SACRED HEART COLLEGE (AUTONOMOUS)

DEPARTMENT OF ZOOLOGY

BACHELOR OF SCIENCE IN ZOOLOGY

Course plan

Academic Year 2016 – 17

Semester 5

COURSE PLAN

U5CRZOO05:CELL BIOLOGY AND MOLECULAR BIOLOGY

COURSE OBJECTIVES

To emphasize the central role of Cell biology and Molecular biology, being the most developing areas of biological science.

To make aware of different cell organelles, their structure and role in living organisms.

To introduce the nature of genetic materials at molecular level, their expression and regulation.

To develop critical thinking, skill and research aptitudes.

Basic Reference

Zoological Society of Kerala Study material. 2002. Cell Biology and molecular biology

TEACHER I			
Sessions	**Topic**	**Method**	**RemarKS**
	CELL BIOLOGY		
	Module I History of cell and molecular biology		
1	Cell theory, Prokaryotes, Eukaryotes	ICT Enabled (ppt& images, charts, video clippings)	
2	Actinomycetes, Mycoplasmas, Virus, Virion and Viroids, Prions	ICT Enabled (ppt& images, charts, video clippings)	
	Module II Cell membrane & Permeability		
3	Molecular models of cell membrane (Sandwich model, Unit membrane model, Fluid mosaic model)	ICT Enabled (ppt& images, charts, video clippings)	

4	Modifications of plasma membrane. (Microvilli, tight junction, gap junction, desmosomes)	ICT Enabled (ppt& images, charts, video clippings)	
5	Cell permeability - Diffusion, Osmosis, Passive transport, Active transport, Cell coat and Cell recognition	ICT Enabled (ppt& images, charts, video clippings)	
	Module III Ultrastructure of Cytoplasm		
6	Cytoskeleton - Microtubules, microfilaments, intermediate filaments	ICT Enabled (ppt& images, charts, video clippings)	
7	Endoplasmic reticulum - Structure and functions	ICT Enabled (ppt& images, charts, video clippings)	
8	Ribosomes (Prokaryotic and Eukaryotic)	ICT Enabled (ppt& images, charts, video clippings)	
9	Golgi complex - Structure and functions	ICT Enabled (ppt& images, charts, video clippings)	
10	Lysosomes - Polymorphism - GERL concept, functions	ICT Enabled (ppt& images, charts, video clippings)	
11	Mitochondria - Structure and functions	ICT Enabled (ppt& images, charts, video clippings)	
12	Symbiont hypothesis	ICT Enabled (ppt& images, charts, video clippings)	

13	**I CIA**	Descriptive test 1 hr	
	Module IV Nucleus		
14	Structure and functions of interphase nucleus,	ICT Enabled (ppt& images, charts, video clippings)	
15	Nuclear membrane, pore complex	ICT Enabled (ppt& images, charts, video clippings)	
16	Structure and functions of nucleolus	ICT Enabled (ppt& images, charts, video clippings)	
17	Chromosomes	ICT Enabled (ppt& images, charts, video clippings)	
18	Structure - Heterochromatin, Euchromatin, Nucleosomes	ICT Enabled (ppt& images, charts, video clippings)	
19	Polytene chromosomes-Balbiani rings, Endomitosis	ICT Enabled (ppt& images, charts, video clippings)	
20	Lamp brush chromosomes	ICT Enabled (ppt& images, charts, video clippings)	
	Module V Cell Division		
21	Cell cycle - G_1, S, G_2 and M phases	ICT Enabled (ppt& images, charts, video clippings)	

22	Mitosis	ICT Enabled (ppt& images, charts, video clippings)	
23	Meiosis	ICT Enabled (ppt& images, charts, video clippings)	
24	Meiosis	ICT Enabled (ppt& images, charts, video clippings)	
	Module VI Cell Communication		
25	Cell signalling - Signalling molelcules	ICT Enabled (ppt& images, charts, video clippings)	
26	Neuro- transmitters, hormones, growth factors, cytokines, vitamin A and D derivatives	ICT Enabled (ppt& images, charts, video clippings)	
27	Role of cyclic AMP	ICT Enabled (ppt& images, charts, video clippings)	
	PART II - MOLECULAR BIOLOGY		
	Module IX Gene regulations		
28	Prokaryotic (inducible, repressible systems)	ICT Enabled (ppt& images, charts, video clippings)	
29	Operon concept -Lac operon	ICT Enabled (ppt& images, charts, video clippings)	

30	Tryptophan operon	ICT Enabled (ppt& images, charts, video clippings)	
31	Brief account of Eukaryotic gene regulation	ICT Enabled (ppt& images, charts, video clippings)	
32	Definitions- Global control – Stimulon and modulon	ICT Enabled (ppt& images, charts, video clippings)	
33	Catabolite repression (Glucose effect)	ICT Enabled (ppt& images, charts, video clippings)	
34	Class Test 1	Descriptive	
35	Class Test 2	Descriptive	
	II CIA		
36	Revision and Evaluation		
	PART II - MOLECULAR BIOLOGY		
	Module VII Nature of Genetic Materials		
TEACHER II			
1	Discovery of DNA as genetic material – Griffith's transformation experiments.	ICT Enabled (ppt& images, charts, video clippings)	
2	Hershey Chase Experiment of Bacteriophage infection	ICT Enabled (ppt& images, charts, video clippings)	

3	Structure and.types of DNA& RNA .	ICT Enabled (ppt& images, video clippings)	
4	DNA replication.	ICT Enabled (ppt& animations, images, video clippings)	
5	Modern concept of gene (Cistron, muton, recon, viral genes). Prokaryotic genome,Eukaryotic genome,	ICT Enabled (ppt& images, video clippings)	
6	CIA - I	1 hr; descriptive answers only	
7	Split genes (introns and exons), Junk genes, Pseudogenes, Overlapping genes, Transposons	ICT Enabled (ppt& images, video clippings)	
	Module VIII Gene Expressions		
8	Central Dogma of molecular biology,	ICT Enabled (ppt& images, video clippings)	
9	One gene-one enzyme hypothesis, One gene-one polypeptide hypothesis.	ICT Enabled (ppt& images, charts, video clippings)	
10	Characteristics of genetic code, Contributions of Hargobind Khorana.	ICT Enabled (ppt& images, charts, video clippings)	
11	Protein synthesis-Transcription (Prokaryotic& eukaryotic)	ICT Enabled (ppt& images, charts, video clippings)	
12	Protein synthesis-Transcription (Prokaryotic& eukaryotic)	ICT Enabled (ppt& images, charts, video clippings)	

13	Reverse transcription, post transcriptional modifications,	ICT Enabled (ppt & images, video clippings)	
14	CIA- II	2hrs	
15	Translation,	ICT Enabled (ppt, images, animations & video clippings)	
16	Translation contd…		
17	Post translational modifications.		
18	Revision and Evaluation of course		

Additional Reading List

1. Veer BalaRastogi. (2008). *Fundamentals of Molecular Biology*, Ane's Books, India Chapter 15, pp343--378.
2. De- Robertis E.D. and De RobertisJr.E.M.F (2002) Cell and Molecular Biology (Lea &Febiger/Info-Med)
3. Karp G. (1996) Cell and Molecular Biology: Concepts and Experiments John Wiley and Sons m, New York

PROGRAMME	**B.Sc. Zoology**	**SEMESTER**	**5**
COURSE CODE AND TITLE	**U5CRZOO06 : CORE COURSE 6-- ENVIRONMENTAL BIOLOGY, TOXICOLOGY AND DISASTER MANAGEMENT**	**CREDIT**	3
HOURS/SEM	54		
OBJECTIVES OF THE COURSE	• To impart basic knowledge on ecosystems and their functioning • To learn about various types of anthropogenic pressures on ecosystem, related degradation and management measures • To generate awareness on the fragility of indigenous ecosystem in which we live.		

	Course Plan for Course Teacher 1 (36 Hours) Term – I (Before I Internal Exams) – 30 % of the syllabus		
Sessions	Topic/Module	Method of teaching *	Remarks: Books, reference *etc.*
1	Introductory Session – Ecosystems- Concept, classification	Lecture and interactions through general questions on Environment and development	Definition of Ecosystem Components of ecosystem Functions of ecosystem
2	Freshwater ecosystem Physico-chemical nature (Brief description only) Types Lentic Lotic		
3	Freshwater ecosystem adaptations	Lecture with Power point presentation	
4	Adaptations of lentic water animals	Lecture with Power point presentation	
5	Adaptations of lotic water animals	Lecture with Power point presentation	
6	Ground water	Lecture and videos	

7	Watershed management	Lecture with Power Point Presentation	Types of watersheds Management strategies
8	Watershed management	Lecture with Power Point Presentation	Land management Water management Biomass anagement
9	Marine ecosystem Physico chemical nature	Lecture with Power Point Presentation	Types of marine habitations
10	Intertidal zone Rocky shore Muddy shore Sandy shore	Lecture with Power Point Presentation	Adaptations of animals in different types of marine habitats
11	Coral reefs	Lecture with Power Point Presentation	Types, diversity, importance. Threats and conservation measures
CIA 1	**First Internal Examination**		20 marks
	Term II		
12	Open sea Pelagic realm Benthic realm	Lecture with Power Point Presentation	Animals and their adaptations
13	Estuaries-Characteristics and Importance Adaptations of animals living in estuarine habitats	Lecture with Power Point Presentation	
14	Wetlands and mangroves	Lecture with Power Point Presentation	Importance of wetlands and mangroves
15	Convention on wetlands (Ramsar, 1971) Ramsar mission	Lecture with Power Point Presentation	
16	Ramsar sites in Kerala –threats and conservation aspects	Lecture with Power Point Presentation	Locations, extend and diversity
17	Terrestrial ecosystem Abiotic/ biotic components (Brief description only) Interactions Classification (Types)	Lecture with Power Point Presentation	

18	Biomes Forest Desert	Lecture with Power Point Presentation	Significance of climatic factors
19	Grassland Tundra	Lecture with Power Point Presentation	Adaptations of animals
20	Causes of land degradation with special reference to Kerala	Lecture with photographs and videos	
21	Discussions on landscape changes and their socio-economic basis		
22	**Module III – Man and Environment** Natural resources Introduction (concept)	Lecture with Power Point Presentation	
23	Energy resources Conventional	Lecture with Power Point Presentation	
24	Non conventional energy resources	Lecture with Power Point Presentation	
25	Inexhaustible resources	Lecture with Power Point Presentation	
26	Energy conservation measures	Interactive session	
27	Assignments	Guidelines	
CIA II	**Second Internal Examination**		2 hour test
28	**Module IV – Global environmental changes** Uniqueness of the earth	Lecture with Power Point Presentation	
29	Global warming	Lecture with Power Point Presentation	Impact on human civilization
30	Green house effect	Lecture with Power Point Presentation	
31	Ozone layer formation and depletion	Lecture with Power Point Presentation	

32	Climate change (Brief description only) Definition- recent developments	Lecture with Power Point Presentation	Impact on ecosystems
33	Kyoto protocol IPCC/UNFCC Emission reduction	Lecture with Power Point Presentation	Legal aspects
34	Carbon credit Carbon trading	Lecture with Power Point Presentation	Economic aspects
35	Carbon sequestration	Lecture with Power Point Presentation	Methods for carbon dioxide capturing
36	**Module V – Local environmental issues** Landscape changes in Kerala Impact of tourism on ecology with special reference to aquatic ecosystems	Lecture with Power Point Presentation	Urbanization, Industrialization Agricultural degradation

Course Plan for Course Teacher 2 (18 Hours)

Sessions	Topic	Method	Remarks
	Module I – Introduction		
1	History, developmentScope, branches	ICT Enabled (ppt&images, video clippings)	
	Module V – Municipal Solid Waste		
2	Plastic pollution Types of plastics Problems of plastics Management Strategies	ICT Enabled (ppt&images, charts, video clippings)	
3	Biowastes and their management. – aerobic and anaerobic systems.	ICT Enabled (ppt&images, video clippings)	
4	e-waste: Major types and sources - Toxic ingredients - Effects on environment and human health Management strategies	ICT Enabled (ppt& animations, images, video clippings)	
	Module V – Local environmental issues		

5	Impact of tourism on ecology	ICT Enabled (ppt&images, video clippings)	
6	Landscape changes	ICT Enabled (ppt&images, video clippings)	
7	**CIA I**		1 hr; descriptive answers only
	Module VI – Disaster Management		
8	Definition,Classification- Natural, Anthropogenic, Hybrid.	ICT Enabled (ppt&images, video clippings)	
9	Earthquake, Landslide, Flood, Drought	ICT Enabled (ppt&images, video clippings)	
10	Cyclone, Tsunami -Mitigation measures.	ICT Enabled (ppt&images, charts, video clippings)	
	Module VII: Toxicology		
11	Definition, History of toxicology, Classification – occurrence/ source	ICT Enabled (ppt&images, video clippings)	
12	Role of toxicology	ICT Enabled (ppt, images, animations & video clippings)	
13	Toxicants of biological origin - Afflatoxin, Botulinum toxin	ICT Enabled (ppt&images, charts, video clippings)	
14	**CIA- II**	2 hrs	
15	Heavy metal toxicants	ICT Enabled (ppt&images, video clippings)	
16	Food additives	ICT Enabled (ppt&images, video clippings)	
17	Revision		
18	Evaluation of the course		

Basic Reference

***Environmental Biology and Ethology*(2002). Zoological Society of Kerala Study material. Published by Zoological Society of Kerala.**

Additional Reading List

1. Odum, E.P. 1971.Fundamentals of Ecology.W.B. Saunders College Publishing, Philadelphia.

2. Pandey Kamleshwar , J.P. Shukla and S.P.Trivedi.2005. *Fundamentals of Toxicology*. New Central Book Agency (P) Ltd. Kolkata, India

COURSE PLAN
U5CRZOO07: EVOLUTION, ZOOGEOGRAPHY AND ETHOLOGY

COURSE OBJECTIVES

- To acquire knowledge about the evolutionary history of earth (living and non living)
- To learn various tools and techniques for evolutionary studies
- To study the distribution of animals on earth, its pattern, evolution and causative factors
- To impart basic knowledge on animal behavioural patterns and their role

Basic Reference

1. Andrews. M.I and Joy, K.P. 2003. *Environmental biology, evolution, ethology and Zoogegraphy.* St.Mary's press and book dept
2. Mani, M.S. 1974.*Ecology and Biogeography of India*. Dr. W. Junk b..v. Publishers , The Hague.
3. Nair, C.S.1991. *The Southern Western Ghats : A Biodiversity Conservation Plan*. INTACH, New Delhi.
4. Ramesh,B.R and Rajan Gurukkal., 2007.*Forest Landscapes of the Southern Western Ghats, India Biodiversity, Human Ecology and management Strategies*. French Institute of Pondicherry, India.
5. Tiwari, S. 1985. *Readings in Indian Zoogeography*
6. Wilson, E.O. 1975. Sociobiology. Harvard University Press, Cambridge, Mass. USA.
7. Zoological Society of Kerala Study material. 2002. *Environmental Biology and Ethology* Published by Zoological Society of Kerala (Module 6, 7, 8 & 9)

Faculty 1

Sessions	Topic	Method	Remarks
1	**Module I – Origin of life** Introduction	Lecture	
2	Origin of universe	Lecture with interaction	
3	Chemical evolution	Lecture	
4	Miller-Urey experiment	Lecture and interaction	
5	Haldane and Oparin theory	Lecture	
6	**Module II – Theories of organic evolution** Lamarckism	Lecture	
7	Critical analysis of Lamarck's propositions , Weisman's germplasm theory	Lecture	
8	Mutation theory.	Lecture	
9	Darwinism	Lecture	
10	Critical analysis of Darwinism	Lecture	
11	Modern Synthetic theory(Neo Darwinism)	Lecture	
12	Neutral theory of molecular evolution	Lecture and interaction	
13	**Module III – Population genetics and evolution** Genetic basis of variation	Lecture	
14	Continue	,,	
15	Hardy Weinberg equilibrium	Lecture	
16	Continue	Lecture	
17	Change in gene frequencies Factors affecting gene frequencies (brief account only)	Lecture	
18	Continue	,,	
19	**Module IV – Evolution above species level** Adaptive radiation	Lecture	

20	Microevolution	Lecture	
21	Macroevolution	Lecture	
22	Evolution of horse	Lecture with ppt	
23	Continue	,,	
24	Mega evolution	Lecture	
25	Punctuated equilibrium	Lecture	
26	Speciation -Phyletic and True-Sympatric and Allopatric	Lecture	
27	**Module V – Geological time scale** Geological dating with radioactive elements	Lecture	
28	Continue	,,	
29	Mass extinction	Lecture	
30	Continue	,,	
	PART II – ZOOGEOGRAPHY AND ETHOLOGY Module VII – Animal distribution		
31	Types and means of animal distribution	Lecture	
32	Continue	,,	
33	Barriers in animal distribution.	Lecture	
34	Continue	,,	
35	Revision of Evolution Module I,II,III	Asking questions and Clearing doubts	
36	Revision of Evolution Module IV,V,& Zoogeography module VII	,,	

1	Zoogeography: Introduction; Origin of oceans and continents; Plate tectonics – continental drift	ICT Enabled (ppt & animations, video clippings)	
2	Zoogeographical realms	ICT Enabled (ppt, maps, images & video clippings)	
3	Zoogeographical realms contd…	ICT Enabled (ppt, maps, images & video clippings)	
4	Insular fauna-Continental Islands & Oceanic Islands	ICT Enabled (ppt, maps, images & video clippings)	
5	Biogeography of India – with special reference to Western Ghats	ICT Enabled (ppt, maps, images & video clippings)	
6	CIA - I	1 hr; descriptive answers only	
Module VIII – Ethology			
7	Ethology: Definition; History and scope of ethology	ICT Enabled (ppt & video clippings)	
Module IX – Learning and imprinting			
8	Types of learning: Habituation, sensitization	ICT Enabled (ppt, animations & video clippings)	
9	Types of learning: Classical conditioning	ICT Enabled (ppt, animations & video clippings)	
10	Types of learning: Operant conditioning	ICT Enabled (ppt, animations & video clippings)	
11	Types of learning: Taste aversion; Latent learning	ICT Enabled (ppt, animations & video clippings)	
12	Types of learning: Insight Learning; Learning set learning	ICT Enabled (ppt, animations & video clippings)	
13	Imprinting; experiments by K. Lorenz	ICT Enabled (ppt, animations & video clippings)	

14	CIA- II	2 hrs	
Module X – Ethology of man			
15	Discussion on CIA-II; Ethology of man - Sociobiology and evolution of human behaviour	ICT Enabled (ppt, images & video clippings)	
16	Primates and human socio groups	ICT Enabled (ppt & images, video clippings)	
17	Human pheromones; Revision	ICT Enabled (ppt & images, video clippings)	
18	Revision & Evaluation of the course		

Additional Reading List

Barnes, C.W. 1988. *Earth, Time and Life*. John Wiley &Sons, NewYork.

Bendall , D. S. (ed.)1983.*Evolution from Molecules to Man*. Cambridge University Press,U.K.

Bonner, J.T. 1980. *The Evolution of Culture in Animals*. Princeton University Press..NJ,USA.

Briggs, J.C. 1996. *Global Biogeography.* Elsevier Publishers.

Bull J.J and H.A.Wichman.2001.Applied Evolution. *Annu.Rev.Ecol.Syst.* 32:183-217 (Visit the Annual Reviews home page at www.AnnulReviews.org.)

Chandran, Subash M .D.1997. On the ecological history of the Western Ghats. *Current Science*, Vol.73, No.2.146-155.

Chattopadhyay Sajib.2002. *Life Origin, Evolution and Adaptation*. Books and Allied (P) Ltd.Kolkata,India.

Chundamannil , Mammen.1993. *History of Forest management in Kerala*. Report number 89. Kerala Forest Research Institute, Peechi, India.

Daniels, R.J.R and J.Vencatesan .2008. *Western Ghats Biodiversity.People.Conservation*. Rupa &Co.New Delhi.India

David McFarland. 1999. *Animal Behaviour*. Pearson Education Ltd . Essex, England. (Module 8 and 9)

Dawkins, M.S. 1995.*Unravelling Animal Behaviour*. Harlow: Longman.

Dunbar, R. 1988. *Primate Social Systems*.Croom Helm, London.

Goodwin,B. 1996. *How the Leopard Changed its Spots: The Evolution of Complexity*. Simon &Schuster, NY,USA.

Jerry A.Coyne and H.Allen Orr.2004. *Speciation*. Sinauer Associates

Manning Aubrey and Marian Stamp Dawkins 1998. *An Introduction to Animal Behaviour*.Cambridge University Press,UK.

Paul W. Sherman and John Alcock.,2001 Exploring Animal Behaviour- Readings from American Scientist 3rd Edn. Sinauer Associates Inc. MA,USA.

Rob Desalle and Ian Tattersall 2008.*Human Origins: What Bones and Genomes Tell Us about Ourselves*. Texas A&M University Press, USA.

Sean B. Carroll and David M. Kingsley .2005 *Evolution: Constant Change and Common Threads*. Holiday Hrs on Science. Webcast or DVD available at www.hhmi.org/biointeractive/evolution.

Strickberger, M.W.2000. *Evolution*. Jones and Bartlett, Boston.

Thomas A P (Editor) 2011 Evolution, Zoogeography and Ethology. Green leaf publications TIES Kottayam.

Wilson, E.O. 1975. Sociobiology. Harvard University Press, Cambridge, Mass. USA.

COURSE PLAN

U5CRZOO08

BIOCHEMISTRY, HUMAN PHYSIOLOGY AND ENDOCRINOLOGY

COURSE OBJECTIVES:

1. This course will provide students with a deep knowledge in biochemistry, physiology and endocrinology.
2. Defining and explaining the basic principles of biochemistry useful for biological studies for illustrating different kinds of food, their structure, function and metabolism.
3. Explaining various aspects of physiological activities of animals with special reference to humans.
4. Students will acquire a broad understanding of the hormonal regulation of physiological processes in invertebrates and vertebrates.

Basic Reference:

Guyton 2002: Text Book of Medical Physiology Saunders pp.718-833

Prosser & Brown 2006: Comparative Animal Physiology

Zoological Society of Kerala, Study material 2002. *Biochemistry, Physiology and Endocrinology* Published by Zoological Society of Kerala

Harper's Illustrated Biochemistry, 27th Ed, Mc Graw Hill

Teacher 1

Session	Topic	Method	Remarks
	Part I. BIOCHEMISTRY		
	Module 1 - GENERAL BIOCHEMISTRY, BIOELEMENTS AND BIOMOLECULES		
1.	Introduction To Biomolecules	Discussion and lecture	
2.	Carbohydrates- structure of basic compounds, classifications with examples and its biological importance.	Lecture	
3.	Protein–classifications and its biological importance.	Lecture	
4.	Protein– structure,	Lecture and powerpoint presentation	
5.	Lipids–structure classifications with examples and its biological importance	Lecture	
	Module -2 METABOLISM		
6	Carbohydrate metabolism- Glycolysis	Lecture and powerpoint presentation	
7	Citric acid cycle		
8	ATP synthesis		
9	Glycogenesis, glycogenolysis,	Lecture and powerpoint presentation	
10	Gluconeogenesis , HMP shunt	Lecture and powerpoint presentation	
11	Lipid metabolism- Biosynthesis	Lecture and powerpoint presentation	
12	Oxidation of fatty acids- Beta oxidation,	Lecture and powerpoint presentation	
13	Physiologically important compounds synthesized from cholesterol	Lecture and powerpoint presentation	

14	Protein metabolism- Deamination, transamination, transmethylation, decarboxylation,	Lecture and powerpoint presentation	
15	Ornithine cycle	Lecture	
	Module 3- ENZYMES		
16	Chemical nature of enzymes,	Lecture and powerpoint presentation	
17	Mechanism of enzyme action,	Lecture and powerpoint presentation	
18	Factors influencing enzyme action	Lecture and powerpoint presentation	
19	Enzyme activation, enzyme inhibition, allosteric enzyme, isoenzymes, co-enzyme	Lecture and powerpoint presentation	

Teacher : 2

Session	Topic	Method	Remarks
1	Food adulteration	Lecture and PowerPoint presentation	
2	Defects of modern food habits	Lecture and PowerPoint presentation	
3	Importance of fibers in food	Lecture and PowerPoint presentation	
4	Weight control	Lecture and PowerPoint presentation	
5	Nutrition during pregnancy, breast feeding	Lecture and PowerPoint presentation	
6	Anorexia, acidity and ulcers, flatulence, fasting and its significance	Lecture and PowerPoint presentation	
7	Malfunctions of gastro intestinal tract	Lecture and PowerPoint presentation	
8	Gas transport, Factors affecting transport of respiratory gases through blood	Lecture and PowerPoint presentation	
9	Oxy-hemoglobin curve, Bohr effect,	Lecture and PowerPoint presentation	

	reverse Bohr effect, Haldane effect		
10	Neural (voluntary and automatic) and chemical control (mention the role of carotid and aortic bodies) of respiration	Lecture and PowerPoint presentation	
11	Smoking and its physiological effects, carbon monoxide poisoning, oxygen toxicity, nitrogen narcosis, dysbarism, oxygen therapy	Lecture and PowerPoint presentation	
12	Artificial respiration, respiratory disorders – hypoxia, hypocapnia, hypercapnia, asphyxia	Lecture and PowerPoint presentation	
13	Cerebral circulation, blood brain barrier and cerebrospinal fluid	Lecture and PowerPoint presentation	
14	Haemo dynamic principles, formation and fate of blood cells	Lecture and PowerPoint presentation	
15	Blood composition ,blood clotting mechanism – intrinsic and extrinsic pathways, clotting factors, anticoagulants	Lecture and PowerPoint presentation	
16	Blood transfusion, safety and security problems, heamostasis	Lecture and PowerPoint presentation	
17	Haemolysis, jaundice, thrombosis, ESR.	Lecture and PowerPoint presentation	
18	Urea cycle (in detail), renal handling of individual substances	Lecture and PowerPoint presentation	

	eg. glucose, sodium, urea, water		
19	Factors affecting GFR, concept of plasma clearance, acid base balance	Lecture and PowerPoint presentation	
20	Kidney disorders – acute renal failure, chronic renal failure- glomerular nephritis	Lecture and PowerPoint presentation	
21	Pyelonephritis, nephrotic syndrome and kidney stones	Lecture and PowerPoint presentation	

Teacher : 3

Sessions	Topic	Method	Remarks/Reference
	Module VIII. MUSCLE PHYSIOLOGY		
1	Ultra structure of striated muscle. Mechanism of muscle contraction.	ICT Enabled (ppt & images, video clippings)	
2	Biochemistry of muscle contraction, isotonic and isometric contraction.	ICT Enabled (ppt & images, charts, video clippings)	
3	Electrical, chemical and morphological changes and ionic fluxes during contraction of striated muscle fibre, Cori cycle, electrophysiology of muscle, threshold and spike potentials, simple muscle twitch, whole muscle contraction, isotonic and isometric contraction, latent and refractory periods, summation, beneficial effect, superposition curve, tetanus, tonus, staircase phenomenon, fatigue, oxygen debt, rigor mortis.	ICT Enabled (ppt & images, video clippings)	
	Module 9 NEUROPHYSIOLOGY		

4	Synaptic transmission & properties of synapses,	ICT Enabled (ppt & images, video clippings)	
5	neurotransmitters, role of dopamine and serotonin.	ICT Enabled (ppt & images, video clippings)	
6	EEG, memory, short term and long term sleep, dream,	ICT Enabled (ppt & images, video clippings)	
7	Neural disorders- dyslexia, Parkinson's disease, epilepsy, Alzheimer's disease, schizophrenia.	ICT Enabled (ppt & images, video clippings)	
	Module 10 -SPORTS PHYSIOLOGY		
8	Muscular, Respiratory and cardiovascular changes during exercise, dope test, drug abuse.	ICT Enabled (ppt & images, video clippings)	
9	Significance of exercise in body fitness.	ICT Enabled (ppt & images, video clippings)	
	Module 11:ENDOCRINOLOGY		
10	Hormones as messengers, classification and types of hormones	ICT Enabled (ppt & images, charts, video clippings)	
11	General principles of hormone action,	ICT Enabled (ppt & images, video clippings)	
12	Concept of hormone receptors,	ICT Enabled (ppt, images, animations & video clippings)	
13	hormonal control of homeostasis	ICT Enabled (ppt & images, charts, video clippings)	
14	CIA- II	2 hrs	
15	Secretion, Regulation, Functions and Disorders of hormones of Hypothalamus, Hypophysis,	ICT Enabled (ppt & images, video clippings)	
16	Secretion, Regulation, Functions and Disorders of hormones of Pineal, Thyroid, Parathyroid,	ICT Enabled (ppt & images, charts, video clippings)	
17	Secretion, Regulation, Functions and Disorders of hormones of Thymus,	ICT Enabled (ppt & images, video clippings)	

	Islets of Langerhans, Adrenal, Gonads, Placenta, Gastro intestinal hormones.		
18	Revision & Evaluation of the course		

Additional Reading List

- Barrington, E.J.W. General and Comparative Endocrinology, Oxford, Clarendon Press.
- Bentley, P.J.Comparative Vertebrate Endocrinology, Cambridge University Press.

Young J.Z. 1981. The life of Vertebrate s (Oxford University Press).

OPEN COURSE FOR OTHER STREAMS

U5OCZOO1: HUMAN GENETICS, NUTRITION, COMMUNITY HEALTH AND SANITATION

COURSE OBJECTIVES

- To develop critical thinking skill and research aptitude among students, by introducing the frontier areas of the biological science.
- To emphasize the central role that biological sciences plays in the life of all organisms.
- To introduce the student to some of the present and future applications of bio-sciences

Core Readings

Zoological Society of Kerala Study Material Series 2002

Cell biology Genetics & Biotechnology published by Zoological Society of Kerala.

K Park, (2008) Park's Text Book of Preventive and Social

TEACHER 1: 18 HRS

Sessions	Topic	Method	Remarks/Reference
	Part- I HUMAN GENETICS		
	Module I		
1.	Human normal chromosome complement	Lecture and ppt	
2.	Chromosomal anomalies	Lecture	
3.	Down Syndrome and Cridu chat syndrome	Lecture and ppt	
4.	Sex chromosomal anomalies – Syndromes- Klinefelters Syndrome and Turners Syndrome	Lecture and ppt	
5.	Genetic disorders in man. Single gene mutation disorders- Eg. Sickle Cell anaemia	Lecture and ppt	
6.	Polygenic disorders – Cleft lip and palate	Lecture and ppt	
7.	Sex linked inheritance – Haemophilia and Colour blindness	Lecture and ppt	
	CIA I	**1 hr**	

8.	Pre – natal Diagnosis - Significance	Lecture	
9.	Amniocentesis, Chorionic Villus Sampling, Ultra sound scanning and Fetoscopy	Lecture and ppt	
10.	Genetic Counselling. Eugenics and Euthenics	Lecture	
	Module II		
11	Human blood groups and their inheritance pattern	Lecture and black board	
12.	Blood transfusion – Universal Donor, Universal recipient – Importance of Blood donation	Lecture and ppt	
13.	DNA finger printing and applications – Probing for criminals – Method to resolve paternity and maternity disputes	Lecture and ppt	
14.	Human Reproductive system	Lecture and ppt	
15.	Causes of human infertility – a brief account	Lecture and ppt	
	CIA II	**2 hrs**	
16.	Human genome project – a brief account	Lecture	

TEACHER 2: 18 HRS

Sessions	Topic	Method	Remarks/Reference
1	**PART – II NUTRITION AND COMMUNITY HEALTH**	Lecture	
	Module III		
2	Definition and meaning of health. Dimensions of health, physical activity and health benefits	Lecture	

3	Effect of exercise on body systems – Circulatory and Respiratory	Lecture	
4	Effect of exercise on body systems – Endocrine and Skeletal	Lecture	
5	Effect of exercise on body systems – Muscular	Lecture	
6	Programmes on Community health promotion – individual and family	Lecture	
7	Programmes on Community health promotion – Society	Lecture	
8	Dangers of alcoholic and drug abuse, medico legal implications.	Lecture and ppt	
	CIA -I	**1 hr.**	
	Module IV		
9	Introduction to concept of food and nutrition.	Lecture	
10	Balanced diet.	Lecture	
11	Vitamins and malnutrition	Lecture and ppt	
12	Deficiency diseases	Lecture and ppt	
13	Determining of caloric intake and expenditure	Lecture	
14	Obesity causes and preventive measures	Lecture	
15	Role of diet and exercise. BMI	Lecture	
	Module V		
16	Introduction to safety education	Lecture	
17	Principles of accident prevention	Lecture	
18	Health and safety in daily life and at work	Lecture	
19	First aid and emergency care	Lecture and ppt	

20	Modern lifestyle and hypokinetic diseases-Prevention and Management	Lecture and ppt	
	Module VI		
21	Introduction to life skill education	Lecture	
22	Physical activity, emotional adjustment and well being	Lecture	
	CIA II	**2 hrs**	
23	Yoga, meditation and relaxation	Lecture and ppt	
24	Psychoneuroimmunology	Lecture	

TEACHER 3: 36 HRS

	PART III. COMMUNITY HEALTH AND SANITATION	
	Module VII	
1.	Potable water quality monitoring and waste water management.	ICT Enabled (ppt & animations, images, video clippings); discussion
2	Potable water quality monitoring and waste water management. Contd..	
3	Determination of sanitary quality of drinking water	ICT Enabled (ppt & animations, images, video clippings); discussion
4	Water purification techniques.	ICT Enabled (ppt & animations, images, video clippings); discussion
5	Water purification techniques.Contd…	
6	Water purification techniques Contd…	
7	Faecal bacteriae and pathogenic microorganisms transmitted by water.	ICT Enabled (ppt & animations, images, video clippings); discussion
8	Faecal bacteriae and pathogenic microorganisms transmitted by water.Contd…	
9	Cholera and Typhoid.	ICT Enabled (ppt & animations, images, video clippings); discussion
10	Cholera and Typhoid. contd…	

11	Vermicomposting a method of solid waste management	ICT Enabled (ppt & animations, images, video clippings); discussion
	Module VIII	
12	Public Health and Food borne diseases	ICT Enabled (ppt & animations, images, video clippings); discussion
13	Public Health and Food borne diseases contd…	
14	Food Poisoning causes and prevention	ICT Enabled (ppt & animations, images, video clippings); discussion
	CIA I	**1 hr**
15	Food poisoning caused by toxins produced by microbes eg Staphylococcal food poisoning,	
16	Botulism, Salmonellosis	ICT Enabled (ppt & animations, images, video clippings); discussion
17	Botulism, Salmonellosis contd...	
18	CIA II	2hrs
19	Food infection caused by growth of microorganisms in the human body after the contaminated food has been eaten.	ICT Enabled (ppt & animations, images, video clippings); discussion
20	E Food Infection hepatitis (hepatitis A)	ICT Enabled (ppt & animations, images, video clippings); discussion
21	Food Infection hepatitis (hepatitis A). Contd…	ICT Enabled (ppt & animations, images, video clippings); discussion
22	Waterborne diseases and food borne diseases :Revision	ICT Enabled (ppt & animations, images, video clippings); discussion
	Module IX	
23	Emerging pathogens and diseases – Introduction	Lecture and PPT
24	Emerging pathogens and diseases – Swine flue (H1N1), bird flue (H5N1)	Lecture and PPT
25	Emerging pathogens and diseases –SARS, Anthrax	Lecture and PPT
26	Reemerging pathogens and diseases – TB	Lecture and PPT

27	Vector borne diseases (mosquito) and their control measures Mosquito eradication	Lecture and PPT
28	Vector borne diseases mosquito- Chikungunya , Malaria	Lecture and PPT
29	Vector borne diseases mosquito- Filariasis and Dengu fever	Lecture and PPT
30	Leptospirosis and preventive measures – Rodent control measures	Lecture and PPT
	CIA II	**2 hrs**
31	Cancer different types	Lecture and PPT
32	Causes of cancer, carcinogens, diet & cancer	Lecture and PPT
33	(e) HIV, AIDS – causes & preventive measures	Lecture and PPT
34 – 36	Revision	

Selected Further Readings

Fashey, Tomas D, Insel, Paul M and Roth Walt (2005) Fit and Well. New York; Mc Graw Hill Inc

Greenberg, Jerol S and Dintiman George B (1997) Wellness Creating a life of Health and Fitness , London Allyn and Bacon Inc.

Edlen Gordon Janes and Barttlet. Human Genatics a modern Synthesis. Published by Boston.

Monica Cheesbrough, Laboratory Manual for Tropical Counties Vol.II LBS.

Norman Bezzaant HELP First Aid for everyday emergencies. Jaico Publishing House, Bombay, Delhi

Pelczar M.J. Jr. E.C.S. Chane & N.R. Krieg, Microbiology (Concept & Applications)

Rai. B.C. Health Education and Hygiene. Published by Prakashan Kendra, Lucknow