

# MANOHAR MEMORIAL (PG) COLLEGE FATEHABAD

## PROGRAM OUTCOMES AND COURSE OUTCOMES

### B.Sc. (Non Medical, Medical and Computer Science)

#### Program Outcomes (PO) for Under Graduate Programmes in the Faculty of Sciences

<b>PO1</b>	Knowledge	Capable of demonstrating comprehensive disciplinary knowledge gained during course of study
<b>PO2</b>	Communication	Ability to communicate effectively on general and scientific topics with the scientific community and with society at large
<b>PO3</b>	Problem Solving	Capability of applying knowledge to solve scientific and other problems
<b>PO4</b>	Individual and Team Work	Capable to learn and work effectively as an individual, and as a member or leader in diverse teams, multidisciplinary settings
<b>PO5</b>	Investigation of Problems	Ability of critical thinking, analytical reasoning and research-based knowledge including design of experiments, analysis and interpretation of data to provide conclusions
<b>PO6</b>	Modern Tool usage	Ability to use and learn techniques, skills and modern tools for scientific practices
<b>PO7</b>	Science and Society	Ability to apply reasoning to assess the different issues related to society and the consequent responsibilities relevant to the professional scientific practices
<b>PO8</b>	Life-Long Learning	Aptitude to apply knowledge and skills that are necessary for participating in learning activities throughout life
<b>PO9</b>	Environment and Sustainability	Ability to design and develop modern systems which are environmentally sensitive and to understand the importance of sustainable development
<b>PO10</b>	Ethics	Apply ethical principles and professional responsibilities in scientific practices

## **PROGRAMME SPECIFIC OUTCOMES**

**PSO1** Acquire good knowledge about the fundamentals and applications of mathematical and scientific theories.

**PSO2** To know inter disciplinary approach between all branches of Science and Technology as Chemistry, Physics, Zoology, Botany, Computer science and Mathematics.

**PSO3** Will become familiar with the different branches of Sciences like analytical, physical, organic, inorganic and environmental..

**PSO4** Will help in understanding the causes of environmental pollution and can open up new methods to control environmental pollution.

**PSO5** Will develop analytical skills and problem-solving skills requiring application of chemical principles and mathematical techniques.

## **SUBJECT: MATHEMATICS**

### **1st Semester Paper-I (BM 111) Algebra**

#### **Course Outcomes:**

**CO1:** To learn multiplication and basic operation of matrices and congruence relations and learn basic matrix algebra and method to find solutions to system of linear equations. Also to learn eigen values and eigenvectors of matrix

**CO2:** To learn operations on polynomials, finding GCD of two polynomials and roots of polynomials.

### **1st Semester Paper-II (BM 112) Calculus**

#### **Course Outcomes:**

**CO1:** To study functions in detail which is a fundamental structure in all sciences, and to be able to check continuity of a function.

**CO2:** To apply notion of derivative in mean value theorem and also in higher order derivatives which arise in all applied sciences.

### **1st Semester Paper-III (BM 113) Solid Geometry**

#### **Course Outcomes:**

**CO1:** To study two dimensional and three dimensional geometry in details which are fundamental structure in all sciences.

**CO2:** In this course, students learn the properties of sphere, cone and cylinder in detail.

### **2nd Semester Paper-I (BM 121) Number Theory and Trigonometry**

**Course Outcomes:**

**CO1:** In this course, students learn the properties of the set of integers in detail and they can find integer solutions to the system of equations which arises in real life problems.

**CO2:** Students can learn about advanced properties of Trigonometric functions, DeMoivre Theorem, Hyperbolic functions.

**2nd Semester Paper-II (BM 122) Ordinary Differential Equations****Course Outcomes:**

**CO1:** To be able to solve first degree differential equations, Langrange's method.

**CO2:** To find solutions of linear differential equations of higher order.

**2nd Semester Paper-III (BM 123) Vector Calculus****Course Outcomes:**

**CO1:** To learn scalar and vector product of multiple vectors.

**CO2:** Learn about curvilinear coordinates and vector integrations, Stokes theorem, Gauss theorem.

**3rd Semester Paper-I (BM 231) Advanced Calculus****Course Outcomes:**

**CO1:** To study functions of several variables, continuity and Differentiability of multivariate functions.

**CO2:** To study the notion of differential geometry, curvature and torsion.

**3rd Semester Paper-II (BM 232) Partial Differential Equations****Course Outcomes:**

**CO1:** Introduction of first order Partial Differential Equations, Charpit method.

**CO2:** Learn methods to solve first and higher order Partial Differential Equations.

**3rd Semester Paper III (BM 233) Statics****Course Outcomes:**

**CO1:** To learn about different forces and equilibrium of system, friction, center of gravity of bodies.

**CO2:** To learn concept to virtual work, central axis and null planes.

**4th Semester Paper (BM 241) Sequence and Series****Course Outcomes:**

**CO1:** to learn about topology of real numbers, open and closed sets.

**CO2:** To learn about real sequences, bounded sequence, infinite series, alternative series and their convergence

**4th Semester Paper II (BM 242) Special Functions and Integral Transforms****Course Outcomes:**

**CO1:** To learn the evaluation of Laplace transform of different types of functions, their derivatives and integrations.

**CO2:** To learn the evaluation of Inverse Laplace transform of functions, their derivatives and integrations, and to learn application of Convolution theorem.

#### **4th Semester Paper-III (BM 243) Programming in C and Numerical Methods**

##### **Course Outcomes:**

**CO1:** Students will learn about basic structure of C language, input and output functions.

**CO2:** They will learn about numerical solution of algebraic and transcendental equations.

#### **5th Semester Paper I (BM 351) Real Analysis**

##### **Course Outcomes:**

**CO1:** To learn basic techniques and examples in analysis to be well prepared for courses like Topology, Measure theory and Functional analysis.

**CO2:** To study various types of sets and relations, and concept of countable and uncountable..

#### **5th Semester Paper II (BM352) Groups and Rings**

##### **Course Outcomes:**

**CO1:** To learn fundamental properties and mathematical tools such as closure, identity, inverse and generators.

**CO2:** To study algebraic structure 'Groups' in detail which is useful in study of Rings, Modules, Algebraic topology, Analysis.

#### **5th Semester Paper-III (BM353) Numerical Analysis**

##### **Course Outcomes:**

**CO1:** To learn to apply the various numerical techniques for solving real life problems.

**CO2:** The problems which cannot be solved by usual formulae and methods can be solved approximately by using numerical techniques.

#### **6th Semester Paper-I (BM 361) Real and Complex Analysis**

##### **Course Outcomes:**

**CO1:** To learn basic algebraic properties of complex numbers and limit and continuity of complex functions.

**CO2:**To learn analytic functions and the C-R equations as its necessary and sufficient condition.

#### **6th Semester Paper II (BM 362) Linear Algebra**

##### **Course Outcomes:**

**CO1:**To learn fundamental properties and mathematical tools such as closure, identity, inverse and generators in vector space.

**CO2:** To study Linear Transformations in detail which is useful in study of Rings, Modules, algebraic topology, Inner product spaces and Gram-Schmidt process of orthogonalization. .

### **6th Semester Paper- III (BM 363) Dynamics**

#### **Course Outcomes:**

**CO1:** To learn about motion along a plane curve, simple harmonic motion, relative motion

**CO2:** To get knowledge about Central orbits, Kepler's laws of planetary motion

## **SUBJECT: PHYSICS**

### **1st Semester Paper-I**

#### **Course Outcomes:**

**CO1:** This subject will be an introduction to the pursuit of physics. Students will get to know the importance to concepts such as generalized coordinates & constrained motion. They'll be able to state the conservation principle involving momentum angular momentum & energy.

**CO2:** From this course students will be able to differentiate between different types of magnetite materials & their properties.

### **1st Semester Paper-II**

**Course Outcomes:** After completing this course, students will able to develop a basis for future learning & work experience in field of physics.

### **2nd Semester Paper-I**

#### **Course Outcomes:**

**CO1:** Kinetic theory of gases: Students shall be familiar with the fundamental principles of general theory of relativity. They'll get to know internship concepts like length contraction & dilation.

**CO2:** Students will be able to know about significance of electrical components & its worship principal & would be able to analyses topically the relationship between various physical quantities.

### **2nd Semester Paper-II**

#### **Course Outcomes:**

Students will be able to develop analytical thinking that makes them versatile & adaptable to do work in technical field.

### **3rd Semester Paper-I**

#### **Course Outcomes:**

**CO1:** Students will develop basic understanding of Fortran programming language, its stages, compilation process & fundamentals of convertity from one number system to another.

**CO2:** Student will get knowledge of principal & theories about behavior of light & its related phenomena in optics.

### **3rd Semester Paper-II**

#### **Course Outcomes:**

Students will get to know about different trades of physics like classical, magnetisms, quantum and will be able to apply this knowledge to analyze a variety of physical phenomenon.

### **4th Semester Paper I**

#### **Course Outcomes:**

**CO1:** Statistical Mechanics : Students would able to distinguish between 3 types of statistics. They'll be able to distribute diptyches in different cells by knowing their possible move of microstate & microstate.

**CO2:** Students will understand thenomenes like refraction, diffraction futelkence etc. They'll be able to know about resolirng power of different instruments in options.

### **4th Semester Paper II**

#### **Course Outcomes:**

**CO1:** Students will be able to solve numerical problems by learning a variety of experimental & computational techniques.

### **5th Semester Paper I**

#### **Course Outcomes:**

**CO1:** Students will get basic knowledge for their higher studies & research in field of science and technology. Students will be able to conduct independent research & can work in a technical position.

**CO2:** Student will get to know about the origin of elementary theories starting from their hypothesis to nuclear properties & their energy. They'll understand various type of nuclear reactions, their q values.

### **5th Semester Paper II**

#### **Course Outcomes:**

Students will get basic knowledge for their higher studies & research in field of science and technology. Students will be able to conduct independent research & can work in a technical position.

### **6th Semester Paper-I**

#### **Course Outcomes:**

**CO1:** Solid state physics: Students will be able to explain about crystal planes, reciprocal lattice, concepts of Brillouin zones & diffraction of X-Rays by crystalline materials.

**CO2:** Students will be able to describe theories exploring the structure of atoms & the origin of observed spectra & its dependence on externally applied electric & Magnetic field.

### **6th Semester Paper-II**

#### **Course Outcomes:**

Students will be able to understand how major advancements are taking place in physics or how major concepts are developing & changing over time.

## **SUBJECT: CHEMISTRY**

### **1st Semester Paper-I (CHEM-101) Inorganic Chemistry-I**

#### **Course Outcomes:**

**CO1:** States the postulates of quantum mechanics and Schrodinger equation to explain the structure of hydrogen atom.

**CO2:** To study and explain the Radial and angular nodes and their significance in describing shapes of s,p and d orbitals.

### **1st Semester Paper-II (CHEM-102) Physical Chemistry-I**

#### **Course Outcomes:**

**CO1:** To learn about Role of temperature and pressure to establish the state of gases and describe the Concept of critical temperature, pressure and volume of real gases

**CO2:** To understand the Maxwell distribution law and various parameters associated with collisions ideal gas molecules

### **1st Semester Paper-III (CHEM-103) Organic Chemistry-I**

#### **Course Outcomes:**

**CO1:** Have sound knowledge of the basic organic chemistry like electron displacement effects with suitable examples.

**CO2:** Get information about the types of structural isomerism and stereoisomers, optical isomerism, and different nomenclature like D/L, R/S, cis/trans, E/Z etc. of various organic compounds. Also gain knowledge of different conformations of cyclohexane and get knowledge of wedge & dash, Newman projections etc.

### **2nd Semester Paper-IV (CHEM-201) Inorganic Chemistry-II**

#### **Course Outcomes:**

**CO1:** To know the concept and able to explain types and effect of hydrogen bonding and van der Waals forces on properties of substances.

**CO2:** To learn about the various theories of metallic bonding with reference to conductors, insulators and semiconductors and their applications.

### **2nd Semester Paper-V (CHEM-202) Physical Chemistry-II**

#### **Course Outcomes:**

**CO1:** To have the knowledge about the concepts of rates of chemical reactions and its applications in derivation of reactions of various orders and half-life

**CO2:** To be able to explain about the physical and magnetic properties associated with various molecular substances

### **2nd Semester Paper-VI (CHEM-203) Organic Chemistry-II**

#### **Course Outcomes:**

**CO1:** Know about Huckel's rule of aromaticity and various methods of preparation of aromatic Hydrocarbons.

**CO2:** Get knowledge about the mechanism of  $S_N1$  and  $S_N2$  reactions and other various chemical reactions of aryl and aryl halides.

### **1st Year Paper-VII (CHEM-204) (Chemistry Practical-I)**

#### **Course Outcomes:**

**CO1:** To gain knowledge about Preparation of standard solutions used in the lab.

**CO2:** Know about Redox, iodometric titrations and complexometric titrations.

**CO3:** To study the concept of surface tension and its determination by various methods.

**CO4:** To know about viscosity and its measurements by using Ostwald's viscometer.

### **3rd Semester Paper-VIII (CHEM-301) Inorganic Chemistry-III**

#### **Course Outcomes:**

**CO1:** Have good knowledge about d-block elements particularly of transition elements.

**CO2:** To study the comparison between 3d elements with 4d and 5d elements with reference to ionic radii, oxidation state, magnetic properties and spectral properties some compounds of transition elements.

### **3rd Semester Paper-IX (CHEM-302) Physical Chemistry-III**

#### **Course Outcomes:**

**CO1:** To know about the laws and concepts of chemical thermodynamics and their applications in thermochemical calculations.

**CO2:** To have knowledge about electrolytic concentration cells with and without transference and their EMF calculation, applications of the concept to determine liquid junction potential, pH determination using potentiometry and potentiometric titrations.

### **3rd Semester Paper-X (CHEM-303) Organic Chemistry-III**

#### **Course Outcomes:**



**CO1:** Know about the preparation of aliphatic, aromatic aldehydes and ketones and various important name reactions of aldehydes and ketones.

**CO2:** Get knowledge about the acidity of  $\alpha$ -hydrogens of diethyl malonate, ethyl acetoacetate and the synthesis and Keto-enol tautomerism of ethyl acetoacetate.

#### **4th Semester Paper-XI (CHEM-401) Inorganic Chemistry-IV**

##### **Course Outcomes:**

**CO1:** To explain the factors responsible for the stability of coordination complexes and various substitution reactions of square planar complexes with reference to trans effect.

**CO2:** To study the magnetic properties of transition metal complexes and various types of magnetic materials and their magnetic susceptibility.

#### **4th Semester Paper XII (CHEM-402) Physical Chemistry-IV**

##### **Course Outcomes:**

**CO1:** To know about dual characteristic of matter and extend this fact to obtain postulates of quantum mechanics and quantum-mechanical operators, apply Schrödinger equation to determine the physical observables for particle in a box.

**CO2:** To understand the need of statistical mechanics and Maxwell-Boltzmann distribution, partition function and its significance.

#### **4th Semester Paper-XIII (CHEM-403) Organic Chemistry-IV**

##### **Course Outcomes:**

**CO1:** Get knowledge aromatic behaviour and basicity of simple heterocyclic compounds.

**CO2:** Knowledge about condensed five and six-membered heterocyclic rings, basicity of pyridine, piperidine and pyrrole and the preparation and reactions of indole, quinoline and isoquinoline.

#### **2nd Year Paper-XIV (CHEM-404) (Chemistry Practical -II)**

##### **Course Outcomes:**

**CO1:** To verify the Beer's Lambert law using potassium permanganate and potassium dichromate and also quantitation of these analytes.

**CO2:** To prepare simple coordination complexes viz. Cuprous chloride, tetra-ammine cupric sulphate, chrome alum, potassium trioxalatochromate(III) and Nickel Hexammine chloride.

#### **5th Semester Paper-XV (CHEM-501) Inorganic Chemistry-V**

##### **Course Outcomes:**

**CO1:** To know about basic concepts of bioinorganic chemistry with reference to metal ions present in biological systems.

**CO2:** To study the biochemistry of dioxygen carriers especially hemoglobin and myoglobin.

#### **5th Semester Paper XVI (CHEM-502) Physical Chemistry-V**

**Course Outcomes:**

**CO1:** To have sound knowledge about the concepts of dual nature of matter and its applications to obtain Schrödinger wave equation and angular momentum.

**CO2:** To solve Schrödinger equation for a particle present in various systems viz., two and three-dimensional boxes, harmonic oscillator and rigid rotator..

**5th Semester) Paper-XVII (CHEM-503) Organic Chemistry-V****Course Outcomes:**

**CO1:** Have knowledge of various absorption laws (Beer-Lambert law), molar absorptivity, analysis UV spectra and application of UV spectroscopy in structure elucidation.

**CO2:** Able To describe absorptions of various functional groups and applications of IR spectroscopy.

**6th Semester Paper-XVIII (CHEM-601) Inorganic Chemistry-VI****Course Outcomes:**

**CO1:** To know about principles and various types of chromatography techniques

**CO2:** To have sound knowledge of the concept of ESR spectra of various molecules.

**6th Semester Paper-XIX (CHEM-602) Physical Chemistry-VI****Course Outcomes:**

**CO1:** To have knowledge about solutions and colligative properties and their application in determining molar mass of solute.

**CO2:** To have good knowledge about fundamental concepts of phase equilibrium and their applications in studying one and two-component systems including eutectics.

**6th Semester Paper-XX (CHEM-603) Organic Chemistry-VI****Course Outcomes:**

**CO1:** To have knowledge about classification, structures and important reactions of carbohydrates and amino acids.

**CO2:** Have sound knowledge about Structural and functional classification of proteins.

**3rd Year Paper-XXI (CHEM-604) (Chemistry Practical- III)****Course Outcomes:**

**CO1:** To analyze the given inorganic mixture qualitatively for various cations and anions present in them.

**CO2:** Able to determine  $R_f$  values.

**CO3:** Identification of organic compounds.

**CO4:** Able to perform thin layer chromatography to separate various components present in the Mixture, determination of hardness of water.

## **SUBJECT: ZOOLOGY**

### **1st Semester Paper-I**

#### **Course Outcomes:**

After completing this course students will be able to describe the general characteristics, classification, reproduction and economic importance of phylum Protozoa, Porifera, Coelenterate, Platyhelminthes and Aschelminthes.

### **1st Semester Paper-II**

#### **Course Outcomes:**

After completing this course students will be able to identify the parasitic diseases and their causal organisms.

### **2nd Semester Paper-I**

#### **Course Outcomes:**

After completing this course students will be able to discuss the structure of animal cell and its organelles, analyze the morphology of chromosome organization and explain the cell-division and its significance.

### **2nd Semester Paper-II**

#### **Course Outcomes:**

After completing this course students will be able to describe the general characteristics, classification, reproduction and economic importance of phylum Annelida, arthropoda, mollusca and echinodermata.

### **3rd Semester Paper-I**

#### **Course Outcomes:**

After completing this course students will be able to describe biodiversity and economic importance of insects

### **3rd Semester Paper-II**

#### **Course Outcomes:**

After completing this course students will be able to Define the basic terms in genetics, discuss the linkage groups, gene frequency and explain the concept of mutation.

### **4th Semester Paper I**

#### **Course Outcomes:**

After completing this course students will be able to classify the chordates along with studies on various physiological functions and comparative anatomy of organs of chordate with example.

### **4th Semester Paper II**

#### **Course Outcomes:**

After completing this course students will be able to define the basic terms in biochemistry, explain the structure, functions and reactions of the various biomolecules.

### **5th Semester Paper I**

**Course Outcomes:**

After completing this course students will be able to describe the general characteristics, classification, structure, functions and biology of amphibians, reptiles, birds and mammals.

**5th Semester Paper II****Course Outcomes:**

After completing this course students will be able to explain the physiological processes in mammals, the anatomy of various systems and the reproductive cycles with hormonal control.

**6th Semester Paper-I****Course Outcomes:**

After completing this course students will be able to learn the different aspects of developmental biology and also gain knowledge about human evolution and various concepts about the origin of species.

**6th Semester Paper II****Course Outcomes:**

After completing this course students will be able to learn details about taxonomy and biology of fishes and various aquaculture techniques. Discuss the life cycle and importance of major parasites.

**SUBJECT: BOTANY****1st Semester Paper-I****Course Outcomes:**

After completing this course students will be able to describe the general characteristics, classification, reproduction and economic importance of Virus, Bacteria, Mycoplasma, Cyanobacteria, Algae, Fungi and Lichens.

**1st Semester Paper-II****Course Outcomes:**

After completing this course students will be able to discuss the structure of plant cell and its organelles, analyze the morphology of chromosome organization and explain the cell-division and its significance.

**2nd Semester Paper-I****Course Outcomes:**

After completing this course students will be able to describe the general characteristics, the classification, morphology, anatomy, life cycle & economic importance of Bryophytes and Pteridophytes.

**2nd Semester Paper-II****Course Outcomes:**

After completing this course students will be able to describe the genetic organization of an organism, its replication, expression and concept of mutation.

### **3rd Semester Paper-I**

#### **Course Outcomes:**

After completing this course students will be able to Evolution, general characteristics, classification, morphology, anatomy and reproduction of Gymnosperms

### **3rd Semester Paper-II**

#### **Course Outcomes:**

After completing this course students will be able to Differentiation of tissue system and their organizations in root, stem and leaf

### **4th Semester Paper I**

#### **Course Outcomes:**

After completing this course students will be able to Origin, classification and diversity of Angiosperms from Dicots to monocots, .Principles and rules of botanical nomenclature

### **4th Semester Paper II**

#### **Course Outcomes:**

After completing this course, students will be able to Morphology and modification of plants, Various parts of flower

### **5th Semester Paper I**

#### **Course Outcomes:**

After completing this course students will be able to understand plant water relation and role of mineral nutrients, summarize the cycle of respiration and photosynthesis.

### **5th Semester Paper II**

#### **Course Outcomes:**

After completing this course, students will be able to Define and explain about ecology branches and its significance, summarize the biotic and abiotic factors & describe the types of ecosystem.

### **6th Semester Paper-I**

#### **Course Outcomes:**

After completing this course students will be able to The basic of Enzymes and Origin, distribution, botanical description, brief idea of cultivation and economic importance of various plants

### **6th Semester Paper II**

#### **Course Outcomes:**

After completing this course students will be able to technique of plant tissue culture and its application, the tools and techniques in genetic-engineering.

**SUBJECT: COMPUTER SCIENCE**

### **1st Semester Paper-I**

### **Course Outcomes:**

After completing this course, students are going to be able to:

By learning the essential of programming constructs they will easily switch to the other language in future. ready to work with textual information ,characters and strings

### **1st Semester Paper-II**

#### **Course Outcomes:**

After completing this course, students are going to be able to:

To understand and examine the structure of varied number systems and its application in digital design. the power to know , analyze and style various combinational circuits.

### **2nd Semester Paper-I**

#### **Course Outcomes:**

After completing this course, students are going to be able to:

To create, polish, and share documents in Word; to research and visualize data in Excel; to make , collaborate, and effectively present ideas in point .

### **2nd Semester Paper-II**

#### **Course Outcomes:**

After completing this course, students are going to be able to:

Analyze a number of the planning issues in terms of speed, technology, cost, performance. ...  
Use appropriate tools to style verify and test the CPU architecture. the power to know , analyze and style various sequential circuits.

### **3rd Semester Paper-I**

#### **Course Outcomes:**

After completing this course, students are going to be able to:

Describe how arrays, records, linked structures, stacks, queues, trees, and graphs are represented in memory and employed by algorithms

### **3rd Semester Paper-II**

#### **Course Outcomes:**

After completing this course, students are going to be ready to

Develop and evaluate system requirements. Work effectively during a team environment. Explain the necessity for and value of a formalized step-by-step approach to the analysis, design, and implementation of computer information systems.

#### **4th Semester Paper I**

##### **Course Outcomes:**

After completing this course, students are going to be able to:

Understand the essential components of a computer operating system, and therefore the interactions among the varied components. They can understand the policies for scheduling, deadlocks, memory management and page replacement policies for dynamic memory management.

#### **4th Semester Paper II**

##### **Course Outcomes:**

After completing this course, students are going to be able to:

- Students list the visual programming concepts.
- Distinguish and compose events and methods.
- They can develop basic desktop application. e.g. calculator

#### **5th Semester Paper I**

##### **Course Outcomes:**

After completing this course, students are going to be ready to

They understand the concept of classes, objects, data-abstraction, polymorphism, data-hiding and inheritance.

They also learn how to handle the exception in the program during run time program.

#### **5th Semester Paper II**

##### **Course Outcomes:**

After completing this course, students are going to be able to:

Find basic concepts of knowledge and files, DBMS functions and components.

Develop an honest database design and normalization techniques to normalize a database and style databases for various applications

### **6th Semester Paper-I**

#### **Course Outcomes:**

After completing this course, students are going to be able to:

To develop an understanding of various components of computer networks, various protocols, modern technologies and their applications

### **6th Semester Paper II**

#### **Course Outcomes:**

After completing this course, students are going to be able to:

Retrieve update, delete, alter, drop, grant & truncate a large amount of record from a database.

By learning SQL they can easily create a database and manage the data.

By learning the RDBMS they can process the large amount of data.



## PROGRAM AND COURSE OUTCOMES

### B. Com. (General)

#### Programme outcomes:-

To Provide well versed and trained human resource to meet the requirements of the industry in the field like MNC's, Accounting, Taxation, Banking, Insurance and stock marketing as well as research. The students will be ready for employment in functional areas like accounting, taxation, banking, insurance and corporate law. An attitude for working effectively and efficiently in a business environment is developed. Learners will gain knowledge of various disciplines of commerce, business, accounting, economics, and finance, auditing and marketing

#### Programme Specific outcome:-

After successful completion of B.Com degree a student should be well acquainted with knowledge and set of skills to meet the challenges of industry with an ease. Understanding and applying mathematical tools and techniques for research in field of commerce Students also acquire skills to work as tax consultant, audit assistant and other financial supporting services. Students have choices to pursue professional courses such as CA, M.COM, MBA, CMA, ICWA, CS, etc Students are able to play roles of businessmen, entrepreneur, managers, consultant, which will help learners to possess knowledge and other soft skills and to react aptly when confronted with critical decision making

#### Course Outcomes :-

Course	Outcome
<b>B.com 1<sup>st</sup>Semester</b>	
BC-1.1English	On successful completion of this subject, the learners would acquire the knowledge of grammar, oral skills, reading, writing and study skills.
BC-1.2Financial Accounting	The students will be capable of understanding and preparation of final accounts of companies and the relevant and the relevant accounting standards.
BC-1.3Business law	To introduce the students to basic legal terms and their usage in business.

BC-1.4 Micro Economics	On successful completion of this subject would give students an insight into the dynamics of microeconomics.
BC-1.5 Business mathematics	To have a knowledge of Elementary Mathematics, basics of integration and its uses in the areas of mathematics.
<b>B.com 2<sup>nd</sup> Semester</b>	
BC-2.1 Proficiency in english	The students would be able to understand the concepts of reading and writing skills, basic grammar and used it in relation to business communication.
BC-2.2 Corporate Accounting	To enable the students to understand the concept company sources of finance, procedure of raising finance and final accounts.
BC-2.3 Corporate law	The students shall become aware about current laws relating to Company.
BC-2.4 Macro economics	On successful completion of this subject would give students an insight into the dynamics of macroeconomics.
BC-2.5 Introduction to Comp. App.	To equip the students with basic knowledge of use of technology in office tools. To equip the students about the network structure and protocols.
BC-2.6 Commerce practical and viva voce	To judge the overall practical and theoretical subject knowledge of students by external examiner.
BC-2.7 EVS	The students shall become aware about basic concepts of environments as well as current changes in environmental issues.
<b>B.com 3<sup>rd</sup> Semester</b>	
BC-301 Corporate Accounting I	On successful completion of this subject, the learners would acquire the knowledge of issue of shares and debenture, final accounting of companies etc.
BC-302 Business Statistics-I	The students shall become aware about basics of statistics as well as methods to analysis of univariate and bivariate data.
BC-303 Company law	The students shall become aware about current laws relating to Corporate world.
BC-304 Principle of	The students shall become aware about basics of marketing.

Marketing I	
BC-305 Business law –I	The students shall become aware about legislative framework governing business world as well as aware about current laws relating to business world.
BC-306(ii) Advertising-I	On successful completion of this subject, the learner understand the role of advertising for the success of brands and its importance within the marketing function of a company as well as to understand actual execution of ad plan.
<b>B.com 4<sup>th</sup> Semester</b>	
BC-401 Corporate Accounting-II	On successful completion of this subject, the learners would acquire the knowledge of accounts of holding company, banking company, insurance company etc.
BC-402 Advanced Statistics	The students shall become aware about different test like Z-test, T-test, Chi- square test etc.
BC-403 Auditing	After successful completion of the course, students should be in a position to understand the fundamental nature of auditing and its implications on the society.
BC-404 Investment Management	Students will be able to use time value of money methodology as well as able to determine the cost of capital.
BC-405 Business Law-II	The students shall become aware about current laws relating to business world.
BC-406(ii) Management of Sales force-II	After successful completion of the course, students should be in a position to understand effective sales compensation plan, identify the key factors in establishing and maintain high morale in the sales force as well as know the distinction between the skills required for selling and sales management.
<b>B.com 5<sup>th</sup> Semester</b>	
BC-501 Management Accounting	Understanding application of practice tools and methods in management accounting. It will help to recognize commonly used financial statements, their components and how information from business transactions flows into these statements.
BC-502 Entrepreneurship	After successful completion of the course, students should be in a

Development	position to understand how entrepreneurship and innovation minors will be able to sell themselves and their ideas as well as will develop and cultivate endurance.
BC-503Income tax-I	After successful completion of the course, students should be in a position to understand basic provisions of direct tax laws and its interpretations. Computation procedure of taxable income and filing of return.
BC-504Cost Accounting	Students will understand cost classification of cost, cost centre, cost per unit and preparation of actual and estimated cost sheet.
BC-505IFS	After successful completion of the course, students should be in a position to understand the Indian financial system and its functioning.
BC-506(iii)Service Marketing	After successful completion of the course, students should be in a position to understand the difficulties of marketing service products and on the differences with marketing goods.
<b>B.com 6<sup>th</sup> Semester</b>	
BC-601Financial Management	The students will be capable of applying and handling the accounting treatment of partnership accounting in relation to amalgamation as well conversion of firm into a company.
BC-602Business Policy and Strategic Management	After successful completion of the course, students should be in a position to understand the major theories, background work, concepts and research output in the field of strategic management.
BC-603Income- Tax-II	After successful completion of the subject, students should be in a position to understand basic provisions of Assessment of individual, HUF and Company as well as penalties provisions.
BC-604Accounting and Reporting Standards	After successful completion of the course, students should be in a position to understand the international financial reporting stands and their application to the companies who use them.
BC-605Disaster Management	After successful completion of the course, students should be in a position to understand the basic conceptual understanding of disasters and its relationship with development as well as to gain understand approaches of DRR and the relationship between vulnerability, disasters, disaster prevention and risk reduction.
BC-606(iii)Marketing	After successful completion of the course, students should be in a

Research	position to understand the basics concepts related to marketing research, research process and interpret development of marketing research.
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## PROGRAM AND COURSE OUTCOMES

### B. A. (General)

#### Program Outcomes (PO) for Under Graduate Programmes in the Faculty of Sciences

<b>PO1</b>	Knowledge	Capable of demonstrating comprehensive disciplinary knowledge gained during course of study
<b>PO2</b>	Entrepreneurship	The students will have wide range of educational future and professional and personal: many will be mature students and many will be employed.
<b>PO3</b>	Critical Thinking	Students will develop a comprehensive understanding of the theories and practice of language use. Students will demonstrate advanced critical thinking skills, inclusive of information literacy.
<b>PO4</b>	Individual and Team Work	Capable to learn and work effectively as an individual, and as a member or leader in diverse teams, multidisciplinary settings
<b>PO5</b>	Communication Skills	Students will be able to communicate to diverse audiences in a variety of contexts and Students will be prepared for a wide range of writing-related careers or graduate. Students will have the ability to use, analyze, and learn communication technologies
<b>PO6</b>	Modern Tool usage	Ability to use and learn techniques, skills and modern tools for scientific practices
<b>PO7</b>	Economic Knowledge	Developing the knowledge about theories of economic growth & Development and issues of economic planning.
<b>PO8</b>	Life-Long Learning	Aptitude to apply knowledge and skills that are necessary for participating in learning activities throughout life
<b>PO9</b>	Environment and Sustainability	Ability to design and develop modern systems which are environmentally sensitive and to understand the importance of sustainable development
<b>PO10</b>	Ethics	Apply ethical principles and professional responsibilities in scientific practices

## **PROGRAMME SPECIFIC OUTCOMES**

1. Developing reading, writing, speaking and listening skills.
2. Availing the job opportunities in translation.
3. Increasing the critical attitude about literary writing.
4. Creating an interest in literature and Introduction of the contemporary literary works, acquiring the skill of translation
5. Imbuing the literary research attitude, Explanation of the need and significance of editing.
6. Developing the knowledge about theories of economic growth & Development and issues of economic planning.
7. Creating awareness about changing macro-economic policies and theories.

### **SUBJECT: English**

#### **Course Outcomes:**

On successful completion of this subject, the learners would acquire:

Knowledge of grammar, oral skills, reading, writing and study skills

They will be able to trace the nature of influence that all the classical texts have on modern English literatures both in British and Indian writings in English.

Appreciate these texts as a source of great wisdom. Interpret these texts from contemporary points of view.

Understand the true meaning of literature as well as life. The inspirational essays, short stories, poems, plays, novels etc. will definitely help them to understand the deep meaning of life and to face the challenges of life courageously.

The grammar topic in the syllabus will enhance students' vocabulary and overall command on the English language and communication skills along with four basic skills of reading, writing, listening and speaking

Develop a skill in applying various literary theories in interpreting a specific text, Interpret the works of great writers of Indian writers in English.

Demonstrate, through discussion and writing, an understanding of significant cultural and societal issues presented in Indian English literature.

They will be able to understand the true meaning of literature as well as life. The inspirational essays, short stories, poems, plays, novels etc. will definitely help them to understand the deep meaning of life and to face the challenges of life courageously. The grammar topic in the syllabus will enhance students' vocabulary and overall command on the English language and communication skills along with four basic skills of reading, writing, listening and speaking.

### **SUBJECT: Hindi**

#### **Course Outcomes:**

On successful completion of this subject, the learners would acquire the following:

Understand the origin of Hindi language and its various types of literature.

Identify the dialects of Hindi language family and get familiarized to basic writing in Hindi.

Understand the concept of the whole history of Hindi literature and language.

Enhance their command on the language by learning the art of letter-writing, reading comprehension et cetera.

Understand life's true meaning by reading the inspirational works of the great writers of Hindi literature.

Generate interest in Hindi literature, identify the dialects of Hindi language family and Analyze the development of 'Khariboli' Hindi

Acquire ability to appreciate stories, poems and plays in Hindi.

Understand various genres in Hindi literature.

Get acquainted with the socio-political contexts of various Hindi writers.

Understand nationalistic values through the study of Hindi literature

Understand life's true meaning by reading the inspirational works of the great writers of Hindi literature.

### **SUBJECT: Sanskrit**

#### **Course Outcomes:**

On successful completion of this subject, the learners would acquire the knowledge of ancient Indian religion, literature and history through the study of Sanskrit texts.

1. The students would know about Character perception, Maheshwar sutrani , shabroop, dhaturoop and use them and how to translate in hindi. The students would know general grammar.
2. The students would know about the second chapter of Shree Madbhagvat Geeta Vedic Brahamana. Fifty shloks of Nitishatkam. Translation of Texts hindi to Sanskrit .



3. The students would know vedic grammar and also know history of Sanskrit prose literature and Sanskrit grammar.
4. The students can take the knowledge about Raghunasham of Kalidas and Shivrajvijay of Ambikadat Vyas, Rigveda and its Philosophical importance.
5. The students should know general introduction Plays of Kalidas AbhigyanShakuntlam.
6. They will also know Indian Petrology and definitions and examples of various Ornamentation.

### **SUBJECT: Punjabi**

#### **Course Outcomes:**

On successful completion of this subject, the learners would acquire the knowledge of important developments in Sikh history and Punjabi literature.

Access a rich and diverse cultural tradition developed over a long period of time. This tradition includes Poetry, Prose, traditional folk dance, philosophy, film, music and meditation. Understand and appreciate the cultural tradition includes Poetry, prose, traditional folk dance, Philosophy, film, music and meditation.

Punjabi Course helps them understand society and make them aware of their rights and duties, enhance their critical thinking

Knowledge of modern standard Punjabi provides foundation for understanding the innumerable regional variants and various style of spoken Punjabi, which are found both within and outside the subcontinent. Use Punjabi to communicate with others. Understand own culture through the study of other culture.

### **SUBJECT: MATHEMATICS**

#### **1st Semester Paper-I (BM 111) Algebra**

##### **Course Outcomes:**

**CO1:** To learn multiplication and basic operation of matrices and congruence relations and learn basic matrix algebra and method to find solutions to system of linear equations. Also to learn eigen values and eigenvectors of matrix

**CO2:** To learn operations on polynomials, finding GCD of two polynomials and roots of polynomials.

#### **1st Semester Paper-II (BM 112) Calculus**

##### **Course Outcomes:**

**CO1:** To study functions in detail which is a fundamental structure in all sciences, and to be able to check continuity of a function.

**CO2:** To apply notion of derivative in mean value theorem and also in higher order derivatives that arise in all subjects.

### **1st Semester Paper-III (BM 113) Solid Geometry**

#### **Course Outcomes:**

**CO1:** To study two dimensional and three dimensional geometry in details that are fundamental structure in all subjects.

**CO2:** In this course, students learn the properties of sphere, cone and cylinder in detail.

### **2nd Semester Paper-I (BM 121) Number Theory and Trigonometry**

#### **Course Outcomes:**

**CO1:** In this course, students learn the properties of the set of integers in detail and they can find integer solutions to the system of equations which arises in real life problems.

**CO2:** Students can learn about advanced properties of Trigonometric functions, DeMoivre Theorem, Hyperbolic functions.

### **2nd Semester Paper-II (BM 122) Ordinary Differential Equations**

#### **Course Outcomes:**

**CO1:** To be able to solve first degree differential equations, Langrange's method.

**CO2:** To find solutions of linear differential equations of higher order.

### **2nd Semester Paper-III (BM 123) Vector Calculus**

#### **Course Outcomes:**

**CO1:** To learn scalar and vector product of multiple vectors.

**CO2:** Learn about curvilinear coordinates and vector integrations, Stokes theorem, Gauss theorem.

### **3rd Semester Paper-I (BM 231) Advanced Calculus**

#### **Course Outcomes:**

**CO1:** To study functions of several variables, continuity and Differentiability of multivariate functions.

**CO2:** To study the notion of differential geometry, curvature and torsion.

### **3rd Semester Paper-II (BM 232) Partial Differential Equations**

#### **Course Outcomes:**

**CO1:** Introduction of first order Partial Differential Equations, Charpit method.

**CO2:** Learn methods to solve first and higher order Partial Differential Equations.

### **3rd Semester Paper III (BM 233) Statics**

**Course Outcomes:**

**CO1:** To learn about different forces and equilibrium of system, friction, center of gravity of bodies.

**CO2:** To learn concept to virtual work, central axis and null planes.

**4th Semester Paper (BM 241) Sequence and Series****Course Outcomes:**

**CO1:** to learn about topology of real numbers, open and closed sets.

**CO2:** To learn about real sequences, bounded sequence, infinite series, alternative series and their convergence

**4th Semester Paper II (BM 242) Special Functions and Integral Transforms****Course Outcomes:**

**CO1:** To learn the evaluation of Laplace transform of different types of functions, their derivatives and integrations.

**CO2:** To learn the evaluation of Inverse Laplace transform of functions, their derivatives and integrations, and to learn application of Convolution theorem.

**4th Semester Paper-III (BM 243) Programming in C and Numerical Methods****Course Outcomes:**

**CO1:** Students will learn about basic structure of C language, input and output functions.

**CO2:** They will learn about numerical solution of algebraic and transcendental equations.

**5th Semester Paper I (BM 351) Real Analysis****Course Outcomes:**

**CO1:** To learn basic techniques and examples in analysis to be well prepared for courses like Topology, Measure theory and Functional analysis.

**CO2:** To study various types of sets and relations, and concept of countable and uncountable..

**5th Semester Paper II (BM352) Groups and Rings****Course Outcomes:**

**CO1:** To learn fundamental properties and mathematical tools such as closure, identity, inverse and generators.

**CO2:** To study algebraic structure 'Groups' in detail which is useful in study of Rings, Modules, Algebraic topology, Analysis.

**5th Semester Paper-III (BM353) Numerical Analysis****Course Outcomes:**

**CO1:** To learn to apply the various numerical techniques for solving real life problems.

**CO2:** The problems which cannot be solved by usual formulae and methods can be solved approximately by using numerical techniques.

### **6th Semester Paper-I (BM 361) Real and Complex Analysis**

#### **Course Outcomes:**

**CO1:** To learn basic algebraic properties of complex numbers and limit and continuity of complex functions.

**CO2:** To learn analytic functions and the C-R equations as its necessary and sufficient condition.

### **6th Semester Paper II (BM 362) Linear Algebra**

#### **Course Outcomes:**

**CO1:** To learn fundamental properties and mathematical tools such as closure, identity, inverse and generators in vector space.

**CO2:** To study Linear Transformations in detail which is useful in study of Rings, Modules, algebraic topology, Inner product spaces and Gram-Schmidt process of orthogonalization. .

### **6th Semester Paper- III (BM 363) Dynamics**

#### **Course Outcomes:**

**CO1:** To learn about motion along a plane curve, simple harmonic motion, relative motion

**CO2:** To get knowledge about Central orbits, Kepler's laws of planetary motion

### **SUBJECT: Economics**

#### **Course Outcomes:**

On successful completion of this subject, the learners will be able to

Describe how economic trade offs and social values impact public & private policy

Explain the functions of markets and prices as allocate mechanisms and explain how fiscal and monetary policies can be used to o provide students a well-founded education in Economics;

Understand the theories and strategies of growth and development and knowledge about the issues relating to sustainable development

Understand the environment protection and pollution control measures provide and adapt curricula that prepare our graduates for employment and further study as economists;

The students with the opportunity to pursue courses that emphasize quantitative and theoretical aspects of Economics;

Students will have the opportunity to focus on applied and policy issues in Economics;

The students will able to choose from a wide range of economic specialization and a well-resourced learning environment for Economics

### **SUBJECT: History**

#### **Course Outcomes:**

On successful completion of this subject, the learners will be able to identify and describe the contours and stakes of conversations among historians within defined history geographical fields. Learn innovative study techniques in the study of History of Maratha to make it value based, conceptual and thought provocative.

Understand the importance of past in exploration of present context. Survey the sources of History of medieval India; understand the social, economic, religious bases of medieval India. study medieval Indian art & architecture Get knowledge of Modern World and also acquainted with the Socio- economic & Political developments in other countries. Get familiarized with political history of Modern World.

### **SUBJECT: Political Science**

#### **Course Outcomes:**

On successful completion of this subject, the learners would acquire the knowledge of vision of politics in areas such as justice, democracy, community or freedom. Know about political system of the nation as well as the world. They will study national and international political affairs, relationships, concept / theories and ideas etc. They will understand the government mechanism, its functions, duties and responsibilities. This course will be helpful to create appropriate and efficient political leaders. Students will get knowledge of political laws, Constitution of India etc.

### **SUBJECT: Health and Physical Education**

#### **Course Outcomes:**

Students who choose to actively participate in quality physical education programs receive a variety of benefits including the development of skills and abilities related to lifetime leisure activities. The students will develop leadership skills by getting academic as well as practical knowledge. This course will impart direct physical experience related to the field of physical education and sports (with the help of audio –visual teaching aids); it will emphasize on comprehensive development of students. (Aspects related to their physical, mental, emotional and social life), to boost their personality.

### **SUBJECT: Public Administration**

#### **Course Outcomes:**

On successful completion of this subject, the learners would acquire the knowledge of nature and scope of public administration, to comprehend the changing paradigms of public administration as well as to understand the world of public administration from the public perspective and provide foundation for further studies in public administration.

Students who graduate with this course will understand the basic concepts of public administration and bureaucracy, human resource management, public budgeting and finance, etcetera. They will understand how administrative responsibility, accountability, efficiency, diversity, and teamwork within the context of government and non-profit public service programs. Through the study of this course, students will be able to develop / formulate a public policy response to social or economic problem.

### **SUBJECT: Home Science**

#### **Course Outcomes:**

This subject focuses on skill development and capacity building to empower women to initiate their own enterprise. Through this course, students will be able to:

Develop professional skills in food, nutrition, textiles, housing and human development.

Understand and appreciate the role of interdisciplinary sciences, the development and well being of individuals, the families and communities.

Acquire professional and entrepreneurial skills for economic empowerment of self in particular and community.

Understand the science and technology that enhance the quality of life of people.

Bring science from laboratory to the people.

### **SUBJECT: Music (Instrumental and Vocal)**

#### **Course Outcomes:**

##### **MUSIC (Vocal)**

On successful completion of this subject, the learners will be able to give a practical demonstration of ragas, demonstrate various aspects of ragas and their differentiation.

Through this course, students will be able to understand the basic terminologies of Indian music, the theoretical aspects of ragas which include classification of instruments, various forms of Hindustani vocal music, the Gharanas of Hindustani music et cetera.

Students will be able to demonstrate the understanding and use of public performance as a means for engaging communities, creating cultural awareness and providing ethical leadership.

##### **MUSIC (Instrumental):**

On successful completion of this subject, the learners will be able to give a practical demonstration of ragas, demonstrate various aspects of ragas and their differentiation.

This course is designed to enable students to create, analyze and appreciate musical compositions. They will be able to recognize, classify and interpret Indian musical ragas and their divisions.

Throughout the journey of this course, students will learn many musical instruments including Sitar, Santoor, Tabla and Harmonium.

Students will be able to distinguish and analyze music according to historical, cultural and stylistic contexts and to adhere culture and history from diverse perspective.

**SUBJECT: Environment Studies (EVS)**

On successful completion of this subject students will able to

- Understanding environmental concerns by the students at the undergraduate level.
- Understanding the relationship of man with the environment and changing his attitude for more picture, proactive, eco-friendly and sustainable lifestyles.
- Getting information about climate change, global warming, acid rain, greenhouse effect, Ozone layer depletion et cetera.
- Reading the impact of human actions on the immediate environment; getting information about Environmental protection Acts et cetera.

***Program Outcomes (PO) for Post Graduate Programmes in the Faculty of Sciences***

**M. Sc. Physics**

**Programme outcomes:-**

Master of Science (M.Sc.) in physics programme prepares graduates to be competitive enough with knowledge of fundamental principles and concepts in a variety of areas of physics along with their applications. It also provides emphasis on advanced ideas and techniques that are useful in wide range of research areas.

The Department members, with specialization in different areas of physics, place good emphasis on teaching as well as research work. The Department has well maintained laboratories with latest instruments.

After completing M.Sc. Physics programme, students will be able to:

- The Master of Science in Physics program provides the candidate with knowledge, general competence, and analytical skills on an advanced level, needed in industry, consultancy, education, and research.
- On completion of program, the post graduates will apply the knowledge and skill in the design and development of Electronics circuits to fulfil the needs of Electronic Industry.
- Become professionally trained in the area of electronics, optical communication, nonlinear circuits, materials characterization and lasers.
- Pursue research related to Physics and Materials characterization.

- Demonstrate highest standards of Actuarial ethical conduct and Professional Actuarial behaviour, critical, interpersonal and communication skills as well as a commitment to life-long learning.
- Understanding the basic concepts of physics particularly concepts in classical mechanics, quantum mechanics, electrodynamics and electronics to appreciate how diverse phenomena observed in nature follow from a small set of fundamental laws,
- Learn to carry out experiments in basic as well as certain advanced areas of physics such as nuclear physics, electronics and lasers.
- A research oriented learning that develops analytical and integrative problem-solving approaches.

**Course Outcomes (CO):**

Course Code	Title of course	Outcomes
PHY- 101	Mathematical physics	<p>Upon completion of the course, the students should be able to understand basic theory of :</p> <ul style="list-style-type: none"> <li>• Vector and tensor analysis</li> <li>• Functions of complex variables</li> <li>• Expand function in Taylor's series</li> <li>• Special functions and power series</li> </ul>
PHY- 102	Classical mechanics	<p>After completion of the course students should be able to :</p> <ul style="list-style-type: none"> <li>• Understand the motion of mechanical system using Hamilton-Lagrange equations.</li> <li>• Solve the problem of generating function, canonical transformation and Poisson brackets.</li> <li>• Derive differential equation of orbit in central force field.</li> </ul>
PHY- 103	Electronics -I	<p>Students will get to know about :</p> <ul style="list-style-type: none"> <li>• Theory of semiconductors and its operating principle</li> <li>• Different configurations of amplifier</li> <li>• Digital electronic basics using gates and working of other sequential and combinational circuits</li> </ul>
PHY- 104	quantum mechanics-I	<p>After successful completion of this paper, students will be well versed in :</p> <ul style="list-style-type: none"> <li>• Basic concepts of quantum mechanics, operators and their properties.</li> <li>• Theory of angular momentum and spin matrices, orbital angular momentum and Clebsch-Gordan coefficient.</li> <li>• Perturbation theory and various methods to find first and second order corrections to energy eigen values and functions.</li> </ul>



PHY-201	Solid state physics	<p>After the completion of this course students will be:</p> <ul style="list-style-type: none"> <li>• Able to explain how the electronic properties of solids differ in classical free electron theory, quantum free electron theory and nearly free electron model.</li> <li>• Able to differentiate between different type of magnetic materials.</li> <li>• Acknowledged with the concept of superconductivity and its related properties</li> </ul>
PHY-202	Classical electrodynamics-I	<p>After successful completion of the course, the student is expected to :</p> <ul style="list-style-type: none"> <li>• Have gained a clear understanding of Maxwell's equations.</li> <li>• have grasped the idea of electrostatics and Magnetostatics along with time varying fields.</li> </ul>
PHY-203	Electronics -II	<p>On completion of this course the student will have knowledge about :</p> <ul style="list-style-type: none"> <li>• frequency response of amplifier</li> <li>• DC/AC analysis of operational amplifier</li> <li>• basic concepts of filters and converters</li> </ul>
PHY-204	quantum mechanics-II	<p>On completion of this course the student will learn about :</p> <ul style="list-style-type: none"> <li>• WKB approximation and perturbation theory</li> <li>• basic concept of scattering , Born approximation properties and construction of wave function</li> </ul>
PHY-301	Statistical mechanics	<p>After the completion of this paper students will be :</p> <ul style="list-style-type: none"> <li>• Able to use various ensemble theories to find the thermodynamic properties of different systems.</li> <li>• Able to compute properties of systems behaving as ideal Fermi gas and bose gas.</li> <li>• Able to classify first and second order phase transitions</li> </ul>
PHY-302	Classical electrodynamics -II	<p>After the completion of this course students will have knowledge about:</p> <ul style="list-style-type: none"> <li>• electromagnetic problems with the help of electrodynamic potentials and superpotentials</li> <li>• concept of relativity, four vectors and conservation laws</li> <li>• lagrangian and hamiltonian of charged particle in EM field</li> </ul>
		<p>After the completion of this course , students will :</p> <ul style="list-style-type: none"> <li>• Get to know about conditions for lasing action and its properties</li> </ul>

PHY-303	Laser and spectroscopy -I	<ul style="list-style-type: none"> <li>• Be able to know about types of resonators and energy stored in it</li> <li>• Be able to illustrate various spectrometers with its principle, construction and applications</li> </ul>
PHY-304	Material science-I	<p>On completion of this course the student will learn about :</p> <ul style="list-style-type: none"> <li>• Various types of crystal imperfections : point defects, line defects, dislocations.</li> <li>• Motion of an electron in an energy band, hot electron and gun effect.</li> <li>• Dielectric materials \$ its classification, loss factor, ferroelectric domain theory</li> </ul>
PHY-401	Nuclear and particle physics	<p>After the completion of this course, students will be able to understand the basic theory of :</p> <ul style="list-style-type: none"> <li>• Nuclear : size, forces, models, decays and reactions</li> <li>• Demonstration of shell model and collective model</li> <li>• To apply the various aspects of nuclear reactions in view of compound nuclear dynamics.</li> </ul>
PHY-402	Atomic and molecular physics	<p>After the completion of this course , students will :</p> <ul style="list-style-type: none"> <li>• learn about electron system, its probability density, hydrogen fine structure</li> <li>• get to know about interaction of system with external field : stark effect, zeeman effect</li> </ul>
PHY-403	Laser and spectroscopy - II	<p>After successful completion of this paper ,students will acquire :</p> <ul style="list-style-type: none"> <li>• knowledge about laser rate equations and its efficiency</li> <li>• good understanding of different types of laser systems with its applications</li> <li>• idea about theory of Q- switching</li> </ul>
PHY-404	Material science -II	<p>After the course , students will learn about :</p> <ul style="list-style-type: none"> <li>• Quantum size effect and Effects of quantum confinement on the electronic energy states.</li> <li>• Various synthesis techniques for preparation of nanostructured materials.</li> <li>• Different methods of characterization using XRD,SEM,TEM etc.</li> </ul>

## M.Sc. Chemistry

### Program Outcomes

After completing M.Sc. Chemistry programme, students will be able to:

- PO1: Demonstrate and apply the fundamental knowledge of the basic principles in various fields of Chemistry
- PO2: Create awareness and sense of responsibilities towards environment and apply knowledge to solve the issues related to Environmental pollution.
- PO3: Apply knowledge to build up small scale industry for developing endogenous product.
- PO4: Apply various aspects of chemistry in natural products isolations, pharmaceuticals, dyes, textiles, polymers, petroleum products, forensic etc. and also to develop interdisciplinary approach of the subject.
- PO4: collaborate effectively on team-oriented projects in the field of Chemistry or other related fields.
- PO5: communicate scientific information in a clear and concise manner both orally and in Writing.
- PO6: inculcate logical thinking to address a problem and become result oriented with a positive attitude.
- PO7: Explain environmental pollution issues and the remedies thereof.
- PO8: apply the knowledge to develop the sustainable and eco-friendly technology in Industrial Chemistry.
- PO9: Have developed their critical reasoning, judgment and communication skills.
- PO10: Augment the recent developments in the field of green and eco-friendly reactions, pharmaceutical, Bioinorganic Chemistry and relevant fields of research and development.

### Course outcomes

CHI(H) 101	Inorganic Chemistry-I	<p>after successfully completing this course, students will be able to</p> <p>Understand group multiplication table, character table and representations of groups</p> <ul style="list-style-type: none"> <li>• Completely understand valence bond theory, Crystal field theory and Molecular orbital theory and their applications.</li> <li>• Able to explain Racal parameter, nephelauxetic effect, Zeeman and stark effect.</li> </ul>
CHP(H) 102	Physical chemistry –	<ul style="list-style-type: none"> <li>• Student learn about rate Laws and different Chain</li> </ul>

	I	<p>reactions. Such as Hydrogen Bromine reactions, Rice Herzfield (Acetaldehyde) mechanisms etc.</p> <ul style="list-style-type: none"> <li>• Understand the laws of thermodynamics, Its uses in daily life, also learn about different equations in thermodynamics like clausius clapeyron equation, Gibbs-Duhem equation etc.</li> <li>• Get knowledge of how two completely miscible system behave and draw their phase diagram and learn about activity and fugacity.</li> <li>• Understand concepts of Quantum Mechanics, in which we study different model systems, particle in a box, the harmonic scillator, the rigid rotor, Hydrogen atom model etc. and also study about Perturbation theory.</li> </ul>
CHO(H) 103	Organic Chemistry-I	<p>Students are capable to find out aromaticity of organic compound like anti aromaticity and homo aromaticity.</p> <ul style="list-style-type: none"> <li>• Understand very well about chiral molecules, diastereomere, enantiomers, conformational analysis and optical isomerism.</li> <li>• Students also learn about various techniques of chromatography like TLC, HPLC, Gas chromatography etc.</li> <li>• Get knowledge about stability and reactivity of carbocation, carbanions and free radicals.</li> </ul>
CHS(s) 104	Spectroscopy and Diffraction Methods	<ul style="list-style-type: none"> <li>• Student will be able to know the NMR spectroscopy, ESR spectroscopy Mass spectroscopy, U.V. Molecular spectro.</li> <li>• Explain the transition in different energy levels, selection rules of spectroscopy, factor affecting spectrum.</li> <li>• Interpret the mass spectrum, N.M.R spectrum, Molecular spectra, UV spectra.</li> </ul>
CH(OE) 106	Basic concept in chemistry I	<ul style="list-style-type: none"> <li>• Get knowledge about chiral molecules, R-S &amp; E-Z nomenclature &amp; reactivity of carbocations, carbanions &amp; free radical.</li> <li>• Get knowledge about laws of thermodynamics &amp; entropy &amp; variation of entropy with temperature &amp; pressure.</li> <li>• Able to understand atomic structure, molecular orbital &amp; coordination chemistry.</li> </ul>
CHI(H) 107	Inorganic Chemistry Pract. I	<ul style="list-style-type: none"> <li>• Understand the schemes to be followed for qualitative and quantitative analysis of rare earth cations.</li> <li>• Able to separate ions of 2 or 3 component by ion exchange method.</li> </ul>
CHP(H) 108	Organic Chem. Pract. I	<ul style="list-style-type: none"> <li>• Get identify of compounds of binary mixture.</li> <li>• Synthesis of organic compounds and their purification.</li> </ul>
CHO(H)	Physical chem..	<ul style="list-style-type: none"> <li>• Students understand terms Adsorption, surface tension,</li> </ul>

109	Pract. I	viscosity, interfacial tension. <ul style="list-style-type: none"> <li>• Able to determine viscosity, surface tension and distribution curve.</li> </ul>
CHI (H) 201	Inorganic chemistry – II	Understand the concept of nuclides, n/p ratio, shell and liquid drop models. <ul style="list-style-type: none"> <li>• Get knowledge about Nuclear fission, fusion and spallation and types of nuclear reactor.</li> <li>• Know about Role of solvent in chemical reaction.</li> <li>• Be able to draw orbital diagram of bi and tri nuclear. Carbonyls and get knowledge about symbiosis and anti symbiosis.</li> </ul>
CHP (H) 202	Physical chemistry – II	<ul style="list-style-type: none"> <li>• Learn about Bond order in Molecular orbital Theory, Enzyme Kinetics and study of fast reactions.</li> <li>• Get knowledge of Entropy production and entropy flow and general theory o non-equilibrium processes and study dynamics.</li> <li>• Also get knowledge of chemistry of Nan materials and Nan particle Morphology.</li> </ul>
CHO(H) 203	Organic Chemistry – II	<ul style="list-style-type: none"> <li>• Get knowledge about aliphatic electrophillic &amp; Nuclcophillic substinenone (<math>SE^1</math>, <math>SE^2</math>, <math>SN^1</math>, <math>SN^2</math>)</li> <li>• Also get knowledge about aromatic Electrophillic &amp; Nucleophillic substitutions (<math>ArSN^1</math>, <math>ArSN^2</math>)</li> <li>• Able to understand mechanism of elimination Reaction (<math>E^1</math>, <math>E^1_{cb}</math>, <math>E^2</math> mechanisms) &amp; neighbouring group participation.</li> <li>• Study the mechanisms of addition to C-C multiple bonds &amp; also addition to Carbon-hetero multiple bond.</li> </ul>
CHS (S) 204	Spectroscopy – II	Understand beer-lambert Law, Frank Condon Principle, merits and demerits of microwave spectroscopy. <ul style="list-style-type: none"> <li>• Explain the transition of different energy levels, selection Rules for transition, factor affecting the molecular and UV spectra.</li> <li>• Interpret the UV spectrum and understand application of spectroscopy.</li> </ul>
CHE (H) 206	Environmental Chemistry	Get introduced to sources and types of air pollutants hydrocarbons and health effect of pollutions. <ul style="list-style-type: none"> <li>• Get knowledge about toxin materials and toxicity by metal ions.</li> <li>• Be able to soil analysis, contaminants with toxic inorganic compounds.</li> <li>• Understand different terms twbidity, BOD, COD and waste Water treatment.</li> </ul>
CHI (H) 207	Inorganic Chemistry- II	<ul style="list-style-type: none"> <li>• Prepare the exact solution for analysis.</li> <li>• Synthesis inorganic complexes and also find their purity.</li> <li>• Apply the knowledge of UV, ESR, IR and magnetic</li> </ul>

		susceptibility.
CHP(H) 208	Physical Practical – II	<ul style="list-style-type: none"> <li>• Prepare solution of desired concentration and desired volume.</li> <li>• Know the principle and handling of ph-meter, potentiometer.</li> <li>• Plot accurate graphs of desired scale for calculations.</li> </ul>
CHO(H) 209	Organic Chemistry – II	<ul style="list-style-type: none"> <li>• Apply their previous knowledge of TLC and IR spectm for functional group identification.</li> <li>• Synthesis organic complexes and their recrystallisation.</li> </ul> <p>Get awareness of safety techniques and handling of chemicals.</p>
CHE(H) 301	Inorganic sp. (I)	<p>Students get knowledge about photochemical reactions and processes, Frank wndon principle and Quenching.</p> <ul style="list-style-type: none"> <li>• Understand Liability and selectivity and Metal complex sensitizers and Exicited electron transfer.</li> </ul>
CHI(H) 302	Inorganic Sp-II	<ul style="list-style-type: none"> <li>• Get knowledge about <math>n^1</math>, <math>n^2</math>, <math>n^3</math>, <math>n^4</math> complexes and their M.O treatment.</li> <li>• Able to understand Metal dusters, Cages and Rings like Borazines, phosphazenes etc.</li> </ul>
CHI(H) - 303	Inorganic sp. III	<ul style="list-style-type: none"> <li>• Understand Bionorganic chemistry : Use of metals in biological system, various aspects of coordination chemistry related to bioinorganic research.</li> <li>• Get knowledge of biochemistry of metals like Na, K, Fe, Ca and Mn.</li> </ul>
CHP (H) 301	Physical Sp (I)	<ul style="list-style-type: none"> <li>• Study about different statistics, Maxwell – Boltzman, Bose Einstein and Fenmi- Dirac Statics.</li> <li>• Also they study about statistical Thermodynamics, Partition function and effects on Partition function.</li> <li>• To know about different models like goucy-chapman and stern model.</li> <li>• Learn about different concepts of electro chemistry which includes lateral repulsion model and Flip-Flop model of contact adsorption.</li> </ul>
CHP(H) - 302	Physical SP. (II)	<ul style="list-style-type: none"> <li>• Understand the laws, classification, Functions and growth of nuclei and Defects in Thermodynamics.</li> <li>• Learn about Classification of Solids, Lattice Heat Capacity and <math>T^3</math> law (Debye).</li> <li>• Know about Electronic properties of solids, Optical properties like Hysteresis and Organic Solids.</li> <li>• Understand Diffraction Methods of Neutron and electron.</li> </ul>

CHP (H) 303	Physical Special – (III)	<p>Study about Classification of Polymers.</p> <ul style="list-style-type: none"> <li>To know about Polymer Characterization and physical testing.</li> <li>Understand the Morphology and Structure, properties of polymers and learn about glass transition temperature.</li> <li>Also learn about solid reactions and its kinetics.</li> </ul>
CHO (H) 301	Organic Special – (I)	<ul style="list-style-type: none"> <li>Study about preparation, principle, properties &amp; applications of reagents.</li> <li>Detailed study about following rearrangements.</li> </ul>
CHO (H) 302	Organic Sp. (II)	<ul style="list-style-type: none"> <li>Get knowledge about enzymes, co-enzymes &amp; their biotechnological applications.</li> <li>Learn about different concepts of disconnection approach, protective groups.</li> </ul>
CHO (H) 303	Organic Sp. (III)	<ul style="list-style-type: none"> <li>Detailed study about synthesis, general mode of action &amp; Mechanical uses of Important Drugs.</li> <li>Get knowledge about plant pigments, porphyrins etc.</li> </ul>
CHC (H) - 305	Computer for Chemistry	<ul style="list-style-type: none"> <li>Students learn how to operate a PC and how to run standard programs and packages.</li> </ul> <p>Get basic knowledge and functioning of computer and how charts and relate with chemistry</p>
CHI (H) 307	Inorganic Sp. Practical	<ul style="list-style-type: none"> <li>Prepare the exact solution for Quantitative analysis.</li> <li>Understand quantitative analysis for determination of metals from ores/alloys.</li> <li>Synthesize inorganic complexes and also find their purity.</li> </ul>
CHP(H) 308	Physical Sp. Practical	<ul style="list-style-type: none"> <li>Know principle and handling of PH- meter, Potentiometer, conductivity meter etc.</li> <li>Get able to find solubility evaporation and gravimetric method.</li> </ul>
CHI(E) 304	Inorganic Chem. General (I)	<ul style="list-style-type: none"> <li>Get knowledge about photochemical reactions and processes, Frank wanton principle and Quenching.</li> <li>Get knowledge about n1, n2, n3, n4, complex and their M.O. treatment.</li> </ul>
CHP (E) 304	Physical Chem. General (I)	<p>Understand laws, classification, functions and growth of nuclei and defects in thermodynamics.</p> <p>Study about different statistics, Maxwell – Boltzman, Bose-einstein and Fermi-Dirac statistics.</p>
	Organic Chem.	<ul style="list-style-type: none"> <li>Study about preparation, principle, properties, applications of Reagent.</li> </ul>

CHO (E) - 304	General (I)	<ul style="list-style-type: none"> <li>Learn about different concepts of disconnection approach and protective group.</li> </ul>
CHO (H) - 508	Organic Sp. Practical – II	<ul style="list-style-type: none"> <li>Synthesis Organic compounds and their recrystallization.</li> <li>Understand different purification techniques in organic chemistry like recrystallization, distillation, steam distillation and extraction.</li> </ul>
CHI (H) - 401	Inorganic Sp IV	<p>Get knowledge of glasses, ceramics, clay and chemical processes, MOCVD, Sol-gel etc.</p> <p>Understand about molecular recognition, supromolecular reactivity.</p> <ul style="list-style-type: none"> <li>Able to understand conducting and ferroelectric conducting.</li> </ul>
CHI (H) – 402	Inorganic Sp V	<ul style="list-style-type: none"> <li>Get knowledge of electron transfer processes and water exchange reactions. Ligand exchange via electron exchange.</li> <li>Understand and draw different structures like <math>\text{NbOCl}_3</math>, <math>\text{NbCl}_4</math>, <math>\text{ReH}_9^{6-}</math>, <math>\text{Re}_2\text{Cl}_8^{7-}</math></li> <li>Also study about photochemistry of carbonyl compounds, Franck codon principle, Jablonski diagram.</li> </ul>
CHO (H) - 403	Organic Special VI	<ul style="list-style-type: none"> <li>Detailed study of Alkanoids, Steroids, Terpenoids.</li> <li>Also get knowledge about antibiotics, prostaglandins.</li> </ul>
CHI (E) - 404	Inorganic Chemistry general – II	<ul style="list-style-type: none"> <li>Get knowledge of Molecular recognition, Receptors and supermolecular chemistry.</li> <li>Understand electron transfer reactions and cluster compound.</li> <li>Draw the structure of <math>\text{NbOCl}_3</math>, <math>\text{ZrO}_2</math>, <math>\text{ZrO}_5</math> [<math>\text{M}_2\text{Cl}_6\text{L}_3</math>]</li> </ul>
CHP (E) - 404	Physical Chemistry general – II	<ul style="list-style-type: none"> <li>Get knowledge of ylides and pericyclic Reactions (<math>4n</math>, <math>4n+2</math> systems)</li> <li>Study the Reaction Norrish type I and type II.</li> </ul>
CHIC (S) - 406	Industrial Chemistry	<ul style="list-style-type: none"> <li>Get introduced to inorganic chemicals like sulphuric acid, sodium chloride and chloralkali etc.</li> <li>Know about fertilizers, insecticides, herbicides and their uses.</li> <li>Get knowledge of various types of pollutions and their harmful effect on environment and their prevention.</li> </ul>
CHIM (S) -	Instrumental Method	<ul style="list-style-type: none"> <li>Get knowledge of cell components. D.C &amp; A.C current, various electrodes their principles and uses.</li> </ul>



405	of Analysis		<ul style="list-style-type: none"> <li>• Get knowledge and how to use different instruments like polar meter, Refractro meter, Conducto meter and PH-meter in measuring solubility, optical activity and strength of the solutions.</li> </ul>
CHI (H) - 407	Inorganic Practical I		<ul style="list-style-type: none"> <li>• Understand the principle and working of different instrument like conducto meter and spectrophoto meter.</li> <li>• Maintain laboratory ethics, safety and cleanliness.</li> </ul>
CHI (H) - 408	Inorganic Pract. II	Special	<ul style="list-style-type: none"> <li>• Synthesis of various inorganic compounds and their estimations</li> </ul>
CHP (H) - 407	Physical Pract. I	Special	<ul style="list-style-type: none"> <li>• Able to get determination of solubility product, thermodynamic parameter and equilibrium constant</li> <li>• Able to get magnetic susceptibility of Mohr's salt at sour temp</li> </ul>
CHP (H) - 408	Physical Pract. II	Special	<p>Students determine strength and concentration of solution by using PH-mercy and conductometry.</p> <p>Draw the graph of the result.</p>
CHO (H) - 407	Organic Practical I	Special	<p>Students are able to prepare the exact solution used in Quantitative analysis also able to use UV and Vis spectroscopy techniques in estimations.</p>
CHO (H) - 408	Organic Practical II	Special	<ul style="list-style-type: none"> <li>• Get identify the components by chemical and spectroscopic methods.</li> </ul>

## **M.Sc. (Mathematics)**

### **Programme Outcomes**

The masters of Mathematics Program provides the students to learn a lot of things as Knowledge, Analytic Skills needed in Industry, society, Education and Research Field.

After completing M.Sc. Mathematics programme, students will be able to:

- PO1: Demonstrate and apply the fundamental knowledge of the basic principles and theories in various fields of Mathematics.
- PO2: Create awareness and sense of responsibilities towards research and apply Knowledge to solve the issues related to optimization of resources.

- PO3: Apply knowledge to build up industries or can provide better techniques to industrialists.
- PO4: Join research in his/her area of research in various institutes of India and abroad through JRF/ other scholarships.
- PO5: Prepare himself/ herself for competitive exams like CSIR, NET and also to develop interdisciplinary approach of the subject.
- PO6: Students will able to gain Employability an knowledge about Pure and applied Mathematics.
  - PO 7: Evaluate hypotheses, theories, methods and evidence within their proper contexts.
  - PO 8: Solve complex problems by critical understanding, analysis and synthesis and demonstrate engagement with current research and developments in the subject.
  - PO 9: Provide a systematic understanding of the concepts and theories of mathematics and their application in the real world to an advanced level, and enhance career prospects
  - PO 10: Recognize the need to engage in lifelong learning through continuing education and research

## Course Outcomes

Paper Code	Name of papers	Course Outcomes
MTHCC 2101	Abstract Algebra	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>• Define Group and Subgroups, Normal Subgroups, Quotient Groups and Permutation Group with examples and Cayley's theorem, Sylow's theorem.</li> <li>• Define Ring, Field, Extension Field, Euclidean Rings, Polynomial Rings and Vector Space with examples, Modules, Submodules, Find the roots and the derivatives of a Polynomial, irreducible polynomial, simple extension, automorphism of a Field.</li> </ul>

<b>MTHCC 2102</b>	<b>Real Analysis</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>• Determine the basic topological properties of subsets of the real numbers</li> <li>• Define connectedness and compactness, and prove 3a selection of related theorems.</li> <li>• Define the limit of a sequence, series and the Cauchy criterion</li> <li>• Test the convergence of series using Ratio, Root and comparison tests.</li> <li>• Define continuity of a function and uniform continuity of a function</li> <li>• Differentiate the concept of continuity and uniform continuity Prove the Bolzano-Weierstrass theorem, Rolle's theorem, extreme value theorem and the Mean Value theorem.</li> </ul>
<b>MTHCC 2103</b>	<b>Classical Mechanics</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>• Define D'Alembert's principle</li> <li>• Derive Lagrange's equation for holonomic and non holonomic constraints</li> <li>• Attain the applications of Lagrange's formulation and Explain the symmetry properties</li> <li>• Classify orbits• Solve the problems of Kepler, Laplace.</li> <li>• Prove Virtual theorem, Bertrands theorem Find the solution of two body central force.</li> </ul>
<b>MTHCC 2104</b>	<b>Complex Analysis</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>• Recognize the concept of limits, continuity, Differentiability and analytic function</li> <li>• Test the analyticity of a given function.</li> <li>• Discuss conformality, linear transformation, singularities, types of singularities and Residues. Evaluate the integral using Cauchy's</li> </ul>

		<p>integral formula and Residue theorem.</p> <ul style="list-style-type: none"> <li>• Find the Taylor's and Laurent's series expansion of given function , Jensen's formula</li> </ul>
<b>MTHCC 2105</b>	<b>Ordinary Differential Equations</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>• define ordinary and partial differential equations of various degrees and order.</li> </ul> <p>Define initial value and boundary value problems and necessary and sufficient conditions that a curve be a straight line and a curve are a plane curve.</p> <ul style="list-style-type: none"> <li>• Show fundamental theorem for space curves.</li> </ul>
<b>MTHCC 2106</b>	<b>Programming in ANSI C</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>• Develop logics which will help them to create programs, applications in ANSI C</li> <li>• They can easily switch over to any other computer language.</li> </ul>
<b>MTHCC 2201</b>	<b>Advanced Abstracts Algebra</b>	<p><b>Student Will able to</b></p> <ul style="list-style-type: none"> <li>• Identify and analyze different types of algebraic structures such as algebraically closed fields.</li> <li>• Identify the challenging problems in advanced algebra to pursue future research</li> </ul>
<b>MTHCC 2202</b>	<b>Measure and Integration theory</b>	<p><b>Student Will able to</b></p> <ul style="list-style-type: none"> <li>• Extend their knowledge of lebesgue theory of integration by selecting and applying its tools.</li> <li>• Understand measure theory and integration from theoretical point of view.</li> </ul>
<b>MTHCC 2203</b>	<b>Mechanics of Solids</b>	<p><b>Student Will able to</b></p> <ul style="list-style-type: none"> <li>• Learn the concept of tensor calculus.</li> <li>• Understand the Concept of Strain, Stress, and isotropic media and shall be able to apply the knowledge in the solving real world problems.</li> </ul>
<b>MTHCC 2204</b>	<b>System of differential equation</b>	<p><b>Student Will able to</b></p> <ul style="list-style-type: none"> <li>• Understand the linear differential system of various types and their solutions.</li> <li>• Discus about autonomous system and stability of system of equations.</li> </ul>

		<ul style="list-style-type: none"> <li>• Prove Benedixsoni non-existence theorem.</li> </ul>
<b>MTHCC 2205</b>	<b>Advanced Complex Analysis</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>• Recognize the concept of limits, continuity, Differentiability and analyticfunction</li> <li>• Test the analyticity of a given function.</li> <li>• Prove the Lucas's theorem, Abel's theorem and Cauchy's Theorems.</li> <li>• Discuss conformality, linear transformation, singularities, types of singularities and Residues.</li> </ul>
<b>MTHCC-2206</b>	<b>Methods of Applied Mathematical Statistics</b>	<p><b>Student Will able to</b></p> <ul style="list-style-type: none"> <li>• Understand the theory and applications of integral transform.</li> <li>• Solve the problems of calculus of variation</li> <li>• Discuss about Curivilender Co-ordinates, orthogonal, Cylindrical and spherical co-ordinates.</li> </ul>
<b>MTHCC2206</b>	<b>Programming in Fortran 95</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>• Understand basic structure of Fortran 95 language and create programs, applications in Fortran.</li> <li>• Learn about basic FORTRAN syntax and other computer logics</li> </ul>
<b>MTHCC2301</b>	<b>Probability and Statistics</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>• Define Probility set function, Expectation of a random variable.</li> <li>• Derive Chebyshev's inequality and Describe conditional Distributions and expectations.</li> <li>• Solve the problems by using Chebyshev's inequality. • Illustrate the Poisson, Gamma and Chi-Square Distributions. • Solve the problems by using Bivariate Normal distribution. • Explain distributions of order statistics and prove the central limit theorem.</li> </ul>
<b>MTHCC2301</b>	<b>Discrete</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>• Define Semi groups, Monoids, Homomorphism and</li> </ul>

	<b>Mathematics</b>	<p>Isomorphism.</p> <ul style="list-style-type: none"> <li>• Describe the TF statements, connectives, atomic and compound statements.</li> <li>• Discuss the theory of inference, quantifiers, predicate calculus.</li> <li>• Interpret Lattices, Boolean Algebra, Karnaugh Map, Switching Circuits.</li> </ul>
<b>MTHCC2302</b>	<b>Topology</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>• Define topological spaces, product topology, metric topology, quotient space.</li> <li>• Discuss the continuous functions, connected space, compact space, complete metric space, related theorems on Baire space.</li> <li>• Describe closed sets and limit points, components and path components.</li> </ul>
<b>MTHCC-2302</b>	<b>Fluid Mechanics</b>	<p><b>Student will able to</b></p> <ul style="list-style-type: none"> <li>• Describe and understand the motion of a mechanical system.</li> <li>• Connect Concepts and mathematical rigger in order to enhance understanding.</li> </ul>
<b>MTHCC-2303</b>	<b>Integral Equations</b>	<p><b>Student Will able to</b></p> <ul style="list-style-type: none"> <li>• Solve Integral differential equation of feedhole type</li> <li>• Understand the properties of various kinds of integral equations.</li> </ul>
<b>MTHCC-2304</b>	<b>Mathematical Statistics</b>	<p><b>Student Will able to</b></p> <ul style="list-style-type: none"> <li>• Define Probability, Random Variable.</li> <li>• Describe Conditional distributions and expectations</li> <li>• Illustrate the poison, Bernoulli and Binominal distribution.</li> </ul>
<b>MTHCC2305</b>	<b>Partial Differential</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>• Analyse some properties of family of curves depending upon type of differential equations.</li> </ul>

	<b>Equations</b>	<ul style="list-style-type: none"> <li>Find orthogonal trajectories of a family of curves and prove Geodesic curvature theorems and Gauss – Bonnet theorem.</li> <li>Prove Monge’s theorem on developables associated with curves on surfaces</li> </ul>
<b>MTHCC2312</b>	<b>Number Theory</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>Define divisibility, greatest common divisor, Prime numbers, congruence, Dirichlet convolution, Generalized convolution, Quadratic residues.</li> <li>Prove fundamental theorem of Arithmetic</li> <li>Compute greatest common divisor of two numbers, more than two numbers.</li> </ul>
<b>MTHCC2401</b>	<b>Functional Analysis</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>Appreciate how abstract ideas and rigorous methods in mathematical analysis can be applied to important practical problems.</li> </ul>
<b>MTHCC2402</b>	<b>Numerical Analysis</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>Solve the equations using Newton’s method, Fixed point iteration and Relaxation method, Uniform Approximation and Least Square approximation by Polynomials.</li> <li>Evaluation of differentiation and integration using Gaussian rules and composite rules, Taylor’s series and Euler’s method.</li> <li>Find the solution of the given equation using Predictor – Corrector method. Solve the boundary value problem.</li> </ul>
<b>MTHCC2403</b>	<b>Computer Programming in MATLAB</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>Understand interactive computations, three dimensional graphs of mathematics using MATLAB as a effective tool.</li> <li>Learn about memory, file management and program coding in MATLAB.</li> </ul>
<b>MTHCC2404</b>	<b>Algebraic</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>Discuss the function of Mobius, Euler , Lioville,</li> </ul>

	<b>Number Theory</b>	<p>Mangolt, the divisor.</p> <ul style="list-style-type: none"> <li>• Apply Chinese Remainder theorem, Quadratic reciprocity law to solve problems. Explain Diophantine equation</li> </ul>
<b>MTHCC2405</b>	<b>Operation Research</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>• Find different techniques of Operation Research, LPP, queuing Theory, Reliability and game Theory</li> <li>• Classify the operations on fuzzy sets and Illustrate fuzzy relation. Crisp sets and fuzzy sets and discuss the types of fuzzy sets.</li> <li>• Explain fuzzy measures and classify possibility and necessity measures</li> <li>• Determine decision making in fuzzy environments and solve the corresponding L.P.P by simplex method</li> </ul>
<b>MTHCC2406</b>	<b>Boundary Value Problems</b>	<p><b>Students will able to</b></p> <ul style="list-style-type: none"> <li>• Solve boundary value problems using shooting method, finite difference method</li> <li>• Approximate the eigen values of a matrix by quadric method</li> </ul>

## **M.COM. (MASTER OF COMMERCE)**

### **Programme outcomes:-**

- To Provide well versed and trained human resource to meet the requirements of the industry in the field like MNC's, Accounting, Taxation, Banking, Insurance and stock marketing as well as research.

### **Programme Specific outcomes:-**



After successful completion of M.COM (Master of Commerce) Post Graduate Degree a student should be well acquainted with knowledge and set of skills to meet the challenges of industry with an ease.

<b>Course</b>	<b>Outcome</b>
<b>M.Com 1<sup>st</sup> Semester</b>	
<b>MC-101 Management process and Organizational Behavior</b>	To make student understand the concept of management and organizational behavior in relation to corporate culture.
<b>MC-102 Business Environment</b>	To enable the student to understand various environmental factors affecting business and Acts enacted relating to business.
<b>MC-103 Economics Analysis</b>	To make student understand the concept of micro and macro economics.
<b>MC-104 Financial Accounting and Reporting</b>	To make student understand the concept of financial statement, accounting standards followed and the purpose of reporting standards.
<b>MC-105 Business Statistics</b>	To make student learn basic as well as advance techniques of statistics to enhance research abilities.
<b>MC-106 Computer Application in Business and Cyber Security</b>	To prepare students to acquire the knowledge of recent trends in e-commerce, identify and analyze computer hardware, software and network. And give learner in-depth knowledge of IT Act and legal framework of right to privacy, data security and data protection.
<b>M.Com 2<sup>nd</sup> Semester</b>	
<b>MC-201 International Business</b>	To make student aware of various modes of entry into foreign market, related formalities and regulations in relation to foreign business.
<b>MC-202 Financial management</b>	The students will be capable of applying and handling the concept of capital structure, dividend policy, capital budgeting and cost of capital.
<b>MC-203 Marketing management</b>	The students shall be well versed with basics of marketing, market segmentation, targeting, positioning, and marketing implementation, control, event marketing, rural marketing and ethics in marketing.
<b>MC-204 HRM</b>	To enable the student to understand the concept of HR planning, recruitment, selection and development.
<b>MC-205 Mgt. and Cost Accounting</b>	To make student understand the tools and techniques of management and cost accounting such as absorption costing,

		marginal costing, breakeven point etc.
<b>MC-206</b>	<b>Research</b>	To introduce the concept of research, types of research, tools and techniques used in research and report writing.
<b>M.Com 3rd Semester</b>		
<b>MC-301</b>	<b>E-Commerce</b>	To make student aware about the concept of online business and electronic payment system.
<b>MC-302</b>	<b>Strategic Management</b>	To inculcate the concept of organizational vision, mission and types of strategies used in management of business.
<b>MC-303</b>	<b>Comprehensive Viva-Voce (external)</b>	To check presentation and conceptual skills of student.
<b>OPTIONAL GROUP:</b>		<b>ACCOUNTING AND FINANCE</b>
<b>MCF-311</b>	<b>Contemporary Issues in Accounting</b>	To introduce the students to the new concept of accounting to make them competent and aware of them latest accounting concepts such as human resource accounting, inflation accounting and brand accounting.
<b>MCF-312</b>	<b>Principles of Banking and Insurance</b>	The objective is to make student aware of various concept and implications of insurance and banking. Recent developments in banking and insurance in India.
<b>MCF-313</b>	<b>Direct Tax laws and Practices</b>	To make student understand about the basic concept, computation of income under various heads, setoff and carry forward of losses.
<b>MCF-314</b>	<b>Investment Management</b>	To make student aware about the basic elements of investment, security analysis and modern investment theories, tools & techniques.
<b>OPTIONAL GROUP:</b>		<b>MARKETING MANAGEMENT</b>
<b>MCM-321</b>	<b>Marketing of Services</b>	The objective is to make student well versed with emergence of service economy, consumer behavior in services, challenges of services, innovation and design and employees role in service delivery.
<b>MCM-322</b>	<b>Consumer Behavior</b>	To introduce the student regarding the concept of consumer buying process, factor affecting consumer decision and strategies used to influence consumer buying behavior
<b>MCM-323</b>	<b>Advertising Management</b>	On successful completion of this subject, the learner understand the role of advertising for the success of brands and its importance within the marketing function of a company as well as to understand actual execution of ad plan.
<b>MCM-324</b>	<b>Sales and Distribution Management</b>	To make student understand sales planning, sales organizational structure, distribution management, logistic management, role of transportation and warehousing in logistic management.
<b>M.Com 4<sup>th</sup> Semester</b>		

<b>MC-401 Business Ethics and Corporate Governance</b>	To make student aware regarding the evolution of corporate governance, reforms of companies act, corporate management, key managerial personnels, their role and responsibilities, concept of business ethics and also functional areas of business.
<b>MC-402 Indian Economy</b>	To introduce the student to the changing structure of Indian economy, rationales behind planning of new economic policy, contemporary issues in Indian economy such as foreign trade, land reforms and infrastructure bottlenecks in Indian economy.
<b>OPTIONAL GROUP:</b>	
<b>MCF-411 Financial Statement Analysis</b>	To make student aware regarding the various tools and techniques of financial statement analysis such as cash flow statement, fund flow statement, ratio analysis etc.
<b>MCF-412 Management of Financial Services</b>	To make student understand the new concepts of financial system such as factoring, mutual fund, merchant banking, book building etc.
<b>MCF-413 Corporate Tax Planning</b>	To make student aware regarding the tax procedure related to companies and tax management of companies
<b>MCF-414 International Finance</b>	To make student understand the new concepts and need of international finance, evolution of international monetary financial system, aspects of international cash management, aspects of raising capital, financial choice s of MNC's.
<b>OPTIONAL GROUP:</b>	<b>MARKETING MANAGEMENT</b>
<b>MCM-421-Retail Management</b>	To make student aware of concept, evolution, types and career in retailing, retail locations, merchandise management, technology in retailing, information and supply challenges for traditional retail and e-retail.
<b>MCM-422-Rural Marketing</b>	After successful completion of the course, students should be in a position to understand the situation of marketing in rural areas.
<b>MCM-423-Industrial Marketing</b>	On successful completion of this subject, the students understand the role of marketing in relation to industrial goods, industrial distribution and industrial communication programme.
<b>MCM-424-Brand Management</b>	To make student understand branding terminology, brand awareness, brand image, importance of branding, brand challenges and opportunities. Branding in specific sectors such as retail, industry and service.

# Master of Arts (Economics)

## Learning Outcome based Curriculum Framework

The Choice Based Credit System (CBCS) has evolved into learning outcome-based curriculum framework and provides an opportunity for the students to choose courses from the prescribed courses comprising core, elective/minor or skill-based courses. The courses can be evaluated following the grading system, which is considered to be better than the conventional marks system. Grading system provides uniformity in the evaluation and computation of the Cumulative Grade Point Average (CGPA) based on students' performance in examinations which enables the student to move across institutions of higher learning. The uniformity in evaluation system also enables the potential employers in assessing the performance of the candidates.

## Objectives of the Programme

The program intends to impart advance knowledge with respect to economic theory, practice, planning and implementation. Besides developing critical thinking, strengthening the spirit of scientific enquiry, the program aims at providing interdisciplinary knowledge and skill enhancement courses to increase the employability of students. Additional courses on ethics and leadership skills have been introduced to build skills, so that the students learn to work as part of a team and lead others, setting directions and formulating inspiring vision.

## Programme Outcomes (POs)

<b>PO1</b>	Knowledge: Demonstrate knowledge of historical emergence, questions asked, and distinctive contributions of the social science disciplines to the analysis of human behaviour and social issues.
<b>PO2</b>	Problem Solving: Visualize, conceptualize, articulate, and solve complex problems through experimentation and observation using theoretical framework of social science disciplines.
<b>PO3</b>	Critical Thinking: Critically analyse everyday problems faced by the society, evaluate specific policy proposals, compare arguments with different conclusions to a specific societal issue, and assess the role played by assumptions in such arguments.
<b>PO4</b>	Scientific Enquiry: Develop the capability of defining problems and strengthening arguments through analysis and synthesis.
<b>PO5</b>	Specialization and Employability: Develop deeper understanding, creativity, and originality in chosen specialized areas of social science disciplines leading to employability.

<b>PO6</b>	Interdisciplinary Knowledge & Adaptation: Enhance the ability to integrate as well as synthesize the acquired knowledge within the social sciences and beyond.
<b>PO7</b>	Self-Directed Learning: Develop the ability to work independently as well as effectively in the changing environment.
<b>PO8</b>	Self-Directed Learning: Develop the ability to work independently as well as effectively in the changing environment.

### **Programme Specific Outcomes (PSOs)**

After completing the M.A. Economics program, the students will be able to:

<b>PSO1</b>	Develop the powers of inquiry, critical analysis, logical thinking, and ability to apply theoretical knowledge to current issues of policy and practice in economics.
<b>PSO2</b>	Learn and apply alternative tools to address various economic policy issues related to various branches of Economics.
<b>PSO3</b>	Develop and demonstrate fundamental in-depth knowledge and understanding of the theories, postulates, methods, principles, concepts, values, substantive rules of core as well as applied areas of Economics.
<b>PSO4</b>	Identify, coherently explain and synthesize core and advanced economic concepts including economic models