JAMAL MOHAMED COLLEGE (AUTONOMOUS), TIRUCHIRAPPALLI - 620 020

P.G. & RESEARCH DEPARTMENT OF ZOOLOGY

Course Learning Outcomes (CLO) (2018-2019)

B.Sc., ZOOLOGY

(Applicable to the candidates admitted from the academic year 2017 -2018 onwards)

SEM	COURSE CODE	PART	COURSE	COURSE TITLE	Course Learning Outcomes (CLO)
I	17U1LT1/LA1/ LF1/LH1/LU1	I	Language – I		
	17UCN1E1	II	English - I		
	17UZO1C1	III	**Core – I**	Biology of Invertebrates	1. Understand the evolution, history of phylum. 2. Understand about the Non Chordate and Chordate animals. 3. To study the external as well as internal characters of non chordates. 4. To study the distinguishing characters of non chordates.
	17UZO1C2 P		**Core – II**	**Practical-I:** Biology of Invertebrates	• Introducing you to the structure, function and behavior of select invertebrate types through the observation of both living and preserved specimens; • Reinforcing your basic laboratory skills including microscopy, dissection and careful observation; • Providing you with the ability to recognize the major groups of invertebrate, • Increasing your understanding of the methods of investigating animal evolution as well the current state of our knowledge
	17UCH1A1:2		**Allied –I**	Inorganic, Organic and Physical Chemistry-I	
	17UCH1A2P		**Allied –II**	Practical : Volumetric analysis	
	17UCN1VE	IV	Value Education	Value Education	
II	17U2LT2/LA2/ LF2/LH2/LU2	I	Language – II		
	17UCN2E2	II	English – II		
	17UZO2C3	III	**Core – III**	Biology of Chordates	1. Understand the basic concepts about chordates. 2. Understand the external morphology and sexual dimorphism in chordates. 3. Study and understand the various systems, adaptation and dentition in Mammals
	17UZO2C4 P		**Core – IV**	**Practical-II:** Biology of Chordates	• Introducing you to the structure, function and behavior of select vertebrate types through the observation of both living and preserved specimens; • Reinforcing your basic laboratory skills including microscopy, dissection and careful observation; • Providing you with the ability to recognize the major groups of vertebrate, • Increasing your understanding of the methods of investigating animal evolution as well the current state of our knowledge.
	17UCH2A3:2		**Allied – III**	Inorganic, Organic and Physical Chemistry-III	
	17UCH2A4P		**Allied –IV**	Practical: Organic Analysis	
	17UCN2ES	IV	Environmental Studies	Environmental Studies	
III	17U3LT3/LA3/ LF3/LH3/LU3	I	Language– III		
	17UCN3E3	II	English – III		
	17UZO3C5	III	**Core– V**	Cell & Molecular Biology	1. Understand the Scope of cell biology, because cell is the basic unit of life. 2. Understand the Main distinguishing characters between plant cell and animal cell. 3. To study and understand the whole cell organelles with their structure and function. 4. Understand the cell cycle and know the importance of various cells in body of organisms. 5. Understand the various applications of cells by using cell biology like study of various types of tumour.
	17UZO3C6 P		**Core– VI**	**Practical-III:** Cell & Molecular Biology	1. Understand the cell cycle and know the importance of various plant and animal cells. 2. Understand the various applications of cells by using cell biology like study of various types of diseases.
	17UBO3A5		**Allied– V**		
	17UBO3A6 P		**Allied–VI**		

	17UZO3N1	IV	Non Major Elective -I	Health Education	1. Explain the history and philosophy of public health as well as its core values, concepts, and functions across the globe and in society. 2. Identify the methods, and tools of public health data collection, use, and analysis and why evidence-based approaches are an essential part of public health practice. 3. Identify the basic processes, approaches, and interventions that identify and address the major health-related needs and concerns of populations.
	17UCN3S1		Skill Based Elective - I	Soft Skills Development	
IV	17U4LT4/LA4/ LF4/LH4/LU4	I	Language–IV		
	17UCN4E4	II	English– IV		
	17UZO4C7	III	**Core– VII**	Animal Physiology	An understanding of invertebrate and vertebrate animal physiology, emphasising control mechanisms and response strategies used to cope with different external environments.
	17UZO4C8 P		**Core - VIII**	**Practical-IV :** Animal Physiology	Students will appreciate how physiological plasticity is key to maintaining and adjusting physiological processes in terrestrial and aquatic animals.
	17UBO4A7		**Allied– VII**		
	17UBO4A8 P		**Allied–VIII**		
	17UZO4N2	IV	Non Major Elective - II	Vermiculture Technology	To Promote their Skill and Provide employable opportunities in the field of higher studies and research in Government and Private organizations
	17UCN4EA	V	Extension Activities	NCC, NSS, etc.	
V	17UZO5C9	III	**Core – IX**	Biostatistics & Bioinformatics & Computer Application	• Demonstrate an understanding of the central concepts of modern statistical theory and their probabilistic foundation; • Select from, use, and interpret results of, the principal methods of statistical inference and design; Communicate the results of statistical analyses accurately and effectively; Make appropriate use of statistical software.
	17UZO5C10		**Core – X**	Genetics	1. To understand how the behavior of chromosomes during meiosis can explain mendal law. 2. To understand how inheritance patterns are affected by position on chromosomes. 3. To understand the similarities and differences between how genetic information is passed on in prokaryotes and eukaryotes. 4. To understand gene interactions.
	17UZO5C11		**Core – XI**	Microbiology	A. Students will be able to acquire, articulate, retain and apply specialized language and knowledge relevant to microbiology. B. Students will acquire and demonstrate competency in laboratory safety and in routine and specialized microbiological laboratory skills applicable to microbiological research or clinical methods, including accurately reporting observations and analysis.
	17UZO5C12		**Core - XII**	Developmental Biology	1. Be able to list the types of characteristics that make an organism ideal for the study of developmental biology. 2. Be familiar with the events that lead up to fertilization. 3. Be able to describe the first four rounds of cell division in different groups. 4. Be able to describe the stages and cellular mechanisms for gastrulation. 5. Able to understand difference between specification and determination.
	17UZO5M1 P		Major Based Elective – I	**Practical-V:** Biostatistics & Bioinformatics & Computer Application, Genetics, Microbiology, and Developmental Biology / Instrumentation-I	• Students will communicate scientific concepts, experimental results and analytical arguments clearly and concisely, both verbally and in writing. Students will demonstrate engagement in the Microbiology discipline through involvement in research or internship activities, and outreach or mentoring activities specific to microbiology
	17UZO5S2	IV	Skill Based Elective -II	Applied Zoology / Solid Waste Management	I. Outline sources, types and composition of solid waste with methods of handling, sampling and storage of solid waste. II. Select the appropriate method for solid waste collection, transportation, redistribution and disposal. III. Describe methods of disposal of hazardous solid waste
	17UZO5S3		Skill Based Elective – III	Biotechnology / Recombinant DNA Technology	1. Understand the various Applications of Biotechnology. 2. Study and Understand the Hybridoma technology as well as Enzyme biotechnology. 3. Study and understand the DNA Recombinant technology. 4. Understand the industrial and environmental biotechnology. 5. Study and understand the Stem cell biotechnology. 6. Understand the Scope and Significance of Biotechnology

	17UZO5EC1		**Extra Credit Course - I**	Water Pollution Management	Understand the properties of water that make it unique. O Identify sources of water. O Recognize the reasons that water demand has outrun water supply in some areas. O Outline legal and economic solutions to water Outline legal and economic solutions to water resource problems
VI	17UZO6C13	III	**Core– XIII**	Biochemistry and Biophysics	1. Understand about the agencies responsible for Production of various products using biochemistry. 2. Understand the term pH ,Buffer 3. Understand the structure and function of carbohydrate, amino acids, proteins, and lipids. 4. Understand the concept Enzymes and also Vitamins and minerals. 5. Understand the Principle role of Vitamins in metabolism and Deficiency diseases
	17UZO6C14		**Core– XIV**	Immunology	• Define the basic mechanisms that regulate immune responses and maintain tolerance • Explain the cellular and molecular aspects of lymphocyte activation, homeostasis differentiation, and memory. Understand the molecular basis of complex, cellular processes involved in inflammation.
	17UZO6C15		**Core - XV**	Economic Entomology	1. Understand the Organization And Life: Homology and Analogy, Diversity of invertebrates, Phylogeny of invertebrates. 2.Understand the larval forms of the invertebrates. 3.Understand the colonial and social life in invertebrates.
	17UZO6C16		**Core XVI**	Environmental Biology and Evolution	1. Students are able to describe the relation between abiotic and biotic factors. 2. Students are able to describe various biological interactions. 3. Able to describe evolutionary history of man.
	17UZO6M2 P		Major Based Elective- II	**Practical-VI:** Biochemistry and Biophysics, Immunology, Economic Entomology and Environmental Biology and Evolution / Instrumentation -II	Students are able to understand how changes in population affect the ecosystem. Students are able to describe origin of species on earth.
	17UZO6M3		Major Based Elective- III	Poultry Science / Pisciculture	• Understand the power of genetic selection and the interaction • Formulate diets for poultry. • Evaluate the quality of poultry meat and eggs • Conduct post mortems and use the knowledge of significant diseases in poultry production
	17UCN6GS	V	Gender Studies	Gender Studies	• Identify major influences within key historic feminist movements. These influences may include activists, authors and/or writings, or legislation. • Articulate how women's studies and gender studies is a distinct field connected to other interdisciplinary fields of study. • Evaluate, compare, and critique gender and feminist theories and methodologies.
	17UZO6EC2		**Extra Credit Course- II**	Wildlife Biology	1. Discuss the biology of wild vertebrates with an emphasis on California taxa, and identify and compare appropriate methods of studying and/or monitoring their physiology, ecology, and populations. 2. Discuss, evaluate, and apply scientific principles to the ecology and conservation of wild vertebrates. 3. Apply a conceptual framework to solve problems in animal ecology and make informed management decisions.

* Not Considered for Grand Total and CGPA.

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(For candidates admitted from the academic year 2017-2018 onwards)

SEM	Course Code	Course	Course Title	Course Learning Outcomes (CLO)
I	17PZO1C1	Core– I	Biology of Invertebrates & Chordates	1. Understand the evolution, history of phylum. 2. Understand about the Non Chordate and Chordate anim 3. To study the external as well as internal characters of n chordates. 4. To study the distinguishing characters of non chordates 5. Understand the economical importance of Molluscs. 7. Understand the basic concepts about chordates. 8. Understand the external morphology and sexual dimorphism in chordates. 9. Study and understand the various systems, adaptation a dentition in Mammals
	17PZO1C2	Core – II	Developmental Biology	1. To understand how organisms maintain gametic population. 2. To understand fertilization process. 3. To understand way of cleavage and different patterns to form zygote. 4. To understand the fundamental embryonic development. 5. To understand the complete process of formation of germ layers.
	17PZO1C3	Core– III	Environmental Biology, Evolution & Paleontology	• Understand legislation governing environmental research and the environment in India • Integrate facts, concepts, and methods from multiple disciplines and apply to environmental problems • Use quantitative reasoning, observation, technical and analytical skills for scientific problem-solving and interpretation of environmental data • Design and evaluate strategies, technologies, and methods for assessment and sustainable management of environmental systems and for the remediation or restoration of degraded environments Characterize and analyze human impacts on the environment
	17PZO1C4 P	Core– IV	**Practical-I:** Biology of Invertebrates & Chordates, Developmental Biology and Environmental Biology, Evolution & Paleontology	After the successful completion of the course students will be 1. Be able to list the types of characteristics that make an organism ideal for the study of developmental biology. 2. Be familiar with the events that lead up to fertilization. 3. Be able to describe the first four rounds of cell division in different groups. 4. Be able to describe the stages and cellular mechanisms for gastrulation. 5. Able to understand difference between specification and determination
	17PZO1CE1	Elective– I	#Biophysics & Radiation Biology / Occupational Health and Safety	Understand how interactions between organisms and their environments drive the dynamics of individuals, populations, communities, and ecosystems Recognize the ecological basis for regional and global environmental issues Understand the processes and patterns of evolution, and the role of evolution as the central unifying concept in environmental science Understand the historical and social context of environmental science thought and research, and the contributions of environmental science to the resolution of ethical, social, and environmental issues in human affairs Develop an in-depth understanding of the interdisciplinary relationship of cultural, ethical, and social aspects of local/global environmental issues.

II	17PZO2C5	Core– V	Genetics	1. Comprehensive and detailed understanding of the chemical basis of heredity. 2. Understanding about the role of genetics in evolution. 3. The ability to evaluate conclusions that are based on genetic data. 4. The ability to understand results of genetic experimentation in animals.
	17PZO2C6	Core– VI	Cell & Molecular Biology	1. Understand the Scope of cell biology, because cell is the basic unit of life. 2.Understand the Main distinguishing characters between plant cell and animal cell. 3. To study and understand the whole cell organelles with their structure and function. 4. Understand the cell cycle and know the importance of various cells in body of organisms. 5. Understand the various applications of cells by using cell biology like study of various types of tumour
	17PZO2C7	Core– VII	Animal Physiology	An understanding of invertebrate and vertebrate animal physiology, emphasising control mechanisms and response strategies used to cope with different external environments. Students will appreciate how physiological plasticity is key to maintaining and adjusting physiological processes in terrestrial and aquatic animals.
	17PZO2C8 P	Core– VIII	Practical-II: Genetics, Cell & Molecular Biology and Animal Physiology	1. Comprehensive and detailed understanding of the chemical basis of heredity. 2. To study and understand the whole cell organelles with their structure and function
	17PZO2CE2	Elective– II	#Biotechnology / Endocrinology	1. Understand the various Applications of Biotechnology. 2. Study and Understand the Hybridoma technology as well as Enzyme biotechnology. 3. Study and understand the DNA Recombinant technology. 4. Understand the industrial and environmental biotechnology. 5. Study and understand the Stem cell biotechnology. 6. Understand the Scope and Significance of Biotechnology.
III	17PZO3C9	Core– IX	Biochemistry	1.Understand about the agencies responsible for Productic various products using biochemistry. 2. Understand the term pH ,Buffer 3.Understand the structure and function of carbohyd amino acids, proteins, and lipids. 4.Understand the concept Enzymes and also Vitamins minerals. 5.Understand the Principle role of Vitamins in metabolism and Deficiency diseases
	17PZO3C10	Core– X	Immunology	• Define the basic mechanisms that regulate immune responses and maintain tolerance • Explain the cellular and molecular aspects of lymphocyte activation, homeostasis differentiation, and memory. Understand the molecular basis of complex, cellular processes involved in inflammation.
	17PZO3C11	Core– XI	Biostatistics & Bioinformatics	Demonstrate an understanding of the central concepts of modern statistical theory and their probabilistic foundation; Select from, use, and interpret results of, the principal methods of statistical inference and design; Communicate the results of statistical analyses accurately and effectively; Make appropriate use of statistical software.
	17PZO3C12 P	Core– XII	Practical-III: Biochemistry, Immunology and Biostatistics & Bioinformatics	• Immunity, in states of health and disease Describe basic and state-of-the-art experimental methods and technologies • Integrate knowledge of each subsystem to see their contribution to the functioning of higher-level systems in health and disease
	17PZO3CE3	Elective– III	#Animal Behavior and Biodiversity	• Gain knowledge of the similarities and differences between vertebrate & some key invertebrate groups:

			Conservation / Biodiversity and Taxonomy	anatomy, functional morphology, behaviour & diversity • Apply evolutionary concepts to understand the evolution of major animal groups.
	17PZO3EC1	Extra Credit Course - I	Comprehensive Examination in Zoology	Conduct a rigorous appraisal of existing research and scholarship and critically appraise the evidence. Demonstrate advanced knowledge and professional expertise in a specialized area of research.
IV	17PZO4C13	Core– XIII	General and Applied Entomology	1.Understand the Organization And Life: Homology and Analogy, Diversity of invertebrates, Phylogeny of invertebrates. 2.Understand the Organization of coelom and its types. 3.Understand various processes like Digestion, Locomotion, Respiration, Excretion, Nervous system. 4.Understand the larval forms of the invertebrates. 5.Understand the colonial and social life in invertebrates.
	17PZO4C14	Core– XIV	Microbiology	A. Students will be able to acquire, articulate, retain and apply specialized language and knowledge relevant to microbiology. B. Students will acquire and demonstrate competency in laboratory safety and in routine and specialized microbiological laboratory skills applicable to microbiological research or clinical methods, including accurately reporting observations and analysis.
	17PZO4C15 P	Core– XV	Practical-IV: Entomology & Microbiology	• Students will communicate scientific concepts, experimental results and analytical arguments clearly and concisely, both verbally and in writing. • Students will demonstrate engagement in the Microbiology discipline through involvement in research or internship activities, and outreach or mentoring activities specific to microbiology.
	17PZO4CE4	Elective - IV	#Aquaculture Practices and Farm Management/ Fish and Fisheries of India	It provides you with basic knowledge of aquaculture companies aimed at working as a medium level leader or manager. Having completed the study programme you will have acquired knowledge of aquaculture biology, leadership and economy. You also learn about the rules and regulations applying for running aquaculture farms, as well as ethical aspects of seafood production.
	17PZO4PW	Project		
	17PZO4EC2	Extra Credit Course - II	Advanced studies in Zoology	

***Not considered for Grand total and CGPA**