FATIMA COLLEGE (AUTONOMOUS), MADURAI – 625018

NAME OF THE PROGRAMME: M. SC ZOOLOGY **PROGRAMME CODE: PSZO**

PROGRAMME OUTCOMES:

Students will be able to

PO1: Apply acquired scientific knowledge to solve major and complex issues in the society/industry.

PO2: Attain research skills to solve complex cultural, societal and environmental issues.

PO3: Employ latest and updated tools and technologies to solve complex issues.

PO4: Demonstrate Professional Ethics that foster Community, Nation and Environment Building Initiatives.

PROGRAMME SPECIFIC OUTCOMES:

On completion (after two years) of M.Sc. Zoology programme, the graduates would be able to

PSO 1: Gain comprehensive knowledge in different branches of zoology – Cell & Molecular Biology, Biochemistry, Microbiology, Developmental Biology, Immunology, Genetics, Biotechnology, Bioinformatics and Evolution.

PSO 2: Interrelate the concepts of gene, genome, cell, tissue, organ and organ-system in the physiological adaptations, development, reproduction, behavior of microbes, plants and animals

PSO 3: Perform experiments in the field of Microbiology, Biochemistry, Cell & Molecular Biology, Environmental Biology, Developmental Biology, Biostatistics, Immunology, Genetics, Biotechnology and Bioinformatics.

PSO 4: Develop empathy towards conservation of plants and animals and appreciate the diversity of animals and their inclusiveness in the sustenance of an ecosystem.

PSO 5: Express ideas and concept through oral presentation and organize research data in the form of dissertation writing.

PSO 6: Solve the environmental, social and ethical problems by applying the biological principles for minimizing pollutants by waste water treatment and solid waste management for eco-sustainable development.

PSO 7: Address the local, regional, national and global environmental issues and mitigating the same through Intervention strategies adopting standard protocol.

PSO 8: Practice judicious way of using animals in experiments, proper disposal of hazardous biological waste and ethics related to conserving endangered animals and plants.

PSO 9: Exhibit the holistic growth by developing interpersonal skills, subject proficiency, and to seek employability in clinical laboratory, Research institutions, Medical coding and IT companies.

PSO10: Make them self employed/ Entrepreneur in the field of Sericulture, Fisheries and Aquaculture, Dairy farming, Apiculture and Poultry.

PSO11: Use of computers for Power point presentation, Virtual Dissection, analysis of bio- molecules using bioinformatics software and computing biological data.

PSO12: Healthy diet pattern for combat life style disorder.

2019-2020

COURSE CODE	COURSE TITLE	NATURE OF THE COURSE (LOCAL/ NATIONAL/ REGIONAL/ GLOBAL)	COURSE DESCRIPTION	COURSE OUTCOMES
19PG1Z1	Animal Diversity	All the Three	This course provides an overview of the Invertebrate and Vertebrate animals by focussing on the General characters, Classification, Special features and Biology of some selected Invertebrates and Vertebrates.	CO 1: Recall the levels of organization among Invertebrates. CO 2: Bring out the General characters of Invertebrates. CO 3: Classify the Phyla of Invertebrates up to class level. CO 4: Distinguish between Invertebrates and Chordates. CO 5: Classify the Classes of Chordates up to order level. CO 6: Analyse the General characters of

				Chordates. CO 7: Evaluate the unique features of each class of Chordates. CO 8: Predict the systematic Position of Animals.
19PG1Z2	Microbiology	Global& National	To understand the fundamentals of microbial diversity and applications of microbes in Industry and Environment.	CO 1: Recognize the contribution of Microbiologist and Bergey's classification CO 2: Differentiate Components and applications of different microscopes CO 3: Describe the detail study of the positive and negative bacteria CO 4: Illustrate the different sterilization methods CO 5: Compare the classification and morphology of viruses, viriods & prions CO 6: Explain the microbial genetics and metabolism of bacteria

				CO 7: Classify the preservation techniques of food microbiology CO 8: Assess the importance of bacteria in production of antibiotic
19PG1Z3	Cell & Molecular Biology	Global& National	This course deals with the central dogma of molecular biology and to understand the basis of heredity.	CO 1: Explain the fine structure and functions of different cell organelles and cellular phenomena CO 2: Discuss the complexity of eukaryotic genome and its replication CO 3: Describe the process of transcription CO 4: List post transcriptional modification in eukaryotes CO 5: Evaluate the process of Protein Sorting and Transport CO 6: Examine the process and regulation of translation CO 7: Assess the regulation of onco genes in

				promoting cancer CO 8: Analyze the pathways of intracellular signal transduction
19PG1Z4	Lab In Animal Diversity &Microbiology	All the Three	This course deals with the learning skills of microbial techniques and fundamentals of diversity of species.	CO 1: Identify the diversity of animals. CO 2: Explain the fundamental organization of cells. CO 3: Prepare different types of media. CO 4: Demonstrate bacterial isolation technique and maintain pure culture. CO 5: Identify unknown bacteria by biochemical testing.
19PG1Z5	Lab In Cell & Molecular Biology	Global & National	It includes cell biology experiments such as observation of mitotic stages in onion root tip and visualizing giant chromosome in	CO 1: Identify and sketch the various microscopy CO 2: Recall the preparation of tissues CO 3: Estimate the quantity of DNA and RNA CO 4: Infer the qualitative estimation of DNA

			Chironomus larva and isolation and estimation of DNA and RNA.	and RNA CO 5: Compute the mitotic index CO 6: Demonstrate the isolation of genomic DNA CO 7: Interpret the mitotic stages of onion root tip
19PGZEDC1	Herbal Medicine	National & regional	This course deals with the study of medicinal plants and therapeutic values of herbs.	CO 1: Make use of alternative medicinal methods. CO 2: Outline the importance of herbs used in day today life. CO 3: Categorize the usage of herbs for different ailments. CO 4: Solve the life style disorders with food supplements. CO 5: Prepare various herbal products.
19PG2Z6	Genetics	Global&	This course provides the	CO1: Find the pattern of inheritance of traits

		National	knowledge of Mendelian inheritance and understanding the molecular basis of mutation which leads to genetic defects in human.	by various crosses. CO2: Compare the patterns of sex determination in various organisms. CO3: Discuss the mechanism of crossing over and linkage CO4: Analyse uniqueness of chromosome mapping. CO5: Identify the types of variation in chromosome. CO6: Assess the process of bacterial transformation, transduction and conjugation.
19PG2Z7	Evolution	Global	To understand the origin of life on the earth through the process of evolution.	CO1: Classify the Theories of the origin of life CO2: Explains the origin of prokaryotes and eukaryotes CO3: Compare the evidences of organic evolution

				CO4: Categorize the theories of evolution CO5: Describe the mechanism of evolution CO6: List down the types of natural selection and speciation CO7: Compare the human evolution with primates CO8: Organise the fossil records and dating methods
19PG2Z8	Biochemistry	Global& National	The course is designed to provide firm foundation in the principles of Biochemistry by providing knowledge on structure,	CO 1: Recall the fundamental principles of Biochemistry. CO 2: Summarize the metabolic pathways of carbohydrates in the living organisms. CO 3: Make use of flow charts to depict the metabolic functions of Glucose. CO 4: Recall the structure and general properties of amino acids. CO 5: Describe the structural organization of

				the proteins. CO 6: Evaluate how the metabolism of organic compounds leads to the generation of ATP. CO 7: Determine the metabolic levels of Starvation. CO 8: Assess the metabolic pathway of biomolecules. CO 9: Describe the mechanism of enzyme action
19PG2Z9	Lab in Genetics & Evolution	All the Three	This course deals with the laboratory experiments that teach the concepts of inheritance of genes and to explore evolutionary dynamics.	CO 1: Determine the sex in man by Barr bodies. CO 2: Experiment with the simple Mendelian traits. CO 3: Examine the process of Sex determination in man and fruit fly. CO 4: Construct the Pedigree charts by

				systematic listing of parents. CO 5: Relate the genotypic frequencies by Hardy-Weinberg equilibrium.
19PGZEDC2	Herbal Medicine	National & Regional	This course deals with the study of medicinal plants and therapeutic values of herbs.	CO 1: Make use of alternative medicinal methods. CO 2: Outline the importance of herbs used in day today life. CO 3: Categorize the usage of herbs for different ailments. CO 4: Solve the life style disorders with food supplements. CO 5: Prepare various herbal products.

COURSE CODE	COURSE TITLE	NATURE OF THE COURSE (LOCAL/NATIONAL/REGIONAL/ GLOBAL)	COURSE DESCRIPTION	COURSE OBJECTIVES
Off Class	SPSS	Global& National	It provides hands on experience on the tools and techniques of SPSS statistical package.	• Apply the knowledge of research methodology and frame the hypothesis • Explains the features of questionnaire • Perform Students t test and ANOVA • Interpret the results obtained through SPSS analysis tools • Analyse the data SPSS • Performs Hierarchical Clustering using SPSS software
PG3Z12	Immunology	Global& National	To understand the function of immune system and to envisage the different immune	• Compare the innate and adaptive immunity • Describe the structure and functions of immune cells and lymphoid organs

			response in human health.	• List the properties of B and T cell epitopes • Discuss the structure, types and properties of various Immune globulins • Differentiate the gene organization and molecular structures of MHC class I and class II • Discuss the activation and maturation of B-cells and T cells • Relate immunoglobulin's and biological consequences of complement activation • Summarize the methods, merits and demerits of different types of vaccines • Explain the immune response to infectious diseases
PG3Z13	Biotechnology	Global& National	To familiarize the use of tools and techniques of engineering and technology for the study	• Identify the principles and applications of Biotechnology for the benefit of mankind • Outline the development of transgenic

			of living organisms, or derivatives to make or modify products for specific use for human welfare.	plants, animals, and microbes or products for specific use • Discuss the solutions to problems concerning human activities in the field of Agriculture, Medicine. Industry and Environment
PG3ZE1	Fisheries And Aquaculture	All the Three	To impart knowledge on Fisheries and Aquaculture Practices in India.	• Identify the economically important fishes and fishery products. • Plans according to the recent concepts in fisheries management. • Distinguish the various aquaculture systems. • Organizes the type of hatchery, brood stock, larval production, feed management water quality and disease management in cultivable species, live feed production. • Described the feed and disease management.

				• Evaluates the Fisheries and Aquaculture Practices in India.
PG3ZE2	Medical Entomology	All the Three	To give a general insight into the public health diseases and to study the biology of arthropods, epidemiology and vector control methods.	• Relate the role of Arthropods in public health • Describe the biology of Arthropod vectors • Evaluate the epidemiology of vector borne diseases
PG3Z14	Lab In Biotechnology	Global & National	This course provides rich knowledge in isolating DNA from different sources	• Demonstrate the plant tissue culture technique. • Experiment with DNA isolation • Estimate DNA quantitatively
PG3Z15	Lab In Immunology	Global & National	It focuses on techniques related to the field of immunology. It includes preparation of antigens and to visualize	• Identify and sketch the different lymphoid organs • Recall the properties of soluble and particulate antigen • Estimate the lymphocytes from peripheral

			precipitin and agglutination	blood • Discuss the various bleeding techniques • Demonstrate the separation of serum and plasma • Identify immune electrophoresis and rocket Immune electrophoresis
PG4Z16	Developmental Biology	Global& National	To acquaint with the development of cell from egg to the foetus stages in Vertebrates.	• Recalls the basic concepts of Developmental Biology. • Explain how fertilization, cleavage and Gastrulation occur. • Compares the basic concepts of organogenesis in different organisms. • Understand the development of egg into a foetus, then into adult. • Associate the embryo development with Phylogeny. • Design experiments with developing stages of Organisms.

PG4Z17	Environmental Management	All the Three	To understand the key aspects of environmental conservation and its applications in environmental issues for sustainable development.	• Relate the Status and Scope of Biotechnology in Environmental protection • Discuss the methods of Bioremediation of wastes • Describe the methods of conservation of Biodiversity
PG4Z18	Genetics	Global& National	To understand the organization, functions of genes and genetic components and appreciate the inheritance of genetic material.	• Find the pattern of inheritance of traits by various crosses. • Compare the patterns of sex determination in various organisms. • Discuss the mechanism of crossing over and linkage • Analyse uniqueness of chromosome mapping. • Identify the types of variation in chromosome. • Assess the process of bacterial

				transformation, transduction and conjugation.
PG4Z19	Lab In Environmental Management, Developmental Biology & Genetics	All the Three	This course deals with the laboratory experiments that teach the concepts of environmental clean inheritance of genes development of invertebrate and vertebrate model systems	• Find the primary productivity • Demonstrate the estimation of various components of soil and water. • Identify the zoo planktons in water sample. • Analyse the various developmental stages of chick embryo. • Compare the diversity of species by quadrate method. • Experiment with the simple Mendelian traits

2018 – 2019

COURSE CODE	COURSE TITLE	NATURE OF THE COURSE (LOCAL/ NATIONAL/ REGIONAL / GLOBAL)	COURSE DESCRIPTION	COURSE OBJECTIVES
PG1Z1	Biochemistry	Global& National	To impart knowledge on the structure, properties and metabolism of biomolecules and their interactions in the biological system	• Recall the fundamental principles of Biochemistry. • Summarize the metabolic pathways of carbohydrates in the living organisms. • Make use of flow charts to depict the metabolic functions of Glucose. • Recall the structure and general properties of amino acids. • Describe the structural organization of the proteins. • Evaluate how the metabolism of organic compounds leads to the generation of ATP.

				• Determine the metabolic levels of Starvation. • Assess the metabolic pathway of biomolecules. • Describe the mechanism of enzyme action.
PG1Z2	Microbiology	Global& National	To understand the fundamentals of microbial diversity and applications of microbes in Industry and Environment.	• Recognize the contribution of Microbiologist and Bergey's classification • Differentiate Components and applications of different microscopes • Describe the detail study of the positive and negative bacteria • Illustrate the different sterilization methods • Compare the classification and morphology of viruses, viriods & prions • Explain the microbial genetics and metabolism of bacteria • Classify the preservation techniques of

				food microbiology • Assess the importance of bacteria in production of antibiotic
PG1Z3	Biophysics	Global& National	To imbibe the principles of physics involved in the structure of biomolecules, energy transformation in living systems and the use of modern physical instruments for the exploration of knowledge in biology.	• Classify the chemical bonds and forces interacting between molecules • Summarize the theories involved in acidity and basicity • Explain the principles of Thermodynamics and biological oxidation • Describe the principle, procedure, components involved and biological applications of Instruments • Apply the principles of Photobiology in the Perception and Chemical Processing of Vision • Assess the principles, properties applications and hazardous nature of Radioactive isotopes • Interpret the Biophysical aspects of

				neurophysiology applied to the Animals • Organize the Biological importance and various domain of physics in Biology in the form of flow chart
PG1Z4	Lab in Biochemistry and Biophysics	Global& National	Introductory laboratory course in current principles and techniques applicable to research problems in biochemistry and molecular biology.	• Acquire skills in handling basic equipments • Calculate the strength of unknown solutions using formula • Estimate the various biomolecules using standard protocols • Demonstrate experiments adopting appropriate procedures • Critically analyze and interpret the results • Design experiments to solve research problems
PG1Z5	Lab in Microbiology	Global& National	This course deals with the learning skills of microbial	• Prepare different types of media. • Demonstrate bacterial isolation technique

			techniques	and maintain pure culture. • Identify unknown bacteria by biochemical testing.
PGZEDC1	Herbal Medicine	National & Regional	To understand ethno botanical importance of indigenous medicinal plants and their implications for common ailments	• Make use of alternative medicinal methods. • Outline the importance of herbs used in day today life. • Categorize the usage of herbs for different ailments. • Solve the life style disorders with food supplements. • Prepare various herbal products.
PG2Z6	Cell & Molecular biology	Global& National	To comprehend the central dogma of molecular biology and to understand the molecular interactions at the cellular level.	• Explain the fine structure and functions of different cell organelles and cellular phenomena • Discuss the complexity of eukaryotic genome and its replication • Describe the process of transcription

				• List post transcriptional modification in eukaryotes • Evaluate the process of Protein Sorting and Transport • Examine the process and regulation of translation • Assess the regulation of onco genes in promoting cancer • Analyze the pathways of intracellular signal transduction
PG2Z7	Biostatistics and Bioinformatics	Global &National	To gain knowledge on various statistical tools available for biological samples and to understand the fundamentals of biological sequence analysis	• Find the measures of central tendency and dispersion values • Assess the difference between the expected and observed frequencies by Chi-Square test • Compute degrees of relationship between two variables with reference to correlation and regression • Test the hypothesis of mean of the

				variables whether significant or not through ANOVA • Apply the statistical tools to calculate the data • Enumerate the applications of bioinformatics
PG2Z8	Ecology & Evolution	All the Three	To understand the principles of ecology and animal interactions in an ecosystem that paves origin and evolution of life.	• key interactions and processes • C Explain the factors that affect population size, Density ,Distribution and dynamics • Compare Ecological niche and habitat • Design novel mechanism for the sustainable utilization of natural resources • Explains the origin of prokaryotes and eukaryotes • Compare the evidences of organic evolution • Categorize the theories of evolution

				• Describe the mechanism of evolution • List down the types of natural selection and speciation
PG2Z9	Lab in Ecology & Evolution	All the Three	It includes Ecology & Evolutionary studies / experiments to assess the interrelationship of human dimensions and ecology/evolution	• Demonstrate the estimation of various components of soil and water. • Find the primary productivity. • Identify the zooplankton in water sample. • Relate the genotypic frequencies by Hardy – Weinberg equilibrium.
PG2Z10	Lab in Cell & Molecular Biology	Global& National	It includes cell biology experiments such as observation of mitotic stages in onion root tip and visualizing giant chromosome in Chironomus larva and isolation and estimation of DNA and RNA.	• Identify and sketch the various microscope • Recall the preparation of tissues • Estimate the quantity of DNA and RNA • Infer the qualitative estimation of DNA and RNA • Compute the mitotic index • Demonstrate the isolation of genomic DNA

				• Interpret the mitotic stages of onion root tip
PG2EDC2	Herbal Medicine	National & Regional	To understand ethno botanical importance of indigenous medicinal plants and their implications for common ailments	• Make use of alternative medicinal methods. • Outline the importance of herbs used in day today life. • Categorize the usage of herbs for different ailments. • Solve the life style disorders with food supplements. • Prepare various herbal products.
	Computer Applications For Biologists	Global& National	It provides hands on experience on the tools and techniques of bio informatics sequence analysis. It begins with the data storage in major biological databases,	• Apply MS-EXCEL for statistical analysis • Retrieve nucleotide, protein sequences and protein structure • Perform BLAST and FASTA • Interpret the results obtained through bio informatics tools • Model protein structure using Swiss pdb

			retrieval of sequences and bioinformatics tools used for pair wise and multiple sequence alignment	viewer • Illustrate the biological interactions of target protein and drugs
PG3Z12	Immunology	Global& National	To understand the function of immune system and to envisage the different immune response in human health.	• Compare the innate and adaptive immunity • Describe the structure and functions of immune cells an dlymphoid organs • List the properties of B and T cell epitopes • Discuss the structure, types and properties of various Immune globulins • Differentiate the gene organization and molecular structures of MHC class I and class II • Discuss the activation and maturation of B-cells and Tcells • Relate immune globulins and biological

				consequences of complement activation • Summarize the methods, merits and demerits of different types of vaccines • Explain the immune response to infectious diseases
PG3Z12	Biotechnology	Global& National	To familiarize the use of tools and techniques of engineering and technology for the study of living organisms, or derivatives to make or modify products for specific use for human welfare.	• Identify the principles and applications of Biotechnology for the benefit of mankind • Outline the development of transgenic plants, animals, and microbes or products for specific use • Discuss the solutions to problems concerning human activities in the field of Agriculture, Medicine. Industry and Environment
PG3ZE1	Fisheries & Aquaculture	All the Three	To impart knowledge on Fisheries and Aquaculture Practices in India.	• Identify the economically important fishes and fishery products. • Plans according to the recent concepts in

				fisheries management. • Distinguish the various aquaculture systems. • Organize the type of hatchery, brood stock, larval production, feed management water quality and disease management in cultivable species, live feed production. • Describe the feed and disease management. • Evaluates the Fisheries and Aquaculture Practices in India.
PG3ZE2	Medical Entomology	All the Three	To give a general insight into the public health diseases and to study the biology of arthropods, epidemiology and vector control methods.	• Relate the role of Arthropods in public health • Describe the biology of Arthropod vectors • Evaluate the epidemiology of vector borne diseases

PG3Z14	Lab In Biotechnology	Global& National	This course provides rich knowledge in isolating DNA from different sources	• Demonstrate the plant tissue culture technique. • Experiment with DNA isolation • Estimate DNA quantitatively
PG3Z15	Lab In Immunology	Global& National	It focuses on techniques related to the field of immunology. It includes preparation of antigens and to visualize precipitin and agglutination	• Identify and sketch the different lymphoid organs • Recall the properties of soluble and particulate antigen • Estimate the lymphocytes from peripheral blood • Discuss the various bleeding techniques • Demonstrate the separation of serum and plasma • Identify immune electrophoresis and rocket immune electrophoresis
PG4Z16	Developmental Biology	Global& National	To acquaint with the development of cell from egg to the foetus stages in	• Recalls the basic concepts of Developmental Biology. • Explain how fertilization, cleavage and

			Vertebrates.	Gastrulation occur. • Compares the basic concepts of organogenesis in different organisms. • Understand the development of egg into a foetus, then into adult. • Associate the embryo development with Phylogeny. • Design experiments with developing stages of Organisms.
PG4Z17	Environmental Management	All the Three	To understand the key aspects of environmental conservation and its applications in environmental issues for sustainable development.	• Relate the Status and Scope of Biotechnology in Environmental protection • Discuss the methods of Bioremediation of wastes • Describe the methods of conservation of Biodiversity
PG4Z18	Genetics	Global& National	To understand the organization, functions of	• Find the pattern of inheritance of traits by various crosses.

			genes and genetic components and appreciate the inheritance of genetic material.	• Compare the patterns of sex determination in various organisms. • Discuss the mechanism of crossing over and linkage • Analyse uniqueness of chromosome mapping. • Identify the types of variation in chromosome. • Assess the process of bacterial transformation, transduction and conjugation.
PG4Z19	Lab in Environmental Management, Developmental Biology & Genetics	All the Three	This course deals with the laboratory experiments that teach the concepts of environmental clean inheritance of genes development of invertebrate and vertebrate model systems	• Find the primary productivity • Demonstrate the estimation of various components of soil and water. • Identify the zoo planktons in water sample.O4 Analyse the various developmental stages of chick embryo. • Compare the diversity of species by quadrat method.

				• Experiment with the simple Mendelian traits

2017 - 2018

COURSE CODE	COURSE TITLE	NATURE OF THE COURSE (LOCAL/ NATIONAL/ REGIONAL/ GLOBAL)	COURSE DESCRIPTION	COURSE OBJECTIVES
PG1Z1	Biochemistry	Global& National	To impart knowledge on the structure, properties and metabolism of biomolecules and their interactions in the biological system	• Recall the fundamental principles of Biochemistry. • Summarize the metabolic pathways of carbohydrates in the living organisms. • Make use of flow charts to depict the metabolic functions of Glucose. • Recall the structure and general properties

				of amino acids. • Describe the structural organization of the proteins. • Evaluate how the metabolism of organic compounds leads to the generation of ATP. • Determine the metabolic levels of Starvation. • Assess the metabolic pathway of biomolecules. • Describe the mechanism of enzyme action.
PG1Z2	Microbiology	Global& National	To understand the fundamentals of microbial diversity and applications of microbes in Industry and Environment.	• Recognize the contribution of Microbiologist and Bergey's classification • Differentiate Components and applications of different microscopes • Describe the detail study of the positive and negative bacteria • Illustrate the different sterilization methods • Compare the classification and morphology of viruses, viriods & prions

				• Explain the microbial genetics and metabolism of bacteria • Classify the preservation techniques of food microbiology • Assess the importance of bacteria in production of antibiotic
PG1Z3	Biophysics	Global& National	To imbibe the principles of physics involved in the structure of biomolecules, energy transformation in living systems and the use of modern physical instruments for the exploration of knowledge in biology.	• Classify the chemical bonds and forces interacting between molecules • Summarize the theories involved in acidity and basicity • Explain the principles of Thermodynamics and biological oxidation • Describe the principle, procedure, components involved and biological applications of Instruments • Apply the principles of Photobiology in the Perception and Chemical Processing of Vision • Assess the principles, properties

				applications and hazardous nature of Radioactive isotopes • Interpret the Biophysical aspects of neurophysiology applied to the Animals • Organize the Biological importance and various domain of physics in Biology in the form of flow chart
PG1Z4	Lab in Biochemistry and Biophysics	Global & National	Introductory laboratory course in current principles and techniques applicable to research problems in biochemistry and molecular biology.	• Acquire skills in handling basic equipments • Calculate the strength of unknown solutions using formula • Estimate the various biomolecules using standard protocols • Demonstrate experiments adopting appropriate procedures • Critically analyze and interpret the results • Design experiments to solve research problems
PG1Z5	Lab in	Global &	This course deals with	• Prepare different types of media.

	Microbiology	National	the learning skills of microbial techniques	• Demonstrate bacterial isolation technique and maintain pure culture. • Identify unknown bacteria by biochemical testing.
PGZEDC1	Herbal Medicine	National & Regional	To understand ethno botanical importance of indigenous medicinal plants and their implications in common ailments	• Make use of alternative medicinal methods. • Outline the importance of herbs used in day today life. • Categorize the usage of herbs for different ailments. • Solve the life style disorders with food supplements. • Prepare various herbal products.
PG2Z6	Cell and Molecular biology	Global & National	To comprehend the central dogma of molecular biology and to understand the molecular interactions	• Explain the fine structure and functions of different cell organ sells and cellular phenomena • Discuss the complexity of eukaryotic genome and its replication • Describe the process of transcription

			at the cellular level.	• List post transcriptional modification in eukaryotes • Evaluate the process of Protein Sorting and Transport • Examine the process and regulation of translation • Assess the regulation of ontogenesis in promoting cancer • Analyze the pathways of intracellular signal transduction
PG2Z7	Biostatistics and bioinformatics	Global & National	To gain knowledge on various statistical tools available for biological samples and to understand the fundamentals of biological sequence analysis.	• Find the measures of central tendency and dispersion values • Assess the difference between the expected and observed frequencies by Chi-Square test • Compute degrees of relationship between two variables with reference to correlation and regression • Test the hypothesis of mean of the variables

				whether significant or not through ANOVA • Apply the statistical tools to calculate the data • Enumerate the applications of bioinformatics
PG2Z8	Ecology and Evolution	All the Three	To understand the principles of ecology and animal interactions in an ecosystem that paves origin and evolution of life.	• Develop an understanding of ecological key interactions and processes • Explain the factors that affect population size, Density ,Distribution and dynamics • Compare Ecological niche and habitat • Design novel mechanism for the sustainable utilization of natural resources • Explains the origin of prokaryotes and eukaryotes • Compare the evidences of organic evolution • Categorize the theories of evolution • Describe the mechanism of evolution • List down the types of natural selection and

				speciation
PG2Z9	Lab in Ecology and Evolution	All the Three	It includes Ecology & Evolutionary studies / experiments to assess the interrelationship of human dimensions and ecology/evolution	• Demonstrate the estimation of various components of soil and water. • Find the primary productivity. • Identify the zooplankton in water sample. • CO 4 Relate the genotypic frequencies by Hardy – Weinberg equilibrium.
PG2Z10	Lab in Cell & Molecular Biology	Global & National	It includes cell biology experiments such as observation of mitotic stages in onion root tip and visualizing giant chromosome in Chironomus larva and isolation and estimation of DNA and RNA.	• Identify and sketch the various microscopy • Recall the preparation of tissues • Estimate the quantity of DNA and RNA • Infer the qualitative estimation of DNA and RNA • Compute the mitotic index • Demonstrate the isolation of genomic DNA • Interpret the mitotic stages of onion root tip

PG2EDC2	Herbal Medicine	National & Regional	To understand ethno botanical importance of indigenous medicinal plants and their implications in common ailments	• Make use of alternative medicinal methods. • Outline the importance of herbs used in day today life. • Categorize the usage of herbs for different ailments. • Solve the life style disorders with food supplements. • Prepare various herbal products.
	Computer Applications For Biologists	Global & National	It provides hands on experience on the tools and techniques of bio informatics sequence analysis. It begins with the data storage in major biological databases, retrieval of sequences and bioinformatics	• Apply MS-EXCEL for statistical analysis • Retrieve nucleotide, protein sequences and protein structure • Perform BLAST and FASTA • Interpret the results obtained through bio informatics tools • Model protein structure using Swiss pdb viewer • Illustrate the biological interactions of target protein and drugs

			tools used for pair wise and multiple sequence alignment	
PG3Z12	Immunology	Global & National	To understand the function of immune system and to envisage the different immune response in human health.	• Compare the innate and adaptive immunity • Describe the structure and functions of immune cells and lymphoid organs • List the properties of B and T cell epitopes • Discuss the structure, types and properties of various Immune globulins • Differentiate the gene organization and molecular structures of MHC class I and class II • Discuss the activation and maturation of B-cells and Tcells • Relate immune globulins and biological consequences of complement activation • Summarize the methods, merits and demerits of different types of vaccines

				• Explain the immune response to infectious diseases
PG3Z12	Biotechnology	Global & National	To familiarize the use of tools and techniques of engineering and technology for the study of living organisms, or derivatives to make or modify products for specific use for human welfare.	○ Identify the principles and applications of Biotechnology for the benefit of mankind • Outline the development of transgenic plants, animals, and microbes or products for specific use • Discuss the solutions to problems concerning human activities in the field of Agriculture, Medicine. Industry and Environment
PG3ZE1	Fisheries And Aquaculture	All the Three	To impart knowledge on Fisheries and Aquaculture Practices in India.	• Identify the economically important fishes and fishery products. • Plans according to the recent concepts in fisheries management. • Distinguish the various aquaculture systems.

				• Organizes the type of hatchery, brood stock, larval production, feed management water quality and disease management in cultivable species, live feed production. • Described the feed and disease management. • Evaluates the Fisheries and Aquaculture Practices in India.
PG3ZE2	Medical Entomology	All the Three	To give a general insight into the public health diseases and to study the biology of arthropods, epidemiology and vector control methods.	• Relate the role of Arthropods in public health • Describe the biology of Arthropod vectors • Evaluate the epidemiology of vector borne diseases
PG3Z14	Lab In Biotechnology	Global & National	This course provides rich knowledge in isolating DNA from	• Demonstrate the plant tissue culture technique. • Experiment with DNA isolation

			different sources	• Estimate DNA quantitatively
PG3Z15	Lab In Immunology	Global & National	It focuses on techniques related to the field of immunology. It includes preparation of antigens and to visualize precipitin and agglutination	• Identify and sketch the different lymphoid organs • Recall the properties of soluble and particulate antigen • Estimate the lymphocytes from peripheral blood • Discuss the various bleeding techniques • Demonstrate the separation of serum and plasma • Identify immune electrophoresis and rocket Immune electrophoresis
PG4Z16	Developmental Biology and Genetics	Global & National	To understand the cellular and molecular mechanisms of development of invertebrate and vertebrate model	• Recalls the basic concepts of Developmental Biology. • Compares the basic concepts of organogenesis in different organisms. • Understand the development of egg into a foetus, then into adult.

			systems	• Find the pattern of inheritance of traits by various crosses. • Compare the patterns of sex determination in various organisms. • Discuss the mechanism of crossing over and linkage • Analyse uniqueness of chromosome mapping.
PG4Z17	Environmental Management	All the Three	To understand the key aspects of environmental conservation and its applications in environmental issues for sustainable development	• Relate the Status and Scope of Biotechnology in Environmental protection • Discuss the methods of Bioremediation of wastes • Describe the methods of conservation of Biodiversity
PG4Z18	Lab in Environmental Management, Developmental	All the Three	This course deals with the laboratory experiments that teach the concepts of	• Find the primary productivity • Demonstrate the estimation of various components of soil and water. • Identify the zoo planktons in water sample.

	Biology and Genetics		environmental clean inheritance of genes development of invertebrate and vertebrate model systems	• Analyse the various developmental stages of chick embryo. • Compare the diversity of species by quadrate method. • Experiment with the simple Mendelian traits

2015 - 2016

COURSE CODE	COURSE TITLE	NATURE OF THE COURSE (LOCAL/NATIONAL/REGIONAL/GLOBAL)	COURSE DESCRIPTION	COURSE OBJECTIVES
PG1Z1	Biochemistry	Global & National	To impart knowledge on the structure, properties and metabolism of biomolecules and their interactions in the	• Recall the fundamental principles of Biochemistry. • Summarize the metabolic pathways of carbohydrates in the living organisms. • Make use of flow charts to depict the

			biological system	metabolic functions of Glucose. • Recall the structure and general properties of amino acids. • Describe the structural organization of the proteins. • Evaluate how the metabolism of organic compounds leads to the generation of ATP. • Determine the metabolic levels of Starvation. • Assess the metabolic pathway of biomolecules. • Describe the mechanism of enzyme action.
PG1Z2	Microbiology	Global & National	To understand the fundamentals of microbial diversity and applications of microbes in Industry and Environment	• Recognize the contribution of Microbiologist and Bergey's classification • Differentiate Components and applications of different microscopes • Describe the detail study of the positive and negative bacteria • Illustrate the different sterilization

				methods • Compare the classification and morphology of viruses, viriods& prions • Explain the microbial genetics and metabolism of bacteria • CO 7 Classify the preservation techniques of food microbiology • Assess the importance of bacteria in production of antibiotic
PG1Z3	Biophysics	Global & National	Biophysics which is an inter disciplinary course, deals with the discipline concerned with the application of the principles and methods of physics and the other physical sciences to the solution of biological	• Classify the chemical bonds and forces interacting between molecules • Summarize the theories involved in acidity and basicity • Explain the principles of Thermodynamics and biological oxidation • Describe the principle, procedure, components involved and biological applications of Instruments • Apply the principles of Photobiology in the

			problems.	Perception and Chemical Processing of Vision • Assess the principles, properties applications and hazardous nature of Radioactive isotopes • Interpret the Biophysical aspects of neurophysiology applied to the Animals • Organize the Biological importance and various domain of physics in Biology in the form of flow chart
PG1Z4	Lab in Biochemistry and Biophysics	Global & National	Introductory laboratory course in current principles and techniques applicable to research problems in biochemistry and molecular biology.	• Acquire skills in handling basic equipments • Calculate the strength of unknown solutions using formula • Estimate the various biomolecules using standard protocols • Demonstrate experiments adopting appropriate procedures • Critically analyze and interpret the results

				• Design experiments to solve research problems
PG1Z5	Lab in Microbiology	Global &National	This course deals with the learning skills of microbial techniques	• Prepare different types of media. • Demonstrate bacterial isolation technique and maintain pure culture. o Identify unknown bacteria by biochemical testing.
PGZEDC1	Herbal Medicine	National & Regional	To understand ethno botanical importance of indigenous medicinal plants and their implications in common ailments	• Make use of alternative medicinal methods. • Outline the importance of herbs used in day today life. • Categorize the usage of herbs for different ailments. • Solve the life style disorders with food supplements. • Prepare various herbal products.
PG2Z6	Cell and Molecular	Global &	To comprehend the central dogma of	• Explain the fine structure and functions of

	biology	National	molecular biology and to understand the molecular interactions at the cellular level.	different cell organelles and cellular phenomena • Discuss the complexity of eukaryotic genome and its replication • Describe the process of transcription • List post transcriptional modification in eukaryotes • Evaluate the process of Protein Sorting and Transport • Examine the process and regulation of translation • Assess the regulation of onco genes in promoting cancer • Analyze the pathways of intracellular signal transduction
PG2Z7	Biostatistics and bioinformati	Global & National	To gain knowledge on various statistical tools available for biological samples and to	• Find the measures of central tendency and dispersion values • Assess the difference between the expected and observed frequencies by Chi-Square

	cs		understand the fundamentals of biological sequence analysis.	test • Compute degrees of relationship between two variables with reference to correlation and regression • Test the hypothesis of mean of the variables whether significant or not through ANOVA • Apply the statistical tools to calculate the data • Enumerate the applications of bioinformatics
PG2Z8	Ecology and Evolution	All the Three	To understand the principles of ecology and animal interactions in an ecosystem that paves origin and evolution of life.	• Develop an understanding of ecological key interactions and processes • Explain the factors that affect population size, Density ,Distribution and dynamics • Compare Ecological niche and habitat • Design novel mechanism for the sustainable utilization of natural resources • Explains the origin of prokaryotes and

				eukaryotes • Compare the evidences of organic evolution • Categorize the theories of evolution • Describe the mechanism of evolution • List down the types of natural selection and speciation
PG2Z9	Lab in Ecology and Evolution	All the Three	It includes Ecology & Evolutionary studies / experiments to assess the interrelationship of human dimensions and ecology/evolution	• Demonstrate the estimation of various components of soil and water. • Find the primary productivity. • Identify the zooplankton in water sample. • Relate the genotypic frequencies by Hardy – Weinberg equilibrium.
PG2Z10	Lab in Cell and Molecular Biology	Global & National	It includes cell biology experiments such as observation of mitotic stages in onion root tip and visualizing giant	• Identify and sketch the various microscopy • Recall the preparation of tissues • Estimate the quantity of DNA and RNA • Infer the qualitative estimation of DNA and RNA

			chromosome in Chironomus larva and isolation and estimation of DNA and RNA.	• Compute the mitotic index • Demonstrate the isolation of genomic DNA • Interpret the mitotic stages of onion root tip
PG2EDC2	Herbal Medicine	National & Regional	To understand ethno botanical importance of indigenous medicinal plants and their implications in common ailments	• Make use of alternative medicinal methods. • Outline the importance of herbs used in day today life. • Categorize the usage of herbs for different ailments. • Solve the life style disorders with food supplements. • Prepare various herbal products.
Off Class	Computer Applications For Biologists	Global & National	It provides hands on experience on the tools and techniques of bioinformatics sequence analysis. It begins with	• Apply MS-EXCEL for statistical analysis • Retrieve nucleotide, protein sequences and protein structure • Perform BLAST and FASTA • Interpret the results obtained through bio

			the data storage in major biological databases, retrieval of sequences and bioinformatics tools used for pair wise and multiple sequence alignment	informatics tools • Model protein structure using Swiss pdb viewer • Illustrate the biological interactions of target protein and drugs