Government Gajanan Madhav Muktibodh College
Sahaspur Lohara Dist- Kabirdham (C.G.)

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Programme Outcomes: B. Sc (Bio)

Department of	After successful completion of three-year degree program in Chemistry, Botany and Zoology a student should be able to;
PO-1.	Demonstrate, solve and an understanding of major concepts in all disciplines of chemistry, Zoology, Botany, environment, and foundation courses.
PO-2.	Employ critical thinking and the scientific knowledge to design, carry out, record and analyze the results of chemical reactions.
PO-3.	To inculcate the scientific temperament in the students and outside the scientific community.
PO-4.	Create an awareness of the impact of chemistry on the environment, society, and development outside the scientific community.
PO-5.	Find out the green route for chemical reaction for sustainable development.

Programme Outcomes

PO-1.	Demonstrate, solve and an understanding of major concepts in all disciplines of Zoology.
PO-2.	Solve the problem and also think methodically, independently and draw a logical conclusion.
PO-3.	Understand the evolution, history of phylum.
PO-4.	Create an awareness of the impact of Zoology on the environment, society, and development outside the scientific community.
PO-5.	To study and understand the classification of whole phyla includes in Non chordates with the help of charts/models/pictures.
PO-6.	To inculcate the scientific temperament in the students and outside the scientific community.
PO-7.	Use modern techniques, decent equipments and Zoology software's

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DEPARTMENT OF CHEMISTRY

Programme Specific Outcomes: B. Sc Chemistry

PSO-1.	Gain the knowledge of Chemistry through theory and practical's.
PSO-2.	Use modern chemical tools, Models, Chem-draw, Charts and Equipments.
PSO-3.	Make aware and handle the sophisticated instruments/equipments.
PSO-4.	Understand good laboratory practices and safety
PSO-5.	To explain nomenclature, stereochemistry, structures, reactivity, and mechanism of the chemical reactions.
PSO-6	Know structure-activity relationship.

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Course Outcomes B. Sc I Chemistry

Course Outcomes	After completion of these courses students should be able to
CH-1 Inorganic Chemistry	CO-1. Understand De-Broglie hypothesis and Uncertainty principle CO-2. Derive Schrodinger" s time dependent and independent equationsCO-3. To understand S and P block elements CO-4. Know the VBT and VSPER and its limitations CO-5. Know the shapes of d-orbital" s and degeneracy of d-orbital" s CO-6. Study the semiconductors, Fajans rule, Metallic bond-free electron, Valence bond & band theories.
CH-2 Organic Chemistry	CO-1. Understand the reaction intermediates. CO-2.Study the resonance, inductive effect and mesomeric effect CO-3. Distinguish between geometrical and optical isomerism. CO-4. Discuss kinetics, mechanism and stereochemistry of SN1 and SN2 reactions. CO-5. Study the aromaticity and Baeyer's strain theory. CO-6. Understand the evidences, reactivity and mechanism of various elimination and substitution reactions.
CH-3 Physical Chemistry	CO-1. Study the differentiation and integration, probability and permutation. CO-2. Write an expression for rate constant of zero, first and second order reaction CO-3. Understand the term specific volume, molar volume and molar refraction CO-4. Understand the gas Law. CO-5. Study the liquid crystals. CO-6. Study the colloid, gel and emulsions. CO-7. Understand the homolytic and heterolytic catalysis.
PAPER - IV LABORATORY	CO-1. Binary mixture analysis of inorganic compound. CO-2. Determination of melting and boiling point.

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COURSE	CO-3. To identify functional group in given organic compound. CO-4.To determine the of % composition of a given mixture by viscosity and surface tension method.

Course Outcomes B. Sc II Chemistry

CH-1 Inorganic Chemistry	CO-1.Understand the first, second and third transition series. CO-2. Study the electronic configuration of lanthanides and actinides. CO-3. Understand Nomenclature and isomerism of co-ordination compounds CO-4. Study the redox cycle. CO-5. Learn acid, base and structure & properties of solvents.
CH-2 Organic Chemistry	CO-1. Study the introduction and chemical reaction of dihydric and trihydric alcohols CO-2. Understand the phenols and epoxides. CO-3. Study the introduction and chemical reactions of carbonyl compounds. CO-4. Understand the chemical reactions of carboxylic compounds and its derivatives. CO-5. Learn the organic compounds of nitrogen. CO-6. Understand the evidences, reactivity and mechanism of various elimination and substitution reactions. CO-7. Study the synthesis, reactivity, aromatic character and importance of heterocyclic compounds. CO-8. Understand the amino acids and peptides.
CH-3 Physical Chemistry	CO-1. Fundamental of thermodynamics and its Law. CO-2. Understand the second law of thermodynamics and Entropy. CO-3. Study the Gibbs and Helmholtz free energy. CO-4. Know the meaning of phase, component and degree of freedom CO-5. Study the Electrolytic Conductanceand its theories. CO-6. Know Electrochemical cell or Galvenic cell. Co-7. Understand Single electrode potential
PAPER - IV LABORATORY COURSE	CO-1.Estimation of hardness of water by EDTA. CO-2. Estimation of calcium content in chalk as calcium oxalate by permanganometry. CO-3. Determination of functional group by given organic compounds. CO-4. To understand the chromatographic techniques CO-5.Determination of the transition temperature of the given substance by

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	thermometric/ dilatometric method (e.g. MnCl2. 4H2O/SrBr2.2H2O). CO-6.To determine the solubility of benzoic acid at different temperatures and to determine H of the dissolution process.

Course Outcomes B. Sc III Chemistry

CH-1 Inorganic Chemistry	CO-1 Study the electronic configuration of lanthanides and actinides. CO-2. Get knowledge of Crystalline solid. CO-3. Understand transition metal complex. CO-4. Study the Bio-inorganic chemistry. CO-5. Study the hard and soft acid base.
CH-2 Organic Chemistry	CO-1. Study the carbohydrate, protein and nucleic acid. CO-2. To study the different types of polymer. CO-3. To understand the function of dyes, paints and pigments. CO-4. To study UV, IR and NMR spectroscopy. CO-5. Understand the organozinc and organo-sulphur compound. CO-6. Determine structure of compound by spectroscopic methods.
CH-3 Physical Chemistry	CO-1. Understand De-Broglie hypothesis and Uncertainty principle CO-2. Derive Schrodinger" s time dependent and independent equation.CO-3. To understand MO and A.O, LCAO. CO-4. To study UV, IR and Raman spectroscopy CO-5. Understand the photochemistry. CO-6. Study the dipole moment and molecular structure. CO-7. Understand the magnetic properties.
PAPER - IV LABORATORY COURSE	CO-1. To understand the chromatographic techniques CO-2. Perform the Binary organic mixtures. CO-3. Single step synthesis. CO-4. Determine the end point by conductivity method.

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	CO-5. To perform gravimetric analysis and synthesis.

DEPARTMENT OF ZOOLOGY

Programme Specific Outcomes : B. Sc Zoology

A graduate with B.Sc. In Zoology will have the ability to:

PSO-1.	Gain the knowledge of Zoology through theory and practical.
PSO-2.	Study and understand the applied branches of zoology like economic zoology, microbiology, animal biotechnology, ecology, toxicology, parasitology , industrial microbiology ,instrumentation, evolution and genetics.
PSO-3.	Pursue Post graduate degree in various branches of biology where minimum qualification is graduation with CBZ is required.
PSO-4.	Use modern Zoological tools, Models, Charts and Equipments.
PSO-5.	Know structure-activity relationship.
PSO-6.	Understand good laboratory practices and safety.
PSO-7.	Develop research oriented skills.

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PSO-8.	Make aware and handle the sophisticated instruments/equipments.

Course Outcomes: B.Sc.- I Zoology

Course Code	Course Name	Course Outcomes
Paper- I	**Cell Biology and non Chordata**	CO-1. Understand the Scope of cell biology, because cell is the basic unit of life. CO-2. Understand the Main distinguishing characters between plant cell and animal cell. CO-3. To study and understand the whole cell organelles with their structure and function. CO-4. Understand the cell cycle and know the importance of various cells in body of organisms. CO-5. Understand the various applications of cells by using cell biology like study of various types of tumour. CO-6. Understand the cell divisions and types of mutation. CO-7. Understand the structure and function of the cells. CO-8. Understand the term cell signalling. CO-9. Aware the students for Cancer.

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		CO-10. Understand the evolution, history of phylum. CO-11. Understand about the Non Chordate animals and their Phylogeny. CO-12. To study the external as well as internal characters of non chordates. CO-13. To study the distinguishing characters of non chordates. CO-14. Understand the various internal systems of invertibrates like Digestive system, nervous system with the help of charts and Drawing.
Paper-II	**Chordata and Embryology**	CO-1.To understand the Origin ,evolution and Classification of Chordate animals upto Class Mammlia. CO-2.To understand various biological phenolminon of chordates like Parental care, Migration , Neotany Paedogenesis etc. CO-3.Study of Protochordates, Hemichordata and Cyclostomes. CO-4.Study of Affinities among therian animals. CO-5.Understand the terms: Gametogenesis, Fertilization and early Development. CO-6.Understand the Morphogenesis and Organogenesis in animals. CO-7.Understand the Aging, Apoptosis and Senescence. CO-8. Gametogenesis: Spermatogenesis , Oogenesis, Seminal transfer, Fertilization and oviposition. CO-9. Insect early embryonic development: CO-10.Cleavage and Blastoderm formation, Germ band,Gastrulation, Blastokinesis, differentiation of germ layers, CO-11.Segmentation, Appendages formation and organogenesis in brief.
Practical Paper	**Invertebrates Phylum, Cell Biology, Emryology, Adaptation, Sessional**	CO-1. To understand the morphology and Anatomy of Invertebrates by Studying Phylum wise Museum Specimen and Permanent slides of animals. CO-2. To understand the morphology and Anatomy of Invertebrates by alternative Dissection methods like Clay models, Charts , Thermocol virtual Dissection, Drawing etc. of animals. CO-3. To understand embryonic development of vertebrates by studying permanent slides . CO-4. To understand CELL and cell cycle by studying permanent slides. CO-5. To umderstand process of Adaptation by studying specific characters of various animals found in different habitat.

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Course Outcomes: B.Sc.- II Zoology

Paper Code	Course Name	Course Outcomes *After completing this course, students will be able to:*
Paper-I (Code-0863)	**Anatomy and Physiolog**	CO-1. Understand the terms Histology and Physiology. CO-2. To understand the comparative and histological studies of systems such as digestive, respiratory, nervous, circulatory, excretory and reproductive system of vertebrates. CO-4. Study the derivatives of skin- horns, nails, hairs to understand Integument and its derivatives.And Integument's Structure, Chemistry. CO-5.Understand the Digestion and Excretion process, by studying the Organs of it. CO-6.Understand the process of Metabolism. CO-7.Understand the Circulatory system and Lymphatic system. CO-8.Study the nervous system. CO-9. Understand the Studies of the following systems: The Sense Organs , Endocrine glands and Exocrine glands. CO-10. To understand Light and sound producing organ. CO-12. To understand Digestion and absorption of proteins, Carbohydrates and lipids. CO-13. To understand Fat body: Structure, physiology, biochemistry, functions. Integration of carbohydrate,fat and acid metabolism CO-14. Ventilatory mechanisms and their control. CO-15. Physico-chemical characteristics of plasma: types and structure of haemocytes, functions. CO-16. Muscle: structure, physiology and biochemistry of flight muscles. CO-17. Excretion and water balance: Structure and function of malphigian tubules. Water balance and nitrogen excretion.
Paper-II (Code-0864)	**Vertebrate Endocrinology, Reproductive Biology, Behaviour, Evolution and Applied Zoology.**	CO-1.To understand Reproductive organ: male and female gonads,duct systems and sex accessories, external sexual dimorphisms CO-2. Understand the Reproductive patterns: Environmental factors and breeding, continuous and seasonal breeders. CO-3.Understand the Sexual cycles: puberty, oestrous and menstrual cycles. Ovarian event: follicular phase, cycling of non-pregnant uterus. CO-4.To understands Pregnancy: conception and blastocyst formation, implantation and delayed implantation, placenta:formation, types

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		and functions, hormones in pregnancy. CO-5. To understand Origin of life with respect to prokyariotic and eukaryotic cells. CO-6. Understand the evidences of organic evolution by anatomical embryological list, paleontological, physiological, genetics and molecular biology evidences. CO-7. Understand theories of organic evolution, isolation, speciation. CO-8. Understand geological time scale, methods and classification of animal distribution and factors affecting animal distribution. CO-9. To understand significance of beneficial and harmful insects with reference to their habit and habitat, life cycle, diseases caused by them and their control measures. CO-10. Students know about economically important Fishery, Poultry, Goat and sheep farming. CO-11. To understand the Aquaculture concept, Culture systems: Freshwater aquaculture systems: Freshwater prawn culture, fish culture in paddy fields, Brackish water culture, Mariculture: Oyster culture, mussel culture. CO-12. To understand the Composite fish culture and Preparation and management of fish culture ponds.fish seed and Brood fish and Harvesting. CO-13.To understand Fresh water prawn culture and Pearl culture, Pearl producing mollusks, pearl formation, collection of oysters, rearing of oysters, insertion of nucleus, harvesting of pearls, composition & quality of pearl.Apiculture, Sericulture, Prawn culture CO-14.Understand the Household insects, Insects of commercial value and stored grain pests.
Practical Work (Code-	**Chordates histology, anatomy,physiol-ogy.** **Osteology, Social Insects.**	CO-1. To understand the morphology Histology and Anatomy of vertebrates by Studying Class wise Museum Specimen and Permanent slides of animals. CO-2. To understand the morphology and Anatomy of vertebrates by alternative Dissection methods like Clay models, Charts , Thermocol,virtual Dissection, Drawing etc. of animals. CO-3. To understand Organisation of Inscet by studying Museum specimens and permanent slides of Hymenopteran insect. CO-4. Comperative study of endoskeleton of tetrapods.

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Course Outcomes: B.Sc.- III Zoology

Paper Code	Course Name	Course Outcomes
Paper-I	Ecology, Toxicology, Microbiology and Parasitology	CO-1.Know the biotic and abiotic components of ecosystem. CO-2.Food chain & food web in ecosystem. CO-3.Understand diversity among various groups of animal kingdom. CO-4.Understand Animal community & ecological adaptation in animals. CO-5. To understand Scope , importance and management of Biodiversity. CO-6.To understands the Biosphere: Introduction, hydrosphere,lithosphere, atmosphere. CO-7. To understand Pollution: Kinds of pollution and pollutants (Air,Water,Soil, Noise etc.).To understands pollution: Characteristics of sound, source and effects of noise pollution. CO-8. Understand the Population and community ecology, wetland forest and their conservation. CO-9. Scope , importance and management of biodiversity. CO-10. To aware the students for various parasites and diseases which spreads in human with the help of study of host-parasite relationship. CO-11. To increase awareness for the health in students. CO-12. Understand the various disease causing vectors like Mosquitoes. CO-13. To aware about the typhoid, cholera likes disease. CO-14.To Understand the classification, geographical distribution,morphology, life-cycle, transmission, pathogenecity, treatment and prophylaxis of: Protozoa, Platyhelminthes, Nematoda.To understand *Leishmania* & *Trypanosoma: Plasmodium,* Resistance of Malaria to drugs, its mechanism & assessment,Platyhelminthes and Nematodes. CO-15. To understand the Study of life cycle, role as vector & control

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		measures of:Mosquito - anyone from- *Anopheles/ Aedes/ Culex.* CO-16.To understands Parasitic protozoans and their role in human welfare, soil protozoans and their role in agriculture. CO-17. Understand human and animal parasites likesprochaetes, Rickettsia etc. CO-18. Study the Methods of preparation and application of Milk and milk products. CO-19. Study the Methods of preparation and application of Beverage, antibiotics. CO-20. Study the process of sewage water treatment
	Genetics, Cell Physiology, Biochemistry,Biotechnology and Instrumentation	CO-1.Understand the cell physiology. CO-2.Understand the terms-Osmosis, diffusion, pH and Buffer. CO-3.Understand the various Applications of Biotechnology. CO-4. Understand the term pH, Buffer. CO-5. Understand the structure and function of carbohydrate, amino acids, proteins, and lipids. CO-6. Understand the concept Enzymes and also Vitamins and minerals. CO-7. Understand the Principle role of Vitamins in metabolism and Deficiency diseases. CO-8. Study and Understand the Hybridoma technology as well as Enzyme biotechnology. CO-9. Study and understand the DNA Recombinant technology. CO-10. Understand the industrial and environmental biotechnology. CO- 11.Understand the Scope and Significance of Biotechnology. CO-12. Understand the Principles of Genetics: Mendalian and Non-Mendalian Inheritance. Linkage, Crossing over, gene Mapping, Multiple allelism,Pliotropism etc. CO-13.Understanding the Principles and uses of various instruments like Microscope, Centrifuge, Colorimeter, Spectrophotometer, electrophoresis, Chromatography ect. CO-14. Study and understand the procedure of Histochemical analysis of various Organic compounds.
Practical	Ecology,	CO-1. To understand the concept of ecology by using practical tools like

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Work	Haematology, cytology,Parasitology, and Instrumentation.	Quadrant. CO-2. To understand the process of different parameters of Blood test by using Haemocytometer,haemoblobinometer,Blood group testing kit, clotting time,haematin crystals etc. CO-3. To study the various human parasite slide to undersatand their life cyle, patogenecity , transmission and their vector host. CO-4. Understand the process of operating various laboratory equipments like microscope, Colorimeter, Spectroscope, Chromatograph, Centrifuge. CO-5. Understand the process of Biochemical analysis of different compoundd.

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Government College
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DEPARTMENT OF BOTANY

Programme Specific Outcomes : B. Sc Botany

PSO-1.	Gain the knowledge of botany. .
PSO-2.	Study understand the applied branches of zoology like economic zoology ,Microbiology,animal biotechnology evolution and genetics.
PSO-3.	Known structure- activity relationship.
PSO-4.	**Understand good Laboratory practices and safety.**
PSO-5.	Develop research oriented skills.
PSO-6	Makawao and handled the sophisticated instruments/ equipments.

Course Outcomes B. Sc I Botany

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Course Outcomes	After completion of these courses students should be able to
CH1 Paper-1	CO-1 viruses and bacteria.- general introduction ,historybackground,important Co-2 different between plant and animals ,viruses, form,and size. Co-3 bacteria.-microbial biotechnology rhizobium azotobactor.
CH-2 Paper-2	Bryophytes,pteridophytes gymnosperms, angiosperms,palaeobotany.- Co-1 bryophyta general charecteristic and classifications. Co-2 classification of bryophyta vegetative propogationin bryophyta.. Co-3 evolution of sporophyta in bryophytes .
CH-3 Vector analysis and geometry. (paper code - 0800)	CO-1. Scalar and vector product of three vectors. Product of four vectors. Reciprocal Vectors. Vector differentiation. Gradient, divergence and curl. CO-2Vector integration. Theorems of Gauss, Green, Stokes and problems based on these. CO-3General equation of second degree. Tracing of conies. System of conies. Confocal conies. Polar equation of a conic. CO-4 Plane the Straight line and the plane. Sphere cone. Cylinder. CO-5Central Conicoids. Paraboloids. Plane sections of conicoids.

Course Outcomes B. Sc II Botany

Paper 1	Co-1 banthum and hooker system of classifications Co-2 systematic position distinguishing,charecteeistic and economic importance. Co-3 economic botany – bacterial name of family.plants used and uses.
Paper-2	Co.1 introduction and scope of ecology environmental ecology. Co-2 embryology ,flowers a s a reproductive organ ,anther, Microstation,microsporangia. Co.-3 systematic position of distinguishing ,charestristic and economic importance.

Course Outcomes B. Sc II Botany

Paper-1	Ecology Microbiology and parasitology. Co.1 plant water relations. Co-2 mineral nutrient difficiency and toxicity symptoms. Co-3 photo respiration,cam plant.
Paper-2	Co-1 growth curve biogeographical reason of India forest and grassland. Co-2 Fibers cotton and jute. Co.-3 vegetable oils groundnuts mustard and coconut.

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