Program outcomes for B.Sc. Biotechnology (CBZ) course

The BSc Biotechnology programme is a three-year degree. In the three years students will tackle core subjects to ensure that they receive a solid grounding in fundamentals. Biotechnology teaches about biological sciences with engineering technologies that manipulate living organisms and biological systems to produce products that advance healthcare, medicine, agriculture, food, pharmaceuticals and environment control. As the programme comprises the paper of Biotechnology, Zoology, Botany and Chemistry so provides the information, knowledge and necessary background of Basic science paper in the programme and to provide opportunity for students for gaining knowledge in multidisciplinary subjects and labs. Acquire the knowledge with facts and figures related to various subjects in pure sciences such as Biotechnology, Chemistry, Botany and Zoology. Understand the basic concepts, fundamental principles, and the scientific theories related to various scientific phenomena and their relevancies in the day-to-day life. Acquire the skills in handling scientific instruments, planning and performing in laboratory experiments.The skills of observations and drawing logical inferences from the scientific experiments.

- To develop skills for general Biotechnology techniques.
- To understand fundamentals of Cell Biology, Biochemistry, rDNA technology, Molecular Biology, Genetics, Plant tissue culture, Bioinformatics and Intellectual property Right.
- To develop advanced knowledge and understanding relevant to Zoology and acquire knowledge of Demonstrated a broad understood of animal diversity, including knowledge of the scientific classification and evolutionary relationships of major groups of animals.
- The entire animal's functions of the body are studied in this part. It includes nutrition. Respiration, heart, excretion, nerve physiology etc in which all structure, function, process and control are to be studied.
- Understand the environmental and basic concept of taxonomy, ecology, Determine economic & medicinal plant in agriculture and medicine, Anlysise the relationship between plants and microbes, Understand the biology of diversity of seed plants or phanerogames, Understand the behaviors of fossils and gymnospermic plants, Understand the plant disease, chemical properties and evolutionary relationship among taxonomic groups.
- The Bachelor of Science in Chemistry programs offer students a more quantitative experience in chemistry. To provide in-depth knowledge of element, compound, scientific and technological aspects of Chemistry. To familiarize with current and recent developments in Chemistry.

Course outcomes of B.Sc. programme:

S.	Course name	Credits	Course outcomes

No.			
BSc 1st Semester			
1	Core Paper Biotechnology: Cell Biology & Genetics	4	To understand Intracellular Compartmentalization. Their Structure, organization and functions. To learn about the Structure and Functions of plasma membrane. To understand the molecular aspects of of Cell Signalling, Protein sorting Cell Cycle and Cell Division. To Understand the fundamentals of mendelian genetics,its exceptions, human genetics and population genetics.
2	Core Paper Zoology: Animal Diversity	4	To introduce the kingdom protista, Phyllum Porifera, Coelenterata, Platyhelminthes, Nematyhelminthes, Annelia, Arthropoda Mollusca, Echinodermata, and All classes of Chordata with referenceces general character and classification upto classes. To learn about the different phyllum system-locomotion in Protozoa, Canal System in Sycon (Porifera), Polymorphismin Hydrozoa(Cnidaria), Life history of Taenia and Ascaris (Helminthes), Metamerism inAnnelida, Metamorphosis in Insects(Arthropoda), Torsion in gastropods(Mollusca), vascular system in Asteroidea(Echinodermata), Phylogeny of Protochordata, Osmoregulation in Pisces, Parental care in Amphibia, Poisonous and non-poisonous snakes, Biting mechanism in snakes Flight adaptations and Origin of mammals
3	Core Paper Botany: Biodiversity (Microbes , Algae, Fungi and archegoniate	4	To Understand the discovery, general characters Economic Importance and replication of virus and bacteria . To know about the, morphology, structure and Economic Importance and

			life cycle pattern of Algae and Fungi. To know about the general characters, classification morphology, anatomy and Economic Importance and life cycle pattern of Bryophytes, Pteridophytes, Gymnosperms. To understand about fossil plants. To learn about the ecology and significance of lower plants. To know about general account and significance of lichens and mycorrhiza.
4	Core Paper Chemistry: Atomic Structure, Bonding, General Organic Chemistry & Aliphatic Hydrocarbons	4	Purpose of this paper at graduate level understanding of major concepts, theoretical principles and experimental findings in chemistry regarding Atomic structure, Chemical Bonding and Molecular Structure, Fundamental of Organic Chemistry, Stereochemistry and Aliphatic Hydrocarbons.
5	Ability Enhancement course: English	2	Write focused, organized, well-developed, and text-based essays using effective paragraphs, which support a clear thesis statement, and demonstrate competence in standard English grammar and usage.
6	Laboratory course (Biotechnology: Cell Biology & Genetics)		To impart practical knowledge and hands on training based on course Cell Biologyu and Genetics.
7	Laboratory course (Zoology: Animal Diversity)	2	To impart the practical knowledge to identify the specimens and slides of different Phylum from Protozoa to Chordata.
8	Laboratory course (Botany: Biodiversity -Microbes , Algae, Fungi and archegoniate)	2	To study about virus and bacteria by using photographs, temporary and permanent slides . To study vegetative and reproductive structure of algae, fungi, bryophytes by

			temporary and permanent slides.(Mentioned in syllabus) To study morphology and anatomy of pteridophytes and gymnosperms by temporary and permanent slides. (Mentioned in syllabus). To know about lichens and mycorrhiza By using photograph.
9	Laboratory course (Chemistry: atomic Structure, Bonding, General Organic Chemistry & Aliphatic Hydrocarbons)	2	Developed the ability to use modern instrumentation for chemical analysis and separation techniques regarding Volmetric Analysis and Organic Chemistry.
BSc 2nd Semester			
10	Core Paper Biotechnology: Biochemistry & Metabolism	4	Introduction to Biochemistry. To study the structure and functions of different biomolecules. To learn about enzymes including classification, properties and coenzymes. To study carbohydrate metabolism and beta oxidation.
11	Core Paper Zoology: Comparative Anatomy and Developmental Biology	4	To get knowledge about the integumentary system and their derivatives, skeletal system, digestive system, respiratory system as gills, lungs, air sacs and swim bladder, circulatory system as to study evolution of heart in differnt vertebrates. To study the comparative account of brain, evolution of urinogenital system, types of receptors in vertebrates. To understand the embryonic developement by gaining the kmowledge of gametogenesis, vitellogenesis in birds and fertilization. To study the early developement of frog and humans upto the gastrula formation and study the movement in

			germ layers and their fate. To get knowledge about the late embryonic developement in humans and study plantation, placenta formation and types of placenta in humans. To study the metamorphic events in frog life cycle and control of developement by studying gene activation, determination, induction, differentiation, morphogenesis, intercellular communication and cell death.
12	Core Paper Botany: Plant Ecology and Taxonomy	4	To Understand the environments and basic concept of taxonomy, ecology. Determine economic & medicinal plant in agriculture and medicine. Analysis of the relationship between biotic and abiotic components of ecosystem and their relationship.. Understand the soil biology. Understand the plant nomenclature and their classification given by different scientists. Understand the different families of angiospermic plants.
13	Core Paper Chemistry : Chemical Energetics, Equilibria Science & Functional Group Organic	4	This paper provide desirable knwledge to the students regarding Chemical Energetics, Chemical Equilibrium, Ionic Equilibria, Aromatic Hydrocarbons, Alcohol, Phenols, Ether and aldehydes and Ketones.
14	Ability Enhancement Compulsory Course : Environment Sciences	2	The Environmental Studies major prepares students for careers as leaders in understanding and addressing complex environmental issues from a problem-oriented, interdisciplinary perspective.
15	Laboratory course (Biochemistry & Metabolism)	2	To impart practical knowledge and hands on training based on course Biochemistry & Metabolism

16	Laboratory course (Zoology: Plant Anatomy and Embryology)	2	To impart practical knowledge about the disarticulated skeleton of fowl and rabbit, Carapace and plastron of turtle /tortoise, mammalian skulls: One herbivorous and one carnivorous animal. To get practical knowledge of frog developmental stages by whole mounts and sections through permanent slides as cleavage stages, blastula, gastrula, neurula, tail bud stage, tadpole external and internal gill stages, study of the different types of placentae through permanent slides or photomicrographs. Study of placental development in humans by ultrasound scans and Examination of gametes as frog/rat - sperm and ova through permanent slides or photomicrographs.
17	Laboratory course (Botany:Plant Ecology and Taxonomy)	2	Study the different instruments used in ecology and taxonomy. Study the morphological adaptations of aquatic and xerophytic plants. Determination of minimal quadrat size and minimum quadrat number to study the plant community. Study the componants of ecosystem. Study of concept of herbarium. Study the plant species belonging to various families.
18	Laboratory course (Chemistry:Chemical Energetics, Equilibria & Functional Group Organic Chemistry-I)	2	Developed an ability to conduct experiments, analyze data, and interpret results to use various techniques like that determination of different physical parameters such as pH, surface tension, viscosity etc and various organic synthesis methods.
BSc 3rd Semester			
19	Core Paper	4	To know the fundamentals, history and

	Biotechnology: Microbiology & Immunology		evolution of microbiology and study the microbial diversity, distribution and characterization of prokaryiotic and eukariotic cells. Know various Culture media and their applications and also understand various physical and chemical means of sterilization. Comprehend the various methods for identification of unknown microorganisms Understand the microbial transport systems and the modes and mechanisms of energy conservation in microbial metabolism and mode of reproduction To understand the fundamentals of immunity & the immune system. Regulation of immunoglobulin gene expression. Genetic basis of Ab Diversity. To understand the concept of Ag processing and presentation, autoimmunity and immunodefeciency. Introduction to immunodiagnostics.To understand active and passive immunization.
20	Core Paper Zoology: Physiology and Biochemistry	4	Understand concepts of growth and reproduction of bacteria. Know parts of microscope, type and its principal. Get the theoretical concepts of related stain. Understand different methods of staining techniques. Understand nutritional requirements of bacterial.
21	Core Paper Botany: Plant Anatomy and embryology	4	Understand the scope & importance of Anatomy and embryology of angiosperms. To know about the meristematic and permanent tissue, anatomy of dicot and monocot root, stem and leaf. To know about the various tissue systems root apex meristem and shoot apex meristem, secondary xylem and leaf growth. Understand the normal and anomalous

			secondary growth in plants and their causes. Sap wood and heart wood. To know about the microspogenesis and megasporogenesis, organigation of embro sac, pollen pistil interaction, methods of pollination and fertilization, endosperm and embryogenesis and polyembrony, apomixis .
22	Core Paper Chemistry: Solutions, Phase Equilibria, Conductance, Electrochemistry & Functional Group Organic Chemistry-II	4	The main purpose of this paper is to developed theoretical knowledge in various fields like that solutions, Phase Equilibria, Conductance, Electrochemistry under physical chemistry and carboxylic acid and their derivatives, amines and diazonium salts, amino acids, peptides and proteins, carbohydrates under organic chemistry.
23	Skill enhancement for Zoology: Pisciculture	2	To gain knowledge about the scope of aquaculture. To learn the techniques of fish farm managements. To gain knowledge about the fish culture techniques (Induced breeding & integrated fish farming). To learn about the fish nutrition and methods of live fish transportation. To gain knowledge about the fish diseases, treatment and preventive measures.
24	Laboratory course Biotechnology: Microbiology& Immunology	2	To impart practical knowledge and hands on training based on course General Microbiology. Develop basic skill in aseptic techniques. Understand various accessories for microbiology practicals. Perform various staining techniques. Cultivate bacteria with different cultivation technique. To impart practical knowledge and hands on training based on course Immunology.
25	Laboratory course (Zoology: Physiology	2	To impart practical knowledge about preparation of hemin and

	and Biochemistry)		hemochromogen crystals, to examine the permanent slides of mammalian pituitary, thyroid, parathyroid, pancreas, adrenal, spinal cord, duodenum, liver, lung, kidney, bone,cartilage. To identify the unknown carbohydrates (Starch, Sucrose, Lactose, Galactose, Glucose, Fructose) and proteins in given solution. To study the activity of salivary amylase under optimum conditions.
26	Laboratory course (Botany: Plant Anatomy and embryology)	2	To study the simple and complex tissue by permanent slides. To study the anatomy of monocot and dicot root, leaf and stem by temporary and permanent slides. To study the abnormal secondary growth in some special case in root, leaf and stem by temporary and permanent slides. To study the floral parts particularly anther and pistil. To study the pollen grain and seed germination and viability in lab. To study the organization of various embryo sac, endosperms, monocot and dicot embryo.
27	Laboratory course (Chemistry:Solutions, Phase Equilibria, Conductance, Electrochemistry & Functional Group Organic Chemistry-II)	2	Developed an ability to conduct experiments, analyze data, and interpret results to use various techniques like that construction of phase diagram, Determination of critical points, study of variation of mutual solubility temperatures, determination of cell constant, equivalent conductance, potentiometric titration and different organic qualitative analysis, separation techniques etc.

			Skill enhancement paper aware to the students regarding application and uses of pesticide in daily life and handle the different pesticide techniques. Pesticide like that organochlorine, organophosphate, carbamate and anelides etc.
BSc 4th Semester			
28	Core Paper Biotechnology Molecular Biology & Recombinant DNA Technology	4	To understand the concepts of Molecular Biology and Genetics. To study the chemical & physical properties of nucleic acids. Learn experimental evidences for nucleic acid as carrier of genetic information. To understand DNA replication, transcription, translation in Prokaryotes and Eukaryotes. To study the basic features of genetic code. To understand the regulation of gene expression in Prokaryotes and Eukaryotes. To impart knowledge about DNA damage and Repair mechanism. To learn fundamentals of genetic engineering, PCR and Cloning. Development of an ability to design and conduct genetic engineering experiments, as well as to analyze and interpret data and construction of DNA and cDNA libraries. Development of research aptitude and technical skills to secure a job in genetic engineering labs.
29	Core Paper Zoology: Genetics and Evolutionary Biology	4	The goal of this course is create a deep understanding about inheritance, Mendelism, Chromosome to cistron journey and deviation Mendel. To understand basic principles of Mendelian inheritance. To learn the

			concepts of Linkage concept of sex determination and sex linked inheritance. The subject introduces students to all aspects of evolutionary biology. the course is to provide students with a deeper insight into the evolutionary processes - both selective and random - which can explain the genetic composition of populations, form, behaviour and distribution of organisms, and to teach students the basic methods of analysing the evolutionary relationships between species.
30	Core Paper Botany: Plant Physiology and Metabolism	4	To know about the metabolic activity and life cycle of the plant from germination through growth and development. Know importance and scope of plant physiology. Understand the plants and plant cells in relation to water-osmosis, imbibition, guttation, diffusion and water potential and the movement of sap and absorption of water in plant body, transpiration-structure and function of stomata, plant nutrition and essentiality and mechanism of absorption. Understand the process of photosynthesis particular light and dark reaction, photorespiration, respiration particular emphasis on aerobic and anaerobic respiration. To learn about enzymes structures, properties and their mechanism, nitrogen metabolism, plant growth regulators, photoperiodism and vernalization.
31	Core Paper Chemistry:	4	In this paper students are expected to understand the colours and magnetic

	Coordination Chemistry, States Of Matter & Chemical Kinetics		behaviour of transition metal complexes. In this branch of chemistry students know how the matter exist and the progress of reaction.
32	Skill enhancement Paper (Chemistry: Pharmaceutical Chemistry Botany: Plant Diversity & Human welfare)	2	Chemistry: Skill enhancement paper aware to the students regarding application and uses of pesticide in daily life and handle the different pesticide techniques. Pesticide like that organochlorine, organophosphate, carbamate and anelides etc. Botany: To know about the plant diversity and its scope To study the values of biodiversity. To study the threats to biodiversity and its management practices. To study the conservation studies of biodiversity. To study the role of different plants in relation to human welfare. i.e. cereals, pulses, fruits etc. To study the social forestry, its utilization and commercial aspects.
33	Laboratory course Biotechnology Molecular Biology & Recombinant DNA Technology	2	To impart practical knowledge and techniques od molecular Biology & Recombinant DNA Technology like DNA isolation Transformation, Restriction Digetion etc.
34	Laboratory course (Zoology: Genetics and Evolutionary Biology)	2	To impart practical knowledge, Numerical problems and evolutionary theories based on Genetics and Evolutionary Biology.
35	Laboratory course (Botany: Plant Physiology and Metabolism)	2	1.To learn about measurement of water potential by osmosis and plasmolysis method.

			2. To demonstrate the rate of transpiration by using potometer. 3.To learn demonstrate the importance of photo-synthesis by the help of wilmonnt bubbler and inverted funnel exp. 4. To study plant movement by the help of clinostat. 5. To study separation of leaf pigments by paper strip chromatography. 6. To study structure of stomata and role of stomata in transpiration by using four leaves exp.
36	Laboratory course (Chemistry: Chemistry of s-and p-block Elements, States of Matter & Chemical)	2	All practicals are related to theory paper CHEMISTRY
BSc 5th Semester			
37	Discipline Specific Elaective Biotechnology: Biostatics & Basic Bioinformatics		To study various aspects of biostats and bioinformatics. To study relation of Life Science with biostatistics. Importance of statistics in biomedical research. To understand the concept of mean, mode, median, range, mean deviation, standard deviation, standard error, skewness & kurtosis, correlation & regression, chi square test, f-test, t-test. To design and conduct computational experiments. To know the history of Bioinformatics with notion of Homology discussed. Sequence Information Sources like EMBL, GENBANK, Entrez, Unigene and Protein Information Sources like PDB, SWISSPROT,TREMBL understood. Sequence and Phylogeny analysis including detecting Open Reading Frames, Outline of sequence

			Assembly have been described.
38	Discipline Specific Elaective Zoology: Reproductive Biology	4	To learn about the gonadal hormones, mechanism of hormone action and hypothalamo – hypophyseal – gonadal axis, regulation of gonadotrophin. To understand about male and female reproductive system, development and differentiation of gonads, genital ducts, external genitalia and mechanism of sex differentiation To acquire knowledge about histology of male reprocuctive system, cellular functions, germ cell, system cell renewal, androgen synthesis and metabolism Epididymal function and sperm maturation, Accessory glands functions; Sperm transportation in male tract. To understand the histology of ovary, folliculogenesis, ovulation, corpus luteum formation and regression, hormones biosynthesis and secretion of ovarian hormones, fertilization, hormonal control of implantation; hormonal regulation of gestation , diagnosis of pregnancy, parturition, lactation and its regulation and reproductive cycles. To gain knowledge about infertility in male and female: causes, diagnosis and management To understand the modern contraceptive technologies. To aquire knowledge about the demographic terminology used in family planning.
39	Discipline Specific Elaective Botany: Cell and molecular Biology	4	Demonstrate understanding of selected basic principles & concepts about biological techniques like light and electron microscopy. To understand intracellular compartmentalization. Their structure, organization and

			functions. To learn about the structure and functions of cell wall and cell membrane. To understand the concepts of Molecular Biology. Learn experimental evidences for nucleic acid as carrier of genetic information. To understand DNA replication, transcription, translation in Prokaryotes and Eukaryotes. To study the basic features of genetic code. To understand the regulation of gene expression in Prokaryotes and Eukaryotes.
40	Discipline Specific Elaective Chemistry: Analytical Methods In Chemistry	4	Spectroscopy is basic tool for understanding analytical techniques. Students are expected to understand basic concept about spectroscopy. Chromatography is an important biophysical technique that enables the separation, identification, and purification of the components of a mixture for qualitative and quantitative analysis.
41	Skill enhancement Paper Biotechnology: IPR & Patenting	2	Assessmentof the potential of an opportunity and to determine its viability practical, social and commercial implications Underrstanding entrepreneurial behaviour & characteristics associated with successful entrepreneurs Efficient utilization of resources including finances to exploit an identified opportunity management of intellectual property, legal structures, ethical issues and risks of a new venture Preparation of a feasibility report for an identified opportunity to assess its feasibility and sustainability

42	Laboratory course Biotechnology: (Biostatics & Basic Bioinformatics)	2	To understand the concept of mean, mode, median, range, mean deviation, standard deviation, standard error, skewness & kurtosis, correlation & regression, chi square test, f-test, t-test. To understand the sequence information resource. Understanding and use of various web resources: EMBL, Genbank, Entrez, Unigene, Protein information resource (PIR). Understanding and using: PDB, Swissprot, TREMBL. Using various BLAST and interpretation of results.
43	Laboratory course (Zoology: Reproductive Biology)	2	To learn about set up and maintenance of animal house, breeding techniques, care of normal and experimental animals. To gain knowledge about the examination of vaginal smear rats from live animals. To learn about the principles of surgery in endocrinology. Ovarectomy, hysterectorny, castration and vasectomy in rats. To learn about the histological sectionsof male female reproductive organ from photomicrographs/ permanent slides of rat/human. To uderstand the human vaginal exfoliate cytology. To learn the technique of sperm count and sperm motility in rat. To learn about the modern contraceptive devices.
44	Laboratory course (Botany: Cell and Molecular Biology)	2	To impart practical knowledge and hands on training based on course.
45	Laboratory course (Chemistry: ANALYTICAL METHODS IN CHEMISTRY)	2	All practicals are related to analytical methods including spectroscopic technique and chromatographic techniques
BSc 6th Semester			
46	Discipline Specific	4	This course provides graduate-level

	Elaective Biotechnology: Plant Biotechnology		knowledge of and expertise in plant tissue culture theory and practice. This course has a vocational focus and introduces the student to the theory and practice of plant tissue culture and their role from modifying plants in plant biotechnology to the propagation of endangered plants. Students study media, sterilisation, explants, micro propagation, callus culture, organogenesis, embryogenesis, somatic variation, doubled haploids, interspecific hybrids, protoplast fusion and environmental conditions required. These are related to uses of tissue culture and compared with traditional techniques.
47	Discipline Specific Elaective Botany: Genetics and plant breeding	4	To study the different terminologies involved in genetics. To study different laws of inheritance and their modified ratios. To study the cytoplasmic inheritance by different examples To study the sex determination and sex linked inheritance To study the mutations and its role in plant breeding. To study the different methods of crop improvement in plant breeding. To study the inbreeding depression and heterosis. To study the process of hybridization.
48	Discipline Specific Elaective Zoology: Applied Zoology	4	Introduce the Host parasite relationship. To be learn about epidemiology for diseases transmission, Transmission, Prevention and control of diseases: Tuberculosis, swine flu, typhoid,

			To develop awareness of Rickettsia prowazekii, Borrelia recurrentis and Treponema pallidum. To learn fundamentals of Parasitic Protozoa : Life history and pathogenicity of Entamoeba histolytica, Plasmodium vivax,Trypanosoma gambiense. And Parasitic Helminthes: Life history and pathogenicity of Schistosoma haematobium,Ancylostoma duodenaleand Wuchereria bancrofti. To develop the knowledge of Insects of Economic Importance Biology, Control and damage caused by Helicoverpa armigera, Pyrilla perpusilla and Papilio demoleus, Callosobruchus chinensis, Sitophilus oryzae and Tribolium castaneum, Safe storage of stored grains. To develop the knowledge of Insects of Medical Importance Life cycle, medical importance and control of Pediculus humanus corporis, Anopheles, Culex, Aedes, Xenopsylla cheopis, Phlebotomus argentipes. To aware the students about Animal Husbandry Preservation and artificial insemination in cattle; Induction of early puberty and synchronization of estrus in cattle. To aware the students about Poultry Farming Principles of poultry breeding, Management of breeding stock and broilers, Processing and preservation of eggs. Understand the Fish Technology Genetic improvements in aquaculture industry; Induced breeding and transportation of fish seed.
49	Discipline Specific Elaective Chemistry: Organometallics,	4	This branch of chemistry is very much related to living being that how any metal ion or group is important to

	Bioinorganic chemistry, Polynuclear hydrocarbons and UV, IRspectroscopy		human body and functions in our body. Students are expected to understand basic concept about spectroscopy.
50	Skill enhancement Biotechnology: Bioprocess Technology)	2	Describe the principle and applications of bioprocess technology. Understanding of upstream and downstream processing for product recovery and purification. Analyze the mass transfer and material balance calculation in different types of application in bioprocess. Analyze the kinetics parameter values in different types of fermentation modes. Discuss the important aspects in bioprocess technology for commercialization purpose of biotechnology products.
51	Laboratory course Biotechnology (Plant Biotechnology)	2	To impart practical knowledge and hands on training based on course. ractical applications of in vitro methods. Plant tissue culture lab organization. To maintain the aceptic condition. Preparations of MS stocks and media.
52	Laboratory course (Zoology: Applied Zoology)	2	Give the knowledge of students to identify the permanent slides/photomicrographs and specimens of Plasmodium vivax, Entamoeba histolytica, Trypanosoma gambiense, Schistosoma haematobium,Ancylostoma duodenale and Wuchereria bancrofti. To impart the practical knowledge to identify arthropod vectors specimens associated with human diseases: Pediculus, Culex, Anopheles, Aedes and Xenopsylla. To develop aptitude of insect damage to different plant parts/stored grains through damaged products/photographs.

			To develop the skills for Identifying feature and economic importance of Helicoverpa (Heliothis) armigera, Papilio demoleus, Pyrilla perpusilla, Callosobruchus chinensis, Sitophilus oryzae and Tribolium castaneum To learn the practical basic fundamentals to vsit a poultry farm or animal breeding centre and submission of visit report To impart the practical knowledge to maintenance of freshwater aquarium.
53	Laboratory Botany: Genetics and Plant Breeding	2	To study the mendel's laws and its modified ratios. To study the different types of aneuploidy syndromes. To study the chi square test To study the hybridization techniques. To study the Pedigree analysis To study the translocation ring, laggards and inversion bridge through photographs. Demonstration of polyploidy conditions in plants.
54	Laboratory Chemistry: Organometallics, Bioinorganic Chemistry, Polynuclear Hydrocarbons And Uv, Ir Spectroscopy	2	In this lab course students are expected to understand the techniques so as they are able to analyses the organic compounds and synthesize their derivatives.