

## 2.6.1 PROGRAM OUTCOME

### B.Sc. Mathematics

(1) It provides a base for higher studies and refines the brain of students in comparison to other students as study of mathematics helps to increase the act of logical thinking.

(2) Students can apply their knowledge in other branches of study as mathematics find application in every field of knowledge.

(3) Students of science have greater chance of employment e.g. in finance and investment. teaching ,keep up mathematical knowledge in the changing environment of technology.

(4) Study of mathematics enhances personal development. One learns to develop skills and time management.

## COURSE OUTCOME

### B.Sc.Part One

#### Calculus :

- By learning the topics taught in this paper student learns how to tackle problems of successive differentiation in other branches of science. Topics like curvature and curve tracing find applications in a number of research fields. Vector calculus too is very useful in building the concepts of Physics.
- In integral calculus student learns to find length, area, volume and surface of revolution of standard curves. A student can apply his knowledge of calculus in physics, chemistry statistics and can also create mathematical models in order to arrive into an optimal solution.
- To Identify and solve the first order and first degree linear differential equations
- To find orthogonal trajectories.
- To solve exact and differential equation of second order simultaneous equations

#### Algebra:

##### Student will be able to

- Apply De Morgan's theorem on functions properties of direct inverse and hyperbolic function.
- To find the logarithm of complex quantities.
- To expand trigonometric function.
- To solve the problem of roots and coefficient of polynomial of the variables.
- To solve the cubic equations.
- To transform different kinds of polynomials.
- To define mapping relations congruence modulo.

- To find gcd of problems based on congruence modulo.
- To define group, subgroup and properties.
- To find order and generator of group.
- To use of coset decomposition in the Lagrange's theorem.
- To understand homomorphism and isomorphism.
- To construct normal, quotient group.
- To find kernel of Homomorphism

### **B.Sc. Part Two**

#### **Advanced Calculus:**

- The topics taught in this paper serve as pivot for other branches of science. For example partial differentiation, Laplace's transformations are few topics in which student must have a good knowledge to understand the concepts of Physics, Chemistry etc.
- Topics taught in this paper like envelope, evolutes, Beta function, Gamma function have been introduced to handle the topics in Physics.

#### **Differential Equation:**

##### **Students will learn**

- To solve the differential equation by power series Frobenius method.
- To solve Bessel's, Legendre's equation.
- Familiar with generating function recurrence relation.
- To solve orthogonality Sturm-Liouville problem.
- To find Laplace transform.
- To find inverse Laplace transform.
- To apply shifting theorem to solve problems.
- To solve differential equation with the help of Laplace transform.
- To solve differential equations of first order.
- To solve equation with Lagrange's and Charpit's method.
- To solve D. E of second and higher orders.
- To classify D. E, reducible to equation with constant Coefficient.
- To define proximity, maximal's, external's.
- To solve boundary value problem with the help of Euler's Lagrange's equation.
- To find the external's.

## B.Sc. Final

### Analysis

#### Students will learn

- To perform basic mathematical operation on complex number
- To define continuity and differentiability..
- To define analyticity, find CR equations.
- To find harmonic function.
- To formation of analytic function with the help of Mile Thomson method.
- To identify different type of Elementary function.
- To decide when and where are given function is analytic.
- To understand the metric space properties and able to verify whether a given function is metric.
- To explain the geometric meaning of metric.
- To distinguish between open and closed balls.
- To define convergence for sequence in a m s.
- Continuity of a function between two m s.
- To understand contraction principle, dense, subsets, separable space.
- To understand FIP, continuous function, compact set.

### Abstract Algebra

#### Students will learn

- To explain linear transformation and their representation as matrices.
- To find the rank and mobility.
- To find the basis.
- To evaluate Eigen values at Eigen vector of LT
- To formation of inner product spaces
- To distinguish the orthogonal set
- To orthogonalize the finite dimensional vector spaces..
- To precise and accurate mathematical definition of object in ring theory.
- To use definition to identify and construct examples.
- To analyze and demonstrate example of Ideas and quotient rings.
- To use rings like polynomial and modular rings.

- Use concept of homomorphism, isomorphism for rings.
- analyze finite and infinite dimensional vector space subspace over field ,including properties structures of vs.
- Compute Eigen values and eigenvectors and applied the basic diagonalization.
- Compute inner product including Graham Schmidt process.

### **B.Sc. Computer Science**

## **PROGRAM OUTCOME**

### **After Completing the Bachelors of Computer Science (B.Sc. Computer Science)**

#### **Students are able to:**

- ✓ Improve their computer literacy, their basic understanding of operative systems and a working knowledge of software commonly used in academic and professional environments.
- ✓ Develop criteria to organize and present different type of works in academic and professional environments.
- ✓ Learn how to organize information efficiently in the forms of outlines, charts, etc. by using appropriate software.
- ✓ Develop the skills to present ideas effectively and efficiently. do Academic and Professional Presentations - Designing and delivering an effective presentations and developing the various IT skills to the electronic databases.
- ✓ Use the Systems Analysis Design paradigm to critically analyze a problem.

### **B.Sc. Zoology**

## **PROGRAM OUTCOME**

After completion of the program, the students will able to

1. Understand the scientific terms, concepts, facts, phenomenon and their interrelationships
2. Understand systemic position and organization of animals through study of classification
3. Know and appreciate life processes governing life from acellular, multicellular and tissue grade organization
4. Apply the subject knowledge for day to day use
5. Develop skills and abilities in practical work, handling instruments in laboratory experiments
6. Appreciate the tenets of the subject, contribution of scientists and scientific programs

### **B.Sc. PHYSICS**

## **PROGRAM OUTCOME**

The main mission of the U.G. degree program is to understanding of core knowledge in physics, including the major premises of classical mechanics, quantum mechanics, electromagnetic theory, Basic electronics, optics, special theory of relativity and modern physics.

- ✓ Students will demonstrate written and oral communication skills in communicating physics-related topics.
- ✓ Students will design and conduct an experiment (or series of experiments) demonstrating their understanding of the scientific method and processes. Students will demonstrate an understanding of the analytical methods required to interpret and analyze results and draw conclusions as supported by their data.
- ✓ Students will demonstrate a thorough understanding of the analytical approach to modeling of physical phenomena.

### **Hindi Language**

#### **COURSE OUTCOME**

##### **UG**

- हिन्दी भाषा और लिपि का ज्ञान।
- ब्यवहारिक तौर पर हिन्दी का प्रयोग व सैद्धांतिक समझ विकसित करना।
- तकनीकी शब्दावली एवं अनुवाद।
- कम्प्यूटर में हिन्दी के अनुप्रयोग।
- हिन्दी भाषा और उसके विविध रूपों ( सर्जनात्मक भाषा, संचार भाषा, कार्यालयीन भाषा, वित्त, वणिज्य की भाषा आदि) का परिचय।
- समाचार लेखन से परिचय।
- हिन्दी भाषा, कौशल विकास के अंतर्गत अनुवाद की समझ रोजगार के अवसर प्रदान करना।

### **English Language**

#### **COURSE OUTCOME**

##### **UG**

- Proficiency in reading and writing.
- To develop effective skills better social interaction and incalculable self directed learning.
- Analyze language at different language levels.
- Teach them the zeal of creativity by teaching them how to write.

### **Environmental Studies**

## **COURSE OUTCOME**

### **UG**

- To acquire awareness of the environment as a whole and its related problems.
- To know ecology and environment of India and world.
- Effect of pollution on environment.
- Conservation of Flora and Fauna.

### **M.Sc. Mathematics**

## **PROGRAM OUTCOME**

- There is a greater chance of self employment and variety of career opportunities like analyst, teaching, banking sector etc.
- Students can pursue research in mathematics and also in interdisciplinary subjects.
- There is an opportunity to fulfill academic hunger.

### **M.Sc. Mathematics**

## **COURSE OUTCOME**

### **M Sc. I Semester**

#### **Paper I – Advanced Abstract Algebra-I**

- In Abstract Algebra, a composition series provides a way to breakup and algebraic structures that is group or a module into simple pieces.
- Modules are very closely related to the Representation theory of groups and are used widely in algebraic geometry and algebraic topology.
- Field theory widely used in Algebra, number theory and many cryptographic Protocols.

#### **Paper II – Real Analysis -I**

- Riemann Stieltjes Integral serves as an instructive and useful procedure of the living integral for the students and also they used it for discrete and continuous probability.
- Power series are useful tools that can be used to expand other functions solve equation and applied in all areas of engineering.
- In the mathematical field of analysis, uniform convergence of convergence is a mode of functions stronger than point wise convergence.

#### **Paper III – Topology -I**

- This paper gives the basic idea of topology and it serves as a foundation for future for future study in Analysis, geometry, fuzzy topology, algebraic topology etc.

- Continuity of function is of core concept of topology. Topology finds applications in Physics, Economics, Networking, Computer Science and many other branches of knowledge.

#### **PaperIV- Research Methodology & Computer Application: Basic**

Upon completion course, the student will be able to.

- \* Discuss different methodologies and techniques used in research work
- \* Explain basic computer skill necessary for the conduct research.
- \* Assess the basic function and working of analytical instrument in research.
- \* Propose the required numerical skills necessary carry in research.

#### **Paper V - Complex Analysis-I**

After completing the course students will be able to

- Carry out computations with the complex exponential, logarithm and root functions and know their definition.
- Calculate the image of circle and lines under mobius transformation.
- Find the harmonic conjugate to harmonic function .
- Express analytical function in terms of power series and Laurent's series Taylor series.
- Calculate Complex line integrals and some infinite real integral using Cauchy's Residue theorem (contour integral).
- Find the number of zeros and poles within a given curve using argument principle, Rouché's theorem.
- Work with multivalued function.

#### **Paper VI – Advanced Discrete mathematics-I**

- Boolean algebra is used to analyse and simplify the digital circuits. Boolean algebra also used to the design of switching circuits.
- Lattice theory is the use of Boolean algebra's in modelling and simplified switching circuits.
- The study of computability theory in computer science is closely related to the study of computability in mathematical logics.
- Descriptive complexity theory relates logics to computational complexity.

### **M Sc. II Semester**

#### **Paper-1 Advanced Abstract Algebra-II**

- Noetherian and Artinian modules and rings are generalized finiteness conditions. Noetherian conditions prevent chains from piling up too much and Artinian condition prevent them from infinitely shrinking.
- Smith normal form is useful in topology to compute the homology of a simplicial complex and also used in control theory to compute transmission and blocking zeros of a transfer function matrix.
- In the field of abstract algebra, structure theorem for finitely generated modules over PID is generalization of Fundamental Theorem of finitely generated abelian groups. It provides simple framework to understand various Canonical form results for square matrices over fields.

### **Paper II- Real Analysis-II**

- Lebesgue spaces are used in the theoretical discussion of problems in Physics, Statistics, Finance, Engineering and other disciplines.
- $L^p$  space used to derived from the fact that they offer a partial but useful generalization of the fundamental  $L^2$  space of square integrable function.
- Function of bounded variation are used to define generalization solution of nonlinear problems involving functional, ordinary and partial differential equation in mathematics, Physics and engineering.

### **Paper III – Topology -II**

- The topic dealt in this paper serve as a foundation to facilitate students for research work in various branches of science.

### **Paper I V- Social outreach and Skill development**

Students able to knowledge about social outreach and project.

### **Paper V - Complex analysis-II**

- The students should learn the basic techniques of contemporary Complex Analysis in various applications such as harmonic analysis differential equations as well as in the applied disciplines.
- formation of entire function with the help of Weierstrass theorem, Runge and Mittag-Leffler's theorem.
- analytic continuation along a path and curve.
- understand Green's theorem, which help to solve differential equations.
- able to find the order and rank of entire function exponent of convergence.
- learn the range of analytic function.

### **Paper V – Advanced Discrete Mathematics-II**

- Graph theory used in modeling transport networks activity networks and theory of games.



- Graphs can be used to model many types of relations and process in physical, biological, social and information system.
- Graphs are used to represent networks of communication, data organization, computational device, the flow of computation etc.
- In computer science, finite state machine are widely used in modeling of application behavior, design of hardware digital system , software engineering , compilers , network protocols and the study of computational and languages.

### **M Sc. III Semester**

#### **Paper I - Integration theory and Functional analysis-I**

- Raydon Nikodym theorem can be used to prove the existence of conditional expectation for probability measures.
- Borel set are used in descriptive set theory.
- Baire measures are convenient framework for integration on locally compact hausdorff space.

#### **Paper II - PDE, Mechanics & Gravitation-I**

##### **Student will be able to**

- its widely used in formulating many fundamental law of Physics and Chemistry .
- gain the vast knowledge by using the application of Calculus of variation in biological and medical field.
- develop the skill while doing using the various problem by using integral equation in all engineering sciences.
- demonstrate their understanding of how physical phenomenon Are modeled by differential equation.
- be familiar with the Modelling assumption and derivation that lead to p d e .
- Be competent is solving linear PDE using classical solution method.
- find the fourier and Laplace transformation its application.
- solve bondary value problem using fourier and laplacetransform.

#### **Paper III - Operations research-I**

- Operations research utilised in allocation and distribution in project and production and facility planning, in marketing, in finance sector etc.
- Network analysis used in construction projects based on the knowledge and experience of the past project for predicting accurately the time required for various activities during execution of project.
- Application of dual simplex method is that it works even when values are zero, easily implemented to solve any type of transportation problem.

- Assignment problem does the allocation in such a way that cost or time involved in process is minimum and profit or sale is maximum.

#### **Paper IV-Intellectual Property, Human Right Environment:Basic**

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

1. Identify key actors and norms in the fields of intellectual property (IP) and human rights, and appreciate the nature and significance of the relationship between intellectual property (IP) and human rights.
2. Identify and understand the tensions arising between IP and human rights and how those tensions are being addressed at domestic, regional and international levels.
3. Critically assess how IP rights may interact with and impact on civil, political, economic and social rights and further issues pertaining to indigenous peoples and the protection of traditional knowledge and traditional cultural expressions from a human rights perspective.
4. Be aware of current developments in the field and be able to contribute in an informed manner to ongoing debate.

#### **PaperV- Numerical Analysis-I**

This course is an introduction to a broad range of numerical methods for solving mathematical problems that arise in Science and Engineering. The goal is to provide a basic understanding of the derivation, analysis, and use of these numerical methods, along with a rudimentary understanding of finite precision arithmetic and the conditioning and stability of the various problems and methods. This will help you choose, develop and apply the appropriate numerical techniques for your problem, interpret the results, and assess accuracy. The problems cover (i) systems of linear equations, linear least squares problems, and eigenvalue calculation; (ii) interpolation, approximation, and integration of functions; (iii) initial value problems governed by ordinary differential equations; (iv) nonlinear scalar equations.

#### **Paper VI – Fuzzy Sets and their applications-I**

This paper gives an introductory idea of fuzzy sets and basic properties of fuzzy sets. This property has been introduced so that a student can fuzzify all the concepts of a crisp set. This paper acts as a tool for serving all types of research concerned with fuzzy sets.

#### **M Sc. IV Semester**

#### **Paper I -Integration theory and Functional analysis-II**

- Hilbert space are used and functional analysis in quantum mechanics. Hilbert space support generalization of simple geometric concept like projection and change of basis from their usual finite-dimensional setting.
- Banach space allow us to transfer variable between the domain and codomain.

- Inner product space can be used to define Fourier coefficient for the series and that gives us a wide range of applications in boundary value problem( mainly heat and wave equation).

### **Paper II –PDE, Mechanics & Gravitation-II**

- have a deep understanding of Newton's Law.
- to solve statistical mechanics problems.
- familiar with experimental techniques used in elementary practical physics.
- to understand the discipline specific knowledge in classical mechanics that is concept and Newton's law and application oscillation, Lagrange's equivalent.
- to solve problem in Applied Physics .
- understand the Lagrange's and Hamiltonian approach in classical mechanics.
- get familiarized with Poisson and Lagrange's brackets and Hamilton Jacobi equations.
- kinematics and dynamics of rigid body in detail and ideas regarding Euler's equations.
- To apply calculus of variation to diverse problems in physics including isoperimetric problems, use of Lagrange multiplier in solving physics problems.

### **Paper III - Operations research-II**

- Dynamic programming used in computer network, routing, graph problems, computer vision, artificial intelligence, machine learning etc.
- Valuable applications of queuing theory are traffic flow (vehicles, aircraft, people Communications, scheduling and facility design etc.). Queuing theory applicable to Healthcare settings where system have excess capacity to accommodate random variation.
- Nonlinear programming is the field of mathematical Optimization that deals with problem that is not linear.

Game Theory is applied for determining different strategies in the business world

### **Paper IV-Dissertation**

Students will be able to

- Read mathematics independently and solve advanced mathematical problems.
- Demonstrate mastery of subject material, as evidenced by quality of performance in coursework, and on written and oral examinations in mathematics.
- Communicate mathematical ideas, results, context, and background effectively and professionally in written and oral form.
- Produce and defend an original contribution to knowledge, as evidenced by the writing and defence of a thesis involving significant original research

### **Paper IV- Numerical Analysis-II**

This course is an introduction to a broad range of numerical methods for solving mathematical problems that arise in Science and Engineering. The goal is to provide a basic understanding of the derivation, analysis, and use of these numerical methods, along with a rudimentary understanding of finite precision arithmetic and the conditioning and stability of the various problems and methods. This will help you choose, develop and apply the appropriate numerical techniques for your problem, interpret the results, and assess accuracy. The problems cover (i) systems of linear equations, linear least squares problems, and eigenvalue calculation; (ii) interpolation, approximation, and integration of functions; (iii) initial values problems governed by ordinary differential equations; (iv) nonlinear scalar equations.

### **Paper V – Fuzzy Sets and their applications-II**

- In this paper students study the most successful application areas of fuzzy system called fuzzy control which finds extensive use in neural network.
- Decision making in fuzzy environment helps in how decisions are made involving single decision maker or multi decision makers. Students also learn fuzzy measure theory, probability theory, evidence theory which are used to characterize the various forms of uncertainty. Students after attaining knowledge of fuzzy sets can apply her knowledge in research work in the field of medicine, economics, science and engineering, neural network and so on.

## **.B.Sc. Botany**

### **PROGRAM OUTCOME**

1. Terminology, phenomenon, concepts and classification of plants and its scientific importance.
2. Introduction and awareness of the related flora (Biodiversity)
3. Practical aspects and knowledge of cell division and growth of plants.

### **COURSE OUTCOME**

#### **1. Biodiversity (Microbes, Algae, Fungi and Archegoniate):-**

Understanding regarding Microbes, Algae, Fungi, Bryophytes, Pteridophyta and Gymnosperms including general characteristics, classifications, morphology and anatomy reproduction and economic importance.

#### **2. Cytology, Genetics and Molecular Biology:-**

Knowledge of cellular organization and their role in governing cellular processes. Knowledge of genetics, genetic interactions and basic genetics at molecular level.

#### **3. Utilization of plant Resources:-**

Basic idea of Ethno botany folk medicines, herbal medicines. Study of Phernocognosy of medicinally important plants. Assignments based on ethnic herbal medicinal plants.

#### **4. Ecology and Systematic Botany :-**

Knowledge of ecosystem, plant communities, phytogeography, ecological factories and pollution study. Introduction with Hydrophytes and Xerophytes and approaches to the plant collection. Taxonomic description and Modern taxonomy.

#### **5. Anatomy, Embryology and Economic Botany:-**

Knowledge of tissue, normal and abnormal secondary growth, embryology and cultivation of major cereals pulses vegetables spices timber and medicinal plants of Chhattisgarh state. Embryological slide preparation. Plants collection. Internal structure of Dicot and Monocot root stem and leaf etc.

#### **5. Plant Physiology and Biotechnology:-**

Knowledge of plant water relation, metabolism, growth regulators, light and temperature effect and fundamentals of Biotechnology.

## **M.Sc. Botany**

### **PROGRAM OUTCOME**

On completing under graduate and Post-graduate studies in Botany course, the students will be in position to understand:-

1. Terminology, phenomenon, concepts and classification of plants and its scientific importance.
2. Flora and fauna (Biodiversity) and its importance.
3. Application of botanical knowledge in day to day activities of life- cycle.
4. How to develop skills and abilities in handling of instruments during practical works.
5. Application of subject knowledge in day to day uses.
6. How to be in position to take up studies at post-graduate level and to further acquire good jobs.
7. General importance of Botany in day to day human and animal life.
8. Develop skills and abilities in practical work, handling instruments in laboratory experiments.
9. Research techniques and knowledge to undertake M.Phil., Ph.D. course after completion of Post Graduation.

### **COURSE OUTCOME**

#### **Semester-I**

#### **Paper I Cell And Molecular Biology:-**

- To understand cellular mechanism at molecular level. Cytological slide preparation and knowledge to recombinants.

### **Paper II Genetics And Cytogenetics**

- Introduction To modern tools and technics of cell biology(microscopy), cell componantes and their functions , cell cycleand cell division, geen structure regulation and expression in eukaryotes and mitochontrial and chloroplast genomes..

### **Paper III Physiology and Biochemistry:-**

- To understand systematic position of vascular plants, classification of angiosperms with their phylogeny. Studies and knowledge of flora in lab and excursion. transpiration, respiration and nitrogen fixation. Flowering process, sensory photobiology and stress physiology. Chromatography and pigment separation To study energy flow, membrane transports enzymology, phytoharmones, photochemistry and photosynthesis. Detail study of Chromatographic studies of pigments and soil analytical studies.

### **Paper IV Recombinant DNA technology and protimics:-**

To understand recombinant DNA technology , principles of gel electrophoresis genomic libraries PCR methodology, column cromatography and protimics us a tool for plant genetics breedins and diversity study.

## **Semester-II**

### **Paper I Developmental Biology:-**

- Knowledge of structure of archegoniiatae, vascular plants various typeof growth anataomical studies in systamatics archeology climate studies formacology forensic science biomedical research . development of flowers and seeds

### **Paper II pathogens and pests of crop plants :-**

- Knowledge of life cycle of various type of viruses , bacteria fungi , insects and nematode intractions

### **Paper III Biotechnology and Resource Utilization:-**

- Methodology of plant tissu culture . Biotechnology in forestry and biofertilizers study of plant resourse utilization

### **Paper I V Systamatics, Evolution And Environmental science:-**

- To understand evoluntionary biology and systamaticsof various plant spes . Environmental science ecosystem and living organism application of environmental studies future of earth.

## **Semester-III**

### **Paper I Algae ,Environment Human Welfare:-**

- Knowledge of diversity and distribution of algae, and their classification algal biotechnology micro and macroalgal biotechnology, biodiesel carbon capture by algae and industrial phycology
- **Paper II Principles of Ecology:-**
- To understand soil and vegetation patterns and their organization, climate and climate changes, ecosystem and green revolution. Ecological and dynamical studies of biotic and abiotic components hydro sere and Xerosere. Study in excursion (Visit to Buka and Satrenga dams.)

**Paper III Advances in Archegoniatae:-**

- To understand diversity of bryophytes and its role in ecosystem, interaction between microorganism and animals and fungi, poikilohydry, diversity of pteridophytes, gymnosperms, tissue culture method of conifers, diversity of non living gymnosperms

**Paper IV Evolutionary Biology:-**

- To understand evolution of various species of plants, diversity and its conservation.

**Semester-IV**

**Paper I In vitro Technologies and Industrial Applications:-**

- To understand plant tissue culture techniques micropropagation of floricultural, agricultural and pharmaceutical crops

**Paper II Reproductive Biology of Flowering Plants:-**

- Knowledge of modes of reproduction, development of gametophytes fertilization and breeding system in various plant species, fruit biology and seed biology.

**Paper III molecular interaction of plants with symbionts, pathogens and pests:-**

- To understand biotic interactions with plants, interaction between plants and bacteria, fungi, insects and nematode Engineering for the production of resistance plants major crop plant diseases and their control. Disease eliminating and innovative ideas for crop improvements.

**Paper IV Advanced Plant Systematics:-**

- Knowledge of plant systematics and taxonomic history, principles of botanical nomenclature classification and systematic evidence, molecular systematics phylogenetics. introduction of some basic angiospermic plants.

# CHEMISTRY

## PROGRAM OUTCOME

To study about the different areas of science.

- Gain the knowledge of chemistry through theory and practicals.

- To explain nomenclature, stereochemistry, structure, reactivity and mechanism of chemical reaction.
- To study the periodic properties of elements, geometry of molecules, characteristics of molecules.
- To study the fundamentals of reaction mechanism, aromaticity, stereochemistry, synthesis and applications of various organic compounds.
- To develop skills in different laboratory analytical works and handling instruments.

## **B.SC. CHEMISTRY COURSE OUTCOME**

### **Paper I- Inorganic Chemistry**

Knowledge of Atomic structure, basic periodic table, chemical bonding, knows about S, P, D block elements, knowledge of transition elements. Knowledge of Lanthanides, Actinides, Acids, Bases, Solid State, Non-aqueous solvents, Hard and soft acids and bases, knowledge of Bio inorganic, Knowledge of Metal ligands bonding in transition metal complexes.

### **Paper II- Organic Chemistry**

Mechanism of organic reactions, Stereochemistry of organic compounds, aromatic ring compounds, Alkyl and aryl halides, Alcohols and phenols, Aldehydes and ketones, Carboxylic acids and their derivatives, Organic compound of nitrogen, Heterocyclic compounds, Amino acids and peptides, carbohydrate dyes, Polymers, Proteins and nucleic acids.

### **Paper III- Physical Chemistry**

Mathematical and Computer concept for chemist, Ideal and non ideal solutions, Liquid crystal, Colloidal state, Chemical kinetics and catalysis, Thermodynamics and Thermo chemistry, Phase equilibrium, Electrochemistry, Physical and magnetic properties, Raman spectra, Photochemistry, Spectroscopy.

## **M.SC. CHEMISTRY COURSE OUTCOME**

### **1. Semester-I**

#### **Paper I- Inorganic Chemistry**

Knowledge the concept of coordination Chemistry, stability of the complexes and stereochemistry of complexes. Knowledge about structure and bonding.

#### **Paper II- Organic Chemistry**

Students able to learn the concepts of stereochemistry, conformational analysis and their application in the determination of reaction mechanism. To understand the nucleophilic and electrophilic substitution.

#### **Paper III- Analytical Chemistry**



Students able to learn about the chemical analysis, solvent extraction, separation technique and spectroscopic technique.

#### **Paper IV- Group Theory Spectroscopy and Diffraction method**

Knowledge of the diffraction techniques and to learn about group theory and spectroscopy.

#### **Paper V- RESEARCH METHODOLOGY & COMPUTER APPLICATION**

- Understands the concept and place of research in concerned subject
- Gets acquainted with various resources for research
- Becomes familiar with various tools of research
- Gets conversant with sampling techniques, methods of research and techniques of analysis of data
- Achieves skills in various research writings
- Gets acquainted with computer Fundamentals and Office Software Package .

### **1. Semester-II**

#### **Paper I- Inorganic Chemistry**

Knowledge about the theories of coordination complexes, Chemistry of lanthanides, to learn about Nanotechnology and use of Inorganic Compounds in Biological Chemistry.

#### **Paper II- Organic Chemistry**

Students able to learn the various types of reactions, rearrangements and their synthetic utility.

#### **Paper III- Physical Chemistry**

Knowledge of the various types of spectroscopy and radio chemistry.

#### **Paper IV- Applied Chemistry**

Students able to gain the knowledge in the preparation, properties, characterization and Uses of polymers.

#### **Paper V- Social outreach and Skill development**

Students able to knowledge about social outreach and project.

## **Semester-III**

#### **Paper I- APPLICATIONS OF SPECTROSCOPY-INORGANIC CHEMISTRY**

Knowledge about application of Spectroscopy in various field of In organic Chemistry.

#### **Paper II - APPLICATIONS OF SPECTROSCOPY-ORGANIC CHEMISTRY**

Knowledge about application of Spectroscopy in various field of Organic Chemistry.

#### **Paper III - PHOTOCHEMISTRY**

Students able to learn about principle and application of Photochemistry in various fields.

**Paper IV- HETEROCYCLIC CHEMISTRY**

Knowledge of Nomenclature, Preparations, Characteristics and Structure of Heterocyclic.

**Paper V- INTELLECTUAL PROPERTY RIGHTS, HUMAN RIGHTS & ENVIRONMENT: BASICS**

- Understands the concept and place of research in concerned subject
- Gets acquainted with various resources for research
- Becomes familiar with various tools of research
- Gets conversant with sampling techniques, methods of research and techniques of analysis of data.

**Semester-IV****Paper I- BIOINORGANIC CHEMISTRY**

Knowledge about Trace metal ions, Enzymes and medicinal bio inorganic chemistry.

**Paper II - ENVIRONMENTAL CHEMISTRY**

Knowledge about Earth, Biosphere and Pollution and its Control.

**Paper III - SOLID STATE CHEMISTRY**

Knowledge of Solid States and their structure and application.

**Paper IV - PHOTO INORGANIC CHEMISTRY**

Knowledge about Photochemistry, Excited States and Ligand field Photochemistry.

**Paper V- Dissertation**

Students able to orient about minor project and research in different field of chemistry.

**B.A.****HINDI**

In our college there is study centre of Hindi Language & literature. Hindi language connects many works in diversity. It is base of national integrity. It gives opportunity to introduce India & Indian culture.

Study of applied Hindi helps students to work in education department as Hindi officer & translators also. Students follow work of journalism in different area. Hindi as contact language is popular in foreign country also. In the field of excursion it is also popular.

**POLITICAL SCIENCE****B.A. COURSE OUTCOME****1. POLITICAL THEORY**

Analysing what is Politics and explaining the approaches to the Study of Political Science – Normative, Behavioral, Post Behavioral, Feminist.

Assessing the theories of State (Origin, Nature, Functions): Contract, Idealist, Liberal and Neo-Liberal Theories.

Explaining the Concept of State Sovereignty: Monistic and Pluralistic Theories. Analysing the changing concept of Sovereignty in the context of Globalisation.

Classification of David Held's Democratic Theories.

Understanding basic concepts of Liberty, Equality, Rights, Law and Justice.

Assessing empirical Political Theory: System's Analysis, Structural Functionalism.

Explaining Dialectical Materialism and Historical Materialism with special reference to relationship between base and superstructure.

Analysing the theory of class and class struggle.

Describing the Marxist Approach to politics.

Analysing Marx's concept of Freedom and Democracy: Nature, Features and Critique.

Discussing Marx's Theory of State with special reference to Relative Autonomy of the State.

Explaining Marxian theory of Revolution.

Evaluating the major debates in Marxism: Lenin- Rosa Luxemburg debate on Political party

## **2. COMPARATIVE GOVERNMENT AND POLITICS**

Tracing the evolution of Comparative Politics as a discipline and drawing a distinction between Comparative Politics and Comparative Government.

Investigating the nature and scope of Comparative Politics.

Analysing the approaches the approaches and models of comparison: systems analysis; structural functionalism; and institutional approach.

Critically analyzing the features of a liberal democratic and socialist political system with focus on UK, USA and the People's Republic of China.

Discussing the features of a federal system with special reference to USA and Russia.

Conducting an intensive comparative study of the Executive (UK, USA, France and Russia); Legislature (UK, USA and the PRC); the Judiciary (UK, USA and PRC).

Critically looking at the rights of the citizens of UK, USA and PRC from a comparative perspective.

## **3. GOVERNMENT AND POLITICS IN INDIA**

Introducing the Indian Constitution with a focus on the role of the Constituent Assembly and examining the essence of the the Preamble.

Examining the Fundamental Rights and Duties of Indian citizens with a study of the significance and status of Directive Principles.

Assessing the nature of Indian Federalism with focus on Union-State Relations.

Critically analyzing the important institutions of the Indian Union: the Executive: President; Prime Minister, Council of Ministers; Governor, Chief Minister and Council of Ministers; The legislature: Rajya Sabha, Lok Sabha, Speaker, Committee System, State Legislature, The Judiciary: Supreme Court and the High Courts: composition and functions- Judicial Activism

Looking at the Constitutional Amendment Procedure with focus on the main recommendations of the Constitutional Review Commission (Venkatachalliah Commission)

Critically evaluating the Indian Party system – its development and looking at the ideology of dominant national parties

Evaluating the role of various forces on Indian politics: religion; language; caste; tribe; regionalism; business; working class and peasants

Evaluating the Electoral Process in India with focus on the Election Commission: Composition, Functions and Role

Investigating the New Social Movements since the 1970s: environmental movements, women's movement and human rights movement

## **2. INTERNATIONAL RELATIONS**

Explaining scope and subject matter of International Relations as an autonomous academic discipline.

Approaches and methods to study the discipline through Political realism, Pluralism and Worlds system's Model.

Examining the issues of Underdevelopment, Terrorism, Regionalism and Integration that characterizes the Post second world war order.

Studying the role of Diplomacy, Propaganda and Military capabilities in the making of foreign policy.

Explaining certain basic concepts like Globalisation in contemporary world order.

Describing the Cold War phases and understanding the post Cold War era.

Discussing the developments in European Ethno-nationalism since 1990's. Tracing the growth of European Union

Examining Indian Foreign Policy: Basic Principles, Evolution and Bilateral Relations.

Evaluating the working of UN and its organs; Peace keeping Function and Human Rights.

Analysing the Foreign Policy of USA and China.

Studying the developments in third world countries in post world war II era like NAM: Relevance, ASEAN, SAFTA and SAARC, OPEC, OAU, West Asia-Palestine problem after Cold War

## **3. WESTERN POLITICAL THOUGHT**

Providing an insight into the dominant features of Ancient Western Political Thought: Ancient Greek political thought with focus on Aristotle and Plato; Roman Political Thought: its contributions with special emphasis on the emergence of Roman law.

Examining the features of Medieval Political Thought.

Evaluating the Renaissance; political thought of Reformation; and Machiavelli.

Critically examining Bodin's contributions to the theory of Sovereignty; Hobbes as the founder of the science of materialist politics; Locke as the founder of Liberalism with focus on his views on natural rights, property and consent; and Rousseau's views on Freedom and Democracy; Bentham's Utilitarianism; and John Stuart Mill's views on liberty and representative government.

Taking an insight into the following: Hegel's views on Civil Society and State; Utopian and Scientific socialism: basic characteristics.

Examining the varieties of non-Marxist socialism: Fabianism, Syndicalism, Guild Socialism, German Revisionism.

Tracing the evolution of Indian political thought from ancient India to modern India.

Analysing the nationalist thought of Raja Rammohun Roy.

Assessing the nationalist thought of Bankim, Vivekananda and Tagore.

Discussing the nationalism of Gandhi, M. N. Roy, Narendra Deva and Syed Ahmed Khan.

Explaining the formation of the Congress in 1885.

Tracing the Bengal Partition and the Swadeshi movement.

Analyzing the Gandhian Movements such as the Khilafat, Non Cooperation, Civil Disobedience movements.

Assessing the alternatives to the Indian National Congress- the Forward Bloc, Congress Socialist Party, Communist Parti of India.

Describing the movements against caste and untouchability, Ambedkar's views on Social Justice and the depressed classes.

Analysing the Working Class and Peasant movements under colonial rule

Discussing the roots of communalism- Savarkar and Hindu Nationalism and Jinnah and the two nation theory

Estimating the contribution of the August 1942 movement, the INA and the naval uprising.

#### **4. PUBLIC ADMINISTRATION**

Explaining the nature, scope and evolution of Public Administration; Private and Public Administration; Principles of Socialist Management.

Discussing making of Public Policy Making and methods of Implementation

Analysing the major Concepts in Public Administration.

Tracing the Challenges in the discipline of Public Administration like New Public Administration (NPA); Comparative Public Administration (CPA) and Development Administration.

Discussing the Ecological approach to Pub. Adm.

Analysing the Administrative Processes: decision making; communication and control; leadership; co-ordination.

Discussing Weberian and Marxian theories of bureaucracy.

Studying the Organisation of the Union Government and State Government.

Examining the Institutions of Local Self Government in India

Assessing the relationship between the Citizen and Administration: Lokpal and Lokayukt.

Understanding the concept of District Administration in India.

Examining the Institutions of Financial Administration in India.

Analysing the Civil Service in India.

Explaining the Planning and Planned Administration in India. Continuity and Change in Indian Administration.

### **POLITICAL SCIENCE PROGRAM OUTCOME**

In Political Science Department is running two Programs namely M.A and PhD. Courses in the master's Program have been designed in a manner so as provide a holistic approach to the study of political science. The core of the discipline is maintained with courses on political philosophy both western and Indian and key concepts of politics. These courses provide a solid grounding to the learners on the history of ideas and the larger issues of epistemology in social sciences. They also try to integrate the concepts with the practices of politics and government and to understand their relevance in totality. The second set of papers on Indian politics including study of constitution, institutions, processes and political economy entail a detailed study and analysis of morphology and anatomy of politics in India. While familiarizing the students with legal framework of government institutions, the courses tend to engage them with the undercurrents of political practice and developmental process. By learning the evolution of concepts and theories of Indian politics, the students are able to critically reflect on the contemporary developments. Courses on comparative politics and international relations provide an overview of political developments at the global level. Comparative analysis not only helps in understanding the patterns of institutionalism, democratization and development in various polities but also provide a framework for explaining variations. In addition, specialized courses like human rights, peace and conflict studies and state politics introduces the students to certain new dimensions of politics. By doing these courses, students develop a solid footing over the vast field of knowledge in the discipline that also in a way encourages them to undertake future research in these unconventional areas of political science. Through them they also tend to develop an interdisciplinary focus without deviating from the core of the discipline. Research methodology is taught both in M.A and PhD Programs. While providing an epistemological

and philosophical grounding on the subject, the course familiarizes the students with specialized techniques of qualitative and quantitative research in social sciences. The field work component of the course further trains the students to undertake field research and write research reports. Advance papers in M.A. Elective paper on Contemporary political theory, Tribal Studies and Public Policy further enhances the knowledge of students in these areas and also help them identify their areas of research.

### **HOME SCIENCE FACULTY**

Performance of home science department is very appreciable. Focus is on skill development & making the student self confident via Tailoring, stitching, Knitting, Embroidery, Printing & tie & dye. Home furnishing materials preparation teaching, teaching kit & aids preparation, counseling, Toy making, Puppet making, Audio visual aids. Baby kit preparation, curtain, doormats, school port Folio Preparation, Food presentation, cooking of different recipies, therapeutic diets preparation low cost Nutrici os recipies preparation Running Canteen, Food science Experiments. Under many courses educational visits, survey , field work, are conducted for students to remain in touch with the different community & Industrials.

Our Students are Working In the field of NRC (nutrition rehabilitation centre). Feeding demonstrator, as school & college teacher working in Aanganwadi & Bal badies trainers, entrepreneurship at all small scale, leadership in the self help group, counselor, working as computer operator many of P.G. students have passed SET, TET,B.Ed. PSC Preliminary exams.

### **B. COM. PROGRAMME OUTCOME**

- After completion of three years for bachelors in commerce program students would gain a thorough grounding in the fundamentals of commerce and finance.
- Learners will gain thorough systematic and subject skills within various disciplines of commerce, business, accounting, economics, finance, auditing and marketing.
- The commerce and finance focused curriculum offers a number of specializations and practical exposures which would equip the students to face the modern-day challenges in commerce and business.
- The all-inclusive outlook of the course offer a number of values based and job oriented courses ensures that students are trained into up-to-date.
- Students will learn relevant managerial accounting career skills, applying both quantitative and qualitative knowledge to their future careers in business.
- Learners will acquire the skills like effective communication, decision making, problem solving in Day to day business affairs

### **COURSE OUTCOME**

#### **FINANCIAL ACCOUNTING**

- Demonstrate an appropriate mastery of knowledge, skill and tools of financial accounting.
- On successful completion of this course the students are enabled with the knowledge in the practical applications of accounting.
- To impart the knowledge of various accounting concepts

### **BUSINESS COMMUNICATION**

- To understand the concept, process and importance of communication
- To develop awareness regarding new trends in business communication.
- To develop effective business communication skills among the students.

### **BUSINESS ENVIRONMENT**

- On successful completion of this subject the students should have Knowledge on the meaning conveyed by the word 'Business' , understand the various forms of business , types of business and impact of various aspects on business environment
- To make the students aware about the Business Environment.
- To make students understand about the internal and external factors that affects the business.

### **BUSINESS MATHEMATICS**

- To Develop Abstract, logical & critical thinking ability to reflect critically upon their work.
- To prepare for competitive examinations
- To understand the concept of Simple interest, compound interest and the concept of EMI.
- To understand the concept and application of profit and loss in business

### **BUSINESS REGULATORY FRAMEWORK**

- To provide a brief idea about the framework of Indian business laws.
- To develop the awareness among the students regarding these laws affecting business, trade and commerce
- To acquaint students with the basic concepts, terms & provisions of Mercantile and Business Laws.

### **BUSINESS ECONOMICS**

- To expose Students of Commerce to basic micro economic concepts and inculcate an analytical approach to the subject matter.
- To stimulate the student interest by showing the relevance and use of various economic theories.



**CORPORATE ACCOUNTING**

- To enable the students to develop awareness about Corporate Accounting in conformity with the provisions of Companies Act and Accounting as per Indian Accounting Standards.
- To make aware the students about the conceptual aspect of corporate accounting

**BUSINESS STATISTICS**

- To gain understanding of statistical techniques as are applicable in business.
- To impact the basis in Statistics to help students acquire new skills on the application of statistical tools and techniques in Business decision-making.

**PRINCIPLES OF MANAGEMENT**

- To familiarize the students with the basics of principles of management.
- To provide an understanding about various functions of management.

**COST ACCOUNTING**

- To expose the students to the basic concepts on the tools used in cost accounting.
- To familiarize students with various methods and techniques of costing.

**COMPANY LAW**

- To provide basic knowledge of the provisions of companies act 1956 along with relevant case law.
- To update the knowledge of provisions of the Companies Act of 2013.
- To acquaint the students with the duties and responsibilities of Key Managerial Personnel.

**FUNDAMENTALS OF ENTREPRENEURSHIP**

- To provide exposure to the students to the entrepreneurial culture and industrial growth so as to preparing them to set up and manage their own small units
- To motivate students to make their mind set for taking up entrepreneurship as career
- On successful completion of this course, the student should be well versed in Concept relating to entrepreneur, Knowledge in the finance institution, project report incentives and subsidies.

**INCOME TAX**

- To enable the students to know the basics of Income tax and its applications.
- This course aims to provide an in-depth knowledge on the provisions of Income Tax.
- To familiarize the students with recent amendments in Income-tax.

**AUDITING**

- To impart the knowledge about the principle and methods of auditing and their applications.
- On successful completion of this course, the student should be well versed in the fundamental concepts of Auditing.

### **FUNDAMENTAL OF INSURANCE**

- To enable the students to know the fundamentals of insurance.
- To impart theoretical base on fundamentals principles of insurance business

### **INDIRECT TAX**

- Aims at imparting basic knowledge about major indirect taxes levied by central and state government.
- To understand the basic concepts and to acquire knowledge about computation of indirect taxes.
- Enable the student to understand the Principles of Indirect Taxes Calculation of Tax, Tax Authorities, Procedures

### **MANAGEMENT ACCOUNTING**

- To develop the understanding of accounting tools and information and their uses in Decision making.
- To introduce students to the various tools and techniques of management Accounting.
- To enlighten students on Financial Statement Analysis with the emphasis on the preparation of fund flow and cash flow statement.

### **INDIAN BANKING SYSTEM**

- To enable the students to know the working of the Indian Money & banking system.
- To understand the legal aspects of Banking transactions and its implications as Banker and Customer
- To make the Students aware of the Banking Law and Practice in India

## **DEPARTMENT OF HISTORY**

### **PROGRAMME OUTCOME**

- I. History is a true teacher of man which shows proper path to the future.
- II. History makes us aware of various aspects of human nature and provides gradual development of civilization.
- III. The study of history is important to every nation and its citizen to remain alive, prosperous and dynamic.

- IV. Through the study of history, one gets to know the circumstances of the rise and fall of a nation.
- V. Study of history makes us understand past mistakes of our ancestor and gives a stern warning not to repeat them.
- VI. Study of history is considered to be a region of human civilization.
- VII. History provides a clear picture of all known things of ethics, religious life, economic life, cultural life, political system, governance etc. of any erstwhile society.
- VIII. Study of history as a provident fund is necessary otherwise a nation has no future.
- IX. The necessity, concept, purpose, importance and usefulness of history is very broad and far reaching.

### **PROGRAMME SPECIFIC OUTCOME [P.S.O]**

1. Analyze relationship between past and present.
2. To develop practical skills helpful in the study and activities related to historical events.
3. Understand present existing social, political, religious and economic conditions of the people.
4. To develop interest in the study of history and activities related to history
5. Understand background of our religion, administration.
6. Critical analysis – student will produce their own historical analysis of documents and develop the ability to think critically and historically when discussing the past.
7. Student will demonstrate in written work and class discussions and the ability to recognize and articulate the diversity of human experience, including ethnicity, race language as well as political, economic, social and cultural structures are time and space.
8. Application - Student will employ full range of techniques and methods used to gain historical method to make comparison across time space and culture.
9. Student will understand and evaluate historical ideas, arguments and point of view.
10. Knowledge – An understanding of the major trends of historical knowledge.
11. Construct and communicate historical arguments in both oral and written form.

#### **BA PART ONE**

#### **HISTORY OF INDIA ( UPTO 1206 A.D.) PAPER 1**

#### **COURSE OUTCOMES**

1. Political History of ancient India. The life-Story of the Indian people in their formative stage, struggling to find happiness both here & hereafter.
2. Reconstruction of that past history through a selection of significant facts.

### **OUTCOME**

- I- Understand the salient features of Indus valley civilization
- II- Evaluate the features of Buddhism and Jainism
- III- Visualize the administration of Mauryas and the art and architecture of Mauryas
- IV- Identify the administration of Guptas and their contribution to Nalanda University
- V- Examine the Arab conquest of Sindu and the battle of Tarain.

### **PAPER 2 WORLD HISTORY 1453 -1890 AD OUTCOME**

- i. Describe the Geographical discoveries and the Renaissance movement in Europe.
- ii. Assess the causes and effects of Reformation and Counter-Reformation movements.
- iii. Narrate the enlightened despotism in Europe, especially in France ,Prussia and Austria.
- iv. Learn the causes and results of Thirty years war. V- Discuss the reforms of Peter the Great and Catherine II of Russia.

### **BA PART TWO**

#### **PAPER 1 INDIAN HISTORY [MEDIEVAL HISTORY] 1206 -1761 AD**

1. Study Indian society that subjected to a variety of impacts under which the Indian people had to learn to adopt themselves to an ever changing environment.
2. Study of Social organization in India which is often remarked as the caste system. Ancient Indian Polity: - 1. All forms of Human organization that of the state.
  - I. Understand the foundation of the Delhi sultanate and the Sultanate administration.
  - II. Recognise the Socio, economic and religious conditions under Vijayanagar Empire.
  - III. Identify the condition of India under the Mughal Empire.
  - IV. Explain the Administration and art and architecture of Mughal.
  - V. Analyse the rise of the Marathas and the contribution of Shivaji.

#### **PAPER TWO [WORLD HISTORY] 1890 -1964**

- I. Identify what is meant by the French Revolution.
- II. Trace short-term and long-term repercussions of revolutionary regimes and Empire-building by France.
- III. Explain features of revolutionary actions and reactionary politics of threatened monarchical regimes.

- IV. Delineate diverse patterns of industrialization in Europe and assess the social impact of capitalist industrialisation.
- V. Analyse patterns of resistance to industrial capital and the emerging political assertions by new social classes.

### **BA PART 3 PAPER 1 HISTORY OF INDIA (MODERN INDIA) 1761 – 1950**

- I. Study the Indian art tradition which one of the oldest living art traditions in the world.
- II. The art of country with its history social & economical perspective.
- III. Excavation of the sites of the old towns like Harappa Mohenjo-Daro & Taxila information of the other ancient monuments.

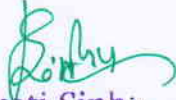
#### **OUTCOME**

- I. Outline key developments of the 18th century in the Indian subcontinent
- II. Explain the establishment of Company rule and important features of the early colonial regime
- III. Explain the peculiarities of evolving colonial institutions and their impact.
- IV. Discuss the social churning on questions of tradition, reform etc, and during first century of British Colonial rule.
- V. Assess the issues of landed elite, and those of struggling peasants, tribals and artisans during the Company Raj.

### **PAPER 2 WORLD HISTORY 1871-1945**

#### **OUTCOME**

- I. Identify how different regional, religious and linguistic identities developed in the late 19th and early 20th centuries.
- II. Outline the social and economic facets of colonial India and their influence on different trends of politics.
- III. Explain the various forms of anti-colonial struggles in colonial India.
- IV. Analyse the complex developments leading to communal violence and Partition.
- V. Discuss the negotiations for independence, the key debates on the Constitution and need for socio-economic restructuring soon after Independence.

  
 Dr. Jyoti Sinha  
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 Govt. Rajmohini Devi  
 Girl's P.G. College Ambikapur  
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