GOVERNMENT COLLEGE ROPAR

(Affiliated To Punjabi University, Patiala)

PROGRAMME OUTCOMES

Graduate Programme Outcomes-BA/BCom/BSc

Graduate programmes at Government College Ropar are outcome-based, with the following expected outcomes:

PO1	**Critical Thinking and Problem-Solving Skills:** Learners will gain advanced critical thinking and problem-solving abilities. They will be able to analyse complicated topics, assess evidence, examine many points of view, and develop novel solutions.
PO2	**Advanced Knowledge and Expertise:** Graduate programs aim to provide students with a deep understanding of their chosen field or specialization. Graduates will have acquired advanced knowledge, theories, methodologies, and skills specific to their area of study.
PO3	**Research and Scholarly Abilities:** Graduates will have the ability to design and conduct independent research, critically analyze existing literature, and contribute to the advancement of knowledge in their field.
PO4	**Effective Communication:** Focusing on developing strong communication skills. Students will be able to articulate complex ideas and research findings clearly and effectively, both in written and oral forms, to both specialized and non-specialized audiences.
PO5	**Cross-Disciplinary Knowledge:** Depending on the program, graduates may acquire cross-disciplinary knowledge, enabling them to integrate and apply concepts and methodologies from multiple fields to address complex problems and contribute to interdisciplinary collaboration.
PO6	**Professional Ethics and Responsibility:** emphasizing professional ethics, integrity, and social responsibility. Graduates will be equipped with ethical decision-making skills and an understanding of the social and ethical implications of their work.
PO7	**Professional and Career Development:** Providing students with opportunities for professional development, including internships, industry collaborations, and networking events.
PO8	**Adaptability and Lifelong Learning:** Programs aim to cultivate a growth mindset and a commitment to lifelong learning. Graduates will be prepared to adapt to new challenges, acquire new knowledge, and continuously develop their skills throughout their careers.

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PROGRAMME SPECIFIC OUTCOMES

B.Sc. Medical

The Bachelor of Science (Medical) Programme at Government College Ropar is outcome-based, with the following PSOs required.

PSO1	**Understanding of Basic Medical Sciences:** Students will develop a strong foundation in basic medical sciences such as anatomy, physiology, biochemistry, pharmacology, and pathology.
PSO2	**Knowledge of Medical Terminology and Healthcare Systems:** Students will acquire a comprehensive understanding of medical terminology, healthcare systems, and medical ethics.
PSO3	**Understanding of Disease Processes and Treatment Modalities:** Students will learn about various diseases, their causes, symptoms, and treatment modalities.
PSO4	**Effective Communication and Interpersonal Skills**: Students will develop strong communication and interpersonal skills necessary for effective patient interaction and collaboration within interdisciplinary healthcare teams.
PSO5	**Ethical and Professional Behavior:** Students will understand and adhere to ethical principles and professional standards in the medical field.
PSO6	**Plant Science:**Students will be able to develop a critical and scientific approach towards plant sciences.

The Bachelor of Science (Medical) Programme at Government College Ropar is outcome-based, with the following COs required.

B.Sc. First Year Semester-I		
Course Name	**Course Outcomes**	
ZOOLOGY		
Cell Biology	CO1	Understood the structure of cells and cell organelles in relation to the functional aspects and understanding of the working, principles and applications of microscopes
	CO2	Described the composition of prokaryotic and eukaryotic cells.
	CO3	Understood the structure and functions of chromosome; mitotic and meiotic cell divisions and their significance
Non Chordates	CO1	Students will develop a comprehensive understanding of the diversity of non-chordate animals.
	CO2	Students will explore the physiological processes and functions of non-chordate animals.
CHEMISTRY		
Inorganic Chemistry	CO1	Graduates will learn about the periodic table, chemical symbols, atomic structure, and the properties of elements.
	CO2	Students will learn about the different types of chemical bonding in inorganic compounds
	CO3	Students will study the principles of coordination chemistry, including coordination compounds and complex ions.
Organic Chemistry	CO1	To help them understand the stereochemistry of organic compounds i.e. isomerism , conformations and

		configurations.
	CO2	Students will develop a fundamental understanding of the structure and bonding in organic compounds.
	CO3	Students will gain knowledge of spectroscopic techniques used in the characterization of organic compounds.
Physical Chemistry	CO1	Students will get a clear understanding of evaluation of analytical data ,liquid and gaseous states and physical properties like optical activity, dipole moment etc.
	CO2	They will learn about the principles of quantum mechanics, including wave-particle duality, atomic orbitals, and quantum numbers.
	CO3	Students will gain an understanding of chemical equilibrium and reaction rates.
BOTONY		
Diversity of Microbes	CO1	The classification, structure and methods of reproduction of algae, fungi, lichens, bryophytes and pteridophytes.
	CO2	Major plant diseases caused by bacteria, viruses & fungi and their effective control measures.
Diversity of Cryptogams	CO1	Students will be able to understand Evolution of bryophytes and pteridophytes
	CO2	Students will be able to understand Economic importance of microbes and cryptograms.
B.Sc. First Year Semester-II		
Course Name	**Course Outcomes**	
ZOOLOGY		
Ecology	CO1	Students will develop mathematical and computational skills necessary to solve mechanics problems, including vector algebra, calculus, trigonometry, and numerical methods.
	CO2	Mechanics courses may include

		laboratory components where students engage in hands-on experiments related to concepts covered in the course.
	CO3	Students will develop critical thinking skills and the ability to analyze complex mechanics problems.
Chordates	CO1	Identified the taxonomic status of the entire chordates and discussed the evolutionary model of the group. Imparted the knowledge on ecology of some important fishes, amphibians reptiles, birds and mammals.
	CO2	Impart knowledge in comparative anatomy and development systems of chordates.
	CO3	Make able to discuss some and very important phenomena in Chordates.
CHEMISTRY		
Inorganic Chemistry	CO1	students will learn about the chemical reactions involving inorganic compounds, including redox reactions, precipitation reactions, acid-base reactions, and complexation reactions.
	CO2	They will study acid-base reactions, pH, pOH, and acid-base titrations.
	CO3	Students will explore the periodic trends in the properties of elements, including atomic size, ionization energy, electron affinity, electronegativity, and metallic character.
Organic Chemistry	CO1	Students get a clear understanding about the nomenclature and classification, preparation and chemical properties of various organic compounds like alkanes,alkenes, alkynes and their derivatives.
	CO2	Students will be introduced to the principles and strategies of organic synthesis.

	CO3	Students will study the properties and reactions of aromatic compounds, including benzene and its derivatives.
Physical Chemistry	CO1	Students will get to know about physical and chemical properties of solutions and colloids.
	CO2	They will have knowledge about chemical kinetics and catalysis.
BIOLOGY		
Cell Biology	CO1	Students will be able to understand the systematic organization of plant life
	CO2	They will study structure of cell organelles and their function.
	CO3	Also study types and methods of cell division.
Genetics and Evolution	CO1	Students will be able to understand DNA replication, transcription, and translation
	CO2	They will study Origin of life on Earth and different theories of evolution.
B.Sc. Second Year Semester-III		
Course Name	**Course Outcomes**	
ZOOLOGY		
Bio Chemistry	CO1	Graduates can attain the knowledge of macromolecule such as carbohydrates, protein and fat, their types and significance.
	CO2	Students can gain the knowledge of cholesterol and its biological significance
	CO3	This course Describes the enzymes, mechanism of enzyme action and factors affecting the enzyme activity
Animal Physiology	CO1	Understood about the composition of food and mechanism of digestion absorption and assimilation.
	CO2	Attained knowledge of respiration and excretion and understood the mechanism of transport of gages and urine formation
	CO3	Described the mechanism of circulation and composition of blood

CHEMISTRY		
Inorganic Chemistry	CO1	Students will deepen their understanding of coordination chemistry by studying advanced topics such as isomerism, crystal field theory, ligand field theory, and spectrochemical series.
	CO2	They will learn about the structure, reactivity, and applications of compounds containing these elements.
Organic Chemistry	CO1	Students will get a clear understanding about the nomenclature, classification, preparation and chemical properties of various organic compounds like alcohols ,phenols ,aldehydes and ketones.
	CO2	They will learn about reaction intermediates, reaction kinetics, and factors influencing reaction rates and selectivity.
Physical Chemistry	CO1	Students will be able to understand the thermodynamics, chemical equilibrium.
	CO2	Students will be studying statistical approaches to chemical systems.
BIOLOGY		
Diversity & Systematics of Gymnosperms	CO1	Students will be able to understand the Origin and evolution of Gymnosperms and angiosperms
	CO2	Student will be introduced to Morphology, anatomy and reproduction of selected Gymnosperms.
Diversity & Systematics of Angiosperms	CO1	This course enables students to understand the Concept of plant taxonomy
	CO2	This course enables students to learn about the identification of major groups of flowering plants.
B.Sc. Second Year Semester-IV		
Course Name	**Course Outcomes**	
ZOOLOGY		
Genetics	CO1	Understood the theories of classical

		genetics and blood group inheritance in man
	CO2	Described the genetic variation through linkage and crossing over, chromosomal aberrations and sex determination.
	CO3	Understood the genetic defects and inborn errors of metabolism
Evolutionary Biology	CO1	Gained slide preparation to observe of Giant chromosome, epithelial and blood cells.
	CO2	Understood the concept of chromatography and finding Rf values of different compounds
	CO3	Preparation, direct observation and appreciation of sperm motility and different stages of chick embryo development and placentation of animals.
CHEMISTRY		
Inorganic Chemistry	CO1	Graduates will learn about the synthesis, structure, bonding, and reactivity of organometallic compounds and their applications in catalysis.
	CO2	Students will expand their knowledge of the properties and reactions of inorganic compounds.
Organic Chemistry	CO1	Students get a clear understanding about the nomenclature and classification, preparation and chemical properties of various organic compounds like carboxylic acids and its derivatives, nitro and amine compounds.
	CO2	Students will study the principles of stereochemistry in organic chemistry.
Physical Chemistry	CO1	Students will get to know about phase equilibrium and electrochemistry.
	CO2	Students will study advanced topics in chemical kinetics and reaction dynamics.
BIOLOGY		
Plant Anatomy	CO1	This course enables students to

		understand the concept of plant anatomy like cells, tissues and their function
	CO2	primary and secondary growth in flowering plants
Development & Reproduction in Flowering Plants	CO1	Students will learn various mode of reproduction, methods of pollination, embryo development in flowering plants.
	CO2	Students will study different types of fruits and methods of seed dispersal.
B.Sc. Third Year Semester-V		
Course Name	**Course Outcomes**	
ZOOLOGY		
Molecular Biology	CO1	Understood the genetic defects and inborn errors of metabolism
	CO2	Understood the molecular structure of genetic materials and understood theØ mechanism of gene expression and regulation character formation.
Developmental Biology	CO1	Students will develop a comprehensive understanding of the processes and mechanisms involved in the development of organisms from fertilization to adulthood.
	CO2	They will explore topics such as gene expression, regulatory networks, and signaling pathways that govern developmental processes.
	CO3	Students will delve into the cellular and molecular mechanisms underlying developmental processes.
CHEMISTRY		
Inorganic Chemistry	CO1	Students will be given the knowledge of metal ligand bonding , thermodynamic , kinetic, spectral and magnetic properties of transition metals.
	CO2	They will learn to interpret and analyze periodic trends.
	CO3	They will study coordination geometries, isomerism, and electronic structure of

		transition metal complexes.
Organic Chemistry	CO1	Students will be introduced to complete concepts of of UV,IR and NMR spectroscopy .
	CO2	They will be given sufficient knowledge of organometallic compounds.
Physical Chemistry	CO1	Students will be introduced to concepts of Quantum Chemistry , rotational and vibrational spectroscopy.
	CO2	They will apply quantum mechanical principles to understand the electronic structure of atoms and molecules, including molecular orbital theory and computational methods.
	CO3	Students will explore the principles and applications of molecular spectroscopy.
BIOLOGY		
Plant Physiology	CO1	This course enables students to Recognize the physiology and principle of growth and development in plants
	CO2	This course enables students to study mechanism of photosynthesis, respiration and nitrogen fixation.
	CO3	mineral nutrition and their role in plant development.
Plant Growth,Development & Biotechnology	CO1	This course enables students to understand the principle and methods of micro-propagation and their applications.
	CO2	techniques and tools of recombinant DNA technology.
	CO3	role of biotechnology in agriculture, medicine and in industries.
B.Sc. Third Year Semester-VI		
Course Name	**Course Outcomes**	
ZOOLOGY		
Medical zoology and medical Laboratory Technology	CO1	Understand the structure and function of various animal systems, including the respiratory, circulatory, nervous, and reproductive systems.

	CO2	Gain insights into the behavior and social interactions of different animal species, including their communication patterns, mating behaviors, and ecological relationships.
Immunology	CO1	Develop a solid understanding of the fundamental principles and concepts of immunology, including the immune system components, cell types, and their functions.
	CO2	Gain knowledge about the different components of the immune response, including innate and adaptive immunity, antigen recognition, antigen processing and presentation, and antibody production.
Insect Biology	CO1	Acquire a comprehensive understanding of the classification and diversity of insects, including their morphology, anatomy, and physiology.
	CO2	Gain knowledge about the ecological roles of insects, their interactions with other organisms, and their impact on ecosystems, including their roles as pollinators, decomposers, and pests.
Economic entomology and Pest management	CO1	Understand the economic impact of insects on agriculture, forestry, human health, and the environment. Learn about the economic losses caused by insect pests and the benefits provided by beneficial insects.
	CO2	Develop skills in identifying and classifying insect pests based on their morphological characteristics, life cycles, and behaviors.
Aquaculture I	CO1	Gain knowledge about the basic principles and concepts of aquaculture, including the farming of aquatic organisms, their biology, and their

		production systems.
	CO2	Acquire knowledge about the different species cultured in aquaculture, including fish, shellfish, crustaceans, and aquatic plants. Understand their biology, life cycles, and nutritional requirements.
Aquaculture II	CO1	Develop a deeper understanding of advanced aquaculture production systems, such as intensive recirculating systems, raceways, and biofloc technology.
	CO2	Gain knowledge about reproductive biology, breeding techniques, and reproductive management of cultured aquatic organisms.
CHEMISTRY		
Inorganic Chemistry	CO1	Students will be given the knowledge of silicon ,phosphazenes bioinorganic chemistry and HSAB concept.
	CO2	Students will gain an understanding of solid state chemistry, focusing on the structure, properties, and applications of solids.
Organic Chemistry	CO1	Students get a clear understanding about the nomenclature and classification, preparation and chemical properties of various organic compounds like heterocyclic compounds ,carbohydrates and amino acids.
	CO2	Students will deepen their knowledge of spectroscopic techniques for structural analysis.
	CO3	They will learn about concepts such as reaction kinetics, thermodynamics, reaction intermediates, and transition state theory.
Physical Optimization Techniques Chemistry	CO1	Students will get to know the Raman and Electronic Spectroscopy
	CO2	They will also study different laws of

		crystallography under solid state.
	CO3	Students may study advanced spectroscopic techniques used in physical chemistry research.
BIOLOGY		
Plant Ecology	CO1	Students will be able to learn about major components of ecosystem and their role in environment.
	CO2	Students will study natural resources and it's management.
Plant Utilisation	CO1	This course enables students to study different plant forms and their sampling methods
	CO2	This course enables students to understandenvironmental problems like pollution, global warming, ozone depletion and their mitigation programs.