

Course Code: 22BZOA1		Allied-IA	T/P	C	H/W
		GENERAL & APPLIED ZOOLOGY	P	3	3
Objectives	<ul style="list-style-type: none"> • To introduce students to the wide range of animal groups. • To create awareness on how animals adapted to different environments • To enhance students' employability skill. • To create awareness on the economic importance of animals 				
Unit - I	<ol style="list-style-type: none"> 1. General classification of animal kingdom. 2. Unicellular, multicellular, radiate, bilateria, acoelomate, pseudocoelomata, coelomate. 3. Classification of invertebrata with Indian examples. 4. Outline classification of Phylum Chordata – Primary & Secondary Characters. 				
Unit - II	<ol style="list-style-type: none"> 1. Malarial parasite – Types & Life cycle – prevention & control. 2. Corals & its importance. 3. Ascaris & Filarial worm Life cycle. 4. Parasitic adaptations 				
Unit - III	<ol style="list-style-type: none"> 1. Insect pests [Paddy & Coconut] – Reasons for outbreak & control. 2. Integrated insect pest management. 3. Beneficial insect – Silkworm. 4. Vermiculture & Apiculture 				
Unit - IV	<ol style="list-style-type: none"> 1. Adaption of animals for various habitats: Terrestrial, aquatic, arial and arboreal 2. Local food fishes – identification, culture techniques and food value of any 3 edible fishes. 3. Composite fresh water fish culture 4. Snakes –identification, venom & its action – biting mechanism – first aid – venomous& non- venomous snakes any 2 for each. 				
Unit - V	<ol style="list-style-type: none"> 1. Poultry & its economic importance. 2. Dairy& its economic importance. 3. Rearing of pig & its economic importance 4. Genetically modified animals and its importance 				
Text books:					
Ekambaranatha Ayyar & T.N.Ananthkrishnan (1992) <i>Manual of Zoology Vol – I, Part I & II</i> S.Viswanathan Pvt. Ltd. Chennai.					
Ekambaranatha Ayyar & T.N.Ananthkrishnan (1992) <i>Manual of Zoology Vol – I, Part I & II</i> S.Viswanathan Pvt. Ltd. Chennai.					
Jordan.E.L & Verma.P.S. “ <i>Invertebrate Zoology</i> ” S.Chand & Co. New Delhi.					
Jordan.E.L & Verma.P.S. “ <i>Chordate Zoology</i> ” S.Chand & Co. New Delhi					
Reference Books:					
Barnes, R.D. (1982) , <i>Invertebrate Zoology</i> Vi Edition. Holt Saunders International Edition.					
R.K. Bhatnagar & R.K. Palta, “ <i>Earthworm Vermiculture and Vermicomposting</i> ”, Kalyani Publishers, No. 1, Mahalakshmi Street, T. Nagar, Chennai -600 017.					
M.R. Gnanamani, <i>Modern Aspects of Poultry Keeping</i> , Deepam Publication, Madurai.					
Ganga, G., & Sulochana chetty, J. “ <i>An Introduction to Sericulture</i> ”, Oxford & IBH Publishing Co.					

Pvt., Ltd., 66, Janpath, New Delhi-110 001.

Kotpal RL, Agarwal SK & Khetarpal RP *Invertebrates*, Rastogi Publications, Meerut.

Kotpal RL *Modern Text Book of Zoology Vertebrates*, Rastogi Publications, Meerut.

Chapman JL & Reiss MJ, *Ecology: Principles and Applications*, Cambridge University Press, New Delhi.

Outcomes	<ul style="list-style-type: none">• On completion of the course, students are able to understand animal diversity• Students will get self-employment through animal rearing.• Students will execute IPM and improve agriculture.• Students will learn to prevent, care and control of vector borne diseases and establish good public health..
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Allied – IA				
Course Code: 22BZOAP1	GENERAL & APPLIED ZOOLOGY	T/P	C	H/W
		P	2	2
SECTION-A Dissection/experiment/analysis	Earth worm digestive system/nervous system/ Blood grouping and Rh Factor for self and class students			
SECTION-B Mountings	Mouth parts of cockroach/House fly/ Earthworm body setae/ penial setae			
SECTION-C Museum specimens/slides/models and charts	One specimen for each phylum in invertebrate. Any three fresh water and 3 marine fishes, Any two insect pests of paddy, coconut, cotton and brinjal. Any two venomous and two non-venomous snakes. Debeaking, feeders, drinker and waterer in poultry.			
SECTION-D	Identify and comment on the Corals, Malarial Parasite, Ascaris and Filarial worms, Silk worm, Honey Bee, Ticks and Mites of Poultry.			
SECTION-E	<ul style="list-style-type: none"> ▪ Preserve any two insect pest and prepare a report on its name, lifecycle, damaging crops and management of the pest using different methods 			
SECTION-F	<ul style="list-style-type: none"> ▪ Bonafide Record of the work done in laboratory must be submitted while attending the examination. 			
SCHEME OF EVALUATION				
Earth worm digestive system/nervous system/ Blood grouping and Rh Factor for self and class students			15 Marks	
Mouth parts of cockroach/House fly/ Earthworm body setae/ penial setae			5 Marks	
Identify, sketch and comment on the spotters given			15 Marks	
Identify and comment on the Corals/Malarial Parasite/ Ascaris /Filarial worms/ Silk worm/ Honey Bee / Earthworm			5 Marks	
Preserve any two insect pest and prepare a report on its name, lifecycle, damaging crops and management of the pest using different methods			10 marks	
Bonafide Record of the work done in laboratory must be submitted while attending the examination.			10 Marks	
Total			60 Marks	

* Offered by B.Sc. Zoology for Other Department Students.

Course code: 22BZOA2	ALLIED – IB	T/P	C	H/W
	CONCEPTUAL ZOOLOGY	T	3	3
Objectives	<ul style="list-style-type: none"> ➤ To understand the structure and purpose of basic components of prokaryotic and eukaryotic cells ➤ To understand the cell organelles, its importance and the process of cell division in both somatic and germ cells. ➤ To understand fertilization and development of embryos. ➤ To understand the concept of gene and mechanism of inheritance. ➤ To understand inborn errors due to defect in genes and chromosomes ➤ To enlighten the basics of human circulatory system and its defects. ➤ To create awareness on basics of cancer ➤ To understand transgenic animal technology ➤ To create awareness on pollution and its impact 			
Unit-I	CELL BIOLOGY <ol style="list-style-type: none"> 1. Prokaryotes & Eukaryotes. 2. Cell division – mitosis & meiosis. 3. Nucleic acid – DNA structure. Types of RNA and its functions 4. Cell organelles: Lysosomes, Mitochondria, Golgi Complex 			
Unit-II	DEVELOPMENTAL BIOLOGY <ol style="list-style-type: none"> 1. Placenta in mammals. 2. Test tube babies 3. Cancer. 4. Stem cells and its applications 			
Unit -III	GENETICS <ol style="list-style-type: none"> 1. Mendelian traits in man & Pedigree analysis. 2. Sex determination in man. 3. Syndromes [Klinefelter, Turner, Down & Cri-du-Chart] in man. 4. Eugenics & eugenics. 			
Unit -IV	Animal physiology and Ecology Blood groups – antigen & antibody reactions, Rh incompatibility, blood sugar & cholesterol. <ol style="list-style-type: none"> 1. Structure and functions of Human heart – functional disorders and reasons – ECG 2. Menstrual cycle & birth control in man. 3. Air pollution, water pollution, Noise pollution and Global warming. 			
Unit -V	Introduction to biotechnology : <ol style="list-style-type: none"> 1. Gene cloning – introduction of rDNA into cells – Identification of rDNA. 2. Transgenic animals – Transgenic Fish, Sheep and Pig. 3. Fermentation technology 			
Texts Prescribed				
Arumugam.N 2013 “Cell Biology” Saras publications.				
Arumugam.N 2013 “ Developmental Zoology” Saras publications.				
Meyyan R.P. 2013 “Genetics” Saras publications.				
Arumugam.N 2013 “Animal Physiology” Saras publication.				
V.Kumaresan – “Biotechnology”, Saras Publication., Nagercoil.				
Reference Books:				

Pawar CB, Cell Biology, Himalaya Publications

Balnisky BI An Introduction to Embryology, W.B. Saunders and Co.

Strickberger MW, Genetics, Pearson publishers.

Verma PS & Agarwal VK Genetics, S. Chand Publishers, New Delhi.

Tyagi BS, Agarwal VK & Verma PS Animal Physiology S. Chand Publishers, New Delhi

Outcomes	<ul style="list-style-type: none">➤ Students will get a clear idea on genetic materials and its importance➤ Students will improve their health through eugenics and stem cells➤ Student will find solution for their reproductive issues➤ Students will establish a healthy environment and prevent pollution➤ Students can utilize genetic engineering , genetically modified animals and fermentation technology for their successful livelihood.
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Course code: 22BZOAP2		ALLIED Practical– IB CONCEPTUAL ZOOLOGY			T/P	C	H/W
					T	3	3
SECTION-A Dissection/experiment /analysis	<ul style="list-style-type: none"> • Testing blood grouping and Rh Factor • Mitotic cell division in onion root tip • Observing Meiotic Cell division in Grasshopper • Monohybrid and Dihybrid cross using beads 						
SECTION-B Mountings/Slides/Id entification analysis	<ul style="list-style-type: none"> • Identify 2 Mendelian traits in human/ Mount buccal epithelial cell and observe chromosomes 						
SECTION-C Museum specimens/ slides/models and charts	<ul style="list-style-type: none"> • Identify, sketch and comment on the spotters: DNA and RNA structure. Cell organelles Nucleus, Lysosomes, Mitochondria and Golgi Complex. Mendelian traits and pedigree analysis in man. Types of placentas. Male and female contraceptive devices 						
SECTION-D	<ul style="list-style-type: none"> • Identify and comment on the Syndromes [Klinefelter, Turner, Down & Cri-du-Chart] in man 						
SECTION-E	<ul style="list-style-type: none"> ▪ Bonafide Record of the work done in laboratory must be submitted while attending the examination. 						
SCHEME OF EVALUATION							
Testing blood grouping and Rh Factor/Mitotic cell division in onion root tip /Observing Meiotic Cell division in Grasshopper					15 Marks		
Find out the type of given Mendelian trails in man (Reasons should be given) / Mount buccal epithelial cell					10 Marks		
Identify, sketch and comment on the 5 spotters given					15 Marks		
Identify and comment on any one of the Syndromes [Klinefelter, Turner, Down & Cri-du-Chart]					5Marks		
Bonafide Record of the work done in laboratory must be submitted while attending the examination.					15 Marks		
Total					60 Marks		

Course code 22BZOA3		ALLIED –IIA	T/P	C	H/W
		FOOD MICROBIOLOGY	T	3	3
Objectives	<ul style="list-style-type: none"> ➤ To introduce students about the microbes and its types ➤ To create awareness about food quality and food contamination due to microbes ➤ To create awareness about Food poisoning, food infection and food borne diseases ➤ To create awareness on probiotics and microbes responsible for food spoilage ➤ To enhance students' employability skill in Food industry ➤ To develop skills to identify and culture microbes. ➤ 7. To develop skills in sterilization techniques 				
Unit -I	<p>Introduction and History of Microbiology – The theory of spontaneous generation, gene theory of disease, Louis pasteur's experiment. Different terminology of Nutrition Heterotrophic nutrition, autotrophic nutrition, saprophytic, holozoic, host, culture, parasite. Bacteria – Morphology, reproduction, growth curve, nomenclature, genera of bacteria importance in food microbiology. Observation of motility of bacteria in bottle milk. Mold – Morphology, reproduction, physiology and nutrition. Demonstration of mold growth in bread.</p>				
Unit-II	<p>Yeast – classification Morphology, physiology, nutrition and reproduction process of hybridization, importance of yeast in food. Observation of yeast cells Virus – Occurrence, morphology, reproduction, human viral disease caused by virus. Algae – Occurrence, morphology, reproduction, importance of algae. General principles underlying spoilage – fitness and unfitness of food for consumption, causes for spoilage, factors affecting the growth of micro organism in food.</p>				
Unit -III	<p>Contamination and kinds of micro organisms causing spoilage of cereal products – grains, flour, baked products and cake. Contamination and kinds of micro organisms causing spoilage of fruits and vegetables and their products – fruit juice, pickles. Contamination and kinds of micro organisms causing spoilage of fleshy foods–meats, Poultry and fish. Observation of milk spoilage.</p>				
Unit - IV	<p>Contamination and kinds of micro organisms causing spoilage of eggs, milk and milk products – cream and butter. Contamination and kinds of micro organisms and spoilage of fats and oils, bottled beverages, spices and condiments. Food poisoning, food infection and food borne diseases. Micro organism in air, air borne diseases.</p>				
Unit -V	<p>Micro-organisms in Water – sources, bacteriological examinations, total count, test of <i>E.coli</i>, purification of water, water borne diseases. Micro organisms in sewage and sewage disposal. Destruction of bacteria – sterilization, physical agents, light, desiccators, electricity, heat and chemical agents. Visit to microbiology lab to learn most probable number</p>				
Books for Reference:					
Frazier WC, Food Microbiology Mc Green Hill Book, 1985					
Sullia SB and S Shantharam – “General Microbiology” Oxford and IBH Publishing Ltd., 1998.					
Michael J.Pelczar, E.C.S.Cahn & Noel R.Kruef – Microbiology, Tata McGraw-Hill Edition – 1993					
Nicklin J. Graeme – Cook K, Page& Killington R – “Notes in Microbiology” Bros Scientific Publishers – Preprinted 2001, 2002.					
Eugene Rosenlarg & Irun R. Cohea – Microbial Biology – Holt-Saunders International Editions 1983					

Outcomes

- On completion of the course, students are able to identify microbes involved in food industry.
- Students will possess skills to identify, culture microbes involved in the food industry.
- Students will have knowledge and skills in sterilization techniques to prevent food contamination and food spoilage
- Students will get employment Food industry.
- Students will able to develop small scale food industry.
- Students will learn to find out adulteration in food and help to establish good public health.

Course code 22BZOAP3	ALLIED -IIA FOOD MICROBIOLOGY		T/P	C	H/W
			P	2	2
SECTION-A Experiments/observation/demonstration/Analysis	<ul style="list-style-type: none"> ➤ Culture Techniques, Isolation and Preservation of Cultures – Broth: flask, test tubes; Solid: Pour plates, streak plates, slants, stabs. ➤ Methylene blue reduction test ➤ Microbial analysis of spoiled food – Bread and Vegetable ➤ Adulteration tests for some common foods ➤ Direct microscopic examination of curd – observation of lactobacilli ➤ Alcohol production / wine (demo) ➤ Motility of bacteria in bottle milk. ➤ Demonstration of mold growth in bread ➤ Observation of milk spoilage 				
SECTION-B Microscopic observation	Microscopic observation of Bacterial motility/ Yeast cell				
SECTION-C specimens/slides/models/techniques	Identification of food spoilers –Bacteria, algae, fungi and moulds. Culture techniques/ Sterilization techniques				
SECTION-D Comment on the instruments	Instruments used for culture/ sterilization				
SECTION-E	Industrial visit to any one Food Factory /Laboratory visit /Food Microbiology Institutional visit and preparation of report				
SECTION-F	Bonafide Record of the work done in laboratory must be submitted while attending the examination.				
SCHEME OF EVALUATION					
Microbial analysis of spoiled food [or] Any one Food Adulteration tests for some common foods with descriptive procedure and inference				10 Marks	
Microscopic observation of Bacterial motility/ Yeast cell				5 Marks	
Identify, sketch and comment on the 5 bacteria/algae/moulds of Food Microbiology given				15 Marks	
Identification and comment on the instruments used in Food Microbiology				5 Marks	
Industrial visit to any one Food Factory /Laboratory visit /Food Microbiology Institutional visit report				10 marks	
Bonafide Record of the work done in laboratory must be submitted while attending the examination.				15 Marks	
Total				60 Marks	

Course code 22BZOA4		ALLIED –IIB	T/P	C	H/W
		FOOD PRESERVATION	T	3	3
Objectives	<ul style="list-style-type: none"> ➤ To introduce general principles and methods of food preservation.to students ➤ To introduce different types preserved food and its techniques ➤ To introduce high temperature and dehydration techniques used in food preservation ➤ To introduce cold storage and preservation techniques to the students ➤ To introduce chemical methods in food preservation ➤ To introduce radiation techniques and equipment in food preservation ➤ To introduce packing materials and techniques in food industry. 				
Unit -I	<p>Food preservation – Definition, General Principles and Methods of Food Preservation. Preservation by addition of sugar – General principles and methods of preparation of jams, jellies and Marmalades, theory of gel formation. Preparation of preserves, squashes & syrups. Preservation by addition of salt-Pickling. Preparation of Indian Pickles. Status & scope of food processing industry in India in developing Entrepreneur.</p>				
Unit-II	<p>Preservation by Use of High Temperature – Pasteurization, Sterilization and their types. Thermal death curve, calculation of process time, methods of heat transfer. Canning – steps, types of cans, advantages, disadvantages. Bottling – steps, advantages, disadvantages.</p> <p>Food dehydration – concept of dehydration and sun drying. Types of driers – advantages, disadvantages. Principle of dehydration – heat and mass transfer.</p>				
Unit -III	<p>Preservation by use of Low Temperature, Types – Common types of cold storage, refrigeration – requirement of refrigerated storage, characteristic of refrigerant, refrigeration during transport, defects in cold storage. Freezing – Principles and methods of freezing, Freeze drying. Advantages and disadvantages.</p>				
Unit -IV	<p>Preservation with chemicals</p> <ol style="list-style-type: none"> a)Mechanism of microbial inhibition, mechanism and action of preservatives in processed food b)Inorganic & Organic preservatives. c)Antibiotics d)Mold inhibitors. e)Antioxidants and its role. 				
Unit -V	<p>Radiation of Foods</p> <ol style="list-style-type: none"> a)Mode of action of irradiation, radiation effect on proteins enzyme system b)Microwave heating, properties of microwaves, applications in food processing and preservation. 				
Books for Reference:					
<p>The technology of food preservation – NV Desroisier</p> <p>Food Science – Norman Potter</p> <p>Food Technology – Prescott and Procter</p> <p>Technology of food preservation – ICAR</p> <p>Food Microbiology – W C Frazier</p> <p>Preservation of Fruits and Vegetables – Siddappa S G, ICAR New Delhi</p>					
Outcomes	<ul style="list-style-type: none"> ➤ Students will get employment opportunities in food preservation industries. ➤ Students will develop small business in food industries and get self-employment. ➤ Students will get a chance to become an entrepreneur in food industry. ➤ Students will possess skills to develop different containers and packing materials required for food preservation. ➤ Students will have a wide spectrum of knowledge and skills in sterilization, radiation, dehydration, cold storage, high temperature and chemical methods of preservation. ➤ Students will be able develop different food products 				

Course code 22BZOAP4	ALLIED Practical-IIB FOOD PRESERVATION	T/P	C	H/W
		P	2	2
SECTION-A Experiments/observation/demonstration/Analysis	Methods of Food Preservation: 1. using salt and sugar. 2. Drying and Dehydration 3. Chemical preservation Test: 4. Food Adulteration tests for some common foods. 5. MBR test Analysis: 6. Sensory analysis of preserved and processed foods. Preservation and bottling: Preservation and bottling of fruit and vegetable products.			
SECTION-B Microscopic observation	Microscopic examination of Curd / Milk			
SECTION-C Comment on the instruments	Types of instruments used in food preservation			
SECTION-D Comment on the techniques	Techniques of food preservation			
SECTION-E	Industrial /Institution visit and preparation of report			
SECTION F	Bonafide Record of the work done in laboratory must be submitted while attending the examination.			
SCHEME OF EVALUATION				
Any one food adulteration test for common food/MBR test with descriptive procedure and inference/			10 Marks	
Microscopic examination of Curd / Milk and infer comments			5 Marks	
Identify, sketch and comment on the instruments used in food preservation			15 Marks	
Identify and Comment on the techniques given			5Marks	
Industrial / Institutional visit report			10Marks	
Bonafide Record of the work done in laboratory must be submitted while attending the examination.			15 Marks	
Total			60 Marks	