MANONMANIAM SUNDARANAR UNIVERSITY
TIRUNELVELI

UG COURSES – AFFILIATED COLLEGES

B.Sc. Zoology

(with effect from the academic year 2016-2017 onwards)
(44th SCAA meeting held on 30.05.2016)

Sem.	Pt. I/II/ III/ IV/ V	Sub No.	Subject status	Subject Title	Hrs./ week	Cre dits	Marks				
							Maximum			Passing minimum	
							Int.	Ext	Tot.	Ext.	Tot.
V	I	33	Core - 7	Animal Physiology	4	4	25	75	100	30	40
	II	34	Core - 8	Animal Biotechnology	4	4	25	75	100	30	40
	III	35	Elective - 1	(**Select any one**) A). Sericulture B). Economic Entomology C). Dairy Farming	5	5	25	75	100	30	40
		36	Elective - 2	(**Select any one**) A). Apiculture B).Food and Food Processing Technology C). Poultry Science	5	5	25	75	100	30	40
		37	Practical -5	Exam at the end of the sixth semester	3	-	50	50	100	20	40
		38	Practical - 6	Exam at the end of the sixth semester	3	-	50	50	100	20	40
		39	Practical - 7	Exam at the end of the sixth semester	2	-	50	50	100	20	40
	IV	40	Skill Based subject (Common)	Personality Development/ Effective Communication/ Youth Leadership	4	4	25	75	100	30	40
				Subtotal	30	22					

Sem.	Pt. I/II/ III/ IV/ V	Sub No.	Subject status	Subject Title	Hrs./ week	Cre dits	Marks				
							Maximum			Passing minimum	
							Int.	Ext	Tot.	Ext.	Tot.
VI	I	41	Core - 9	Evolution	6	4	25	75	100	30	40
	II	42	Core - 10	Immunology and Microbiology	6	4	25	75	100	30	40
	III	43	Core - 11	Biostatistics, Computer applications & Bioinformatics	5	4	25	75	100	30	40
		44	Elective - 3	**(Selective any one**) 1. Aquaculture 2. Medical Laboratory Technology 3. Marine Biology	5	5	25	75	100	30	40
		45	Practical -1	Exam at the end of the sixth semester	3	4	50	50	100	20	40
		46	Practical - 2	Exam at the end of the sixth semester	3	4	50	50	100	20	40
		47	Practical - 3	Exam at the end of the sixth semester	2	4	50	50	100	20	40
				Subtotal	30	29					

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology) Semester -V/Core -7

ANIMAL PHYSIOLOGY

OBJECTIVE

Carving an integrated approach to chemistry related to the functional significance of the various organs and organ systems of animals.

UNIT I

- Introduction – Animal physiology and Biochemistry
- Carbohydrates – Classification – Structure and functions of glucose, fructose, sucrose and glycogen
- Proteins – classification – structure and function of albumin and glyco proteins.
- General structure of amino acids – essential, non essential amino acids.
- Lipids – classification – structure and functions of lecithin, Cephalin, glycol lipids and cholesterol
- Prostaglandins – Introduction – Structure – Classification – Functions.

UNIT II

- Enzymes – classification – Nomenclature and properties – Mechanism of enzyme action.
- Digestion – Role of enzymes in carbohydrate,Protein and Fat Digestion in man absorption of digested food materials in man.
- Metabolism – Carbohydrates – Glycogenesis, glycogenolysis, glycolysis – Krebs's cycle.
- Protein's – Deamination – Transamination – Urea cycle.
- Lipids – β-Oxidation.

UNIT III

- Respiration – respiratory pigments – Distribution – composition – properties – Functions – Transport and exchange of oxygen and carbon-di-oxide - Anaerobiosis-Respiratory Quotient.
- Circulation – Origin and conduction of heat beat – cardiac cycle – ECG – Blood pressure – Heart diseases – Artherosclerosis, Angiogram.
- Excretion – kinds of excretory products – structure of kidney – Nephron – Mechanism of urine formation in man – composition of urine – Nephritis – Dialysis.

UNIT IV

- Muscle Physiology – types of muscles - Ultra structure of skeletal muscle – properties – mechanism of muscle contraction – Tetanus – Muscle fatigue
- Nerve Physiology – structure, types and functions of neuron.
- Nerve impulse – Definition – Conduction of nerve impulse through nerve – Saltatory conduction – Synapse – Synaptic transmission of impulses – Neurotransmitters – Neuromuscular junction.

UNIT V

- Endocrine system – Fine structure and functions of Pituitary, thyroid, Parathyroid, Adrenal, Islets of Langerhans – Testis, Ovary.
- Reproductive Physiology - Ovary, Graafian follicles, menstrual cycle, pregnancy,lactation, menopause - the role of hormones.

PRACTICALS

- Rate of Oxygen consumption in a fish.
- Effect of temperature on the opercular movement of fish – Calculation of Q10.
- Action of salivary amylase in relation to enzyme concentration.
- Qualitative test for carbohydrate (glucose), protein and lipid.
- Demonstration of blood pressure using sphygmomanometer.
- Estimation of Haemoglobin – demonstration only.
- Counting of different kinds of blood cells using haemocytometer – demonstration only.
- Qualitative test for ammonia,Urea and Uric acid.

SPOTTERS

- Slides, models and charts – glucose, fructose, glycogen, sucrose, Aminoacid, Cholesterol, Intestinal Villi, Haemoglobin, myoglobin, ECG, Sphygmomanometer, Haemometer, Haemocytometer, Kymograph, Cardiac Muscle, Striated and Non – Striated Muscle, Simple Muscle Twitch.

REFERENCE BOOKS: ANIMAL PHYSIOLOGY

1. Agarwal, R.A, A.K. Srivastava and Kaushal Kumar. Animal Physiology and Biochemistry (third edition).S.Chand & Company Limited, New Delhi.
2. Arora, M.P. Animal Physiology (sixth edition) Himalaya Publishing house, Ramdoot, Dr. Bhalerao Marg, Girgaon, Mumbai.
3. Berry, A.K. A Text Book of Animal Physiology with related Biochemistry (6^{th} Edition). EMKAY Publications, Post box No.9410. B – 19 East Krishna Nayar, Swami Dayanad Marg, Delhi.

4. Das, A.K. Medical Physiology, Vol. I and Vol. II Books and allied (P) Limited, No.1 E/2 Shubam Plaza (1st Floor), 83/1 Beliaghata Main Road, Kolkata.
5. Goyal, K.A and K.V. Sastry, Animal Physiology,6th Revised Edition, Rastogi Publication, Gangotri, Shivaji Road, Meerut.
6. Guyton, A.C. (1981).Text Book of Medical Physiology, W.B. Saunders co.
7. Hill. Animal Physiology, ANE Books India, Anantika Niwas,19 Doraiswamy Road, T-Nagar,Chennai.
8. Hoar, W.S.(1975). Text Book Of Medical Physiology, W.B.Saunders Co.
9. Juneja, Kavita, Animal physiology. Anmol Publications Pvt. Ltd, 4374/4B Ansari Road, Daryaganj. New Delhi
10. Nagabhushanam, R.M.S. Kodarkar and R. Sarogini. Text Book of Animal Physiology 2nd Edition. Oxford & IBH Publishing Company Private Limited, S – 155, Panchshila Park, New Delhi.
11. Nigam, H.C. Animal Physiology. Vishal Publishing Company, Books Market Old Railway Road, Jalandhaar.
12. Prosser, L. and A. Brown Comparative Animal Physiology. Saunders & Co. Philadelphia.
13. Prosser,C.L.(1978). Comparative Animal Physiology. W.B. Saunders co.
14. William, S. Hoar, General and Comparative Physiology. Prentice – Hall of India, M-97 Connaught Circus, New Delhi.

REFERENCE BOOKS:BIO CHEMISTRY

1. Agarwal , G.R. Kriran Agarwal and O.P Agerwal, Text Book of Biochemistry (Physiological chemistry),Krishna Prakashan Media (P) Limite ,11 Shivaji Road, Meerut.
2. Berry, A.K. A Text Book of Biochemistry. EMKAY Publications, Post Box No.9410, B -19 East Krishna Nager, Swamy Dayanand Marg, Delhi.
3. Deb, A.C Concepts of Biochemistry (Theory + Practical).Books and Allied (P) Limited, Nol – E/1, Shubham Plaza (1st Floor) 83/1, Kolkata.
4. Jain, J.L, Sanjay Jain and Nitin Jain, Fundamentals of Biochemistry (6th Edition).S. Chand & Company Limited,7361 Ram Nager, New Delhi.
5. Jeyaraman, K. Laboratory Manual in Biochemistry, New Age International Publishers,4835/24 Ansari road,Darya Ganj, New Delhi.
6. Power and Chatwal.Biochemistry. Himalaya Publishing House, Ramdoot, Dr.Bhalerao Marg, Giragaon, Mumbai.
7. Rastogi, S.C. Biochemistry. Tata Mc Graw Hill Publishing Company Limited,No.444/1 Sri Emabara Naicker Industrial Estate, Alapakkam, Porur, Chennai.
8. Satyanarayana, U.Biochemistry. Books and Allied (P) Limited, Nol – E/1,Shubham Plaza(1st floor) 83/1,Kolkata.
9. Weil ,J.H General Biochemistry, New Age International Publishers,4835/24 Ansari Road, Darya Ganj, New Delhi.

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology)/Semester-V/ Core - 8

ANIMAL BIOTECHNOLOGY

UNIT: I

Definition, History old and new Biotechnology, Scope and importance of biotechnology. Biotechnology in India. Research promotions and priorities in India, Restriction enzymes; enzymes useful for genetic engineering.

Steps in Gene cloning – preparation of desired DNA, Isolation of Plasmid vector, Insertion of desired gene into vector DNA, Introduction of recombinant DNA into host cells - prokaryotic and Eukaryotic animal cells. (Transformation, Transfection, Transduction, Microinjection, Biolistics, Electroporation, Liposome fusion). Screening and selection of recombinants. (Insertional inactivation, blue-white selection, Direct selection), Hybridization techniques (Colony hybridization), Blotting techniques (Southern, Northern and Western).

UNIT: II

Genomic library, DNA probe, cloning vectors: Plasmids – types, characteristic features, properties of an ideal gene cloning vector. Plasmid vector ($_{p}$BR 322,$_{p}$UC8, Ti plasmid), Bacteriophage vector (Lambda phage and M13), cosmid, phagemid, plant viral vector (CaMV), Animal Viral Vector (SV40); Yeast artificial chromosome, Transposons as vectors. Gene Amplification through PCR.

UNIT: III

Animal cell and Tissue culture: Requirements for animal cell culture laboratory, substrate, liquid media and gases; Maintenance of aseptic condition, Explant, Isolation of Explant, culture of Explant, disaggregation of Explants; Primary culture, secondary culture, subculture, prevention of contamination storage of animal cells (cryopreservation) Large scale culture – (Mono layer culture), Bioreactors – (CSTB and Air lift Bioreactor), Organ Culture: Techniques, advantages, applications Artificial skin & Cartilage. Stem cell culture.Hybridoma technology / Monoclonal antibody production.

UNIT: IV

Transgenic animal technology – Introduction, Methods of trans genesis (Any 3 methods), Dolly, applications.Gene therapy – Definition, classification, Bone marrow and Liver transplantation.Enzyme technology: Definition, Production of β Galactosidase enzyme, Enzyme immobilization and their application.

Bioethics: Intellectual property right, patenting of Biotech products. Bio safety – definition, Biosafety guidelines in India.

UNIT: V

Applied Biotechnology:-

Biotechnological methods of sewage water treatment – primary, secondary and tertiary treatment.

Bioremediation: Definition, types, Role of genetically engineered organisms in bioremediation (Super bug, phyto remediation)

Biofuel: - Ethanol, Biogas.

Aqua culture technology: - DOT-ELISA, Gene probe PCR.

Human genome project; DNA finger printing techniques and its application in forensic medicine,

Microarrays, Biochip, Bioweapons.

PRACTICAL

1. Isolation of genomic DNA – Demonstration.
2. Isolation of plasmid – Demonstration
3. Protoplast preparation and fusion – Demonstration
4. Estimation of Co_2 in any three effluent / sewage water samples – (Individual)
5. Isolation of Protein by PAGE – Demonstration.
6. Models / charts / photos**:**PBR 322, PUC 8, Ti plasmid, Lambda Phage, M13 Phage, SV40, CaMv, Restriction enzyme, recombinant DNA, Gene cloning, Electroporation, Microinjection, Lipofection, Southern blotting, Monoclonal antibody, stem cells, Dolly, Trans genesis, Animal cloning, organ culture, Anaerobic digester, Fermentor.

REFERENCE BOOKS:

1. Prof.V. Kumaresan,"Animal Biotechnology", Saras Publication, A.R.P. Camp Road, Periavilai, Kottar P.O.,Nagercoil, K.K.Dist., - 629 002.
2. Kumar H.D." A text book of Biotechnology,Affiliated East – West Press(P) Ltd., New Delhi.
3. Animal Biotechnology,2006,R.Sasidhara,MJP Publishers,Chennai.
4. Dubey R.C "A text book of Biotechnology"S.Chand & Co.,Ltd.,New Delhi.

SERICULTURE

OBJECTIVE

To explore the scope for students adopting sericulture as a vocation after their graduation as it is rural based and welfare oriented agro based industry.

UNIT I

Importance of sericulture, sericulture industry in India, sericulture as cottage industry, role of Central Silk Board, Moriculture, Mulberry varieties – High yielding varieties – Varieties for rainfed conditions. Morphology of mulberry plant, methods of propagation, irrigation, manuring – Biofertilizers – Green manuring – Triacontanol for increased mulberry productivity – Seriboost, pruning, harvesting and storing of mulberry leaves, package of practices for mulberry cultivation.

UNIT II

Diseases of mulberry – fungal diseases – fungal root diseases, fungal shoot diseases, Bacterial diseases – leaf blight disease, rot disease, Viral disease – mulberry leaf mosaic disease, dawn disease, Neamatode disease - root knot disease, Deficiency diseases – nitrogen deficiency, phosphorus deficiency, potassium deficiency, magnesium deficiency and calcium deficiency. Pests of mulberry – leaf eating insect pests and borer pests one example each.

UNIT III

Classification of mulberry silkworm, habit and habitats of silkworm, voltinism, races of silkworms, life cycle of mulberry silkworms, structure of egg, larva, pupa and adult, sexual dimorphism digestive system, circulatory system, excretory system, respiratory system, nervous system and reproductive system, endocrine glands, glands of silkworm.

UNIT IV

Rearing of silkworm: Rearing house – Rearing appliances – Rearing operation – Disinfection – Brushing – Maintenance of optimum conditions, Feeding – bed cleaning – spacing. Rearing of young ages – Chawki rearing - Rearing of late age larva: Shelf rearing. Floor rearing, shoot rearing. Application of sampoorna. Mounting: Methods – precautions, Cocoon marketing: Characteristics of cocoon – defective cocoons – methods of harvesting.

UNIT V

Diseases of silkworms; Protozoan – pebrine, Viral – Flacherie, gattine, grasserie Bacterial – Flacherie, septicemia, sotto, court, Fungal – Muscardine, Pests – Uzy fly, dermestid beetle of silkworm.Silk reeling: cocoon stifling – types, storage of stifled cocoons, sorting, cocoon, boiling and deflossing – brushing, Process of reeling: Different methods, silk waste and byproducts of silk reeling. Raw silk and marketing.

PRACTICALS:

1. Dissection of silk glands, digestive and nervous systems.
2. Dissection of male and female reproductive system.
3. Selection of mulberry leaves according to different stages.
4. Life history – egg, larva, pupa and adult.
5. Sexual dimorphism in larva, pupa and adult.
6. Mulberry varieties such as MR2, S30, S36, V2.
7. Chandrike.
8. Rearing tray and rearing stand.
9. Raw silk.
10. Report on field visit to sericulture farm.

REFERENCE BOOKS:

1.Ganga, G. and I. Sulochana Chetty, An introduction to Sericulture.Oxford & IBH Publishing Company Private Limited,S -155,Panchshila Park,New Delhi.

2.Ganga,G. Comprehensive Sericulture,Volume – 2 Silkworm Rearing and Silk Realing. Oxford & IBH Publishing Company Private Limited,S -155,Panchshila Park,New Delhi.

3.Dandin, S.B, Jayant Jayaswal and K.Giridhas, Hand Book of Sericultural Technologies,Central Silk Board,Madivala,Bangalore – 68.

4.Kamile Afifa. S and Masoodi M. Amin,Principles of Temperate Sericulture,Kalyani Publishers, B – 1/1292,Rajinder Nagar,Ludhians.

5.Kesary,M and M.Johnson,Sericulture,Department of Zoology,N.M.Christian College,Marthandam.

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology)
Semester-V/ Elective – 1(B)

ECONOMIC ENTOMOLOGY

UNIT I

Structure and salient features

Brief account of external morphology of head, thorax and abdomen; Classification and development (metamorphosis) of insects; Salient features (up to order) and economic important of Thysanura, Orthoptera, Odonata, Thysanoptera, Isoptera, Coleoptera, Lepidoptera, Hemiptera, Diptera, Hymenoptera, Dermaptera

UNIT II

Productive insects

Sericulture- Types of Silkworm, Life cycle and rearing of mulberry silkworm, *Bombyx mori*; Economic importance of silkworms

Apiculture – Types of honey bees, Life cycle and culture methods, bee product and its economic importance

Lac culture – Lac insect,*Laccifer lacca* - Life cycle, Lac processing, Lac products and Economic Importance

UNIT III

Beneficial insects

Biological control agents –Characters and different between parasitoids and predators (common Indian insects); General characters and beneficial role of scavengers, pollinators, weed killers; Medicinal and Aesthetic value of insects; Insect as human food (general account only)

UNIT IV

Insects of medical importance

General account on Personal Pests (Lice, Fleas, Bedbugs, Ticks, Scabies mites), Housefly, Cockroach, Biting insects (Mosquitoes, Biting Midges, Sandflies, Black flies, Horse Flies, Stable flies), Major insect-born disease and their management; Recent development in Forensic entomology

UNIT V

Pest management

Components of pest control – physical, mechanical, cultural, chemical and biological control; Pesticide applicators; Pesticide poisoning and first aids; Banned pesticides; General Principles, advantages and disadvantages of Integrated Pest Management; Recent advances in pest control – sterilization techniques, liquid vaporizers, pheromones, RNA interferences, kairomones

PRACTICALS:

1. Head sclerites, thoracic segments, abdominal segments of cockroach
2. Types of antennae. Filiform, Moniliform, Aristate, Capitate, Clavate, Clubbed, Plumose, Pilose, Pectinate, Bipectinate, Setaceous and Geniculate, Lamellate, Serrate. (Any two mountings and rest for study with photo/permanent slides) (Preferably pests)
3. Halter and wing of house fly
4. Types of legs- Typical, Cursorial, Fossorial, Saltatory, Natatorial and Scansorial (Mountings of any two and rest for study with photo/permanent slides).
5. Abdominal appendages- Styles, cerci of cockroach.
6. Mouthparts of Cockroach
7. Malpighian tubules (cockroach)
8. Collection, preservation and display of 5 insect types (Collection and preservation of insects other than pests be discouraged)
9. Common Insecticide formulations (display of samples)
10. Field visit / Assignment / Play and ponder. Give actual handling of bees/ silk moth / lac insect or visit to any one of these units.

REFERENCES BOOKS

1. Abhishek Shkula, 2009. A Handbook on Economic Entomology, Daya Publishing House, India
2. Ganga, G. & Sulochana Chetty, J. 1997. An introduction to Sericulture. Oxford & IBH Publ. Co. pvt. Ltd., India.
3. David, B.V.& Ramamurthy,V.V. 2016. Elements of Economic Entomology, 8th Edition, Brillion Publishing, India

DAIRY FARMING

UNIT I

Importance of the study – Live stock in India – Live stock reproduction – Organs – Fertilization – Artificial Insemination – Inheritance – Hybrids – Hybrid Vigor – Grading – Pure breeds – Inbreeding.

UNIT II

Nutrition – Nutritive values of common feeds – Commercial and mixed feeds – Balance ration.

UNIT III

Dairy animals – Cattle – Cow – Buffaloes – Goat – Their economic importance – Productivity.

UNIT IV

Live stock diseases – Common parasites in India – Treatment.

UNIT V

Marketing the diary products – Milk and other dairy products – Nutritive values of fresh and preserved products – Combating spoilage of milk – Souring – Gassy Curdling – Robiness – Sweet curdling – Pasteurization.

PRACTICALS:

1. Visit to pasteurization plant and reporting.
2. On the spot tests of pure milk – Specific gravity,total soilds and adulteration of milk.
3. Demonstration of Dairy products – Cream,Butter,Ghee,Khoa, and Ice cream.
4. Identification of cattle diseases – Prevention and Cure-Method of taking temperature in cows.
5. Preparation of Cattle Feed-Balanced food – Identification of different feed plants.
6. Artificial insemination – Common Surgical Instruments and their uses.
7. Periodical visit to a Good Dairy Farm and Reporting.

REFERENCE BOOKS:

1. Principles of Dairy Chemistry. Janness, Robert and Sturte Patton; Wiely Eastern.
2. Artificial Insemination in Farm animals: Perry Enos (Eds.) Oxford & IBH.
3. Breeding and Improvement of Farm animals: Rice, Victor, Arthur; Tata MC Graw Hill.
4. Livestock and Poultry Production: Singh, Herbans and Earl Moore; Prentice Hall in India.

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology)
Semester-V/Elective – 2 (A)

APICULTURE

Objective: To examine the scope for self employment opportunities after their graduation account of the rural based and welfare oriented nature of this vocation.

UNIT I

Definition, Scope, Classification of bees, Rock bee, Indian bee, Little bee and Dammer bee- their identification and habits, choice of species in Apiculture.

Bee colony-Distinctive features, Identification and Functions of queen,drones and workers, Structure and functions of Legs, mouth parts and sting of worker bee.

Development of Honey bee-egg,larva and pupa-time taken for the development of queen,drone and worker.Food of the bee- honey and pollen-royal jelly.

Artificial feeding.Behaviour of bees-dances

UNIT II

Principles of apiculture, Arranging an apiary, position-space-direction,acquiring bees-care of newly captured colonies-handling the bees.

Bee keeping-Primitive methods and their Advantages and Disadvantages. The bee comb and its architecture-Different kinds of cells-Burr comb.

Different types of Modern hives – Architecture- Parts of artificial hive and its advantages -other appliances used in apiaries.

UNIT III

Honey bee products.

Honey- Collection and Extraction, Preservation and storage –Physical properties,Chemical composition,nutritive value, medicinal values-honey as daliy food.

Bee wax-Production , method of extraction-characteristics and uses.

Bee venom-method of collection -composition of venom- its uses.

UNIT IV

Enemies of bees-Greater wax moth,lesser wax moth,ants,wasps,lice,beetles, birds and their management.Diseases of bees-adult and brood diseases- Bacterial,Fungal,Viral & Protozoan; Prevention and Control measures.

UNIT V

Swarming-Prevention and control.
Robbing and Fighting-Prevention and control.
Uniting stocks-Different methods.
Queen rearing.
Supersedure.
Foraging, inter-relationships of plants and bees

PRACTICALS

1. Mountings of Legs, mouth parts and sting.
2. Spotters:
   Queen, worker, Drone, Artificial hive,Queen excluder, smoker, honey extractor, honey, Bee comb and Comb foundation sheet.
3. Report on field visit to apiary.

REFERENCE BOOKS:

1. Mishra,R.C. and R. Garg. Perspectives in Indian Apiculture. Agrobios (India) behind Nasrani Cinema, Chopasani Road, Jodhpur-342 002.
2. Abrol,D.P. Bee Keeping in India. Kalyani Publishers, B-1/1292, Rajinder Nagar,Ludhiana-141 008.
3. Cherian, M.C. and Ramachandran. Bee Keeping in South India.
4. Philips, E.F. Bee Keeping,Agrobios (India) behind Nasrani Cinema, Chopasani Road,Jodhpur-342 002.
5. Sadar Singh, Bee Keeping in India Kar Delhi.
6. Sharma P.L and Singh, S.(controller) Hand Book of bee Keeping, printing and Stationery, Chandigarh.
7. Webb,A. Bee Keeping for profit and Pleasure, Agrobios (India), Behind Nasrani Cinema, Chopasani Road, Jodhpur-342 002

FOOD AND FOOD PROCESSING TECHNOLOGY

Objective:

To understand the physical and chemical properties of food stuff,the methods of preparation of palatable diets and the techniques employed to increase their shelf – life.

UNIT I :FOOD CHEMISTRY

Food chemistry: Definition and importance, water in food, water activity and shelf life of food. Carbohydrates: Chemical reactions, functional properties of sugars and polysaccharides in foods. Lipids: Classification and use of lipids in foods, physical and chemical properties, effects of processing on functional properties and nutritive value. Protein and amino acids: physical andchemical properties, distribution,amount and functions of proteins in foods, functional properties. Effects of processing- Losses of vitamins and minerals due to processing. Pigments in food, food flavours, browning reaction in foods. Enzymes in foods and food industry, Bio-deterioration of foods, food contaminants,additives and toxicants.

UNIT II: PRINCIPLES OF FOOD PROCESSING

Scope and importance of food processing – National and International perspectives. Principles and methods of food preservation – freezing, heating, dehydration, canning, additives, fermentation, irradiation, extrusion cooking, hydrostatic pressure-cooking, dielectric heating, microwave processing, aseptic processing, hurdle technology.Storage of food, modifiedatmosphere packaging. Refrigeration , freezing and drying of food, Minimal processing, Radiation processing.

UNIT III :

Definition of milk, composition, physical and chemical properties of milk Constituents and nutritive value of milk, Factors affecting composition of milk, Types of milk.Fluid Milk Processing. Receiving, Filtration & Clarification, Straining, Standardization, Homogenization and its Effects, Pasteurization and various systems of pasteurization ; LTLT, HTST , UHT methods, Pasteurizes(Heating and Cooling systems ,Flow controller regenerator,Flow division valve) sterilization, packaging of fluid milk. Coagulated Milk Products.Channa, Paneer, Classification and manufacturing process of cheese, butter and ghee and its storage. Condensed Milk-Types and factors affecting the quality of Condensed Milk , Storage of condensed milk - Methods of drying milk.(Drum and Spray drying) factors affecting the quality of dry milk. Introduction to instant non-fat dry milk, packaging of dry milk products.

UNIT IV :FRUITS AND VEGETABLES TECHNOLOGY

Cleaning, sorting, grading, peeling, and blanching methods and their Equipments, Ingredients and Processes for the manufactures of jam, jellies, marmalade, preserves, pickles and chutneys.Defects and factors affecting the quality of above. Thermal Processing of Fruits and Vegetables: History, definition,various techniques of thermal processing and their effects on the quality of fruits and vegetable products, thermal process time, introduction to concept of thermal process calculations,types of containers and their selection,spoilage of canned food.Dehydration of fruits and vegetables, equipment and process for dehydration of plums, apricot, apple , fig, grapes, peach, cauliflower,potato, mushroom, tomato. Freezing process of selected fruits and vegetables: Peas, beans, cauliflower, apricot and mushroom.

UNITV :TECHNOLOGY OF MEAT,FISH AND POULTRY PRODUCTS

Slaughter of meat animals,differentcutsof lamb and their uses,post-mortem inspection – postmortem changes- Loss of homeostasis, post-mortem glycolysis and pH decline, Rigor mortis. Preparatory operations of meats and meat products: Abattior- definition and construction, Basic preparatory procedures (commintion, emulsification, preblending). Cured and smoked meats,sausage products- classifications, processing steps and canned meat,meat pickles.Handling and Dressing of poultry: Inspection of poultry birds,dressing and preparation of ready to cook poultry, factors affecting the quality-Egg and Egg products-structure, chemical composition and nutritive value, spoilage of eggs and preservation of whole eggs and egg products,preparation of egg powder. Fish and fish products: Types of fish, composition and nutritive value, judging and freshness of fish,fish grading and cooking of fish, smoking, pickling, salting and dehydration , preservation of fish and processed fish products. Frozen storage of fresh and processed meat,fish and poultry. Byproducts of fresh and processed meat,fish,poultry and egg industry.

PRACTICALS:

1. Determination of Protein, Starch, Sugar, Amino acids, Crude fibers, Total minerals, Crude fat in food stuff.
2. Estimation of Vitamins – Ascorbic acid, Thiamine.
3. Browning reaction in food,Analysis of lipid-saponification value,acid value & Iodine Value.
4. Determination of Tannins-chemical residues and Aflatoxins,Estimation of Preservative and Antioxidants.
5. Platform test of Milk.
6. Determination of SNF, Specific gravity and total solids of milk.
7. Determination of moisture and fat content of milk powder.
8. Detemination of adulterants in milk like Water,Urea,Neutralizes,Preservatives and Starch.
9. Preparation of Channa and Paneer.

10. Preparation of different types of milk products and their evaluations.
11. Preparation of fish, Meat, Egg and Vegetable pickles – Demonstration.
12. Estimation of iron sulphide formation in cooked egg.
13. Visit to a Dairy Unit,Different fruit and vegetables processing unit,Slaughter house and observation of different types of cuts made and demonstration of slaughtering,fish processing unit and submit a report.
14. Equipments and appliances used in various food processing industries-observation.

REFERENCE BOOKS:

1. Food processing and nutrition – Bender A.E. – 1978 Academic Press,London.
2. Food processing technology: Principles and Practices.Fellows,P. and Ellis, A.1990,New York.
3. Introduction to food processing – Jelen,P.-1985.Prentice Hall,Reston Virginia,USA.
4. Food Chemistry – Awrand. W and Woods,A.E.1973.AVI,Westport.
5. Food Chemistry – Meyer,L.H.-1973.East West Press Pvt.Ltd,New Delhi.
6. Outlines of Dietary technology – Woarnes.
7. Preservation of fruits and Vegetables – Vijayakhader kalyani.
8. Preservation of fruits and Vegetables Srivastava,IBD Co.Lucknow.
9. Fish Preservation – S.K Kulsherestha.
10. Fish Processing and Preservation – C.L.Cutting.
11. Processed Meat- Pearson and Glite – CBS publishes.
12. Poultry,Meat and Egg Products – Parkursht and Mountney.CBS Publishers

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology)
Semester-V/Elective – 2 (C)

POULTRY SCIENCE

UNIT I

Poultry industry in India – a brief introduction.Choosing a commercial laying stock –sexing in one day old chicks.Poultry housing – General principles of building poultry house.
Deep litter system – Droppings pit – Feeders , Waters – Nest boxes.Laying cages – Californian cages – Management of cage birds

UNIT II

Poultry manure – Volume, Composition and values.Nutritional content of eggs.
Management of Chicks, Growers, Layers and Broilers.
Lighting for Chicks, Growers, Layers and Broilers.Summer and winter management.
Debeaking –Forced moulting

Unit III

Poultry nutrition : Protein and Amino acid requirements for chicks , growers ,layers and broilers – Symptoms of excessive dietary levels and deficiency.
Carbohydrates and Fat requirements for Chicks, Growers, Layers and Broilers – Symptoms of excessive dietary levels and deficiency.Fibre requirement for poultry feeds.Requirements of vitamins and inorganic minerals for Chicks, Growers and Layers – Deficiency Symptoms.

UNIT IV

Importance of feed additives in a poultry feed.Preparation of supplementary feed for poultry-South Indian feed ingredients in relation to M.E level, Protein level, Amino acid, Minerals (ca &p) and Fiber content.

UNIT V

Poultry diseases – Causes, Symptoms,Transmission, Treatment, Prevention and Control of the following diseases : Viral diseases - Ranikhit disease, Fowl pox, Infection and control bronchitis and Gumboro disease. Bacterial disease – Fowl typhoid, Paratyphoid, Pullorum, fowlcholera, Coryza and Mycoplasmosis. Fungal diseases – Aspergillosis and Aflatoxicosis. Parasitic disease – Coccidiosis. Nematode infections. Tape worm infections. External parasites of chicks – Ticks, mites and lice.

PRACTICALS :

1. Identification of Ectoparasites of poultry studied in the theory.
2. Identification of Endoparasites.
3. Feeders – Different types.
4. Waterers – Different types.
5. Cage house – Model
6. New castel disease, Fowl pox, Coryza, Coccidiosis- Diagrams or models
7. Debeaking
8. Visit to a poultry farm and reporting.

REFERENCES :

- Poultry keeping – M.R. Gnanamani
- The Rearing of pullets – Bulletin No. 54, Her majesty's stationary office, London
- Intensive Poultry management for egg production. Bulleting No. 152. Her majesty 's stationary office , London.
- Nutrition of Chicken - M.L Scott et al .,
- Disease of Poultry – Biester Oxford&IBH

EVOLUTION

UNIT I ORIGIN OF LIFE

Chemical origin of life – Biological experimental evidences.

Evidences in favour of evolution :

-Homologous organs and Analogous structures.

-Embryological evidences – palaeontology-geological scale – biochemistry and physiology.

UNIT II

Lamarckism and Neo – Lamarckism

Darwinism and Neo – darwinism.

Mutation theory of De vries

Modern concept of evolution :Natural selection – types and mechanism.

UNIT III :

Variations and Sources of Variability.

Isolation and Isolating mechanisms.

Population genetics and evolution :

- Hardy – weinberg law
- Species concept and speciation – types and mechanism

UNIT IV:

Mimicry and Protective Colouration .

Adaptations : Cursorial , Fossorial , Arboreal, Volant , Aquatic , Desert , Cave.

UNIT V :

Evolution of Horse.

Evolution of man- Ancestry of man-Salient features of Apes and Man- Trends in Human Evolution – Causes for Human Evolution- Evolution of man as seen in the fossil record.

Cultural Evolution of Man.

Animal distribution (Geographical) – Patterns of Distribution - Zoogeography of Palaearctic , Nearctic , Neotropical , Ethiopian , Oriental and Australian region.

PRACTICALS:

Museum specimens,slides,models and charts.

Animals of evolutionary significance: Peripatus,Archeopteryx,Limulus.

Colouration:Mimicry- Lycodon and Krait; Mutation-Peppered Moth, Ancon sheep,Stick insect,Leaf insect.

Reference books

- Organic Evolution- N.Arumugam
- Evolution- M.P.Arora
- Moody,Introduction To Evolution.
- Dobzhansky, Th.:Genetics And The Origin Of Species 1951,Columbia Uty.Press.
- Dodson, Evolution – Process and Product.

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology)/Semester-VI/ Core - 10

IMMUNOLOGY & MICROBIOLOGY

UNIT I

Historyand Scope of Immunology.Immunity-Type of Immunity-Innate & acquired,passive & active.Lymphoid organs –primary & secondary (Thymus, Bone marrow, Bursa of fabricius , Spleen, Tonsil, Lymph node, Peyer's patches) – Structure and Functions.

UNIT II

Immunoglobulin-Structure, Function, Biological properties of Ig classes.Interaction of Antigen and antibody.Salient features of antigen- antibody reaction.Types of antigen-antibody reaction – Agglutination, Precipitation, Opsonization, Cytolysis

UNIT III

Immune response-Lymphocyte as unit of immune system, stem cells - Structure and lineage, T cells, B cells & Macrophages.Humoral immune response- primary & secondary responses-B cell activation.Cell-Mediated immune response- Type of T cells & functions.Tumour immunology.

UNIT IV

Introduction : History & Scope of microbiology.General structure of microbes (Bacteria, virus).Bacterial growth : Culture media & selective media; Continuous & batch culture techniques, growth curve.

UNIT V

Food microbiology :Food poisoning ; Food spoilage & preservation.Industrial microbiology : production of Antibiotic penicillin.Soil microbiology : Role of soil microbes in N2 fixation.Medical microbiology : Diseases caused by bacteria in different systems of man as given below**:** Dermal – Streptococcal inflammation : - Tuberculosis; Gastro-intestinal-dysentery**:**Reproductive – Gonorrhea.Viral diseases with reference to causative organisms, symptoms, impact on the host & control measures,AIDS ,Rabies,Chicken pox,Measles,Influenza & polio.

PRACTICALS:

I .IMMUNOLOGY:

1.ABO blood grouping and Rh blood grouping.

2.Lymphoid organs in Rat(Demonstration only)

Spotters:

Charts, slides and figures:Stem cells, Phagocytes, Thymus, Bone marrow, Spleen, Lymph node, Immunoglobulin.

II . MICROBIOLOGY:

1.Simple staining of bacteria.

2.Gram-Staining of bacteria.

3.Serial dilution techniques.

4.Microscopic examination of living bacteria - hanging drop method.

5.Microscopic counting of microbes using haemocytometer (Demonstration only)

6. Measurement of microbes using ocular & stage micrometers (Demonstration only)

7. Preparation of culture media for microbes.

8. Distribution of microorganisms in nature-soil, water, & air.

9. Aseptic transfer of microbes & pure culture of bacteria and cultural characteristics of Micro-organisms.

Spotters:

Charts, slides and figures-Autoclave, Hot air oven, Agar plate, Agar stab, Agar slant, Inoculation needle.

REFERENCE BOOKS:

IMMUNOLOGY

1. Roitt, I. : Essential Immunology (ELBS).
2. Kuby : Immunology (W.H.Freeman)

MICROBIOLOGY

1. Pelczar, Reid & Chan: Microbiology.
2. Philip, L. Carpenter : Microbiology.
3. Powar : General Microbiology.
4. Salle,A.J: Fundamental Principles of Bacteriology.
5. Alexander, M : Introduction to Soil Microbiology.
6. Frazier,A.C. & Westhoff,D.C: Food Microbiology.
7. Burrows : Text Book of Microbiology.
8. Lakshmanan,M : Laboratory manual in Microbiology.
9. Moat & Foster : Microbial Physiology.
10. Rangaswami,G : Diseases of crop plants in India.
11. Patel,A.H.:Industrial Microbiology (MC . Millan India).

BIO STATISTICS, COMPUTER APPLICATIONS AND BIOINFORMATICS

UNIT I

Definition and scope; Data – Types & collection; Sampling methods – Variables – Discrete and continuous; Presentation of Data , Classification and Tabulation ; Parts of table. Diagrams and Graphs: Line diagrams, Bar Diagram, Pie diagrams, Histogram, Frequency polygon, Frequency poly curve. Measures of Central Tendency – Calculation of Mean, Mode and Median (Grouped and Ungrouped Data)

UNIT II

Measures of dispersion: Variance , Range , Standard Deviation and standard Error, Coefficient of variation. Chi – square test – Calculation and application, students't' Test. Correlation: Introduction , Types ,Perfect positive and negative, Linear and Non-Linear methods – Scatter diagram, Karl Pearson's correlation coefficient ; Interpretation of the Correlation coefficient.

UNIT III

Introduction to computer, Generation of computer – Components of computer, Input devices and Output devices – CPU – Primary and Secondary Memory operating system. Introduction to M.S. Office software, covering, word processing, spread sheet and presentation software. MS Word basics : Creating word document – File, edit, Format, Save menus, adding bullets, numbering and symbols – printing. MS Excel – entering and editing cell entries – adjusting row and column height – Pie-bar-line chart preparation. Uses of Internet – Email, Internet Browsing, World Wide Web(WWW), M.S Power point.

UNIT IV

Bioinformatics : Introduction – Definition of Bioinformatics – History – Importance of Bioinformatics – Scope and application of Bioinformatics – Components of Bioinformatics - Bioinformatics in life science. Biological sequence analysis – Sequence alignment – Pair wise sequence comparison – multiple sequence alignment.

UNIT V

Major Data bases in Bioinformatics – Nucleic acid sequence databases – EMBL – Genbank – Protein sequence database – SWISS – PROT . Databases similarity search Tools: BLAST FASTA – Application of bioinformatics tools. Database Retrieval Tools: ENTREZ – Locus link – Pub Med (Publishers on Medicine) SRS . Protein structure visualizing tools – RasMol, Swiss PDB viewer.

PRACTICALS:

1. Find out Mean, Median, Mode, Standard deviation, Standard error and co-efficient of variance using Neem leaf.
2. Calculation of correlation.
3. Bar diagram, Histogram, Pie diagram and frequency curve.
4. Models, Chart and Photos: Computer Mouse, CPU, Keyboard, Monitor.
5. Visit to a Computer centre to learn internet browsing and email sending – Compulsory for each student.
6. Take printout from NCBI,EMBL and PubMed and keep it for spotters.
7. Write some of the file commands and keep for spotters.

REFERENCE BOOKS:

BIO STATISTICS

1. Arora and Mathan. Bio Statistics (5th Edition). Himalaya Publishing House, Ramdoot, Dr.Bhalerao Marg,Girgaon,Mumbai – 400 004.
2. Daha, T.K. Biostatitics in Theory and Practics. EMKAY Publications, Post Box No.9410, B-19, East Akrishna Nagar, Swami Dayanand Marg, Delhi-110 051.
3. Gurumani. N, An Introduction to Biostatistics (computer Application included) 2nd Edition M.J.P. Publishers, Tamilnadu Book House, 47 Nallathambi street, Triplicane-600 005.
4. Jasra, P.K. and Gurdeef Raj. Biostatistics, Krishna Prakashan Media(P) Limited, 11, Shivahi Road, Meerut – 250 001
5. Parihar and Parihar. Biostatistics and biometry, Student Edition, Agrobios (India) Behind Nasrani Cinema,Chopasani Road,Hodhpur-342 002.
6. Pranab Kumar Banergee. Introduction to Biostatistics (2nd Edition). S. chand & Company Limited, 7361, Ram nager,New Delhi-110 055
7. Prasad, S. Elementa of Biostatistics. Rastogi Publications, Gangotri, Shivaji Road, Meerut 250 002.
8. Satguru Prasad – Fundamentals of Biostatistics (Biometry). EMKAY Publication, Post Box No.9410 B-19, East Akrishna Nagar, Swami Dayanand Marg, Delhi-110 051.

9. Pagano, M. and K. Gauvreau. Principles of Biostatistics. Thomas Learning, Alps Building,1st floor,56,Janpath,New Delhi.
10. Satgurau Prasad, Elements of Biostatistics, Rastogi Publications Gangotri, Shivaji Road, Meerut 250 002.

COMPUTER APPLICATIONS:

1. Krishnamoorthy, R. Computer Programming and applications.
2. Rajaram, V.Fundamentals of computers.

BIOINFORMATICS:

1. Bal, H.P. Bioinformatics principles and Applications, Tata Mc Graw Hill Publishing company Limited, No. 444/1 Sri Ekambara Naicker Industrial Estate,Alkapakkam, Porur, Chennai – 600 116
2. Dan, E.Krane and Michael L.Raymer.Fundamental concepts of Bioinformatics.Pearson Education (Singapore) PTE Limited, Indian Branch, 482 FIE Patparganj,Delhi-110 092.
3. Ignacimuthu, S.Basic Bioinformatics.Narosa Publishing House Private Limited,35-36 Greams Road,Thousand Lights, Chennai-600 006
4. Ranga, M.M. Bioinformatics,Agrobios (India) Behind Nasrani cinema, Chopasani Road,Hodhpur – 342 002.
5. C.S.V.Murthy Bioinformatics- Himalaya Publishing House.

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MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology)
Semester-VI/ppr.-29/ Elective (any one) - 3 (A)

AQUACULTURE

OBJECTIVE : To illustrate Aquacultural potential and practices in India and augment food production from aquatic resources through Aquaculture.

UNIT I

Definition, scope of aquaculture, cultural techniques, Aquaculture in India – Freshwater,Coastal and marine aquaculture – Culturable oraganisms – Fin fishes, Shell fishes and their qualities.

UNIT II

Preparation of pond for fish culture.
Types of fish ponds – Nursery pond, rearing pond and culture pond. Fin fish culture – Culture of Indian major carp – Bundh breeding,Induced breeding, Transport of fish seeds. Shell fish culture – culture of marine prawn – Induced breeding – Types of prawn culture in India.
Edible Oyster culture and Pearl Oyster culture.

UNIT III

Types of cultures – Extensive, Semi-intensive and Intensive culture, Monoculture,Monosex culture, Polyculture, Cage culture,Pen culture. Integrated fish farming – Paddy cum fish culture. Animal husbandary cum fish culture,Sewage fed fish culture.

UNIT IV

Fish feed – Artificial feed – feed formulation,need,ingredients,pellets.Live feeds and their culture – Artemia, Diatoms, Rotifers, Micro AlgaeDiseases of aquaculture organisms – Ectoparasites and Endoparasites.Bacterial, Viral and Fungal diseases – Nutritional deficiency diseases.

UNIT V

Government participation in aquaculture. CMFRI,CIFRI,MPEDA,FFDA.Post harvest technology in fishes – Rigor mortis, fish spoilage, fish preservation techniques – freezing,canning,drying. Fish marketing; Co-operative marketing in fisheries.Craft and gears.Water quality management.

PRACTICALS:

1. Determination of pH in two water samples using pH meter.
2. Estimation of Salinity, Dissolved oxygen and Alkalinity in two water samples.
3. Mountings;Placoid, Cycloid and Ctenoid scales.

4. Museum specimens,slides,models and charts**:**
   Catla,Rogu,Mrigal,Channa,Penaeus,Crossostrea,Raft culture,Pinctada,Argulus,Lernaea.

REFERENCE BOOKS:

1. Beavan, R. Handbook of Freshwater Fisherries on India. Narendra Publishing House,1417, Kishan Dutt street, Maliwara, Delhi – 110 006.
2. Biswas, K.P. Prevention and control of fish and prawn diseases, Narendra Publishing House,1417, Kishan Dutt street, Maliwara, Delhi – 110 006.
3. Dash, M.C. and P.N. Patnik, Brackish Water Prawn Culture, Palani Paramount Publications,69-D.,Anna Nager, Palani – 624602.
4. Dick Mills, Tropical Aquarium Fishes, Chencellor Press, Michelin House,81,Fulham Road, London SW3 6RB.
5. Jhingran, V.G. Fish and Fisheries of India, Hindustan Publishing Corporation (India), Delhi.
6. Khanna, S.S. Introduction of fishes, Central Book dept, Allahabad.
7. Latha Shenoy, Course Manual in Fishing Technology Central Institute of Fisheries Education (Indian Council of Agricultural Research), Versova, Bombay – 400061`.
8. Mary Chandy, Fishes. National Book trust.A-5,Green Park, New Delhi – 110 016.
9. Pandian, T.J., Sustainable India Fisheries. National Academy of Agricultural Sciences. ICAR, Ministry of Agriculture, New Delhi.
10. Parihar R.P. A Text Book of Fish Biology and Indian Fisheries. Central Publishing House, Allahabad.
11. Rath. R. K. Freshwater Aquaculture. Scientific Publishers.5A.New Pali Road Jodhpur,342001.
12. Santhanakumar, G and A.M. Selvaraj. Concepts of Aquaculture. Meenam Publications. Nagercoil Lekshmi Papers, Thirumal Complex, Opp. Chakkaravarthi theatre. Chettikulam Jn., Nagercoil – 629 002.
13. Sebastian. CD. A Manual on seed production and Farming of gaint Freshwater prawn Macrobrachium Rosenbergii. The Marine Product Export Development Authority MPEDA House, Panampilly Avenue, Kochi – 682 036.
14. Srivastava, C.B.L. A Text Book of Fishery Science and Indian Fisheries. Kitab Mahal Distributors,28,Netaji Subash Marg, New Delhi – 110 002.
15. Sundararaj, V. and B. Srikrishnadhas, Cultivable Aquatic Organisms, Narendra Publishing House,1417, Kishan Dutt street, Maliwara, Delhi – 110 006.

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology)
Semester-VI/ Elective (any one) - 3(B)

MEDICAL LABORATORY TECHNOLOGY

Objective : To learn the utility and the applications of the instruments so as to study the etiology of various diseases affecting human beings.

UNIT I

Medical Laboratory Personnel – Code of conduct, Laboratory requirements, Sterilization, Dry heat (Hot air oven),Moist heat (Autoclave, Pressure cooker),Laboratory equipments – Spectrophotometer, Incubator Refrigerator, Auto analyzer, Micro centrifuge, Automatic pipettes.

UNIT II

Collection of blood samples, Packed cell volume (PVC), Erythrocyte sedimentation Rate (ESR),RBC Count, WBC Count, Reticulocyte count, Total count, Differential Count, Pulse rate, Use of blood pressure Apparatus, Electrocardiogram, Echocardiogram, Estimation of Haemoglobin, Artificial pacemaker.

UNIT III

Blood cross matching – Hepatitis test – Haemolytic jaundice, ELISA, Estimation of blood glucose fasting two hour post prandial – Diabetes mellitus, Estimation of blood Cholesterol, Blood Urea, Blood Uric Acid.

UNIT IV

Analysis of urine – Physical examination, Blood cells, Urine glucose, Urine albumin, Bile salts, Ketone bodies, Urine culture – Antibiotic susceptibility test.
Pregnancy Test (Detection of HCG).
Analysis of faeces – Components of faeces their characteristics, factors affecting faeces composition.
Analysis of sputum – Pathological conditions that can be detected in sputum – their causes – Detection of Group A – Streptococcus.

UNIT V

Cerebrospinal fluid – Formation, Composition function, Conditions altering its composition – their causes. Seminal fluid – Composition of seminal fluid, Sperm count, Abnormal sperms, Common pathological conditions detected in semen – their causes.

Aminotic fluid – Sex determination, Diagnosis of pathological conditions of developing foetus through analysis of amniotic fluid.

PRACTICALS:

1. Blood – Packed cell volume (PVC),erythrocyte sedimentation Rate (ESR), Reticulocyte Count, Total Count, Differential Count, Estimation of haemoglobin.
2. Urine – Albumin, Sugar, Ketone bodies, Bile salts, Bile pigments, Pregnancy test – Sputum – Microscopic structures seen in sputum – Semen – Sperm count.
3. Specimens, Slides, Models and Charts:- Haemocytometer, Haemoglobinometer, ESR tubes, Autoclave, Automatic pipette, Reticulocyte.

REFERENCE BOOKS:

1. Biswajit Mohanty and Sharbari Basu – Fundamentals of Practical Clinical Biochemistry, B.I. Publications PVT., LTD.,54, Janpath, New Delhi – 110001.
2. Estridge B.H. Raynold A.P and Walters N.J. Basic Medical Laboratory Techniques,4th edition, Thomson Delmar Learning, Eastern press (Bangalore)Pvt., Ltd., Boommasandra Industrial Area, Hosur Road, Bangalore – 562158.
3. Kannai, L. Mukherjee, Medical Laboratory Technology Vol - I, Vol - II and Vol - III. Tata MC Graw Hill Publishing Company Limited,No:444/1,Sri Ekambara Naicker Industrial Estate, Alapakkam, Porur, Chennai – 600116.
4. Ramnik Sood, Medical Laboratory Technology, Methods and Interpretations. Jaypee Brothers Medical Publishers (P) Ltd., New Delhi.
5. Venkadesan, O. Essential of Medical Laboratory technology, Bicobas P.G and Research Department of Zoology, Loyola College, Madras – 600034.

MSU/2016-17/UG-Colleges/Part-III (B.Sc. Zoology)
Semester-VI/ Elective (any one) - 3(C)

MARINE BIOLOGY

UNIT I

Classification of Marine environment – Horizontal and Vertical – Names and Extent of different oceans. Physiological oceanography – Physical properties of water,Specific gravity,Solubility and their influence on marine organisms.

UNIT II

Origin of waves and tides – Major water currents and their impact on animal and plantpopulations and productivity

UNIT III

Chemical Oceanography – Major and Minor constituents of SeawaterSalinity and Chemical composition and their influence on productivity. Energy cycle in marine environment, Carbon, Nitrogen, Phosphorus cycles in marine environment.

UNIT IV

Biological Oceanography – Study of Phyto and Zooplankton – Adaptations of phytoplankton to float.A Survey of economically important fish,prawn and molluscan populations in the nearby coastal region – their life history, food and feeding habits – their natural enemies.

UNIT V

Marine Geology – Study of marine sediments and their economic importance – Oil resources – Pollutants and their effect.Coral reefs in the world.

PRACTICALS

1. Qualitative and Quantitative analysis of Planktons.
2. Estimation of Salinity.
3. Estimation of Nitrates, Silicates and Phosphates.
4. Gut content analysis of local marine fish fauna at two different seasons.
5. Collection of Crabs & tackles used in fisheries (photographs and charts)
6. Study of the biology of any one marine organism available in the local area by each student

REFERENCE BOOKS:

1. M.C. Connaghey – Introduction to Marine Biology (Toppan Co.)
2. Sir Frederick S.Russel and Sir Maurice Yonge- Advances in Marine Biology (Academic Press) 1971 Edition.
3. M.V.Moore-Marine Ecology (John Wiley Sons)