GOVT. M.M.R.P.G. COLLEGE, CHAMPA
Distt. – Janjgir-Champa (C.G.)
[Atal Bihari Vajpayee University, Bilaspur (C.G.)]

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PROGRAMME OUTCOMES, PROGRAMME SPECIFIC OUTCOMES AND COURSE OUTCOMES

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Program Outcomes of UG English Literature and Language

PO 1: Imbibe moral and human values though study of English language and literature.

PO 2: Make special use of language for their expression.

PO 3: To make accurate use of English language in their respective field and communicate effectively.

PO 4: Get acquaint with the language, poetical style, and diction to interpret any literary text.

PO 5: Make proficient in English language to improve their employability.

PO 6: To understand the usage of words and phrases in communicative skills.

PO 7: Comprehend various forms of literature like prose, poetry, drama and fiction

PO 8: Apprehend different cultures and cultural sensibilities around the world

PO 9: Perspectives of literary movements that existed in different ages.

Program Specific Outcome of UG English Literature and Language

PSO 1: Develop the knowledge of grammatical system of English language.

PSO 2: Define literary theory and terms in criticism.

PSO 3: Develop four language skills LSRW.

PSO 4: Scope of employability and entrepreneurship in the field of Media and Journalism, Teaching, Public Relations, Human Resource, Civil Service, Creative Writing etc.

Course Outcomes of UG English Literature and Language

On the completion of course the students are able to:

CO 1: Analyze the text for understanding content.

CO 2: Study basic English Grammar and composition for developing communication skills.

CO 3: Study and understand poetic types and trends

CO 4: Express creativity through writing poems.

CO 5: Understand and comprehend the significance and relevance of English as an International language.

CO 6: To develop one self as an Learners of Language.

CO 7: To compete in General English paper in career oriented exams.

PRINCIPAL
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Program Outcome of P.G. English Literature

PO 1: Study and understand fiction and non-fiction to learn human values.

PO 2: Learn various concepts of English Language and Literature teaching.

PO 3: Get acquaints with the life and culture of various nations though the works of art.

PO 4: Learn language thought literary text.

PO 5: Study and understand contemporary literary theories for the practical application of literary text.

PO 6: Learn Human values through literary work.

P0 7: Understand and apply the basic concepts of research in their research work.

PO 8: Study the methods of research, critical approaches and theories for the practical application of the Literature

PO 9: Do the practical application of literary terms and figures of speech in their writing.

PO 10: Understand the cultural ethos of America through Literary text.

PO 11: Get acquaints with Indian writer writing in English and understand the cultural multiplicity through Indian writing in English translation.

Program Specific Outcome of P.G. English Literature

PSO 1: Identify major literary genres of English Literature.

PSO 2: Critical evaluation and interpretation of a literary text

PSO 3: Study and understand classical and modern literary theory for the practical application to literature.

PSO 4: Develop aesthetic sense

PSO 5: Do linguistic analysis of the text.

PSO 6: Study and understand the basic concepts of contemporary literary theory for the practical application of it to literature

PSO 7: Get acquaint with various cultures though literary works.

PSO8: Write analytically in different formats like essays, reviews, research papers etc.

PSO9: Scope of employability and entrepreneurship in the field of Media and Journalism, Teaching, Public Relations, Human Resource, Civil Service, Creative Writing etc.

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Course outcomes of P.G. English Literature

On the completion of the course the students are able to:

Poetry

CO1: Students able to understand various forms of poetry such as sonnet, Ballad, Epic, Elegy , Free verse and others forms of poems.

CO2: Students will be able to identify and understand the rhythmic metre and rhyme scheme.

CO3: Students understand the arrangement of colloquial words.

CO4: Students are able to do critical appreciation of the poem.

Drama

CO 1: Students would able to understand and identify the various forms of drama from Elizabethan age to the modern age.

CO2: Students able to understand the usage of drama to tell the story in specific time frame.

CO3: Students interpret understand the human nature highlighted through dialogue and. action.

CO4: Students able to understand the social cultural and psychological interpretation of various cultures.

Prose

CO 1: Study and understand fiction and non-fiction to learn human values.

CO 2: Learn various concepts of English Language and Literature teaching.

CO 3: Get acquaints with the life and culture of various nations through the works of art.

CO 4: Students able to learn language thought literary text.

CO 5: Students are able to study and understand contemporary literary theories for the practical application to literary text.

CO 6: Students able to learn human values through literary work. They are able to understand the vocabulary and usage of it.

Program Outcomes of UG Zoology

PO1: Students gain knowledge and skill in the fundamentals of animal sciences, understand the complex interactions among various living organisms.

PO2: Apply the knowledge of internal structure of cell, its functions in control of various metabolic functions of organisms.

PO3: Analyze complex interactions among the various animals of different phyla, their distribution and their relationship with the environment.

PO4: Correlates the physiological processes of animals and relationship of organ systems.

PO5: Understanding of environmental conservation processes and its importance, pollution control and biodiversity and protection of endangered species.

PO6: Gain knowledge of Agro based Small Scale industries like sericulture, fish farming, butterfly farming and vermin-compost preparation.

PO7: Understands the complex evolutionary processes and behavior of animals.

PO8: Understands about various concepts of genetics and its importance in human health.

PO9: Apply ethical principles and commit to professional ethics and responsibilities in delivering his duties.

PO10: Apply the knowledge and understanding of Zoology to one's own life and work.

PO11: Develops empathy and love towards the animals.

Program Specific Outcomes of UG Zoology

PSO1: Demonstrated a broad analysis of animal diversity, including knowledge of the scientific classification and evolutionary relationships of major groups of animals.

PSO2: Recognized the relationships between structure and functions at different levels of¬ biological organization (e.g., molecules, cells, organs, organisms, populations, and species) for the major groups of animals.

PSO3: Characterized the biological, chemical, and physical features of environments (e.g.,¬ terrestrial, freshwater, marine, host) that animals inhabit. Explained how animals function and interact with respect to biological, chemical and physical processes in natural and impacted environments.

PSO4: Explained how organisms function at the level of the gene, genome, cell, tissue, organ¬ and organ-system. Drawing upon this knowledge, they are able to give specific examples of the physiological adaptations, development, reproduction and behavior of different forms of life.

PSO5: Understood the applied biological sciences or economic Zoology such as sericulture,¬ Apiculture, aquaculture, Industrial microbiology, RDNA technology and medicine for their career opportunities.

Course Outcomes of UG Zoology

Cell Biology and Non-chordata

CO1: The students after the completion of this course will be able to describe & differentiate between prokaryotic & eukaryotic cell. Structure of an animal cell and its different cell organs.

CO2: The students after the completion of this course will be able to understand various types of cell division like mitosis & meiosis. Basic idea about cancerous cell. Elementary idea of immunity.

CO3: The students after the completion of this course will be able to know about the classification of Invertebrates & also be able to know about Phylum Protozoa, Porifera & Coelenterata

CO4: The students after the completion of this course will be able to classify & understand the Phylum Platy helminthes, Nemathelminthes, Annelida & Arthopoda

CO5: The students after the completion of this course will be able to describe & classify Phylum Mollusca & Echinodermata.

Chordata & Embryology

CO1: The students after the completion of this course will be able to learn about Protochordates, origin of Chordates & their classification

CO2: The students after the completion of this course will be able to know about Fishes, Amphibians & Reptiles. Students will also be able to know about fish biology & also become versed in differentiating poisonous & non-poisonous snakes.

CO3: The students after the completion of this course will be able to know about various aspects of birds & mammalian biology.

CO4: The students after the completion of this course will be able to describe Fertilization, Gametogenesis, Parthenogenesis, various types of eggs, patterns of cleavage, developmental biology of the common Indian frog,

CO5: The students after the completion of this course will be able to describe embryological induction, differentiation, Development of chick up to three germ layers, regeneration & various types of placenta in mammals.

ANATOMY & PHYSIOLOGY

CO1: The students after the completion of this course will be able to understand comparative anatomy of various organ systems of vertebrates including Integument and its derivatives: structure of scales, hair and feathers. Alimentary canal and digestive glands in vertebrates. Respiratory organs including Gills and lung, air-sac in birds

CO2: The students after the completion of this course will be able to understand comparative study of Endoskeleton, heart & urinogenital system in vertebrates.

CO3: The students after the completion of this course will be able to understand comparative study of Nervous System, structure & functions of ear and eye, Gonads and genital ducts in vertebrates.

CO4: The students after the completion of this course will be able to describe digestion & absorption of dietary components, physiology of heart, cardiac cycle and ECG, blood Coagulation, respiration: mechanism and control of breathing in vertebrates

CO5: The students after the completion of this course will be able to describe physiology of excretion, osmoregulation, Physiology of muscle contraction, nerve impulse & synaptic transmission.

VERTEBRATE ENDOCRINOLOGY, REPRODUCTIVE BIOLOGY BEHAVIOUR, EVOLUTION AND APPLIED ZOOLOGY

CO1: The students after the completion of this course will be able to know structure and function of various endocrine glands, Hormone receptor, Biosynthesis and secretion of thyroid, adrenal, ovarian and testicular hormones, endocrine disorder of pituitary, thyroid, adrenal and pancreas.

CO2: The students after the completion of this course will be able to describe reproductive cycle in vertebrates, menstruation, lactation & pregnancy, mechanism of parturition, hormonal regulation of gametogenesis.

CO3: The students after the completion of this course will be able to understand Evidences of organic evolution, theories of organic evolution, variation, mutation, isolation & natural selection, evolution of horse.

CO4: The students after the completion of this course will be able to know various branches & concept of ethology, patterns of behaviour, taxes, reflexes, drives & stereotyped behavior, reproductive behavioural patterns, drugs & behavior, effect of hormones & behavior.

CO5: The students after the completion of this course will be able to know prawn Culture, sericulture, apiculture, pisciculture, poultry farming, Chemical & biological control of insect pests.

Ecology, Environmental-biology, Toxicology, Microbiology and Medical Zoology

CO1: Students after the completion of this course will be able to know about aims and scopes of Ecology, major ecosystems of the world, characteristics of population, communities & ecosystems, biogeochemical cycles, pollution & its types, ecological succession.

CO2: Students after the completion of this course will be able to know about laws of limiting factors, food chain in a freshwater ecosystem, energy flow in ecosystem, trophic levels, conservation of natural resources & environmental impact assessment.

CO3: Students after the completion of this course will be able to know about definition of toxicity, classification of toxicants, principle of systematic toxicology, toxic agents and their action, snake-venom, scorpion and bee poisoning, food poisoning.

CO4: Students after the completion of this course will be able to know about general and applied microbiology, microbiology of domestic water and sewage, microbiology of milk and milk products, industrial microbiology.

CO5: Students after the completion of this course will be able to develop knowledge about pathogenic microorganisurs, rickettsia, spirochaetes & bacteria, life-history and pathogenicity of the pathogens with reference to man like Entamoeba, Trypanosoma, Giardia, Schistosoma, Ascaris, Wuchereria & Vector insects.

GENETICS, CELL PHYSIOLOGY, BIOCHEMISTRY, BIOTECHNOLOGY AND BIOTECHNIQUES

CO1: Students after the completion of this course will be able to develop knowledge about linkage & linkage maps, gene expressi, gene interaction, Sex chromosome systems, sex-linkage, mutation & chromosomal alterations, human genetics, chromosomal & single gene disorders.

CO2: Students after the completion of this course will be able to understand general idea about pH & buffer, transport across cell membrane, mitochondria & endoplasmic reticulum, active transport & its mechanism, active transport in mitochondria & endoplasmic reticulum, hydrolytic enzymes: their chemical nature, activation & specificity.

CO3: Students after the completion of this course will be able to know about the basic structure & functions of amino acids, metabolism of glycogenesis, gluconeogenesis, glycolysis, glycogenolysis, Cori-cycle, oxidation of glycerol & fatty acid, protein metabolism - deamination,transamination, transmethylation, biosynthesis of protein.

CO4: Students after the completion of this course will be able to know about scope and importance of biotechnology, recombinant DNA and gene cloning cloned genes & other tools of biotechnology, applications of biotechnology in pharmaceutical & Food processing industry.

CO5: Students after the completion of this course will be able to understand principles & techniques about the pH meter, colorimeter, light microscopes, phase contrast & electron microscopes, Centrifugation, Separation of biomolecules by chromatography & electrophoresis, histrochemical methods for determination of protein, lipids, & carbohydrate.

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Program Outcomes of UG Botany

PO1: Knowledge and understanding about plant diversity

PO2: Practical skills in the field and laboratory experiments.

PO3: Presentation skills (oral & writing) in life sciences.

PO4: Scientific knowledge in life science and fundamental metabolism of plants.

PO5: Knowledge about biodiversity exploration, estimation and conservation.

Program Specific Outcomes of UG Botany

PSO1: Stewardship responsibility

PSO2: Hands on expertise in Biological sciences

PSO3: Entrepreneurship skill development

PSO4: Career opportunities and job opportunities

Course Outcomes of UG Botany

CO1: Understand the characerstic of virus.

CO2: Understand the structure of bacteria.

CO3: Understand the diversity among algae.

CO4: Uderstand the diversity of fungi.

CO5: Understand the structure of lichen.

CO6: Understand the morphological diversity of Bryophytes.

CO7: Understand the morphological diversity of Pteridophytes.

CO8: Structure of pteridophytic plant.

CO9: Understand the economic importance of gymnosperm.

CO10: Understand the palaeobotany.

CO11: Learn and understand about classification of plants and nomenclature.

CO12: Students will be able to demonstrate the families.

CO13: Understand the Economic Botany.

CO14: Understand the plant anatomy.

CO15: Understand the Embryology.

CO16: Understand the scope of ecology.

CO17: Understand the population ecology.

CO18: Learn about the movement of sap and absorption of water in plant body.

CO19: Understand the photosynthesis.

CO20: Understand the plant movement.

CO21: Know importance and scope of plant physiology.

CO22: Understand the enzymology.

CO23: Understand the process of photosynthesis in higher plants with particular emphasis on light and dark reaction, C3 and C4 pathways.

CO24: Understand the respiration in higher plants with particular emphasis on aerobic and anaerobic respiration.

CO25: Understand the plant movement.

CO26: Understand the biotechnology.

CO27: Understand the plant and environment.

CO28: Understand the community ecology.

CO29: To study the population ecology.

CO30: Understand the utilization of plant.

CO31: Understand the uses of medicinal plants.

Program Outcomes of UG Physics

Students having B.Sc. program in various branches. After the completion of the B.Sc. degree there are various options available for the science students, they can pursue master degree in science. M.Sc. & work in research related fields and can even look for professional job oriented courses often in some reputed universities or colleges the students are recruited directly by big MNC's after the completion of the course. The student is also eligible for the job of various government exams conducted by UPSC, PSC, SSC and Banking field.

Program Specific Outcome of UG Physics

PSO1: Graduates will acquire a comprehensive knowledge and sound understanding of fundamentals of physics.

PSO2: Graduates will be prepared to acquire a range of general skills to solve problems to evaluate information to use computers productively to communicate with society effectively learn independently.

PSO3: Graduates will acquire a job efficiently in diverse field such as science and Engineering, Education, Banking Public Services, Business etc.

PSO4: The graduates will have continuous learning attitude to adopt new skills and techniques to overcome the challenges related with new technologies.

PSO5: Students will be able to understand the fundamental theories, consents and application in basic areas of research develop the ability to explore new areas of research.

Course Outcomes of UG Physics

CO1: Machine, Oscillations and properties of matter students will have understanding relative motion, Inertial and non-Inertial frames. Study of the interaction of forces between solids in mechanical system center of mass of mechanical system law of motion and conservation strain and stress viscosity and surface tensions and elasticity.

Electricity and Magnetism

CO2: Student will be able to :-

- Understand the relationship between electrical charge, electrical field, potential and magnetism.
- Understand the dielectric constant, resonance define the magnetic field and magnetic flux.
- Understand the Biot-Savart and Amperelow, Grass Law etc.

Thermodynamics and statistical physics

CO3: Completion of this course will enable the students to :-

- Know the basics of thermal physics.
- Understand the behavior of real gases.
- Understand the kinetic theory of gases: Maxwell-Boltzmann, Bose-Einstein, Fermi-Dirac stastics.
- Understand the probality and thermodynamics probality.

Waves, Acoustics and Potics

CO4: Students will be able to :-

- Understand the role of the wave equations.
- Understand superposition of harmonic waves.
- Understand optical phenomena such as interference and diffraction.
- Optical phenomena such as polarization.
- Understand the loser system and various application of laser.

Relativity, Quantum mechanics, Atomic, molecular and nuclear physics

CO5: Completion of this course will enables the student to :-

- Understand of importance of quantum machanics compared to classical mechanics.
- Understand of schrodinger's ea^{n} .
- Basic properties of nucleus and nuclear models to study the nuclear structures properties.
- Nuclear fission and fusion.

Solid state physics

CO6: Students will have uncerstanding of :-

- Structures in solids and their determination using XRD.
- Behavior of electrons in solid incuding the concept of energy bonds.

Solid State devices and Electronics

CO7: Students understands :-

- The semiconductors, diodes and various transistors.
- In brif discuss the rectifier, and amplifiers.

Program Outcomes of P.G. Sociology

PO1: Students would be able to think critically on societal issues and its national & global impression.

PO2: Students should understand their responsibility and work out to be a better teltizin.

PO3: Students should have retional outlook towards the social issues.

PO4: Students should possess good communication skills to ecpion and interact their emotion and ideas.

PO5: The students will be able to engage themselves in life-long self-determining and learning in the comprehensive background of socio-technological changes for continued self directed and life-long learning.

Program Specific Outcomes of P.G. Sociology

PSO1: After completion of their program students will be able to comprehend and contemplate on the socio-issues.

PSO2: They should able to contemplate and comprehend philosophical and conceptual foundation of social research able to effectively communicate and draft sociological concepts and theories associated with we life situations.

PSO3: The students after the completion of program will be able to contemplate and comprehend Indian rural background and society.

PSO4: The students after the completion of this program will be able to contemplate and comprehend social movements in India.

PSO5: The students after the completion of this program will be able to understand and evaluate contemporary issues in Industry and society.

PSO6: The students should understand criminology. They should aware about the laws. They are able to understand the socio-cultured background.

Course Outcomes of P.G. Sociology

CO1: Students will be able to recognize various issues and challenges in social research.

CO2: Students able to identify the social research program.

CO3: Students will be able to assimilate the theoretical and emperies implication of the past and curried rural scenario and approach in rural sociology.

CO4: Student will be able to explain the major themes of Mercian and Webrian perspectives in the social world.

CO5: Students will be able to comprehend various sociological theories like structuralism and exchange theories.

CO6: Students will be able to assess inter ling corrects and use the measures of central tendency and measures of variation involved in social research.

CO7: Students will be able to explain the major methods and concepts used in the systematic study of Indian society, its social classes, its social fabric and its sociological issue.

CO8: Students will be able to ascertain the history, objection and functions of trade union in India.

CO9: Students will be able to contemplate on in industrialization in the third world countries.

CO10: Students should be able to assess hypothetical scenarios, behaviors and trends.

CO11: Student should be acquainted with mainstream criminological theories.

CO12: Students should be able to understand the application of criminal theories.

Program Outcomes of History

PO1: To acquaint student with the past and present of Indian cultural and History.

PO2: To acquint student with the past and present of world cultural and historical details.

PO3: Impart a critical understanding or Indian society, Economy, Polity and culture through a historical perspective.

PO4: To stimulate intellectual curiosity and research attitude in the students.

PO5: To understand the various Indian and foreign traditions of history writing.

PO6: To understand the various empire, cultural and language of Indian polity.

PO7: To make student returnal in judging the past of India and the world and clearly state their rows.

PO8: To make students well-verse in writing the historical documents and reports.

Program Specific Outcomes of History

PSO1: Students should acquire the skills to explain how and why important events happen.

PSO2: Student should understand and comprehend the historical method of study.

PSO3: Student should assess and comprehend the evidence collected from historical sources.

PSO4: Students should have critical understanding of developments in historiography.

PSO5: Students should have knowledge of the history of the India and 20th century modern world.

PSO6: Students should have explicit about the multiple cultures and diversity.

PSO7: Students should have knowledge of current historical debates.

PSO8: Student should understand the skills that are used bit historians in research.

Course Outcomes of History

CO1: Historical methods and historiography.

CO2: To understand its nature and relation with science and art.

CO3: To understand the theories, concept and ideology.

CO4: To understand the development of capitalism and its development in France, England, Germany and Japan.

CO5: Cause and effect of I & II world war.

CO6: Achievement and failures of United nation.

CO7: Origin and decline of Nazism.

CO8: Clod war- meaning and definition.

CO9: Arab nationalism.

CO10: Ancient, medieval and contemporary Chhattisgarh.

CO11: Modern turning.

CO12: International problems – Philistine, Korea and Vietnam.

CO13: Concept, Ideology and Philosophy socialist, Marxist and Psychological.

CO14: Study, Importance and historical resources related to women study.

CO15: Position of women in Vedic, Mauryan gupts and Rajput etc.

CO16: Position of women in Buddhism, Jainism, Islam and Sikhism.

CO17: Education for women in medieval Age.

CO18: Position of women in south.

CO19: Medieval politics and women.

CO20: Position and Role of women in Maratha Age.

CO21: Introduction of Chhattisgarh geographical location.

CO22: Mauryan Rule and gupta period.

CO23: Regional Rulers.

CO24: Kalchuri dynasty and it rule.

CO25: Maratha Rule and its cultural and social impact on Chhattisgarh.

Program Outcomes of P.G. in Commerce

PO1: This course develops managerial perspective to economics fundamental as aids to decision making under environment constraints.

PO2: The program enables a students to expose accounting issue and practices such as maintenance of company account and handling accounting adjustment.

PO3: This course acquaints student with the accounting concept tools and techniques for managerial decisions.

PO4: The objective of the course is to help student learn the application of statistical tools and techniques for decision making.

PO5: The objective of this course is provide knowledge of relevant provisions of various laws influencing business operations.

PO6: This course develops managerial perspective to economic fundamental as aids to decision making under giver environment constrictions.

PO7: The objective of this course is to expose students to accounting issues and practices such as maintenance of company accounts and accounting adjustment.

PO8: The objective of this course is to acquaint student with the accounting, concept, tools and techniques for managerial decisions.

PO9: The objective of this course is to help student learn the application of statistical tools and techniques for design making.

PO10: This course provide knowledge of relevant provision of various laws influencing business operations.

PO11: This course provide essential knowledge of management thought, managerial functions, staffing, motivation, group dynamics and team development.

PO12: This program helps students to understand conceptual framework of management and organizational behavior like leadership and organizational conflict.

PO13: This program exposes the students to the basic concept and the tools used in cost accounting such as labour cost, contract costing and operating costing etc.

PO14: This course develops understanding conceptual knowledge of Income Tax framework.

PO15: This course aims at making students conversant with the concept of corporate tax planning and Indian Tax Laws, As also their implications for corporate management.

PO16: This course facilitates understand of the framework of marketing and its applications in decision making under various marketing environment constraints.

PO17: This course aims to provide knowledge of pre-lunch advertising, promotional management, personal selling and sales management concept.

PO18: This program make students able to understand marketing research, marketing research methodology, organizational research and advertising research.

PO19: This program provide knowledge to students international marketing environment, identifying and selecting foreign market to promote various product.

PO20: This program helps students of understand the conceptual framework of financial management and its application for finance function such as budget cost of capital, financial feaverage etc.

PO21: This program enables students to having knowledge of personal policy, program, personal department, function and organization of personal management.

PO22: This course provide comprehensive knowledge for fundamental of production management, production planning, process design, work measurement and work standards and production control.

PO23: This program provide specific knowledge to students in strategy implementation and evaluation.

PO24: This course enables the students to know the working of the Indian Banking System and fundamentals of banking.

PO25: This program make student enable to understand function and role of various banking institutions under fluctuating economic and industrial environment.

PO26: This program develops comprehensive knowledge of life insurance policies and premium, Counting of annuity insurance agent and his functions, IRDA etc.

PO27: This program embark knowledge in students about fire, marine and motor vehicle insurance.

Course Outcomes of P.G. in Commerce

CO1: Students would be able to understand market analysis and selection, product and pricing decision and distribution channels and physical distribution.

CO2: Students would be able to make themselves efficient in pre-launch advertising decision, promotional management, personal selling and could prove themselves as a good sales manager.

CO3: Students would be able to organize good marketing research program and they could use research outcome to keep business result higher.

CO4: Students would be able to understand international business and marketing issues relating to import and expert policy.

CO5: Students would be able to understand various decision making problems relating to investment, financing, capital budgeting etc.

CO6: Students could make themselves able to implement personal policies in various personal wellness.

CO7: Students could be able to implement manpower planning in a good manner in an organization of personal management.

CO8: Students would be able to solve various production problems on the basis of P.E.R.T. and C.P.M.

CO9: Students would be able to design good marketing strategies and also be able to implementing them to grow up industrial result.

CO10: Students would be able to solve various banking problems relating to deposit and loan.

CO11: Students could ease the banking function by implementing knowledge of fund and liquidity.

CO12: Students would be able to understand the formation of various banking institutions, make there comprating study and give right suggestion to banking institutions.

CO13: Students would be able to understand the nature and function of life insurance corporation. Keep the public aware from various insurance brand and provide appropriate knowledge about insurance policies.

CO14: Students would be able to understand about marine fine and general insurance, spread updated general insurance knowledge amongst society, play role as a safeguard in accruing any deserter.

Program Outcomes of UG Hindi Language and Literature

PO1: हिन्दी भाषा का सम्पूर्ण ज्ञान।

PO2: पारिभाषिक शब्दावली का ज्ञान।

PO3: निबंध की जानकारी।

PO4: हिन्दी भाषा और उसके विविध रूप का ज्ञान।

PO5: हिन्दी व्याकरण की जानकारी।

PO6: विभिन्न प्रकार की शैलियों की जानकारी।

PO7: पर्यावरण प्रदूषण के बारे में ज्ञान।

PO8: साहित्य के अंतर्गत – पद्य, गद्य, नाटक, एकांकी के बारे में जानकारी।

PO9: राष्ट्रभाषा, राजभाषा, सम्पर्क भाषा, संचार भाषा का ज्ञान।

PO10: हिन्दी साहित्य के इतिहास के अंतर्गत विभिन्न कालों के बारे में जानकारी

Program Specific Outcomes of UG Hindi Language and Literature

PSO1: हिन्दी वर्तनी संबंधी अशुद्धियां का ज्ञान।

PSO2: अनुवाद व्यवहार के बारे में ज्ञान।

PSO3: हिन्दी के प्रमुख कवियों, निबंधकारों, एकांकीकारों एवं उनके सहित्य की जानकारी।

PSO4: प्रौद्योगिकी एवं नगरीकरण के बारे में ज्ञान।

PSO5: ऊर्जा के बारे में ज्ञान।

PSO6: प्रेमचंद की कहानियों, उपन्यासों के बारे में ज्ञान।

PSO7: कबीर के दोहे का ज्ञान।

PSO8: उपन्यास, कहानी, नाटक, संस्मरण, रिपोतार्ज, आत्मकथा का ज्ञान।

PSO9: हिन्दी का शब्द भंडार के बारे में ज्ञान।

PSO10:रस, छंद का ज्ञान।

Course Outcomes of UG Hindi Language and Literature

CO1: कबीर, जायसी के जीवनी, रचनार एवं दोहे के बारे में ज्ञान।

CO2: घनानंद कवि के बारे में ज्ञान।

CO3: तुलसीदास के बारे में ज्ञान।

CO4: भक्तिकाल के बारे में ज्ञान।

CO5: रीतिकाल के बारे में ज्ञान।

CO6: हिन्दी कहानी के बारे में।

CO7: ठेस कहानी (फणीश्वर नाथ रेणु) के बारे में बच्चों की जानकारी।

CO8: गदल (रांगेय राघव) कहानी के बारे में जानकारी।

CO9: प्रेमचंद के बारे में जानकारी तथा उनकी रचनाओं के बारे में जानकारी।

CO10: गबन उपन्यास के बारे में सम्पूर्ण जानकारी।

CO11: मैथिलीशरण गुप्त की जीवनी एवं कृतियों के बारे में जानकारी।

CO12: सूर्यकांत त्रिपाठी "निराला" के "तोड़ती पत्थर" कविता के बारे में बच्चों को जानकारी।

CO13: माखनलाल चतुर्वेदी कवि के जीवनी एवं कृतियों की जानकारी।

CO14: सुभद्रा कुमारी चौहान के बारे में बच्चों को ज्ञान।

CO15: श्रीकांत वर्मा के बारे में बच्चों को ज्ञान।

CO16: हिन्दी नाट्य साहित्य के बारे में बच्चों को जानकारी।

CO17: हिन्दी एकांकी साहित्य जैसे–डॉ. रामकुमार वर्मा की एकांकी "औरंगजेब की आखिरी रात" के बारे में ज्ञान।

CO18: हिन्दी निबंध के बारे में ज्ञान।

CO19: "बेईमानी की परत" निबंध (हरिशंकर परसाई) के बारे में जानकारी।

CO20: महादेवी वर्मा के बारे में बच्चों को जानकारी।

CO21: छत्तीसगढ़ी साहित्य की विकास यात्रा के बारे में बच्चों को जानकारी।

CO22: संत धर्मदास के जीवनी एवं दोहे के बारे में बच्चों को जानकारी।

CO23: विनय कुमार पाठक के जीवनी एवं रचनाओं के बारे में बच्चों को ज्ञान।

CO24: मुकुन्द कौशल (छत्तीसगढ़ी गजल) के बारे में छात्रों को जानकारी।

CO25: "सुन्दरलाल शर्मा" के बारे में छात्रों को जानकारी।

CO26: हिन्दी भाषा का उदय और विकास के बारे में छात्रों को जानकारी।

CO27: हिन्दी का शब्द भंडार के बारे में जानकारी।

CO28: हिन्दी साहित्य का इतिहास के बारे में जानकारी।

CO29: रस के बारे में छात्रों को जानकारी।

CO30: छंद एवं अलंकार के बारे में छात्रों को जानकारी।

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Course Outcomes of Political Science

CO1: Acquiring proper knowledge political science a student may able to understand various political issues and find best solution from their surroundings. He may also be able to deal with political system, political approach, political development, political ethics, political parties and modernization. He could have better command upon public administration field. He could also have better knowledge of chief executive, line and staff agencies, leadership, decision making, accountability control over administration-Legislative and judicial.

Program Specific Outcomes of Political Science

PSO1: **Comparative Politics –** Acquiring knowledge of this subject a student will be able to deal with theoretical evaluation and approaches to the study of politics. He would also be able to highlight on variations in systematic characteristics and process to equip with a sound group of methodology of comparison and these enable to understand alternative theoretical males and explanations.

PSO2: **Public Administration** – Having proper knowledge of the subject students may be able to study public administration in its larger systematic million to identify key interacting factors in its apparatus and actor and to develop understanding of measures that affect its operating efficiency and strengthen its significant contributions to the process of development.

PSO3: **International Politics** – Going through the subject a students would be able to deal with the different approaches and methods of studying international political along with an emphasis on same important contemporary issues. One very important component of this subject is the theoretical postulates about power and the actual operation of it in contemporary international politics. The concept of non-alignment, arms control and disarmaments the regional organization of South East Asia and the major area of conflict and co-operation in south and west need is also to be analyzed.

PSO4: **Contemporary Political issues –** This subject provide the knowledge of science, economics, culture and humanitarian concerns in the most well established democracies in the post cold war period. These concerns also find their advocates in the relative by under development counters of the third world. There is a need examine to what extant are this concerns new or are they a redefined of old ideas with a fresh look? A student may able to examine critically these and analyze their impact on the word politics and policy making Initiatives both globally and within individual countries.

PSO5: **Research Methodology –** A student may have knowledge for basic instruction to the process and method of empirical research for achieving scientific knowledge in political science. He can make attempt to relate social science research methods to other course of political science. He may be able to learn the method of data collection, sample survey, preparation of bibliography and questionnaire, writing of report dissertation and thesis.

PSO6: **International organization –** By having proper knowledge of this subject students may able to study of evaluation and the development of international organization from its inception till present times. He may focus on the problems that confirms international organization and constructs within which they function. An in-depth study of the structure

and functioning of united nations needs to be undertaken and analyzed from the perspective of whether it has lined up to the expectations hope and aspirations of its architects in addition the shift from political and security considerations to social, economic and humanitarian concern following the end of the cold war.

PSO7: **Western Political Thought –** This subject provides the knowledge on the nature and significant of political theory as it evolved and analyses its contemporary relevance. Students may able to explain the continuing significance of the study of the classics and indicates its short comings by underlining the need to incorporate new perspectives that have arisen in recent past.

PSO8: **Modern Indian Political Thought –** Having proper knowledge of the subject students may able to generate a critical awareness about the distinctive features of the political theory tradition in Modern India. He may focus the bearing of India philosophical system of thought on social and political ideas and to what extent is Indian political thought a rejection derivative mutation or innovation transformation of western political thought.

Program Outcomes of Economics

PO1: The study of economic activities of a particular entity (a consumer a firm), Knowledge of economics structure and resources of entire India.

PO2: Study of subject of micro economic unit (a firm, a consumer).

PO3: Of business and finance required for this.

PO4: Study of the economy as a whole total employment, total income, total expenditure.

PO5: Governments of economic activities and its obligations.

PO6: Environment and economic welfare of common people.

PO7: Knowledge of mathematics and research methodology.

PO8: Of India's economic policy.

PO9: Knowledge of economic development and planning.

PO10: Knowledge of Industry, infrastructure, problems and financial management.

PO11: Knowledge of country and worlds population.

Program Specific Outcomes of Economics

PSO1: Study of ideal economic behavior and theory of consumer and producer unit, knowledge of India's economic and human resources, economic progress and constraints.

PSO2: Study of ideal economic behavior and principles of consumer and producer unit.

PSO3: Knowledge of various dimensions of international trade, exchange rate, world physical system, direction and condition of capital circulation trade.

PSO4: Knowledge of complication of national other employment theory exchange rate stamps and supplies in the producer market.

PSO5: Knowledge of Governments fiscal physical policy and market.

PSO6: Economic and environmental damage of the country study of social costs and benefits study of educational and health care.

PSO7: Knowledge of mathematical methods and computers useful for research.

PSO8: Knowledge of India's national income, elements of development, poverty, appropriation etc.

PSO9: Knowledge of the determinants of economic development, models of index development and planning.

PSO10: Knowledge of industrial products, development, market management, industrial labor and its problems.

PSO11: Population statistics analyst and population policy.

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Course Outcomes of Economics

CO1: Student have knowledge of market activities and part and supply etc. determining returns (rout, interest) of consumer and firm specific economic activity tools.

CO2: The study of this course gives the knowledge of determining the return (interest, rout) of economic activity tools of the consumer and producer unit, market activities, demand supply and social welfare.

CO3: The study of this course given the knowledge of profit and loss, requirements exchange rates, trade conditions and direction of international trade, global economic relations and politics.

CO4: The study of this course gives knowledge of national income employment, overall demand fulfillment compilation of capital and producer market global economic situation and comparison and business cycle etc.

CO5: The important economic role of the government from the study of this course is the information about the fiscal physical and market allocation sources of their income expenditure.

CO6: The study of this course given knowledge of socio-economic welfare, environmental value and damage social costs and benefits, education and proper care of health.

CO7: Mathematics, Research and analytical oath and research using computer. It makes the works easy it is one of the useful subject.

CO8: National income structure, policy for development, agriculture and industry policy, knowledge of market and import and export.

CO9: National income necessary measures for the development state fund knowledge of various economics problems.

CO10: Various industries formation, market industrial policy, finance management, modern industries problems and industrial labor condition's situation.

CO11: Principal of population, policy for family planning and women's condition.

Program Outcomes of UG Tasar Technology

PO1: Students gain knowledge and skill about fundamentals of Sericulture.

PO2: Understands about lifecycle of silkworm rearing , moulting, spinning and harvesting of cocoon.

PO3: Understands various techniques of spinning and spun silk industry.

PO4: Students understand to develop Tasar technology as a tool for rural development.

PO5: Develop awareness about Interstate Tasar Project program, Tribal development program of Govt. of India through tasar culture.

Program Specific Outcomes of UG Tasar Technology

PSO1: Demonstrated a broad analysis of silkworm including knowledge of the scientific Classification.

PSO2: Characterization of physical features of environment (soil, water) and food plants of Tasar silkworm, how silkworms function and interact w ith these physical environment.

PSO3: Understood the Tasar technology, survey, planning and marketing management for carrier.

Course Outcomes of UGTasar Technology

Morphology, Anatomy and Physiology of Tasar silkworm and Agronomy

Tasar silkworm –Genetics and Breeding

CO1: The students after completion this course will be able to know about egg, fertilization, embryogenesis and incubation and hatching of silkworm.

CO2: The students after completion this course will be able to know about silkworm genetics and silkworm races.

CO3: The students after completion this course will be able to know about different breeding methods of silkworm.

CO4: The students after completion this course will be able to know about various diseases of Tasar silkworm such as Protozoan, Viral, Bacterial, Fungal etc..

Course Outcomes of UGTasar Technology

Seed technology and Reeling, Spinning, dyeing and Printing of Tasar silk

CO1: The students after completion this course will be able to know about Spinning ,winding and silk processing.

CO2: The students after completion this course will be able to know about bleaching, dyeing and printing methods.

CO3: The students after completion this course will be able to know by products of silk pupa and different types silk waste.

CO4: The students after completion this course will be able to know about printing of tasar silk and cotton by various methods.

Subject outcomes of UG Tasar Technology

Textile Design, Fabric structure and Weaving, Extension Organization, Planning and Management

CO1: The students after completion this course will be able to know about looms, weaving, warping, beaming, drawing, denting and weft preparation.

CO2: The students after completion this course will be able to design different fabric structure.

CO3: The students after completion this course will be able to know about the planning, budget and govt. scheme for growing Tasar industry.

CO4: The students after completion this course will be able to know the prospects and problems of Tasar technology.

Department of Chemistry

Course Objective and Learning Outcome of the Courses Offered in

M.Sc. Curriculum

SEMESTER I

PAPER – I

INORGANIC CHEMISTRY

Unit I – Stereochemistry and bonding in main group compounds, based on VSEPR theory and Walsh diagram.

Unit II - Discussions on metal ligand bonding and metal complexes, Molecular orbital theory and energetic of hybridization.

Unit III – Electronic spectra of transition metal complexes, term symbols, Orgel diagram and Tanabe Sugano diagrams.

Unit IV – Magnetic properties and charge transfer spectra of transition metal complexes. Symmetry and Matrix representations of different symmetry groups.

Unit V - To study of symmetry and group theory in chemistry, determination of reducible and irreducible operations.

PAPER - II

ORGANIC CHEMISTRY, STEREOCHEMISTRY & PERICYCLIC REACTION

Unit I – Study of reaction intermediates in organic chemistry and detection using NMR studies. To study nature of bonding in organic molecules using orbital methods and aromaticity.

Unit II – Knowledge about conformational analysis and stereochemistry.

Unit III – To study reaction mechanism, structure and reactivity, kinetic and thermodynamic aspects of organic reactions and their reaction intermediates.

Unit IV – To study about pericyclic reactions using Frontier and perturbation molecular orbital theories.

Unit V – To study general mechanistic approach to molecular rearrangement reactions and specific named examples.

PAPER – III

PHYSICAL CHEMISTRY- I

Unit I – Time independent formalism: Rayleigh-Schrödinger theory of non-degenerate systems; applied to systems like an harmonic oscillator, non-rigid rotor, He atom, etc.; degenerate perturbation theory, Stark effect. ii) Time dependent formalism.

Unit II – To Study electronic structure of atoms, Russell- Saunders terms and introduction of Self Consistent Field methods.

Unit III – To study different methods of determining rate laws based on classical and modern principles. Kinetics studies based on dynamic chain length of chain reactions and unimolecular reaction theories.

Unit IV – To study surface phenomena and surface properties using isotherms, surface area studies, Micelles and micellisation, properties and interactions.

Unit V – To study macromolecules, types and special polymers. Kinetic and mechanistic studies of different polymerization reactions. Calculation of various chain structures.

PAPER – IV

SPECTROSCOPY AND MATHMATICS/BIOLOGY FOR CHEMISTS

Unit I – Study of unifying principles of spectroscopy.

Unit II – Detailed study on microwave spectroscopy, and Discussions on scattering spectroscopy.

Unit III – To study vibrational spectroscopy of polyatomic molecules and selection rules determination of group frequencies of different functional groups.

Unit IV – To study fundamental mathematics useful and applicable in chemistry. To study elementary ideas of cell structure, composition and functions.

Unit V – To study elementary differential calculus and integral, permutations and probability calculations. Determination of errors. To study biomolecules such as lipids, proteins, Nucleic acids etc. Biological enzymatic actions and biological processes.

Learning Outcomes: At the end of the course, the learners should be able to:

- Identify basic principles of group theory. In this segment of group theory, procedures for construction of character tables for point groups have been explained.
- Use of various reagents and organic reactions in a logical manner in organic synthesis. Use retrosynthetic method for the logical dissection of complex organic molecules and different reaction intermediates and devise synthetic methods.
- Student investigates the various chemical processes by using a series of spectroscopic techniques. The various corner of synthetic chemistry related problem will be explained by these techniques.
- The segment of physical chemistry is aimed at building up the underlying basic concepts of various chemical ideas used in theoretical as well as in experimental chemistry. The instructions are given keeping in view of the working principles of different instrumental techniques, like IR etc., frequently used in analytical chemistry. Thus the instructor thinks that this chapter has huge applicability in future research aspect. Students also get considerable amount of questions in various competitive examinations like GET/NET/ SET etc. from this chapter.

SEMESTER-II

PAPER –I

INORGANIC CHEMISTRY

Unit I – To study metal ligand equilibrium in solutions, stability of metal complexes.

Unit II - To study reaction mechanism of different transition metal complexes, energy profile, reactivity and lability of complexes. Hydrolysis and substitution reactions of transition metal compounds.

Unit III - Metal clusters, carboranes and metallocarboranes and discussions on mechanism of electron transfer reactions.

Unit IV – Metal carbonyls, and nitrosyls, preparations, structure, bonding and structural elucidations.

Unit V - Study of structures of isopoly acid and heteropoly acid of different transition metals.

PAPER - II

ORGANIC CHEMISTRY

(REACTION MECHANISM)

Unit I – To study about aliphatic and aromatic electrophilic substitution reactions and mechanisms with different named reactions.

Unit II – To study aliphatic and aromatic nucleophilic substitution and mechanisms with different named reactions.

Unit III - Mechanistic and stereo chemical aspects of free radical reactions and mechanisms.

Unit IV – To study addition to carbon-carbon multiple bonds and study on addition to carbon-hetero multiple bonds.

Unit V – To study Elimination reactions, mechanism and their spectrum analysis.

PAPER - III

PHYSICAL CHEMISTRY

KINETICS & ENERGETICS

Unit I – To study classical thermodynamics with reference to ideal and non-ideal systems, calculation of activity coefficient, Debye-Huckle theory for strong electrolytes.

Unit II – Study on statistical thermodynamics and Non-equilibrium thermodynamic.

Unit III – Discussions on electrochemistry, overview on concepts of electrical double layer and Electrodics based on different models systems. Theory of electrified interfaces.

Unit IV – Study on electrocatalysis and polarography. Introductions to corrosion, forms and monitoring methods.

Unit V – To study electron and neutron diffraction techniques, measurement and principle with the applications in structural elucidations of molecular surface.

PAPER –IV

SPECTROSCOPY, DIFFRACTION METHODS & COMPUTER FOR CHEMISTS

Unit I – To Study electronic spectroscopic techniques including atomic, molecular and photo-electronic spectroscopy.

Unit II – Explanation about nuclear magnetic, electron spin resonance, Nuclear Quadruple resonance spectroscopy and Photo acoustic spectroscopy, basic principle and applications

Unit III – Detailed study on X-ray diffraction techniques.

Unit IV – Introduction to fundamental of computer and computer programming in "C".

Unit V – To study programming in chemistry and use of computer programmes in chemical sciences.

Learning outcome: At the end of the course, the learners should be able to:

- explain the principle behind the experiments performed in the laboratory
- Plan and Perform experiments and Interpret experimental results.
- Quantitative analysis of crystal and their analysis
- To plot various graphical representation using computer applications.
- Understand the principle of analysis quantitatively.
- Computer applications: Solutions of simultaneous equations: Gauss elimination, Numerical integration methods.
- To plot CV curves, and explain them. To use different methods such as polarography, stripping voltammeter, RDE etc. for estimation of different metal ions and oxidation states in electrolytic mixture solution etc.
- To apply knowledge for future research.

SEMESTER III

PAPER- I

APPLICATIONS OF SPECTROSCOPY

Unit I – To Study about electron spin resonance spectroscopy studies of biological systems, nuclear magnetic resonance of paramagnetic substances and vibrational spectroscopy of metalloprotein based molecules.

Unit II – Discussions on Ultra-Violet and Visible spectroscopic applications on carbonyl compounds, conjugated dienes systems etc. and Infrared spectroscopy applications in different functional group containing compounds. Elementary ideas on Fourier transform Infrared spectroscopy.

Unit III – To study Nuclear magnetic resonance in different proton bonded carbon systems, and Nuclear Overhaouser effect and Fourier Transform NMR spectroscopy studies.

Unit IV– To study Carbon-13 NMR spectroscopy its general considerations and applications to organic compounds. Discussions on optical rotatory dispersion and circular dichroism for absolute configuration deduction.

Unit V – To study theory, principles and applications of mass spectroscopy.

PAPER- II

CHEMISTRY OF BIO-INORGANIC & BIO-ORGANIC

Unit I – Conceptual study on bioenergetics, electron transfer in biology and transport and storage of dioxygen.

Unit II – Study on metalloenzymes, cytochromes and metalloproteins in bio-inorganic systems.

Unit III – Study about enzymes, co-enzyme chemistry and enzyme kinetics and enzyme inhibitions.

Unit IV – Discussions on different kinds of reaction catalyzed by enzymes and co-enzyme chemistry. Effect and applications of cofactors and prosthetic groups in enzymes.

Unit V- To study Supramolecular chemistry, weak interactions and macro cyclic systems in molecular recognition. Biotechnological applications of enzymes in clinical and industrial technology.

PAPER-III

PHYSICAL ORGANIC CHEMISTRY

Unit I – To study concepts in molecular orbital and valence band theory in molecular mechanics. Quantitative MO theory and curve crossing models.

Unit II-Discussions on solvation and solvent effect and Acids, Base, electrophiles, nucleophiles and non-covalent catalysis (Micellar).

Unit III – Study on principles of reactivity, various approaches to transition state complexes and electron transfer chemistry in organic compounds. Radical and pericyclic reactions.

Unit IV – To study structural and electronic effects on nucleophilic and electrophilic reactivity principles.

Unit V- Discussions on steric and conformational properties, effect of steric strain on reactivity. Conformational barriers to bond rotations.

PAPER-IV

CHEMISTRY OF HETEROCYCLIC COMPOUNDS

Unit I– To study nomenclature of heterocyclic compounds and aromatic heterocycles.

Unit II – Discussion on non-aromatic heterocycles.

Unit III – To study synthetic principles of heterocyclic compounds and small ring heterocycles.

Unit IV – To Study six membered heterocycles with one heteroatom and two or more hetero atoms.

Unit V- To study synthesis and reaction of medically applicative five membered benzo-fused heterocycles and seven and large membered heterocycles.

Learning Outcomes: At the end of the course, the learners should be able to:

- Identify the structure of various heterocycles & their derivatives. To know the importance, applications and uses of heterocyclic compounds.
- The students will acquire knowledge of (i) details of synthesis, structure as well as reaction of supramolecules, (ii) Molecular recognition and nature of bindings involved in biological systems (iii) Structure of supramolecules of various types in solid state (iv) Applications of supramolecules in miniaturization of molecular devices.
- Able to describe composition of biomolecules like proteins, nucleic acids, RNA and DNA, enzymes etc.
- Able to apply concept of thermodynamics and determine energy change in bio-transformations and explain transport through biological membranes.
- Able to apply NMR, IR, MS, UV-Vis spectroscopic techniques in solving structure of organic molecules and in determination of their stereochemistry.
- Interpret the above spectroscopic data of unknown compounds. Use these spectroscopic techniques in their research.

Fourth Semester

SEMESTER – IV

PAPER – I

PHOTOCHEMISTRY & SOLID STATE CHEMISTRY

Unit I- To study basic principles, Jablonski diagram, photosensitization and quenching,

Unit II -Photochemistry of olefinic compounds, cis-trans isomerisation, Peterno-Buchi reaction, Norrish Type – I and II reactions, photoreduction of ketones, di -π methane rearrangement, photo-induced reactions in organic compounds.

Unit III – To study photochemical reactions of aromatic compounds and different miscellaneous reactions.

Unit IV – Discussions on basic principles of solid state reactions and can understand and explain different types of defects, able to tune the properties of ionic solid by creating defects.

Unit V- To study systematic electronic properties of solids; B-zones and Fermi level in lattice, concept of particle-hole in conduction process, Magnetic properties and Band theory, theory of conductors, semiconductors and insulators. Superconductivity and superconductors based organic compounds.

PAPER – II

BIO-PHYSICAL & ENVIRONMENTAL CHEMISTRY

Unit I – To study about biological cell and its constituents, bioenergetics in cellular systems. Biopolymers and statistical mechanics in biopolymers.

Unit II – Study of different biopolymer interactions, thermodynamics consideration of biopolymer solutions. Concept of bio membranes and transport across cell membrane.

Unit III – A detailed study on biopolymer and their molecular weight determination by diffraction methods.

Unit IV- It affects our environment and at the same time it is very beneficial to our society. Human health, environment, economy and business are benefitted through the study of green chemistry. Able to understand the Greenhouse effect, soil, water and air pollution, acid rain, etc.

Unit V- Able to do more research on waste management, nuclear waste management, biodegradation of hazardous wastes etc. Greenhouse effect monitoring, mechanistic pathways of smog formation and ozone hole, acid rain; major, minor and trace constituents of the atmosphere; water quality parameters, biochemical effects of As, Pb, Cd, Hg, organic toxicants, pesticides and their chemical speciation; eutrophication, waste water treatment—primary, secondary and tertiary treatment, nuclear waste; nuclear accidents, control of air pollution: different methods — gravitational setting chamber, cyclone separators, electrostatic precipitation; role of plants, various sources of soil pollution; noise pollution: classification, hazards.

PAPER-III

MEDICINAL CHEMISTRY

Unit I- To study drug design, theories of drug activity, Concept of structure-activity relationship (SAR) and quantitative structure and relationship (QSAR). Definition of antagonist, agonist, Prodrugs.

Unit II – Discussion on introduction to drug absorption, pharmacokinetics and pharmacodynamics and drug metabolism.

Unit III – Study on antineoplastic agents, introduction on local anti-infective drugs.

Unit IV – Study on cardiovascular drugs. Discussions on cell wall biosynthesis, synthesis of antibiotics.

Unit V- To study different classes of psychoactive drugs and chemotherapy of mind. Concept of serendipity and drug development.

PAPER-IV

CHEMISTRY OF NATURAL PRODUCT

Unit I – Discussions on classification, nomenclature, occurrence and structure determination of Terpenoids.

Unit II – To Study classification, nomenclature, occurrence and structure determination of alkaloids.

Unit III – Discussions on classification, nomenclature, occurrence and structure determination of steroids and hormones.

Unit IV - Discussions on isolation, nomenclature, occurrence and structure determination of natural plant pigments.

Unit V– To study the structure and synthesis of porphyrins and carotenoids based natural pigments.

Learning Outcomes: At the end of the course, the learners should be able to:

- Predict the course of an organic photochemical reaction and identify the product with the type of functional group present on the molecule
- Apply photochemistry concepts, plan and program molecules for photochemical application of specific interest. Appreciate the photochemical phenomena by light and be able to design and practically carry out simple photochemical reactions.
- Able to understand the Green house effect, soil, water and air pollution, acid rain, etc. Apply the knowledge to aware common people about environmental pollution.
- Able to do more research on waste management, nuclear waste management, biodegradation of hazardous wastes etc.
- Understand the terminology and special notation of statistical analysis.
- Able to acquire knowledge on medicinal chemistry structure study and synthetic protocols.
- Able to understand nature of naturally available chemical products such as alkaloids, Terpenoids and plant pigments.
- Gather a complete knowledge on how to do research for higher studies. Students may get publication on successful execution of his/her project as well higher research.

Course Objective and Learning Outcome of the Courses Offered in

Bachelor of Science Curriculum

Course Objective: Today nuclear chemistry is a part of our course curriculum and has been introduced with an objective to present a vignette of the composition of the nuclear structure, its stability and induce the students to take up nuclear research in their higher studies.

There are lots of scope and opportunities, research and development in this subject, since a lot still remains unexplored in this arena.

B.Sc. Part I

Paper-I

Inorganic Chemistry

Unit I- To study atomic structure and periodic properties to explain the chemical behavior.

Unit II- To discuss chemical bonding, valence bond theory and shape of some inorganic molecules.

Unit III- To study chemical bonding and ionic structures.

Unit IV - Comparative study and features of s block & p block elements.

Unit V - To study chemical properties of noble gases and inorganic chemical analysis.

Paper –II

Organic Chemistry

Unit I - To study electronic structure and bonding of organic reactions.

Unit II - To discuss stereochemistry of organic compounds

Unit III- To study aliphatic and aromatic ring compounds of cycloalkanes.

Unit IV - Discuss the mechanism of alkenes, dienes, and alkynes.

Unit V – To study aromatic hydrocarbons, Huckle rule and substitution reactions.

Paper- III

Physical Chemistry

Unit I- To study the mathematical concept, permutation &combination & probability.

Unit II - Discuss the gaseous state and molecular velocities of gaseous molecules.

Unit III- To study the liquid state, properties and colloidal and surface chemistry.

Unit IV – Discuss solid state chemistry and X-ray diffraction.

Unit V - Study the chemical kinetics Arrhenius theory & catalysis.

Learning Outcomes: After completing the course the student will be expected to be able to:

- Understand chemical bonding in compounds and ionic structures
- Understand the concept of saturation, unsaturation and aromaticity.
- Solve mathematical calculations applied in chemistry.
- Apply integrated rate equations to solve for the concentration of chemical species during reaction of different orders, recall, manipulate and properly employ the Arrhenius law, plot equations and functions representing kinetic behaviour of chemical systems, explain potential energy surface.
- Solve the problems in solid, liquid and colloidal states.

B.Sc. Part II

Paper I

Inorganic Chemistry

Unit I- Discuss the Chemistry of elements of transition series

Unit II- Study the oxidation & reduction and coordination compounds

Unit III- To study coordination chemistry

Unit IV - Study of Chemistry of lanthanide elements.

Unit V- Study the Acid and bases.

Paper-II

Organic Chemistry

Unit I - To study chemistry of organic halides.

Unit II –To study alcohols, phenols & ethers.

Unit III – To study of aldehydes & ketones.

Unit IV- To discuss the carboxylic acid and its derivatives.

Unit V- To discuss the organic compounds of nitrogen.

Paper- III

Physical Chemistry

Unit I- To study fundamentals of thermodynamic system and surroundings and thermochemistry.

Unit II - To study change in entropy of different processes through thermodynamics.

Unit III - To discuss chemical and ionic equilibrium.

Unit IV- To study phase rule, phase component & Nernst distribution law

Unit V - To study about the theories and principles of photochemical reactions (photochemistry).

Learning Outcomes: After completing the course the student will be expected to be able to:

- Student should learn the synthesis, structures, bonding and reactivity of lanthanides and actinides element. Industrial application as well as medicinal importance of these compounds will also be discussed.
- Be able to identify and rationalize type of redox reaction with suitable mechanism. Able to do some quantitative analysis.
- Able to discuss the concept of entropy in different thermodynamic systems and chemical & ionic equilibrium in solution and gas phase.

B.Sc. Part III

Paper I

Inorganic Chemistry

Unit I- To study Metal-ligand bonding in transition metal complexes and thermodynamic & kinetic aspects of transition metal complexes.

Unit II- To discuss Magnetic properties and electronic spectra of transition metal complexes.

Unit III - To study nomenclature, classification, preparation and bonding in organometallic compounds.

Unit IV - To Study Bioinorganic chemistry Essential and trace elements in biological processes

Unit V – To study Hard and soft acids and bases concept in chemistry.

Paper-II

Organic Chemistry

Unit I- To study organometallic & organolithium, organo sulphur compounds. Discussions on organic synthesis via enolates formation.

Unit II - To study biomolecules classification and their constituents.

Unit III - To study synthetic polymers and synthetic dyes.

Unit IV - To discuss principles and applications of mass, UV-visible and IR spectroscopy.

Unit V - To study NMR and ^{13}CMR spectroscopy and applications in MRI (introductions).

Paper-III

Physical Chemistry

Unit I - To study Quantum Mechanics.

Unit II - To Discuss Quantum mechanical approach of molecular orbit theory.

Unit III - To study electromagnetic radiations, vibrational and Raman spectra.

Unit IV - To study Electronic Spectra of diatomic molecule and photochemistry.

Unit V - To study principles and application of thermodynamics. Physical properties and molecular structure and magnetic properties of solids.

Learning Outcomes: After completing the course the student will be expected to be able to:

- Apply NMR, IR, MS, UV-Vis spectroscopic techniques in solving structure of organic molecules and in determination of their stereochemistry, explain the spectral transitions
- Determine bond length from rotational spectral data, identify functional group in vibration spectra. Interpret the above spectroscopic data of unknown compounds and determine the nature of proton and determine number of equivalent proton in a molecule from proton NMR spectra.
- Explain and use the central concepts, theoretical descriptions, and fundamental approximations applied to atoms.
- Treat the quantum mechanical formalism for identical particles and apply these to the structure of atoms, explain fundamentals of photochemistry and the laws governing it, explain Jablonski diagram and describe and radiative and non- radiative transitions.

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Program Outcomes of Master of Social Work

Complition of all odd and even semester students will be able to deliver important knowledge of professional Social Work, approaches and model of Social Work. Displte of this student would also be able to know about following matter -

PO1: Human Growth and Development – This may be able to express idea and knowledge about various stages of human development.

PO2: Working with individuals – Students may be able to having knowledge about Social Work, tolls of working with individuals and families, the process of interventions with client and target system.

PO3: Social group work – Students may be able to form various social group for development and betterment of society.

PO4: Social Work research and statistics – Students make themselves able for social work research and they may use statistical data to analyse various social problems for obtaining optimed social welfare.

PO5: Social policy planning and welfare administration – Students would be able for drawing social policy planning and they can deliver good welfare administration to society.

PO6: NGO management & disaster relief services – Students may present themselves as a good disaster manager and could manage NGO organization for social development purposes.

PO7: Working with community/community organization – Students may be able to present themselves as a good group leader amongst various community and community organization.

PO8: Integrated Social Work practice – Students may be able to carry many Social Work practice in integrated way.

PO9: Social Development – Students may be able for launching (introducing) many works for social development.

PO10: Urban community planning and development – Through special knowledge of this subject students may be able to make planning for urban community planning and development.

PO11: Rural community planning development – Students may be able to prepare planning for rural community development.

PO12: Indian labor problem and legislation – Students may apply their legislative knowledge for solving different labor problems.

PO13: Management of industrial relation – Students may be able to manage settlement of various industrial disputes and develop healthy industrial atmosphere for development.

PO14: Counselling and Social Work practice – Students can be able to organize counseling program to resolve various social and economical problems.

PO15: Legal system in India – Students may be able to understand various social problems and find their legal solution in the context of judicial law.

PO16: Tribal community planning and development – Students can be able to draw good planning for development of Indian tribal society.

PO17: Human Resource Management & H.R.D. Practice – Students make themselves able to manage different aspect of human resource management and apply their managerial knowledge for H.R.D. practice.

Program Specific Outcomes of Master of Social Work

PSO1: Community Development – This program specially make students able to apply knowledge for understanding tribal and deprived community problem. These problems either may belongs to urban class or rural class. The knowledge of this program make students able to solve various community problem and challenges in skilled manner.

PSO2: Human Resource Management – This program specially make students able to understand various human resource relating problems. They can be able to manage main problems which course difficulties in the way of obtaining maximum favorable result. Keeping managerial skill in the view, students may solve problem either it may be from recruitment training placement or from retirement and post retirement.

Course Outcomes of Master of Social Work

CO1: Social work History and Ideology – Going through this subject will be able to describe knowledge relating to role and function of social work welfare v/s development orientation, professional social work, social service, and security policy and reform tradition in India. He will also be able to understand comparative History of social work in India and abrod. Student can also learn approaches and model of social work.

CO2: Human growth and Development - By owing knowledge of this subject students will be able to express specific idea about concepts of development, personality definition, motivation and behavior, stress and modes of adaption, hearidity environment and process of socialization of te child. He could be able to know about different theories of human development and stages of human development.

CO3: Working with Individuals - On the basis of this special knowledge students will be able to understand special approaches relating to social case work as a method of social work, tools of working with individuals and families, the process of intervention with client system and target system. He can also express special takes for model of casework practice and their different approaches.

CO4: Social Group Work : theory and practice – On the basis of this subject knowledge studnts may be able to know about value and ethics in group work practice, social group work, steps of group formation process, techniques and skill in social group work. They can also be able to know about recording and termination phase.

CO5: Social work research and statistics – By owing knowledge of this special subject students could make able themselves to emerg idea about types of social research, research design, research repent writing, data presentation. They could also be able to express idea about use of statistics in SWR.

CO6: Social Policy Planning and Welfare Administration – Going through this subject students could be able to know various social policy planning. Their concept its they can also be able to explain about use of planning in administration and social welfare as well. They can apply knowledge of planning in Basic Administration process that is known as POSD CORB.

CO7: NGO Management and Disaster relief Services – By having knowledge of this special subject students may be able to know about needful social welfare services in the context of disaster, Registration of NGO under relevant law, projects proposals based on needs and resources. They can also be able to know about various types of disaster and their impact in social, physical and economical field.

CO8: Working with community/community organization – Having knowledge of these subject students will be able to know about concept of community, community in social work perspective, community power structure. He can also be able to know about different community organization approaches, models and skill of community organization. They can define role of social workers as social activist.

CO9: Integrated Social Work Practice – Knowledge of this special subject make students able to understand about social work intervention with individuals, groups, communities and organization. It could also make them able to know about various problem solving approach and provide knowledge of sustaining elements and there interrelationship in a holistic framework.

CO10: Social development – By owing knowledge of this subject students can be able to understand about characteristics of developing society and various stages of social development. They could also be able to know about various factors of development directions principles of state policy, Agrarian and land reform, use of economic indices to measure social welfare program and role of international organizations in socio-economic development.

CO11: Urban Community Planning & Development – Going through this subjects students have knowledge about urban community planning and community participation, role of social worker in urban community development, major agencies of urban development and problem of coordination between them, role of civil society in urban development, national policy of urban development and housing etc.

CO12: Rural Community Planning Development – By having knowledge of this special subject student can be able to know about manor issue of rural community, models and approaches of rural development, role of NGO's in rural development, concept of democratic decentralization. They can also be able to know about panchayati raj institution at local, block and district level.

CO13: Indian Labor Problem and Legislation – Going through this subject students could be able to understand specific knowledge of emergence of industries working class, labor market demand, problems of job commitment, condition of work and problem of social security. They may also understand various labor problems and their relating couses, they could be able to suggest right solution of labor problem in the context of labor legislation and social security.

CO14: Management of Industrial Relation – By having knowledge of this specific subject students could be able to know the right approach to settlement of various industrial disputes, bi-partite negotiation and collective bargaining. They may also apply ethical approaches to settlement of industrial disputes.

CO15: Counseling and Social Work Practice – Going through this subject students may have knowledge of basic principled of counseling, kind of counseling couple and family counseling, counseling for groups, advantages of counseling and various techniques of counseling.

CO16: Legal system in India – Having well knowledge of this subject make students competent to understand, civil right, right of children, women and deprived class, crime and delinquency special explanation about juvenile aid and women crime setting of judicial administration.

CO17: Tribal Community Planning and Development – Acquiring knowledge of these specific subject students will be able to know about tribal social structure, status of tribal women and children, tribal marriage and leadership. They would also be able to know about various tribal problems like poverty, literacy, exploitation atrocities etc. Challenges regarding agriculture, employment, misappropriation, displacement, political problem are also the subject matter of tribal community planning and development. Students can express idea relating to tribal development administration and role of tribal development agencies.

CO18: Human Resource Management & H.R.D. Practice – This special subject make students able to understand about human resource management, human resource planning, HR policy, function of personnel management performance appraisal, job analysis, placement, training development and establishment of training needs strategies.

Program Outcomes, Program Specific Outcome and Course Outcomes of M.Sc. Mathematics I & II Semester

Advanced Abstract Algebra

1. Students will learn Group theory, Ideals, Ring theory, Modules, Vector space, Normal Group, Abelian group etc.
2. Students Skills to solve any theorem by using the properties of the given group, Ring, Ideal or field.
3. Students compute different theorems and learn how to find the Galois group of any given group

Real Analysis

1. Students will be able to know the sequence and series of real numbers, convergence and divergence of both sequence and series. Determine the Riemann integrability.

Topology

1. Understand various basic topologies and topological spaces.
2. Understand the countability and uncountability of spaces and sets and their types.
3. Understan d the concept of connectedness, compactness, completeness of spaces.
4. Understan d the topological and hereditary property.
5. Learns the separation axioms.

Complex Analysis

1. Analyze sequence and series of complex numbers and analytical function.
2. Apply the concept of Cauchy-Riemann equations for analytic function.
3. Compute complex contour integrals and apply the cauchy Integral formula in various versions.
4. Understand the concept of Harmonic functions.

Advanced Discrete Mathematics

1. Students will know aibout the finite state machine, their outputs corresponding to their next state of input.
2. Students will learn the conjunctives and disjunctive Canonical form of two, three, four variables.
3. Students learn to formulate the output of Mealy and Moore machine, parallel and series circuits.
4. Students will have the knowledge of graphs, Trees, Spanning trees etc.

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M.Sc. Mathematics III & IV Semester

Integration Theory and Functional Analysis

1. Learn the concept of linear and bounded linear transformation.
2. Understands the Function spaces and conjugate of Function Spaces.
3. Understand the concept of Dual linear spaces.
4. Learns to compute the real and complex functions.

PDE and Mechanics

1. the partial differential equations and solve them.
2. Learn the wave equations and heat equations and form their solutions.
3. Solve the problems on first order and higher degree partial differential equations and its application.

Fuzzy Sets and their Applications

1. Students learn the fundamentals of fuzzy set theory.
2. Students Skill to compute operations with fuzzy sets, extension principle, fuzzy logic, fuzzy probability.
3. Students acquire knowledge of important parts of fuzzy set theory which will enable them to create effective mathematical models of technical phenomena.

Operations Research

1. Students will be able to model LPP and solve them.
2. Students will understand the feasibility, infeasibility, basic, bounded, unbounded, optimal solutions of the problem.
3. Students will understand the Game theory. Modify a primal problem and obtain its solution.

Programming In 'C'

1. Code programs in 'C' of different types
2. Understand different type of preprocessors in 'C'.
3. Struct basic structure of C-program and learns how to compile and run a C-program.

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