

 II - Teaching-Learning and Evaluation
 2.6.1 - Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and Course Outcomes (COs) - M. SC. ZOOLOGY
 2015 - 2020



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.

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- **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	COURSE OUTCOMES
19PG1Z1	Animal Diversity	 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 7: Evaluate the unique features of each class of Chordates.



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		CO 8: Predict the systematic Position of Animals.
19PG1Z2	Microbiology	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	CO 1: Explain the fine structure and functions of different cell
	Biology	organelles and cellular phenomena
		CO 2: Discuss the complexity of eukaryotic genome and its replication
		CO 3: Describe the process of transcription



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		 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	 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	CO 1: Identify and sketch the various microscopyCO 2: Recall the preparation of tissuesCO 3: Estimate the quantity of DNA and RNACO 4: Infer the qualitative estimation of DNA and RNA



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		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	CO 1: Make use of alternative medicinal methods.
		CO 2: Outline the importance of herbs used in day today life.
	E S	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	CO1: Find the pattern of inheritance of traits 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.
	Λ	CO5: Identify the types of variation in chromosome.
	×	CO6: Assess the process of bacterial transformation, transduction and
		conjugation.

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19PG2Z7	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	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.

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		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 &	CO 1: Determine the sex in man by Barr bodies.
	Evolution	CO 2: Experiment with the simple Mendelian traits.
		CO 3: Examine the process of Sex determination in man and fruit
	5	CO 4: Construct the Pedigree charts by systematic listing of parent
	<u>ب</u>	CO 5: Relate the genotypic frequencies by Hardy-Weinberg equilibrium.
19PGZEDC2	Herbal Medicine	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.
	Y	CO 4: Solve the life style disorders with food supplements.
		CO 5: Prepare various herbal products.

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: 2.6.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and Course Outcomes (COs) – M. SC. ZOOLOGY



COURSE CODE	COURSE TITLE	COURSE OBJECTIVES
Off Class	SPSS	 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	 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 T cells Relate immunoglobulin's and biological consequences of

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			NAAC – 4 th CYCLE – Self Study Repor
ATTINA COLLEGE	Criterion Metric Year	: II – Teaching-Learning : 2.6.1 – Programme Out Course Outcomes (COs) : 2015 - 2020	and Evaluation comes (POs), Programme Specific Outcomes (PSOs) and - M. SC. ZOOLOGY
			 complement activation Summarize the methods, merits and demerits of different types of vaccines Explain the immune response to infectious diseases
PG	3Z13	Biotechnology	 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
PG	3ZE1	Fisheries And Aquaculture	 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. ٠



PG3ZE2	Medical Entomology	 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	 Demonstrate the plant tissue culture technique. Experiment with DNA isolation Estimate DNA quantitatively
PG3Z15	Lab In Immunology	 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	 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	 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	 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	 Find the primary productivity Demonstrate the estimation of various components of soil and water.

AT INTA COLLAR A COLA	Criterion : II – Teachir Metric : 2.6.1 – Prog Course Outo Year : 2015 - 2020	 II - Teaching-Learning and Evaluation 2.6.1 - Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and Course Outcomes (COs) - M. SC. ZOOLOGY 2015 - 2020 	Farm Cologe
		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	COURSE OBJECTIVES
PG1Z1	Biochemistry	 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.

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		• Describe the mechanism of enzyme action.
PG1Z2	Microbiology	 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	 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

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)	Course Outcomes (COs) - N	A. SC. ZOOLOGY
MADURAL	Year	: 2015 - 2020	
			 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
			 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
PC	31Z4	Lab in Biochemistry and Biophysics	 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
PC	31Z5	Lab in Microbiology	 Prepare different types of media. Demonstrate bacterial isolation technique and maintain pure culture.



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		Identify unknown bacteria by biochemical testing.
PGZEDC1	Herbal Medicine	 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	 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 on co genes in promoting cancer Analyze the pathways of intracellular signal transduction
PG2Z7	Biostatistics and Bioinformatics	 Find the measures of central tendency and dispersion values Assess the difference between the expected and observed

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AND A LIGHT			Course Outcomes (COs) - M. S	SC. ZOOLOGY
MADURA		Year	<mark>:</mark> 2015 - 2020	
				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
	PG2Z	8	Ecology & Evolution	 key interactions and processes
				• C Explain the factors that affect population size, Density
				,Distribution and dynamics
			E Sal	Compare Ecological niche and habitat
			(A)	• Design novel mechanism for the sustainable utilization of natural
			A	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

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MADURAL	Year	: 2015 - 2020	

PG2Z9	Lab in 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	 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	 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.

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		Prepare various herbal products.
	Computer Applications For Biologists	 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
PG3Z12	Immunology	 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



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		 Summarize the methods, merits and demerits of different types of vaccines Explain the immune response to infectious diseases
PG3Z12	Biotechnology	 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	 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	 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	 Demonstrate the plant tissue culture technique. Experiment with DNA isolation Estimate DNA quantitatively
PG3Z15	Lab In Immunology	 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	 Recalls the basic concepts of Developmental Biology. Explain how fertilization, cleavage and Gastrulation occur. Compares the basic concepts of organogenesis in different organisms.



: 2.6.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and **Course Outcomes (COs) – M. SC. ZOOLOGY**



		 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	 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	 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	 Find the primary productivity Demonstrate the estimation of various components of soil and water.

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	Biology & Genetics	• 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		

2017 - 2018

COURSE CODE	Course Title	COURSE OBJECTIVES
PG1Z1	Biochemistry	 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.



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		Describe the mechanism of enzyme action.
PG1Z2	Microbiology	 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	 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

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MADURAL	Year	: 2015 - 2020	
			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
	0.174	Lahin Diashamiatan and	
P	GIZ4	Lab in Biochemistry and	Acquire skills in handling basic equipments
		Biophysics	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
P	G1Z5	Lab in Microbiology	Prepare different types of media.
			Demonstrate bacterial isolation technique and maintain pure
			aulture
			Identify unknown bacteria by biochemical testing.

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PGZ	ZEDC1	Herbal Medicine	 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.
PG2	2Z6	Cell and Molecular biology	 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 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
PG2	2Z7	Biostatistics and bioinformatics	 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

Line Ci	riterion	: II — Teaching-Learning an	d Evaluation
M	letric	: 2.6.1 – Programme Outco	mes (POs), Programme Specific Outcomes (PSOs) and
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Al Y	ear	: 2015 - 2020	
			 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	 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	• Demonstrate the estimation of various components of soil and

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COLLERE	Criterion Metric	: II — Teaching-Learning an : 2.6.1 — Programme Outco	d Evaluation mes (POs), Programme Specific Outcomes (PSOs) and
	V	Course Outcomes (COs) –	M. SC. ZOOLOGY
URAL	Year	: 2015 - 2020	
		Evolution	water.
			• Find the primary productivity.
			Identify the zooplankton in water sample.
			• CO 4 Relate the genotypic frequencies by Hardy – Weinberg
			equilibrium.
PG2	Z10	Lab in Cell & Molecular	Identify and sketch the various microscopy
		Biology	Recall the preparation of tissues
			• Estimate the quantity of DNA and RNA
			Infer the qualitative estimation of DNA and RNA
			Compute the mitotic index
		E Ca	Demonstrate the isolation of genomic DNA
			Interpret the mitotic stages of onion root tip
PG2	EDC2	Herbal Medicine	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.
			• Frepare various nerbar products.
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MADURAL	Year	: 2015 - 2020	
		For Biologists	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
PG3	3Z12	Immunology	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
		a la	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

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		• Explain the immune response to infectious diseases
PG3Z12	Biotechnology	 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	 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	 Relate the role of Arthropods in public health Describe the biology of Arthropod vectors



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		Evaluate the epidemiology of vector borne diseases
PG3Z14	Lab In Biotechnology	 Demonstrate the plant tissue culture technique. Experiment with DNA isolation Estimate DNA quantitatively
PG3Z15	Lab In Immunology	 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	 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. Find the pattern of inheritance of traits by various crosses. Compare the patterns of sex determination in various organisms.



Metric

Year

Criterion : II - Teaching-Learning and Evaluation : 2.6.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and **Course Outcomes (COs) – M. SC. ZOOLOGY** : 2015 - 2020



		 Discuss the mechanism of crossing over and linkage
		• Analyse uniqueness of chromosome mapping
		rinaryse aniqueness of enromosomic mapping.
PG4Z17	Environmental	Relate the Status and Scope of Biotechnology in Environmental
	Management	protection
	Management	 Discuss the methods of Bioremediation of wastes
		Describe the methods of conservation of Biodiversity
PG4Z18	Lab in Environmental	Find the primary productivity
	Management,	• Demonstrate the estimation of various components of soil and
	Developmental Biology	water.
	and Genetics	• 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
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TIMA COLLE	Criterion	: II - Teaching-Learning and Evaluation	Fatima College
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		Course Outcomes (COs) - M. SC. ZOOLOGY	
MADURAL	Year	: 2015 - 2020	

2016 - 2017

COURSE CODE	COURSE TITLE	COURSE OBJECTIVES
PG1Z1	Biochemistry	 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 metabolic pathway of biomolecules.
PG1Z2	Microbiology	 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

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MADURAL	Year	: 2015 - 2020			
			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		
P	PG1Z3	Biophysics	 Classify the chemical bonds and forces interacting between molecules Summarize the theories involved in acidity and basicity 		
		E C	 Explain the principles of Thermodynamics and biological oxidation Describe the principle, procedure, components involved and 		
			biological applications of Instruments		
		A l	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		



Year

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		in Biology in the form of flow chart
PG1Z4	Lab in Biochemistry and Biophysics	 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	 Prepare different types of media. Demonstrate bacterial isolation technique and maintain pure culture. Identify unknown bacteria by biochemical testing.
PGZEDC1	Herbal Medicine	 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.

IMA COLL	Cri	terion	: II – Teaching-Learning and Evaluation				
	Me	tric	: 2.6.1 – Programme Outcomes (POs), Programme Specific Outcomes (PSOs) and				
			Course Outcomes (COs) - I	A. SC. ZOOLOGY			
MADURA	Yee	ar	: 2015 - 2020				
	PG2Z6		Cell and Molecular	• Explain the fine structure and functions of different cell organelles			
			biology	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	• Find the measures of central tendency and dispersion values			
			bioinformatics	• 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			

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MADURAL	Year	: 2015 - 2020		
PG2	2Z8	Ecology and Evolution	 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 	
PG2	2Z9	Lab in Ecology and 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. 	

ATTINA COLLEGE	Criterion Metric	: II – Teaching-Learning an : 2.6.1 – Programme Outcon	d Evaluation mes (POs), Programme Specific Outcomes (PSOs) and	ma College
MADURAL	Year	Course Outcomes (COs) - I : 2015 - 2020	M. SC. ZOOLOGY	<u>L</u>
PG	2Z10	Lab in Cell and Molecular Biology Herbal Medicine	 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 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. 	
Of	f Class	Computer Applications For Biologists	 Prepare various herbal products. 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 	



