills to:

- Explain the fundamental concepts of functional analysis and their role in modern mathematics and applied contexts.
- Demonstrate accurate and efficient use of functional analysis techniques.
- Demonstrate capacity for mathematical reasoning through analyzing, proving and explaining concepts from functional analysis.
- Apply problem-solving using functional analysis techniques applied to diverse situations in physics, engineering and other mathematical contexts.

MT04E01ANALYTIC NUMBER THEORY

On completion of this unit successful students will be able to:

- The aim of this course is to study the prime numbers using the famous Riemann ζ -function. In particular, we will study the connection between the primes and the zeros of the ζ -function. We will state the Riemann hypothesis, perhaps the most famous unsolved problem in mathematics, and examine its implication for the distribution of primes. We will prove the prime number theorem, which states that the number of primes less than X is asymptotic to $X/\log X$.
- In addition to the highlights mentioned above, students will gain experience with different types of Fourier transform and with the use of complex analysis.
- The course aims to introduce students to the theory of prime numbers, showing how the irregularities in this elusive sequence can be tamed by the power of complex analysis. The course builds up to the Prime Number Theorem which is the corner-stone of prime number theory, and culminates in a description of the Riemann Hypothesis, which is arguably the most important unsolved problem in modern mathematics.
Learning Outcomes
- Students will learn to handle multiplicative functions, to deal with Dirichlet series as functions of a complex variable, and to prove the Prime Number Theorem and simple variants.

MT04E05 MATHEMATICAL ECONOMICS

On completion of this unit successful students will be able to:

- Possess a solid grasp of essential mathematical tools required for the further studies in economic theory.
- Use and explain the underlying principles, terminology, methods, techniques and conventions used in the subject.
- Develop an understanding of optimization techniques used in economic theory.
- Encourage students to think about applying these mathematical tools in their own research, if necessary, with suitable modifications.
- Solve economic problems using the mathematical methods described in the course.
- Use the mathematical methods described in the course to analyze and solve problems in tutorials in a group discovery setting.

MT04E07 OPERATIONS RESEARCH

On completion of this unit successful students will be able to:

- To apply the notions of linear programming in solving transportation problems.
- To understand the theory of games for solving simple games.
- To acquire knowledge in formulating Tax planning problem and use goal programming algorithms.
- To use linear programming in the formulation of shortest route problem and use algorithmic approach in solving various types of network problem.
- To know the use of dynamic programming in various applications.

MT04E14 CODING THEORY

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

- Comprehend various error control code properties, error detection and correction.
- Understand various methods of generating and detecting different types of error correcting codes
- Understands the fundamentals of coding theory
- The student has knowledge of properties of and algorithms for coding and decoding of linear block codes, cyclic codes and convolution codes. The student has an overview of arithmetic in finite fields, linear algebra over finite fields, and rings of power series.
- Apply various algorithms and techniques for coding
- Understands binary symmetric channel

PROJECT

- Engage in the study or research of a topic that is beyond the regular math department offerings in both rigor and content, and
- Produce a document (paper or honors thesis) that exhibits both the background and the conclusions reached as a result such study or research.

MASTER OF HUMAN RESOURCE MANAGEMENT
(MHRM)

Programme Specific Outcomes

The MHRM Programme is designed to equip post-graduate students with an integrated set of skills that will allow them to develop their professional careers in the area of Human Resource Management.

- Students will get an idea on how to think creatively and broaden their innovative skills.
- The program helps aspirants develop their managerial expertise so that they can face any problem in the manufacturing or service sectors in national or international level firms.
- The individual competency of students is built here. The team spirit as well as inter personal relationships of candidates is built here by means of theoretical and practical classes.

Course outcomes of the programme

Semester I

CC 101-Management Process and Organizational Behavior

Course Outcome

- To understand the dynamics of human behaviour in organisational settings
- To search into the development of OB in industrial settings
- To learn to appropriate the uniqueness of each individual in the universe
- To understand how we perceive and interpret events, situation and people
- To acquire skills in tapping the talents in each human being

CC 102-Quantitative Methods for Management

Course Outcome

- To understand the nature of statistics and statistical inference
- To analyse quantifiable and non-quantifiable data
- To acquire facility in using various statistical methods
- To base oneself on facts and figures

- To be able to use statistical packages to perform statistical calculations.

CC 103-Public policy and Managerial Economics

Course Outcome

- To introduce students to the domain of economics
- To acquaint with the labour market in a developing economy like India.
- To introduce them to the changes in economic environment in the world and India
- To acquaint them with the industrial policies of the government
- To enable students to participate in debates on economic matters.

CC 104-Accounting for Management

Course Outcome

- Understand what managerial accounting is and why it is important.
- Describe fundamental concepts of managerial accounting.
- Apply the financial perspective of accounting for costs.
- Identify problems associated with relying on financial accounting information for internal decision making.
- Organize cost information according to the decision-making needs of the organization.

CC 105-Legal Environment of Business

Course Outcome

- Legal Environment of Business seeks to increase understanding of the most important legal issues affecting business.
- The course aims to provide business students with the rudiments of the methods of legal thinking.
- In addition, it teaches the basic principles of the legal framework in which international business takes place.
- Specific emphasis will be given to the business laws

CC 106-Information Processing using Computers

Course Outcome

- *Students* will attain an ability to apply knowledge of computing appropriate to the discipline.
- *Students* will attain an ability to design, implement, and evaluate a *computer*-based system, process, component, or program to meet desired needs.
- It also incorporates desktop publishing, design and data handling features, allowing businesses to create many different types of professional documents for both internal and external purposes.

CC 107-Buisness Communication

Course Outcome

- To familiarise the students with the basic concepts of business communication in the organizational context.
- To understand the various forms and applications of communication in business.
- To develop the skills of written and oral communication
- To equip students to apply IT and audio visual tools for effective communication
- To acquire active listening skills

CC 108-Buisness and Ethical Values

Course Outcome

- Upon successful completion of the requirements for this course, students will be able to:
- Define, explain and illustrate the theoretical foundations of business ethics;
- Re-examine their knowledge of business and economic concepts from an ethical perspective;
- Explain and illustrate the importance, for business and the community, of ethical conduct;
- Recognise and resolve ethical issues in business;
- Reflect on and critically examine their own values and the importance of the ethical dimension in in business and workplace decision making; and,

- Confidently apply systematic ethical reasoning to business dilemmas and communicate effectively in oral and written forms these, using the concepts, logic and rhetorical conventions of business ethics

Semester II

CC 201-Environmental Management

Course Outcome

- The overall aim of the course is to give an introduction to how companies and organisations deal with environmental and sustainability matters.
- The course reflects different strategies, tools and accounting systems being used in the current development process and the driving forces behind them.
- The course discusses both process and product development in different companies related to sustainable development.

CC 202-Financial Management

Course Outcome

- At the end of this *course* students should be able to describe the dimensions of performance and risk relevant to *financial* firms.
- Calculate contemporary measures of *financial* measures of performance and risk
- Describe contemporary managerial risk *management* oversight processes

CC 203-Marketing Management

Course Outcome

- At the end of this *course* students should be able to describe knowledge of social, legal, ethical and technological forces on *marketing* decision-making.
- The marketing emphasis prepares students for *marketing management* responsibilities, e-marketing, high-tech marketing, database mining and analysis, product/brand management, industrial and consumer product sales, market analysis, and entrepreneurial activities.

CC 204-Operations Management

Course Outcome

- The course focuses on the relation of systems and technologies to the strategic direction for manufacturing operations and the function of operations planning.

- This course will equip you with the skills to analyse and apply the essential principles of business logistics.
- This course provides you with a capstone experience, which will give you the opportunity to integrate, critically reflect on and consolidate what you have learnt in your program.

CC 205-Human Resource Management

Course Outcome

- The course will explain the importance of human resources and their effective management in organizations.
- Demonstrate a basic understanding of different tools used in forecasting and planning human resource needs .
- Describe the meanings of terminology and tools used in managing employees effectively.
- Analyze the key issues related to administering the human elements such as motivation, compensation, appraisal, career planning, diversity, ethics, and training

CC 206-Research Methodology

Course Outcome

- To develop an inquisitive mind and foster a scientific temperament.
- To undertake a study into the observable phenomena.
- To understand the process involved in scientific inquiry.
- To gain insights about the practical application of research in HR and related issues.

CC 207-Management Information System

Course Outcome

- The objective of this course is to introduce the students to the Management Information Systems and its application in organizations.
- The course would expose the students to the managerial issues relating to information systems and help them identify and evaluate various options in Management Information Systems.

- Students will be able to: ... Explain the role and significance of effective *management information systems*, and describe how they contribute to optimizing organizational performance.

CC 208-Operations Research

Course Outcome

- The goal of this **course** is to teach you to formulate, analyze, and solve mathematical models that represent real-world problems.
- This aims to introduce students to use quantitative methods and techniques for effective decisions-making; model formulation and applications that are used in solving business decision problems.

Semester III

CC 301-Global Business Environment

Course Outcome

- Identify the main features of the international business environment and its main institutions;
- Analyse the political, social, economic, technological and other configurations that support cross-border trade;
- Apply an understanding of the nature of the multinational firm as an institutional structure for the conduct of cross-border trade and investment;
- Apply an understanding of the different modes of engagement with international markets and explore the interconnectedness between these and the economic, legal, governmental, political, regulatory, cultural and other environments in which expanding companies operate;
- Research international business issues and apply theoretical insights to the analysis of such issues in the context of a complex international business environment; and,

CC 302-Manpower Sourcing

Course Outcome

- To assess the human resource requirement of an enterprise and to suggest the best

course of action to be taken and also Outline the current theory and practice of recruitment and selection.

- This includes but is not limited to the supply of human resources and the advantages and disadvantages of external and internal recruiting
- To acquire skills in imparting training based on training needs identified

CC 303-Social Security and Employee Welfare

Course Outcome

- To acquaint with the concept an evolution of Employee Welfare(wellness)
- To get to know the social security measures in India
- To understand the structure and functions of Labour Administration in India
- To develop a perspective about the basics of constitution of India

CC 304-Human Resource Development

Course Outcome

- On successful completion of this *course* you will be able to: Differentiate between *human resource development* and other *human resource* management functions.
- Explain the strategic importance of *Human Resource Development* and its contribution to organisational effectiveness, productivity and quality of work-life.
- Participants will be able to: identify skills which are transferable from teaching to *training*, identify and describe learning styles, evaluate *training* materials for trainees of different experiential levels.

CC 305-Performance Management and Reward System

Course Outcome

- To familiarise the students with the need and relevance of performance management in organisations.
- To equip students with comprehensive knowledge about performance management of employees in their organisations.
- To understand the process involved in the performance management.
- To acquaint the students with the various methods and strategies used to measure

performance employees.

CC 306-Industrial Relations

Course Outcome

- To acquire skills in handling employer-employee relations.
- To get to know the composition of the parties to industrial relations.
- To familiarize with the role of management and unions in the promotion of

industrial

growth of the economy.

- To develop a perspective about industrial peace and harmony in the changed economic scenario

CC 307-Database Management Systems

Course Outcome

- Design and build a simple database system and demonstrate competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.
- Define program-data independence, data models for database systems, database schema and database instances.

CC 308-Management of Change and Organizational Development

Course Outcome

- To understand the concepts and practice relating to the processes of organisation development and change.

• To develop insight and competence in diagnostic and intervention processes and skills

for initiating and facilitating change in organisations.

- To provide necessary self-insight, skills and techniques to become effective change agents and internal OD consultants.

• To help the students to understand the various change management strategies adopted

by competing organisation and impact of change on organisations

Semester IV

CC 401-Strategic Human resource Management

Course Outcome

- The goal of this *course* is to provide students with the knowledge and skills that they can use to effectively manage human resources to achieve organizational goals.
- After studying this *course*, students should be able to: explain the scope of *HRM*.
- Understand the meaning and nature of *strategic HRM* and appreciate how *HR strategies* are related to business *strategies*.

CC 402-Elective I Global Human Resource Management

Course Outcome

- The course aims to Create a local appeal without compromising upon the global identity.
- To Generating awareness of cross cultural sensitivities among managers globally and hiring of staff across geographic boundaries.
- To Training upon cultures and sensitivities of the host country.

CC 403-Elective II Employee Counseling

Course Outcome

- To provide an overview of the counselling processes and techniques.
- To create a forum for practicing the basic counselling skills.
- To realise the various problem areas where counselling can be applied as a tool.
- To identify and select the key areas and situations where management can and should help employees in performance planning and career advancement.
- To provide insights in developing alternative approach to dealing with problem situations in organisations.

CC 404- Elective III Human Resource Accounting and Auditing

Course Outcome

- *Human resource Accounting* (HRA) engages accounting for the organization's management and employees as human capital that provides future

- Management decisions about acquiring, allocating, developing and maintaining human resources in order to achieve cost effective organizational *objectives*.

-

CC 405- Elective IV Software Project Management

Course Outcome

- By the end of this *course* student will have good knowledge of the issues and challenges faced while doing the *Software project*.
- Manage the selection and initiation of individual projects and of portfolios of projects in the enterprise.
- Conduct *project* planning activities that accurately forecast *project* costs, timelines, and quality.
- Implement processes for successful resource, communication, and risk and change *management*.

CC 406- Elective V Human Resource Planning

Course Outcome

- Explain the importance of *human resources* and their effective management in organizations.
- Demonstrate a basic understanding of different tools used in forecasting and *planning human resource* needs.
- Contribute to the development, implementation, and evaluation of employee recruitment, selection, and retention plans and processes. Administer and contribute to the design and evaluation of the performance management program.

CC 407- Project report based on training from a reputed organization for a period from 6 to 8 weeks

Course Outcome

The objective of internship programs is to provide students with a monitored meaningful work experience related to a determined set of learning goals that will increase their job marketability and enhance their life skills.

- Demonstrates dependability, initiative, time-management, organization and prioritization
Accepts constructive feedback

- Works effectively in a team environment
- Utilizes communication skills successfully
- Practices safe work habits
- Creates and maintains productive working relationships follows instructions
- Uses judgment
- Acts in professional, ethical manner
- Attains specific job-related skills
- Gains practical experience

CC 408-Comprehensive viva voce

Programme Specific Outcome of B. Sc. Physics (Model I) & B. Sc. Physics (Model II) programmes

The syllabi are framed in such a way that it bridges the gap between the plus two and post graduate levels of Physics by providing a more complete and logical framework in almost all areas of basic Physics. By the end of the first year (2nd semester), the students should have attained a common level in basic mechanics, properties of matter, a secure foundation in mathematics and other relevant subjects to complement the core for their future courses and developed their experimental and data analysis skills through a wide range of experiments through practical at laboratories. By the end of the fourth semester, the students should have been introduced to powerful tools for tackling a wide range of topics in Thermodynamics, Statistical Mechanics Electricity, Electrodynamics and Electronics. They should have been familiar with additional relevant mathematical techniques and other relevant subjects to complement the core and developed their experimental skills through a series of experiments which also illustrate major themes of the lecture courses. By the end of the sixth semester, the students should have covered a range of topics in almost all areas of physics including quantum physics, solid state physics, computational physics, electronics etc. and had experience of independent work such as projects; seminars etc. They should have been developed their understanding of core Physics.

Course Outcomes of B. Sc. Physics (Model I) Programme

course	Outcome
Methodology in physics	This course gives an introduction to the history and methodology of physics. The course emphasizes the importance of measurement which is central to physics.

Mechanics and properties of matter	This course would empower the student to acquire engineering skills and Practical knowledge, which help the student in their everyday life. This syllabus will cater the basic requirements for their higher studies. This course will provide a theoretical basis for doing experiments in related areas.
Electronics	This course helps the student to know the physical Principles and applications of Electronics.
Electricity and electrostatics	This course helps students to provide a sound foundation in electricity and electrostatics which have the key role in the development of Modern technological world.
Classical and quantum mechanics	This course makes the student eligible for advanced theoretical studies in Condensed Matter Physics, Spectroscopy, Astrophysics, Electrodynamics and Nuclear Physics.
Physical Optics and Photonics	This course provides necessary foundation in optics and photonics which prepare the students for an intensive study of advanced topics at a later stage.
Thermal and Statistical Physics	This course develops a working knowledge of statistical mechanics and to use this knowledge to explore various applications related to topics in material science and the physics of condensed matter.
Digital Electronics	This course provides necessary back ground for applications of Electronics in mathematical computation.
Computational Physics	This course give an insight to computer hardware and Computer applications.
Nuclear and Particle Physics	This helps students to explore the interior of nucleus and interaction Between nucleons.
Condensed Matter Physics	Provides an introduction to the physics of Condensed Matter. This study attempts to explain various types of phenomena like electro-magnetic properties, super-conductivity and super fluidity.
Relativity and Spectroscopy	Introduces students to principles of spectroscopy and special Theory of relativity.
Optoelectronics	

Course outcomes of B. Sc. Physics (Model II) Programme

Principles of Electronic Components	This course is helps in the familiarization of various electronic Components.
Electronic	This course helps to provide knowledge of various electronic

Applications	circuits and its application.
Basics of Power Electronics	This course enables to provide knowledge of various Power Electronic Components and its application.
Power Electronics	This course helps to provide knowledge of various Power electronic circuits and its applications.
Linear Integrated Circuits	This course is provides knowledge of various Linear Integrated Electronic circuits and its application.
Communication Electronics	This course instills knowledge of various communication systems and its working.
Micro Processor and Interfacing Devices	This course imparts knowledge of Micro Processor and Interfacing Devices.
Applications of Microprocessors	This course provides the students knowledge of architecture and applications of Microprocessors.
Energy and Environmental Studies(open course)	The course creates concern among the students on energy conservation and environmental protection.
Amateur Astronomy(open course)	Helps the students to comprehend the Cosmos and its origin and to develop scientific aptitude.

PROGRAMME SPECIFIC OUTCOMES & COURSE OUTCOMES

M.Sc. Statistics Program

(Under Credit and Semester System (CSS) 2012 onwards)

Semester-I (Total credits-20)

Course Code	Course Title	Credits	Teaching
			Hours/Week
ST1C01	Distribution Theory	4	5
ST1C02	Analytical Tools for Statistics	4	5
ST1C03	Probability Theory	4	5

ST1C04	Mathematical Methods for Statistics	4	5
ST1C05	Statistical Computational Techniques	4	5

Semester-II (Total credits-20)

ST2C06	Multivariate Distributions	4	5
ST2C07	Advanced Probability Theory	4	5
ST2C08	Statistical Estimation Theory	4	5
ST2C09	Stochastic Processes	4	5
ST2C10	Statistical Computing-1	4	5

Semester-III (Total credits-20)

ST3C11	Sampling Theory	4	5
ST3C12	Statistical Testing of Hypotheses	4	5
ST3C13	Design and Analysis of Experiments	4	5
ST3C14	Multivariate Analysis	4	5
ST3C15	Statistical Computing-2	4	5

Semester-IV (Total credits-20)

ST4C16	Statistical Quality Control	3	5
ST4 E01	Econometric Methods	3	5
ST4 E02	Operations Research	3	5
ST4 E05	Statistical Decision Theory	3	5
ST4 E08	Statistical Computing-3	3	5
ST4CD	Dissertation/Project	3	2

Programme Specific Outcomes of M. Sc. Statistics

- ü *M. Sc. Statistics programme is accepted as being highly desirable for starting and developing a career in Statistics.*
- ü *After the completion of the programme, students can serve as a Statistical Consultant/ Data Analyst in the public or private sector.*
- ü *The programme is also an excellent preparation for embarking on a Doctoral programme in Statistics.*
- ü *The programme enables the type of quantitative reasoning necessary for making important advances in the sciences such as Medicine & Genetics, for making important decisions in business & public policy etc.*
- ü *A wide choice of career opportunities exists for well qualified statisticians for example in Banking, Insurance, Share Markets, Pharmaceutical industry and various Government bodies.*

Course Outcomes of M. Sc. Statistics Programme

ST1C01 Distribution Theory

Upon completion of this course students will get a well understanding of following ideas

- Students are aware of well-known Discrete Distributions: - Power series, Binomial, Geometric, Poisson, Negative binomial and Hyper geometric and Continuous Distributions:- Rectangular, Exponential, Weibull, Beta, Gamma, Pareto, Normal, Lognormal, Cauchy, Laplace, Logistic. In each distributions the students got ideas in Calculate moments and

moment generating function, definitions of probability function, density function, cumulative distribution function and moment generating function, and their inter-relationships, determine and interpret independence and conditional distributions, Use moment generating function to determine distribution function and moments

- The derivations of sampling distributions such as chi-square, t and F distributions from normal distribution.
- Find distributions of functions of random variables, including distributions of maximum and minimum observations., r^{th} order , r^{th} and s^{th} order statistics, distribution of range midrange and sample median are completed using this course

ST1C02 Analytical Tools for Statistics

The course present

- Basic concepts of matrices and matrix algebra
- Methods of solving systems of linear equations
- Basic concepts of vector spaces
- Concepts of linear transformations
- The concept of and methods of computing determinants
- Methods of computing and using eigenvalues and eigenvectors.

Student Learning Outcomes: Students in this course will:

1. Demonstrate ability to manipulate matrices and to do matrix algebra.
2. Demonstrate ability to solve systems of linear equations.
3. Demonstrate ability to work within vector spaces and to distill vector space properties.
4. Demonstrate ability to manipulate linear transformations and to distill mapping properties
5. Demonstrate ability to manipulate and compute determinants.
6. Demonstrate ability to compute eigenvalues and eigenvectors.

All objectives address the Content Knowledge program.

ST1C03 Probability Theory

Probability theory is the branch of mathematics that deals with modelling uncertainty. It is important because of its direct application in areas such as genetics, finance and telecommunications. It also forms the fundamental basis for many other areas in the mathematical sciences including statistics, modern optimisation methods and risk modelling. This course provides an introduction to probability theory, random variables and Markov processes. Topics covered are: probability axioms, conditional probability; Bayes' theorem; discrete random variables, moments, bounding probabilities.

ST1C04 Mathematical Methods for Statistics

This course will give the students an idea regarding

- Sequences and series of functions convergence, continuity, uniform continuity, differentiability. Functions of several variables: maxima and minima, Method of Lagrangian multipliers, Riemann integration theory Laplace transform and its applications to differential equations.
- Different measures, measurable and measure space measurable set and its properties are discussed
- Lebesgue integration theory and general definition of integral and very important three theorem such as Fatou's lemma, monotone convergence theorem, Lebesgue dominated convergence theorem are covered in this course
- Basic ideas of complex numbers and complex functions are covered in this paper. Analytic functions, Cauchy-Riemann equations, contour integral, Cauchy's theorem Cauchy's integral formula, Liouville's theorem, Maximum modulus principle, Zeroes of a function, singular point, different types of singularities, residues at a pole.

Learning outcomes

This course is a basic course and awareness these ideas are useful to study statistics MSc program in a good way.

ST1C05 Statistical Computational Techniques

The course in Statistical Computational Techniques consists of two major parts- topics on numerical analysis and basic concepts of the open source software R.

Topics on numerical analysis will develop methods aided by technology to solve algebraic, transcendental, and differential equations, and to calculate derivatives and integrals. The course will also develop an understanding of the elements of error analysis for numerical methods. The course will further develop problem solving skills of students.

R is an open-source free computer programming language and a highly interactive environment for statistical computing and graphics. It provides a wide variety of statistical and graphical techniques, including state-of-the-art modelling methods and facilities to produce well-designed publication-quality plots. The environment is highly extensible, and is increasingly being adopted as the platform of choice both for research in statistical methodology and for applied statistics. During the course, we cover data manipulation, tables, graphics, hypothesis tests, and linear models. It's about giving people a map, so that after the course they can find their own way onward through the massive amount of things R can now do. The course takes a tutorial and interactive approach that encourages students to write their own R programs and perform analyses. The course outcome will be a foundation for fluency in R programming, and an insight into the capabilities of the language as a productivity tool for data manipulation and statistical analyses.

Course Objectives:

1. derive appropriate numerical methods to solve algebraic and transcendental equations
2. develop appropriate numerical methods to approximate a function
3. derive appropriate numerical methods to solve a linear system of equations
4. perform an error analysis for various numerical methods
5. prove results for various numerical root finding methods
6. derive appropriate numerical methods to calculate a definite integral
7. code various numerical methods in the modern computer language R.

Course Outcomes: Students will be able to

1. solve algebraic or transcendental equations using appropriate numerical methods
2. approximate a function using an appropriate numerical method
3. solve a linear system of equations using an appropriate numerical method
4. perform an error analysis for a given numerical method
5. prove results for numerical root finding methods
6. calculate a definite integral using an appropriate numerical method
7. code numerical methods in the R language

ST2C06 Multivariate Distributions

Multivariate analysis skills have been commonly recognized as part of the key requisites for analytics analysts. The complexity of most phenomena in the real world requires an investigator to collect and analyze observations on many different variables instead of a single variable. The desire for statistical techniques to elicit information from multivariate dimensional data thus becomes essential and crucial for data analysts.

The objective of the course is to introduce several useful multivariate techniques (like Multivariate Distributions, Joint and Marginal Distributions, Stochastic Independence Covariance and Correlation, Conditional Distributions, Multinomial Distributions, Joint Moment Generating Functions etc) making strong use of illustrative examples and a minimum of mathematics. The course will start with the extensions of univariate techniques to multivariate framework, such as multivariate normal distribution, confidence ellipse estimation, hypothesis testing, simultaneous confidence intervals and Bonferroni confidence intervals. The course will also cover the techniques unique to the multivariate setting such as principal component analysis, factor analysis, discrimination, classification and clustering analysis.

Skills will be developed with SAS, a leading statistical analysis software package used in industry.

Course Learning Outcomes

On successful completion of this course students will be able to:

1. demonstrate knowledge of and properties of statistical models in common use
2. Understand the basic principles underlying statistical inference (estimation and hypothesis testing).
3. be able to construct tests and estimators, and derive their properties.
4. Demonstrate knowledge of applicable large sample theory of estimators and tests.

ST2C07 Advanced Probability Theory

The course will give the student a deeper understanding of the foundations of probability theory, such as probability theory from a measure-theoretic perspective, convergences of distributions and probability measures, and conditional expectations. During the course, important theorems, such as Borell-Cantelli lemma, Radon-Nikodym theorem, Fubini theorem, and general central limit

theorems, will be investigated. The syllabus also covers advanced topics in characteristic functions and its convergence properties.

Learning outcomes

For a passing grade, the student must be able to

- independently give a count of the foundations of probability theory from a measure-theoretic perspective
- thoroughly explain, define and relate different types of convergences of distributions, probability measures and characteristic functions
- thoroughly explain important results and properties for expectation
- thoroughly describe theory for conditional distributions and expectation from a measure-theoretic perspective
- thoroughly explain, define and relate different types of martingales and its use in practical situations

ST2C08 Statistical Estimation Theory

Main objective is to provide basic estimation and detection background for engineering applications. After taking this course, students should have enough understanding of the main concepts and algorithms of detection and estimation theory for practical applications as well as for their research.

Learning Outcomes

1. Learn about basic Estimation Methods: Maximum Likelihood Estimation, Minimum Variance Unbiased Estimation, method of moments, method of minimum chi square and method of modified minimum chi square
2. Learn about basic estimator properties such as Bias, Efficiency, sufficiency
3. Learn Classical and Bayesian Estimation Approaches
4. Learn Basic Estimation Performance Bounds such as Cramer-Rao Bound and Bhattacharyya lower bound
5. Gain ability to apply estimation methods to real engineering problems.

ST2C09 Stochastic Processes

Course Description

Stochastic models are among the most widely used tools in operations research and management science. Stochastic processes and applications can be used to analyse and solve a diverse range of problems arising in production and inventory control, resource planning, service systems, computer networks and many others. This course, with an emphasis on model building, covers inventory models, Markov chains, Poisson processes, queuing theory, Branching process and renewal process.

On completion of this course you should be able to:

1. Elucidate the power of stochastic processes and their range of applications;
2. Demonstrate essential stochastic modelling tools including Markov chains and queuing theory;
3. Formulate and solve problems which involve setting up stochastic models

ST2C10 Statistical Computing-1

This course covers the practical problems of Distribution theory, Estimation Multivariate distributions and stochastic process. It develops the computational skill and familiarity in data analysis techniques in real life situations.

ST3C11 Sampling Theory

Sample surveys are an important source of statistical data. A great many published statistics on demographic, economic, political and health related characteristics are based on survey data. Simple random sampling is a well known method of sampling but, for reasons of efficiency and practical constraints, methods such as stratified sampling and cluster sampling are typically used by statistical authorities and by market research organisations. This course is concerned with the design of sample surveys and the statistical analysis of data collected from such surveys.

Topics covered are: Simple random sampling with associated estimation and confidence interval methods, Selecting sample sizes, Estimating proportions, Unequal probability sampling, Ratio and regression estimation, Stratified sampling, Cluster and systematic sampling, Multistage designs and Double or Two-stage sampling. Upon completion of his/her course on Sampling Theory, the graduate will be able to:

- i. apply mathematical concepts and principles to perform numerical and symbolic computations.
- ii. use technology appropriately to investigate and solve mathematical and statistical problems.
- iii. write clear and precise proofs.
- iv. communicate effectively in both written and oral form.
- v. demonstrate the ability to read and learn statistics independently.

Also the student will

1. Learn differences in simple random sampling, sampling with replacement and other types of sampling.
2. Estimate population means, totals, proportions, and ratios.
3. Estimate sample sizes for estimating population means and totals.

In short, the aim of this course is to cover sampling design and analysis methods that would be useful for research and management in many field. A well designed sampling procedure ensures that we can summarize and analyze data with a minimum of assumptions and complications.

ST3C12 Statistical Testing of Hypotheses

This course involves basic concepts in testing of hypothesis, randomized tests, Neymann- Pearson most powerful tests, (MLR) property, UMP tests, construction of uniformly most accurate (UMA) confidence intervals using UMP tests, UMPU tests, construction of uniformly most accurate unbiased (UMAU) confidence intervals using UMPU tests, Locally most powerful (LMP) and locally most powerful unbiased (LMPU) tests. This course involves LR tests, SPRT tests and non - parametric tests.

Using this course the student will be able to

1. MP tests
2. UMP tests, UMPU tests
3. LR tests
4. SPRT tests
5. Different non parametric tests.
6. This course will help to solve the testing problems in real life situations.

ST3C13 Design and Analysis of Experiments

This subject provides students with the knowledge to:

1. Use statistics in experimentation;
2. Understand the important role of experimentation in new product design, manufacturing process development, and process improvement;
3. Analyse the results from such investigations to obtain conclusions;
4. Become familiar methodologies that can be used in conjunction with experimental designs for robustness and optimization

ST3C14 Multivariate Analysis

The central theme of the course is the multivariate general linear model, and statistical methods include multivariate hypothesis testing, principal component analysis, factor analysis, discriminant analysis, canonical correlation analysis, and multivariate analysis of variance and covariance and cluster analysis. The course covers theoretical, computational, and interpretive issues of multivariate techniques using computer solution.

Learning outcomes

- On a general level the students should be able to understand the concept of analyzing multivariate data.
- They should be familiar with a basic minimum level of matrix competency and with general aspects of handling multivariate data. On successful completion of the course the student.
- Will appreciate the range of multivariate techniques available.
- Will be able to summarize and interpret multivariate data.
- Will have an understanding of the link between multivariate techniques and corresponding univariate techniques.

Will be able to use multivariate techniques appropriately, undertake multivariate hypothesis tests and draw appropriate conclusions.

ST3C15 Statistical Computing-2

This course covers the practical problems of Sampling theory, Testing of Hypothesis Multivariate distributions and Design of experiments. Also, it develops the computational skill and familiarity in data analysis techniques in real life situations. This practical awareness helps the students to get familiarity with data sets and different techniques

ST4C16 Statistical Quality Control

The goal of the course is to introduce students to statistical quality control (SQC) emphasizing those aspects which are relevant for SQC's practical implementation. This course will present the theory and methods of quality monitoring including process capability, control charts, acceptance sampling, quality engineering, and quality design. The objectives include

- To understand the basic concepts of quality monitoring.
- To understand the statistical underpinnings of quality monitoring.
- To learn various available statistical tools of quality monitoring.
- To learn the statistical and economical design issues associated with the monitoring tools.
- To demonstrate the ability to design and implement these tools.

After completing the course on Statistical Quality Control, the student will understand the concepts of Quality Control and Statistical Process Control (SPC), Control Charts for Variables, The Central Limit Theorem, Natural and assignable causes of variation, Setting Mean Chart Limits , Setting Range Chart Limits, Using Mean and Range Charts, Control Charts for Attributes , Managerial Issues and Control Charts, Process Capability, Producer's and consumer's risk, Acceptance Sampling, Operating Characteristic (OC) Curves and Average Outgoing Quality.

ST4 E01 Econometric Methods

The course will give

- a broad knowledge of regression analysis relevant for analyzing economic data.
- interpretation and critical evaluation of the outcomes of empirical analysis
- elementary procedures for model validation in the single equation context.

- theoretical background for the standard methods used in empirical analyses, like properties of least squares estimators and the statistical testing of hypothesis.

ST4 E02 Operations Research

Operations research (OR) have many applications in science, engineering, economics, and industry and thus the ability to solve OR problems are crucial for both researchers and practitioners. Being able to solve the real-life problems and obtaining the right solution requires understanding and modelling the problem correctly and applying appropriate optimization tools and skills to solve the mathematical model. The goal of this course is to teach the students to formulate, analyse, and solve mathematical models that represent real-world problems.

In particular, we will cover linear programming, network flow problems, nonlinear programs, dynamic programming, solve specialized linear programming problems like the transportation and assignment problems, solve network models like the shortest path, minimum spanning tree, and maximum flow problems, understand how to model and solve problems using dynamic programming, learn optimality conditions for single- and multiple-variable unconstrained and constrained non-linear optimization problems and corresponding solution methodologies

ST4 E05 Statistical Decision Theory

Learning Objectives/Outcomes: The students will familiarize with fundamental concepts of the statistical decision theory and Bayesian inference. At the end of the course, they are expected to be able to formulate a decision theoretic approach to the problem, evaluate a utility function, propose a conjugate family of prior distributions, evaluate Bayes and posterior risks and find the optimal solution. The students will be able to apply empirical and hierarchical Bayes approaches, will solve statistical games and find maximin and minimax strategies when playing against an intelligent opponent

ST4 E08 Statistical Computing-3

This course covers the practical problems of Statistical Quality Control, Econometric Methods and Operations Research. It develops the computational skill and familiarity in data analysis techniques.

Programme specific outcomes of B. Sc. Zoology & M. Sc. Programmes

Name of the Programme	Programme Code	Outcome of the programme	Programme specific outcome
<p style="text-align: center;">B. Sc. Zoology Programme (Model 1)</p>		<p>The BSc. Zoology programme is designed to help the students to:</p> <ol style="list-style-type: none"> 1. Impart basic knowledge of various disciplines of Zoology and General biology meant both for a graduate terminal course and for higher studies. 2. Inculcate interest in and love of nature with its myriad living creatures. 3. Understand the unity of life with the rich diversity of organisms and their ecological and evolutionary significance 4. Acquire basic skills in the observation and study of nature, biological techniques, experimental skills and scientific investigation 5. Acquire basic knowledge and skills in certain applied branches to enable them for self employment 6. Impart awareness of the conservation of the biosphere. 	<p>The graduate of this programme should be able to</p> <ol style="list-style-type: none"> 1. Identify and list out common animals 2. Explain various physiological changes in our bodies 3. Analyze the impact of environment on our bodies 4. Understand various genetic abnormalities 5. Develop respect for nature 6. Explain the role and impact of different environmental conservation programmes 7. Identify animals beneficial to humans 8. Identify various potential risk factors to health of humans 9. Explain the importance of genetic engineering 10. Use tools of information technology for all

			activities related to zoology
M. Sc. Zoology Programme		<ul style="list-style-type: none"> • Candidates after completing the course can enter any field of Zoological and biomedical research. • They can become researchers, teachers and can be trained in any fields of Zoology with in a short duration. If their past learning outcome in excellent they are fit for doing any job in the field of Animal Science. • They have also job scopes in the media or the environmental and ecosystem management sector • They have also scopes of career in the environmental consulting firms in public or private sector. 	<ul style="list-style-type: none"> • To produce Post graduates of Zoology with in-depth knowledge of basic and advance areas in the subject. • That inculcates the deep knowledge of the Zoology and related fields • To develop the scientific temperament and problem solving attitude. • To promote the attitude to serve the society • To promote learning and research aptitude

Course outcomes of

B. Sc. Zoology & M. Sc. Zoology programmes

Programme	Course Code	Name of the course	Course Specific Outcome
B. Sc. Zoology (Model 1)	ZY1B01U	General Methodology and Perspectives in science	<ul style="list-style-type: none"> • To make aware of the basic philosophy of science, its history, concepts and scope • To develop proper scientific mind, culture and work habits • To familiarize with the basic tools and techniques of scientific study with emphasis on biological sciences
			<ul style="list-style-type: none"> • To create appreciation on diversity

	ZY2B02U	Biodiversity & Modern systematics	<p>of life on earth</p> <ul style="list-style-type: none"> • To understand different levels of biological diversity • To familiarize taxa level identification of animals • To learn biodiversity estimation techniques • To create interest for conservation of biodiversity
	ZY3B03U	Animal diversity non chordata	<ul style="list-style-type: none"> • To study the scientific classification of invertebrate fauna. • To learn the physiological and anatomical peculiarities of some invertebrate phyla through type study. • To learn the evolutionary significance of various invertebrate fauna • To stimulate the curiosity in living things around them.
	ZY4B04U	Animal diversity chordata	<ul style="list-style-type: none"> • To make the student observe the diversity in chordates and their systematic position. • To make them aware of the economic importance of some classes.
	ZY5B05U	Cell Biology and Molecular Biology	<ul style="list-style-type: none"> • To emphasize the central role of Cell biology and Molecular biology, being the most developing areas of biological science. • To make aware of different cell organelles, their structure and role in living organisms. • To introduce the nature of genetic materials at molecular level, their expression and regulation. • To develop critical thinking, skill and research aptitudes.
	ZY5B06U	Environmental Biology, Toxicology and Disaster	<ul style="list-style-type: none"> • To impart basic knowledge on ecosystems and their functioning • To learn about various types of anthropogenic pressures on ecosystem, related degradation and management measures • To study toxicants, their impacts on

		Management	<p>human health and environment and remedial measures</p> <ul style="list-style-type: none"> • To create awareness about disasters, prevention and mitigation measures
	ZY5B07U	Evolution, Zoogeography and Ethology	<ul style="list-style-type: none"> • To acquire knowledge about the evolutionary history of earth (living and non living) • To learn various tools and techniques for evolutionary studies • To study the distribution of animals on earth, its pattern, evolution and causative factors • To impart basic knowledge on animal behavioural patterns and their role
	ZY5B08U	Biochemistry, Physiology and Endocrinology	<ul style="list-style-type: none"> • This course will provide students with a deep knowledge in biochemistry, physiology and endocrinology. • Defining and explaining the basic principles of biochemistry useful for biological studies for illustrating different kinds of food, their structure, function and metabolism. • Explaining various aspects of physiological activities of animals with special reference to humans. • Students will acquire a broad understanding of the hormonal regulation of physiological processes in invertebrates and vertebrates. • By the end of the course, students should be familiar with hormonal regulation of physiological systems in several invertebrate and vertebrate systems. • This also will provide a basic understanding of the experimental methods and designs that can be used for further study and research. • The achievement of above objectives along with periodic class discussions of current events in science, will benefit students in their further studies in the

			biological/physiological sciences and health-related fields, and will contribute to the critical societal goal of a scientifically literate citizenry.
	ZY6B09U	Reproductive and Developmental Biology	<ul style="list-style-type: none"> • This will provide a basic understanding of the experimental methods and designs that can be used for further study and research. • The achievement of above objectives along with periodic class discussions of current events in science, will benefit students in their further studies in the biological/physiological sciences and health-related fields, and will contribute to the critical societal goal of a scientifically literate citizenry.
	ZY6B10U	Genetics and Biotechnology	<ul style="list-style-type: none"> • To emphasize the central role that genetics and biotechnology plays in the life of all organisms. • To introduce the student to some of the present and future applications of bio-sciences • To develop critical thinking skill and research aptitude among students, by introducing the frontier areas of the biological science.
	ZY6B11U	Microbiology and Immunology	<ul style="list-style-type: none"> • To inspire the students in learning the frontier areas of biological sciences • To make them aware of the pathogens , health related problems, their origin and treatment. • To equip the students with the knowledge of modern developments and recent trends in biological sciences
	ZY6B12U	General informatics Bioinformatics and Biostatistics	<ul style="list-style-type: none"> • To inspire the students in learning the frontier areas of biological sciences • To update and expand basic informatics skills and attitudes relevant to the emerging knowledge of society and also to equip the students to effectively utilize the digital knowledge resources in learning.

			<ul style="list-style-type: none"> • To equip the students with the knowledge of modern developments and recent trends in biological sciences
	ZY5D01U	Man, nature and sustainable development	<ul style="list-style-type: none"> • To understand how Man originated and attained present status • To learn the basic concepts of Ecosystems and its functioning • To study the use and abuse of nature by Man • To learn the different resources available on earth • To Study global environmental problems and its impact on human well being • To appreciate the perspectives of Man on nature and learn the strategies for conservation • To familiarize with sustainable development and develop an attitude for sustainability • To dismantle compartmentalization of knowledge, reveals links between different disciplines and promotes solutions which reconcile interests of nature and human beings. Such a holistic approach is necessary for sustainable development.
	ZY1C01U	Animal diversity – non chordata (complementary course for bsc. Botany)	<ul style="list-style-type: none"> • To acquire knowledge on the taxonomic status of various Invertebrate animals and animal groups. • To familiarize the students with the diverse group of organisms around us. • To develop an aptitude for understanding nature and its rich bio-diversity.
	ZY2C02U	Animal diversity – chordata (complementary course for bsc. Botany)	<ul style="list-style-type: none"> • To acquire knowledge on the taxonomic status of the various vertebrate animals and animal groups. • To familiarise the students with the diverse groups of organisms around us.

			<ul style="list-style-type: none"> ○ To develop an aptitude for understanding nature and its rich biodiversity.
	ZY3C03U	Human physiology and immunology (complementary course for bsc. Botany)	<ul style="list-style-type: none"> ● To inspire the students in learning the frontier areas of biological sciences ● To appreciate the correlation between structure and function of organisms ○ To make them aware of the health related problems, their origin and treatment
	ZY4C04U	Applied zoology (complementary course for bsc. Botany)	<ul style="list-style-type: none"> ○ Equip the students interested in the applied branches of zoology with skills and knowledge which can lead to self employment opportunities.
M. Sc. Zoology	ZY1CT01	Biosystematics and animal diversity	<ul style="list-style-type: none"> ● To give a thorough understanding in the principles and practice of systematics ● To help students acquire an in-depth knowledge on the diversity and relationships in animal world ● To develop an holistic appreciation on the phylogeny and adaptations in animals
	ZY1CT02	Evolutionary biology and ethology	<ul style="list-style-type: none"> ● To provide an understanding on the process and theories in evolutionary biology ● To help students develop an interest in the debates and discussion taking place in the field of evolutionary biology ● To equip the learners to critically evaluate the debates and take a stand based on science and reason ● To expose students to the basics and advances in ethology, and generate an interest in the subject in order to understand the complexities of both animal and human behavior
	ZY1CT03	Biochemistry	<ul style="list-style-type: none"> ● To understand the chemical nature of life and life process ● To provide an idea on structure and functioning of biologically important molecules ● To generate an interest in the subject and help students explore

			the new developments in biochemistry
	ZY1CT04	Biostatistics, computer application And research methodology	<ul style="list-style-type: none"> • To impart concepts, generate enthusiasm and make awareness about the tools/gadgets and accessories of biological research • To equip the learner to carry out original research in biology • To help the students to improve analytical and critical thinking skills through problem solving • To provide hands on training in the use of various tools and techniques suggested in the course
	ZY 2CT06	Ecology: principles and practices	<ul style="list-style-type: none"> • To provide an understanding on the basic theories and principles of ecology • To help study various disciplines in ecology • To learn current environmental issues based on ecological principles • To gain critical understanding on human influence on environment
	ZY2CT07	Genetics and bio informatics	<ul style="list-style-type: none"> • To give an in-depth understanding on the principles and mechanisms of inheritance • To help study the fine structure and molecular aspects of genetic material • To provide an opportunity to learn the importance of inheritance in Man • To expose the learners to the emerging field of bioinformatics and equip them to take up bioinformatics studies
	ZY2CT08	Developmental biology	<ul style="list-style-type: none"> • To introduce the concepts and process in developmental biology • To help students understand and appreciate the genetic mechanisms and the unfolding of the same during development • To expose the learner to the new developments in embryology and its relevance to Man
	ZY2CT09	Biophysics, instrumentation	<ul style="list-style-type: none"> • To learn the biophysical properties and functioning of life processes • To introduce the tools and

		And biological techniques	<p>techniques available for studying biochemical and biophysical nature of life</p> <ul style="list-style-type: none"> • To equip the learner to use the tools and techniques for project work/ research in biology
	ZY3CT11	Animal physiology	<ul style="list-style-type: none"> • To study and compare the functioning of organ systems across the animal world • To give an over view of the comparative functioning of different systems in animals • To learn more about human physiology
	ZY3CT12	Cell and molecular biology	<ul style="list-style-type: none"> • To help study the structural and functional details of the basic unit of life at the molecular level • To motivate the learner to refresh and delve into the basics of cell biology • To introduce the new developments in molecular biology and its implications in human welfare
	ZY3CT 13	Microbiology and biotechnology	<ul style="list-style-type: none"> • To provide an over view of the microbial world, its structure and function • To familiarize the learner with the applied aspects of microbiology • To give students an intensive and in-depth learning in the field of biotechnology • To understand the modern biotechnology practices and approaches with an emphasis in technology application, medical, industrial, environmental and agricultural areas • To familiarize the students with public policy, biosafety, and intellectual property rights issues related to biotechnology
	ZY3CT 14	Immunology	<ul style="list-style-type: none"> • To provide an intensive and in-depth knowledge to the students in immunology • To help the learner to understand the role of immunology in human health and well-being • To familiarize the students the new developments in immunology

	ZY4C ET 01	Environmental science: concepts and approaches	<ul style="list-style-type: none"> • To provide a broad and deep understanding on environment and influence of man on environment • To equip the students to use various tools and techniques for the study of environment • To enable the learner to understand, think and evolve strategies for management and conservation of environment for sustaining life on earth • To take up further studies and research in the field
	ZY4C ET02	Environmental pollution and toxicology	<ul style="list-style-type: none"> • To provide a broad and deep understanding on environment and influence of man on environment • To equip the students to use various tools and techniques for the study of environment
	ZY4C ET03	Environmental management and development	<ul style="list-style-type: none"> • To enable the learner to understand, think and evolve strategies for management and conservation of environment for sustaining life on earth • To take up further studies and research in the field