St. Albert's College (Autonomous)

ZOO01-ZOO1CRT 0119 ANIMAL DIVERSITY – NON-CHORDATA

I. Course Instructor

Name	Sem, Programme & Batch	Email
Prof. K. J. Benny	B.Sc. Zoology Semester I 2020-21	bennykj@alberts.edu.in
Dr. Jissa G. Krishna	B.Sc. Zoology Semester I 2020-21	jissa@alberts.edu.in

II. Duration of Course:

No	Activity	Duration
1	Contact hours	32 (Including assignments)
2	Assessment (CAE & ESE)	4
	Total	36
	Remedial Sessions/Peer Tutoring/Tutorials (need based & Optional)	0

III. Course Objectives:

- Improving the knowledge about criteria for animal classification.
- Improving the knowledge of animals about their special adaptations and evolutionary relationship.
- Scientific study of their nature of habitat.
- Improving information about morphology and anatomy of animals.
- Understanding the arrangement of organism or groups of organism in distinct categories in accordance with particular and well established plan.
- Explanation of unity in diversity of organism.
- Studying specific and scientific names to organism.
- Collecting information about useful and harmful animals helps in understanding the nature of habitat.

IV. Course Delivery Plan

This course is a course requiring lot of student centric learning processes. The teaching methods include lectures, discussions, Assignments/Seminars etc.

Topics	Session No & Date(s)	Methodology and Duration (2 hours per day)
These are the topics to be covered in the modules **MODULE I SYSTEMATICS** **Systematic, Taxonomy, Phylogeny [Brief account], Approaches to taxonomy, Zoological nomenclature, International Code of Zoological Nomenclature (ICZN), Law of Priority. Five Kingdom Classification; Linnaean classification, Basis for Animal kingdom classification [Levels of organization, Symmetry, Coelom].** **Modern Tools- Molecular taxonomy, Bar coding.**	**26-11-2020** **03-12-2020** **17-12-2020**	**Lectures**
MODULE II: PROTISTAN DIVERSITY **Type: Paramecium: morphology and structural organization [as revealed by compound microscopy]; locomotion, nutrition, excretion, osmoregulation and reproduction; conjugation in detail.** **Characteristic features and classification of Kingdom Protista down to phyla** **Phylum Sarcomastigophora examples: Amoeba, *Noctiluca*, and *Trichonympha*** **Phylum Apicomplexa [=Sporozoa] example: *Plasmodium*** **Phylum Ciliophora examples: *Vorticella, Ephelota*** **General Topics:** **Parasitic protists (diseases mode of transmission and prophylactic measures) - *Entamoeba, Trypanosoma, Plasmodium* (detailed account**	**31-12-2020** **04-01-2021** **07-01-2021** **14-01-2021**	**Lectures**

of life cycle), *Leishmania.*		
MODULE III: KINGDOM ANIMALIA **Outline classification of Kingdom Animalia** **Three branches - Mesozoa, parazoa and Eumetazoa** **Mesozoa: Phylum Orthonectida –** **eg. *Rhopalura* (mention 5 salient features)** **Parazoa:** **Phylum Placozoa – Eg. *Trycoplax adherens*** **Phylum Porifera – Classification upto classes; Mention gemmules** **Class I- Calcarea. Eg.*Sycon*.,** **Class II – Hexactinellida .Eg.*Euplectella*.** **Class III - Demospongia Eg.*Cliona*.** **General Topics** **1. Canal system in sponges.** **Eumetazoa** **Phylum Coelenterata -Classification upto classes** **Class I - Hydrozoa Eg. Eg. Obelia - mention Metagenesis** **Class II- Scyphozoa Eg. *Rhizostoma*.** **Class III- Anthozoa Eg. *Metridium*.** **General Topics:** **Coral and coral reefs with special reference to conservation of reef fauna.** **Polymorphism in Coelenterates** **Phylum Ctenophora - Eg. *Pleurobrachia*.**	**16-01-2021** **18-01-2021** **21-01-2021** **25-01-2021**	**Lectures**
MODULE IV **Phylum Platyhelminthes Salient features; classification up to classes** **Class I - Turbellaria. Eg. *Planaria*.** **Class II –Trematoda Eg. *Fasciola*** **Class III- Cestoda Eg. *Taenia saginata*.** **General Topics:** **Life history of *Fasciola hepatica*.** **Platyhelminth parasites of Man and Dog (*Schistosoma, Taenia solium, Echinococcus*)** **Phylum Nemathelminthes (Nematoda)** **Salient features, classification up to classes**	**27-01-2021** **28-01-2021**	**Lectures** **Lectures**

Class: Phasmidia Eg. *Enterobius*		
Class: Aphasmidia Eg. *Trichinella*		
General Topic		
Pathogenic nematodes in man. (*Wuchereria bancrofti, Ascaris lubricoides, Ancylostoma duodenale, Trichinella trichiuris*)		
History and multidisciplinary foundation of Social work education, Field work, supervision and Recording-Need and importance	**01-02-2021**	
Phylum Annelida:	**04-02-2021**	
Salient features, Classification upto classes.	**11-02-2021**	
Class I- Archiannelida Eg. *Polygordius*		
Class II -Polychaeta Eg. *Chaetopterus*		
ClassIII- Oligochaeta Eg. *Megascolex*		
Class IV- Hirudinea Eg. *Hirudinaria*		
MODULE V		
Phylum Onychophora		
Eg. *Peripatus* (Mention its affinities).		
Phylum Arthropoda Salient features, Classification upto classes		
Type: Prawn –*Fenneropenaeus* (*Penaeus*)		
Sub Phylum - Trilobitomorpha		
Class -Trilobita (mention the salient features). Eg.*Triarthrus* – A trilobite (extinct)		
Subphylum –Chelicerata		
Class 1 Merostomata (Xiphosura) (Eg. *Limulus*)		
Class 2.Arachnida (Eg., Palamnaeus- *Scorpion*)		
Class 3 Pycnogonida (Eg. Pycnogonum – Sea spider)		
Subphylum- Crustacea		
Class 1 Branchiopoda Eg. *Daphnia*		
Class 2 Ostracoda Eg. Cypris -seed shrimp		
Class 3 Copepoda Eg. *Cyclops*		
Class 4 Remipedia Eg. *Speleonectes* (eyeless crustacean seen in caves)		
Class 5.Branchiura Eg.,*Argulus* (common fish louse)		
Class 6 Cirripedia Eg. *Sacculina* (parasitic castrator of crabs)		
Class 7 Malacostraca Eg. *Squilla*		

(spot tail mantis shrimp) Subphylum- Uniramia Class 1 Chilopoda Eg. *Scolopendra* – (Centipede) Class 2 Symphyla Eg. *Scutigerella* – (garden centipedes or pseudocentipedes) Class 3 Diplopoda Eg. *Spirostreptus*- (Millipede) Class 4 Pauropoda Eg. *Pauropus* Class 5 Hexapoda (Insecta) Eg. *Bombyx mori* – (silk moth)	12-02-2021 16-02-2021 16-02-2021 17-02-2021 18-02-2021 19-02-2021	
MODULE IV Phylum Mollusca Salient features, Classification upto classes Class I- Apalcophora Eg. *Neomenia* Class II- Monoplacophora Eg. *Neopilina* Class III Amphineura Eg. *Chiton* Class IV Gastropoda Eg. *Aplysia* Class V Scaphopoda Eg. *Dentalium* Class VI Pelecypoda (Bivalvia) Eg. *Pinctada* Class VII Cephalopoda Eg. *Sepia*	22-02-2021 23-02-2021 24-02-2021 25-02-2021 26-02-2021	
Phylum Echinodermata Classification upto classes Class I- Asteroidea Eg. *Astropecten* Class II- Ophiuroidea Eg. *Ophiothrix* Class III- Echinoidea Eg. *Echinus* Class IV- Holothuroidea Eg. *Holothuria* Class V – Crinoidea Eg. *Antedon* General Topics 1. Water vascular system in Echinodermata Phylum Hemichordata: Eg. *Balanoglossus* Minor Phyla Chaetognatha Eg. *Sagitta* Sipunculida Eg. *Sipunculus*	01-03-2021 02-03-2021 03-03-2021 04-03-2021 05-03-2021	

V. Innovative Learning Programmes

Name of Programme	Duration	Type	Proposed Time
Videos describing the life style of animals	In between the classes in the appropriate topic		

IV. Assignments and Seminars

Assignments

The following Assignment needs to be submitted to Google Classroom. Both the assignments & presentation are individual assignments.

Number	Topics	Activity	Submission Deadline
Assignment	Assignment on given topic	Preparation of assignment	Thursday of 5th Week of Course

Note: Failure to submit the assignment on the date mentioned will result in 0 marks for the assignment. Requests for extension of dates for submission not entertained.

VII. Attendance (one component in class participation):

95-100%	5
90-95%	4
85-90%	3
80-85%	2
75-80%	1
<75	Not eligible for appearing for ESE

VIII. Required reading:

- Barnes, R.D. (1987). Invertebrate Zoology, W.B. Saunders, New York.
- Barrington, E.J.W.(1967). Invertebrate Structure and function. ELBS and Nelson, London.
- Dhami, P.S. and Dhami, J.K. (1979). Invertebrate Zoology. S. Chand and Co. New Delhi.
- Ekamberanatha Ayyar M. (1990) A Manual of Zoology, Volume I. Invertebrate Part I andpart II.
- S. Viswanathan Printers & Publishers. Pvt. Ltd.
- Groove, A.J. and Newell, G.E. (1974). Animal Biology – Indian Reprint, University Book Stall, New Delhi.
- Hyman, L.H. (1942) The Invertebrate volumes. McGraw-Hill.
- James R.D. (1987). Invertebrate Zoology, W.B. Saunders, New York.
- Jordan E.L and Verma P.S (2007). Invertebrate Zoology. S.Chand and Co.New Delhi.
- Joy P.J., George Abraham K., Aloysius M. Sebastian and Susan Panicker (Eds) (1998).
- Animal Diversity, Zoological Society of Kerala, Kottayam
- Kapoor, V.C. (1994). Theory and Practice of Animal Taxonomy, Oxford and IBH Publishing Co., New Delhi.
- Kotpal.R. L., 1988-92 (All series). Protozoa, Porifera, Coelentereta, Helminthes, Annelida, Arthropoda, Mollusca, Echinodermata, Rastogi Publishers, Meerut.

- Kotpal R.L. Agarwal S.K. and R.P. Khetharpal (2002). Modern Text Book of Zoology. Rastogi Publications, Meerat – 250 002.
- Marshall, A.J. and Williams, W.D. (1972). Text Book of Zoology Vol. Invertebrates (ELBS and Macmillan, London).
- Mayr, E. (1980). Principles of Systematic Zoology (Tata McGraw Hill Publishing
- Co., New Delhi)
- Parker and Hanswell, 2004, Text Book of Zoology,Vol I (Invertebrate), 7th Edition, A.Z.T,B.S. Publishers and Distributors, New Delhi – 110 051
- Pechenik J A (2005) Biology of Invertebrates, (Tata McGraw Hill Publishing Co., NewDelhi.)
- Prema A.K., Joseph M.L. and Terrence Rebello V. (Eds) (2011). Invertebrate Diversity of Kerala. Zoological Society of Kerala, Kottayam.
- Thomas A P (Editor) 2010 The Invertebrates, Green leaf publications Kottayam

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St. Albert's College (Autonomous)

ZOO2CRT0119 ANIMAL DIVERSITY CHORDATA

I. Course Instructor

Name	Sem, Programme & Batch	Email
Prof. K. J. Benny	B.Sc. Zoology Semester II 2020-21	bennykj@alberts.edu.in
Dr. Jissa G. Krishna	B.Sc. Zoology Semester II 2020-21	jissa@alberts.edu.in

II. Duration of Course:

No	Activity	Duration
1	Contact hours	32 (Including assignments)
2	Assessment (CAE & ESE)	4
	Total	36
	Remedial Sessions/Peer Tutoring/Tutorials (need based & Optional)	0

III. Course Objectives:

- In depth knowledge on the diversity of chordates and their systematic position.
- Acquiring knowledge about the distinguishing characteristics and classification of the
- major vertebrate phyla.
- Will be aware of the economic importance of some classes.
- Understanding the evolutionary importance of selected chordate groups.

- In depth knowledge on the diversity of chordates and their systematic position.
- Acquiring knowledge about the distinguishing characteristics and classification of the
- major vertebrate phyla.

IV. Course Delivery Plan

This course is a course requiring lot of student centric learning processes. The teaching methods include lectures, discussions, Assignments/Seminars etc.

Topics	Session No & Date(s)	Methodology and Duration (2 hours per day)
These are the topics to be covered in the modules MODULE I Introduction General Characters and outline classification of Chordata up to class Origin of Chordates – mention theories in brief Protochordates: General characters and Classification 1. Sub phylum: Urochordata Class I Larvacea Eg. *Oikopleura* Class II Ascidiacea Eg: *Ascidia* (Mention Retrogressive Metamorphosis) Class III Thaliacea Eg: *Doliolum* 2. Sub phylum:Cephalochordata Example - *Amphioxus* (Structure and affinities)	01-03-2021 04-03-2021 08-03-2021 11-03-2021	Lectures
MODULE II Sub phylum: Vertebrata General characters and Classification 4. Division 1– Agnatha Class I Ostracodermi Eg: *Cephalaspis* Class II Cyclostomata Eg: *Petromyzon* Division 2 – Gnathostomata Super class Pisces General Characters and Classification Class: Chondrichthyes – General Characters Sub class – ElasmobranchI Eg: *Narcine* Sub class – Holocephali Eg: *Chimaera* Class: Osteichthyes – General Characters Sub class – Choanichthyes Order 1 Crossopterigii(Coelocanths) Eg: *Latimeria*(Evolutionary Significance) Order 2 Dipnoi Eg: *Lepidosiren* –	15-03-2021 17-03-2021 08-04-2021 12-04-2021	Lectures

Super order II: Neognathe Eg: Brahminy kite **General topics** **1. Migrations in birds** **2. Flight adaptations in birds**		
MODULE IV **Class Mammalia** **Sub class I: Prototheria Eg: Echidna, *Ornithorhychus*** **Sub class II: Metatheria Eg: *Macropus*** **Sub class III: Eutheria** **Order 1 Insectivora Eg: *Talpa*** **Order 2 Dermoptera Eg: *Galeopithecus*** **Order 3 Chiroptera Eg: *Pteropus*** **Order 4 Primates Eg: *Loris*** **Order 5 Carnivora Eg: *Panthera*** **Order 6 Edentata Eg: *Armadillo*** **Order 7 Pholidota Eg: *Manis*** **Order 8 Proboscidea Eg: *Elephas*** **Order 9 Hydracoidea Eg: *Procavia*** **Order 10 Sirenia Eg: *Dugong*** **Order 11 Perissodactyla Eg:*Rhinoceros*** **Order 12 Artiodactyla Eg: *Camelus*-mention ruminant stomach Order 13 Lagomorpha Eg: *Oryctolagus*** **Order 14 Rodentia Eg: *Hystrix* (Porcupine)** **Order 15 Tubulidentata Eg: *Orycteropus*** **Order 16 Cetacea Eg: *Delphinus*** **General topics** **1. Aquatic Mammals and their adaptations.**	**24-05-2021** **27-05-2021** **28-05-2021**	**Lectures**

Distribution, affinities and systematic position of lung fishes. **Sub class: - Actinopterygii** **Super order 1. Chondrostei Eg: *Acipencer*** **Super order 2. Holostei Eg: *Amia*** **Super order 3. Teleostei Eg: Sardine** **General topics** **1. Accessory respiratory organs in fishes.** **2. Parental care in fishes.** **3. Scales in fishes.** **4. Migration in fishes**		
MODULE III **Super class: Tetrapoda** **General characters, Classification up to Orders.** **Class Amphibia - Type Frog** **(*Euphlyctis hexadactylus*)** **Order I Anura Eg*: Hyla*** **Order II Urodela Eg: *Amblystoma*** **(mention axolotl larva and** **Paedomorphosis /neotony)** **Order III Apoda Eg: *Ichthyophis.*** **Class Reptilia** **Sub class I: Anapsida** **Order Chelonia Eg: *Chelone*** **Sub class II: Parapsida Eg: *Ichthyosaurus*** **Sub class III: Diapsida** **Order I Rhynchocephalia Eg: *Sphenodon*** **Order II Squamata Eg: *Chamaleon*** **Order III. Crocodilia Eg..*Crocodylus*** **Sub class IV: Synapsida Eg: *Cynognathus*** **General topic** **Identification of poisonous and non-poisonous sn** **Class Aves** **Sub class I: Archeornithes** **Eg: *Archaeopteryx* (Affinities)** **Sub class II: Neornithes** **Super order I: Palaeognathe Eg: *Struthio***	**19-04-2021** **22-04-2021** **26-04-2021** **29-04-2021** **03-05-2021** **10-05-2021**	

V. Innovative Learning Programmes

Name of Programme	Duration	Type	Proposed Time
Videos of animals ahowing their life habits	**In between the class in the appropriate content**		

VII. Assignments and Seminars

The following Assignment needs to be submitted as individual assignments.

Number	Topics	Activity	Submission Deadline
Assignment	Assignment on given topic	Preparation of assignment	Thursday of 5th Week of Course

Note: Failure to submit the assignment on the date mentioned will result in 0 marks for the assignment. Requests for extension of dates for submission not entertained.

VIII. Attendance (one component in class participation):

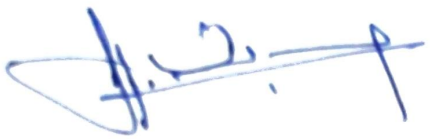
95-100%	**5**
90-95%	**4**
85-90%	**3**
80-85%	**2**
75-80%	**1**
<75	**Not eligible for appearing for ESE**

IX. Required reading:

- Ekambaranatha Iyer (2000), A Manual of Zoology Vol. II .S. Viswanathan and Co.
- Jhingran (1977), Fish and Fisheries of India, Hindustan Publishing Co.
- Jordan E L and P.S. Verma, (2002), Chordate Zoology, S. Chand and Co. New Delhi
- Joy P.J., George Abraham K.,Aloysius M. Sebastian (1998). Animal Diversity. Zoological Society of Kerala, Kottayam
- Kotpal R.L. (2000), Modern Text Book of Zoology, Vertebrates, Rastogi Publications, Meerut.– 250 002.

- Nigam, H. C. (1983). Zoology of Chordates, Vishal Publications, Jalandhar - 144008

- Nigam, H.C. and Sobti (2000), Functional Organization of Chordates, Shoban Lal
- Nagin Chand and Co., New Delhi.
- Parker and Hanswell, (2004), Text Book of Zoology, Vol II (Chordata).
- A.Z.T.B.S. Publishers and Distributors, New Delhi – 110 051
- Pough H. (2009) Vertebrate life, VIII Edition, Pearson International
- Prema A.K., Terrence V.R. and Mini K.D.(Eds.) (2011). Chordate Diversity of Kerala, Zoological Society of Kerala, Kottayam
- Thomas A. P. (Editor) (2010) Chordata .Green leaf publications Kottayam
- Young J.Z.(2004), The life of Vertebrates, Oxford University Press (Third Ed.) India



St. Albert's College (Autonomous)

ZOO4CRT0119 RESEARCH METHODOLOGY, BIOPHYSICS AND BIOSTATISTICS

I. Course Instructor

Name	Sem, Programme & Batch	Email
Dr. M. L Joseph **Dr.Vincent Terrence Rebello** **Prof. K J Benny** **Prof. Nimila P J**	B.Sc. Zoology Semester 4 2019-20	nimilapj@alberts.edu.in bennykj@alberts.edu.in josephml@alberts.edu.in terrencerebello@alberts.edu.in

II. Duration of Course:

No	Activity	Duration
1	Contact hours	48 (Including assignments)
2	Assessment (CAE & ESE)	6
	Total	**54**
	Remedial Sessions/Peer Tutoring/Tutorials (need based & Optional)	4

III. Course Objectives:

- Familiarising the learner the basic concept of scientific method in research process.
- Carry out research work and research documentation.
- Develop skill in research communication and scientific documentation.
- Awareness about the laws and ethical values in biology.

IV. Course Delivery Plan

This course is a fundamental learning step in the formation of developing scientific understanding of research process and to develop skill in research communication and scientific documentation. The teaching methods will include lectures, power point presenations, cross over learning and hands on training in computer applications.

Topics	Session No & Date(s)	Methodology and Duration
Topics	Session No & Date(s)	Methodology and Duration

These are the topics to be covered in the modules		
Basic concepts of research: Meaning, Objectives, Approaches, Types of research; Research Process: Scientific method in research (eight steps); Importance of literature reviewing in defining a problem, Identifying gap areas from literature review; Research Communication and scientific documentation: Project proposal writing, Research report writing, (Structure of a scientific paper), Thesis, dissertation, research article. Presentation techniques: Oral presentation, Assignment, Seminar, Debate, Workshop, Colloquium, Conference Sources of Information: Primary and secondary sources. Library-Books, Journals, Periodicals, Reviews, Internet. Search engines Online libraries, e-Books, e-Encyclopedia, Institutional Websites. Plagiarism	11/11/2019 12/11/2019 13/11/2019 14/11/2019 15/11/2019 18/11/2019 19/11/2019 20/11/2019 21/11/2019 22/11/2019 25/11/2019 26/11/2019 27/11/2019	Lectures Power point presentations Technical sessions
Animal Collection – Tools & techniques Sampling techniques; Biodiversity indices Collection methods, techniques and equipments Preservation techniques	28/11/2019 29/11/2019 02/12/2019 03/12/2019 04/12/2019 05/12/2019 06/12/2019 09/12/2019 10/12/2019 11/12/2019 12/12/2019 13/12/2019	Lectures Museum specimen study Technical sessions
Basic understanding on principle and uses of the following: Microscopy (a) Light microscopy, Bright field (Compound Microscope), Phase contrast, Dark field microscopy, Fluorescence, Polorization microscopy, Video microscopy. (b) Electron - Scanning (SEM), Transmission (TEM) and STEM Micrometry – Stage and Eyepiece micrometers Camera	16/12/2019 17/12/2019 18/12/2019 19/12/2019 20/12/2019 31/12/2019 01/01/2020 03/01/2020 06/01/2020 07/01/2020 08/01/2020	Lectures Power point presentations Technical sessions

Lucida Instrumentation pH Meter Separation Techniques: Centrifuge, Chromatography, Electrophoresis Analytical techniques: Colorimeter, Spectrophotometer, X-ray crystallography	09/01/2020 10/01/2020 11/01/2020 13/01/2020	
Bioethics : Introduction, Animal rights and animal laws in India, Prevention of cruelty to animals Act 1960, Biodiversity Act 2003. Concept of 3 R – conservation (Refined- to minimize suffering, Reduced – to minimize animals, Replaced – modern tools and alternate means), Animal use in research and education. Laboratory animal use, care and welfare, Animal protection initiatives- Animal Welfare Board of India, CPCSEA, ethical commitment. Working with human: Consent, harm, risk and benefits.	14/01/2020 15/01/2020 16/01/2020 17/01/2020 20/01/2020	Lectures
Sample & Sampling techniques: Collection of data, classification of data, frequency distribution tables, graphical representation Measures of Central Tendency: Mean, Median, Mode (Problem - Direct method only) Measures of dispersion: Range, Quartile Deviation, Mean Deviation, Standard Deviation, Standard error. (Merits & demerits and problems on SD). Correlation: Definition, Types of correlation.(mention in brief) Test of Hypothesis and Test of Significance: Basic concept, Levels of significance, test of significance, Procedure for testing hypothesis, types of hypothesis- Null hypothesis and Alternate hypothesis.	21/01/2020 22/01/2020 23/01/2020 24/01/2020 25/01/2020 27/01/2020 28/01/2020 29/01/2020 30/01/2020 31/01/2020	Lectures Power point presentations Problem based learning methods

V. Innovative Learning Programmes

VI. Assignments and Seminars

Assignments

The following Assignment needs to be submitted to Google Classroom. Both the assignments & presentation are individual assignments.

No	Topics	Activity	Submission Deadlines	
Assignment	Assignment on given topic	Preparation of assignment	Wednesday of 5th Week of Course	Submit the assignment to Google Classroom on or before 9pm
Seminar	PowerPoint presentation on given topic	PowerPoint Presentation for a presentation of 10 minutes duration	Wednesday of 8th Week of Course	Submit the assignment to Google Classroom on or before 9pm

Note: Failure to upload the assignment to Google Classroom *on the date mentioned will result in 0 marks for the assignment. Requests for extension of dates for submission not entertained.*

VII. Attendance (one component in class participation):

95-100%	5
90-95%	4
85-90%	3
80-85%	2
75-80%	1
<75	**Not eligible for appearing for ESE**

VIII. Required reading:

1. Gupta K.C, Bhamrah, H.S and G.S.Sandhu (2006) Research Techniques in Biological Sciences. Dominant Publishers and Distributors, New Delhi.
2. Khan and Khanum, (1990) Fundamentals of biostatistics.Press, Chicago
3. Rastogi, V.B (2009) Fundamentals of Biostatistics, Ane Books Pvt. Ltd. New Delhi.
4. Ackoff, R.L. (1962) Scientific Method, New York : John Wiley Press.
5. Aggarwal. S.K.(2009) Foundation Course in Biology, 2nd Ed.. Ane's Student Edition. Ane Books Pvt. Ltd.
6. Anderson, J, Durston, B.H. and Poole, M. (1992). Thesis and assignment writing. Wiley Eastern Ltd.
7. Best, J.W.and K.V. James, (1986) Research in Education.5th Edn. Prentice- Hall of India Pvt.Ltd. 42
8. Campell, R. (1990). Statistics for biologists. CBS Publishers and distributors.
9. Day, R.A. (1993). How to write and publish a scientific paper. Cambridge University Press. 10. Day, R.A. (2000) Scientific English: A guide for Scientists and other Professionals. Universities Press.
11. Fischer, R.A.(1960)The Design of Experiment. 7th rev.edn. New York: Hafner Publishing Co.,
12. Hawkins C. and Sorgi, M. (1987). Research: How to plan, speak and write about it. Narosa Publishing House.
13. Killick, H.J. (1971). Beginning ecology. Ibadan University Press.
14. Kleinbaum, D.G. and M.Klein (2009) Survival analysis-Statistics for Biology & Health 2nd Ed. Springer International ed.
15. Knudsen J. W (1966) Biological Techniques: Collecting,Preserving, and Illustrating Plants and Animals.
16. Kothari, C.R. and G.Garg. (2014) Research Methodology. Methods and Techniques. 3rd edn.
17. Marie, M. (2005). Animal Bioethics: Principles and Teaching Methods Wageningen Academic Publishers.
18. Norman T.J. (2007) Bailey Statistical methods in biology, Cambridge University press.
19. Roberts, M. T. King and M. Reiss.(1994) Practical Biology for Advance Level. Thomas Nelson and Sons Ltd. Surrey, UK.
20. Ruxton, G.D. and Colegrave, N. (2006), Experinmental design for the life sciences. Oxford University Press.
21. Sateesh, M.K. (2008) Bioethics and Biosafety; I.K. International Publishing House . 43
22. Taylor D.J. Green N.P.O and Stout G.W. (2008). Biological science (3rd edition-R.S. Oper Ed). Cambridge University press.

St. Albert's College (Autonomous)

ZOO5CRT0217- Cell Biology and Genetics

1. Course Instructor

Name	Programme, Semester and Batch	Email
Ms. Nimila P J	B.Sc. Zoology, Semester 5, 2020-21	nimilapj@alberts.edu.in

2. Duration of Course:

No.	Activity	Duration
1.	Contact Hours	50
2.	Assessment	4
	Total	54
	Remedial/ Peer Tutoring/ Tutorials (Need based and Optional)	

3. About the Course:

The course introduces the molecular and structural organization of prokaryotic and eukaryotic cells, the Genetics section gives a detailed study of classical transmission of genetic information and provides an introduction to the principles of genetics.

By the end of this course students will be able to;

- Describe the fine structure of Prokaryotic and Eukaryotic cell.
- Demonstrate the process of cell division.
- Explain the process of communication between cells.
- Explain theories of classical genetics.
- Describe the mechanism of genetic variability.

Pre -requisites

- ✓ Knowledge of cell theory.
- ✓ Basic understanding of Mendel's theories and genetic crossing.

4. Course Delivery Plan

This course is a course requiring lot of student centric learning processes. The teaching methods include lectures, discussions, field-based assignments etc.

Topics	Date(s)	Methodology
History, Cell theory	01-06-2020	
Prokaryotes and Eukaryotes	02-06-2020	
Mycoplasmas, Virus, Virions and Viroid, Prions.	03-06-2020 04-06-2020	Lectures
Molecular models of cell membrane (Sandwich model, Unit membrane model,	05-06-2020 08-06-2020	

Fluid mosaic model).	09-06-2020	
	10-06-2020	
Cell properties - permeability, Transport [Diffusion, Osmosis, Passive transport, Active transport, bulk transport],	11-06-2020	
	12-06-2020	
	15-06-2020	
	16-06-2020	
Cell coat and Cell recognition.	17-06-2020	
	18-06-2020	
	19-06-2020	
	22-06-2020	
	23-06-2020	
	24-06-2020	
	25-06-2020	
Structure and functions of following cell organelles:	26-06-2020	Lectures
	29-06-2020	
Endoplasmic reticulum	30-06-2020	
Ribosomes (Prokaryotic and Eukaryotic).	01-07-2020	
Golgi complex	02-07-2020	
Lysosomes – Polymorphism.	03-07-2020	
GERL concept.	06-07-2020	
Mitochondria - Structure and functions.	07-07-2020	
	08-07-2020	
Nucleus: Structure and functions of interphase nucleus, nuclear membrane, pore complex, structure and functions of nucleolus.	09-07-2020	
	10-07-2020	
	13-07-2020	
	14-07-2020	
	15-07-2020	
Chromosomes – Structure & organization, Heterochromatin, and Euchromatin, Nucleosomes.	16-07-2020	
	17-07-2020	
	21-07-2020	
	22-07-2020	
Polytene chromosomes- Balbiani rings, Endomitosis.	23-07-2020	
Lamp brush chromosomes.		
	24-07-2020	Lectures
Cell signalling - Types of signalling, signalling molecules (neurotransmitters, hormones, Growth Factors, Cytokines Vitamin A and D derivatives).	27-07-2020	
	28-07-2020	
	29-07-2020	
	30-07-2020	
	03-08-2020	
Cell Division: Cell cycle - G1, S, G2 and M phases, Mitosis and Meiosis. The difference between Mitosis and Meiosis.	04-08-2020	
	05-08-2020	
	06-08-2020	
	07-08-2020	
	10-08-2020	
	11-08-2020	
	12-08-2020	
	13-08-2020	
	14-08-2020	
	17-08-2020	
	18-08-2020	GD, Lectures.
Mendel's experiments- Monohybrid	19-08-2020	
	20-08-2020	

Cross, Dihybrid Cross, Mendel's Laws, Test Cross, Back Cross and Reciprocal Cross. Chromosome Theory of Inheritance.	21-08-2020 24-08-2020 25-08-2020 26-08-2020 08-09-2020 09-09-2020 11-09-2020	
Interaction of genes: Allelic: Incomplete Dominance and Co-Dominance.	14-09-2020 15-09-2020 16-09-2020	
Non-Allelic: Complementary (Flower colour in Sweet Pea) Supplementary (Coat colour in mice) Epistasis - dominant (Plumage in poultry) and recessive (Coat colour in mice). Polygenes (Skin colour inheritance in man) Pleiotropism.		Class Works- Problem Solving.
Lethal Alleles: Dominant lethal gene and recessive lethal gene.		
Multiple alleles – ABO Blood group system, Rh group and its inheritance. Erythroblastosis foetalis.		
Chromosome theory of sex determination- Autosome and Sex chromosomes, male heterogamy and female heterogamy- xx-xy, xx-xo, ZZ-ZW, ZZ-ZO.	17-09-2020 18-09-2020 23-09-2020	
Genic Balance theory of Bridges. Barr bodies, Lyon's hypothesis.	24-09-2020 25-09-2020	Lectures
Gynandromorphism, sex mosaics, intersex (Drosophila).	28-09-2020 29-09-2020 30-09-2020	
Hormonal and Environmental influence on Sex determination. Linkage and recombination of genes based on Morgan's work in Drosophila.	01-10-2020 05-10-2020 06-10-2020 07-10-2020	
Linked genes, Linkage groups, Chromosome theory of Linkage, Types of linkage- complete and incomplete. Recombination, cross over value, chromosome mapping.	08-10-2020 09-10-2020 10-10-2020 11-10-2020 12-10-2020 13-10-2020 14-10-2020 15-10-2020	
Sex Linked inheritance: Characteristics of Sex-Linked inheritance.		

X Linked inheritance of man. Y linked inheritance Incompletely Sex-Linked genes Sex limited genes Sex influenced genes Mutation: Chromosomal mutations - structural and numerical changes. Gene mutations - Addition, Deletion and substitution. Human Genetics: Karyotyping, Normal Human chromosome Complement. Pedigree analysis Aneuploidy and Non- disjunction. Autosomal abnormalities - Down syndrome, Cry du chat syndrome. Sex chromosomal abnormalities- Klinefelter's syndrome, Turner's syndrome. Single gene disorder - Autosomal single gene disorder -sickle cell anaemia Inborn errors of metabolism - phenylketonuria, alkaptonuria, Albinism. Multifactorial traits – polygenic disorder- cleft lip and cleft palate	16-10-2020 17-10-2020 18-10-2020 19-10-2020 20-10-2020 21-10-2020 22-10-2020 23-10-2020 27-10-2020 28-10-2020 30-10-2020	Lectures, Co-operative Learning. Activity.	

5. Innovative Learning Programmes

Name of Programme	Duration	Type	Proposed Time
Co-operative Learning.	2 days	Peer group Learning	7th Week
Pedigree chart	2 days	Activity	8th Week

6. Assignments and Seminars

Assignments

The following Assignment needs to be submitted to Google Classroom. Both the assignments & presentation are individual assignments.

No	Topics	Activity	Submission Deadlines
Assignment	Assignment on given topic	Preparation of assignment	Wednesday of 3rd Week of Course

Seminar	PowerPoint presentation on given topic	PowerPoint Presentation.	Wednesday of 10th Week of Course

Note: Requests for extension of dates for submission not entertained.

7. Attendance (one component in class participation):

95-100%	**5**
90-95%	**4**
85-90%	**3**
80-85%	**2**
75-80%	**1**
<75	**Not eligible for appearing for ESE**

8. Suggested Readings:

1. Zoological Society of Kerala Study material. 2002. *Cell Biology, Genetics and Biotechnology.*
2. Karp, G. (2010). *Cell and Molecular Biology: Concepts and Experiments.* VI Edition. John Wiley and Sons. Inc.
3. Koshy Thomas & Joe Prasad Mathew (Editors) (2011) *Cell Biology and Molecular Biology.*
4. Sarada K & Mathew Joseph (Editors) (1999) *Cell Biology, Genetics and Biotechnology.*
5. Thomas A.P (Editor) (2011) *Cell & Molecular Biology- The Fundamentals.* Green leafpublications. TIES. Kottayam.
6. Rastogi S. C. (1998) Cell Biology. Tata Mc. Graw Hill Publishing Co., New Delhi.
7. Powar C.B. (1983) Cell Biology (Himalaya Pub. Company).
8. Cooper, G.M. and Hausman, R.E. (2009). *The Cell: A Molecular Approach.* V Edition. ASM Press and Sunderland, Washington, D.C.; Sinauer Associates, MA.
9. De Robertis, E.D.P. and De Robertis, E.M.F. (2006). *Cell and Molecular Biology.* VIII Edition. Lippincott Williams and Wilkins, Philadelphia.
10. Shirly Annie Oommen, Sampath Kumar S., and Jinsu Varghese (Editors) (2012), Gene to Genome. Zoological Society of Kerala, Kottayam.

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Z0001-Z005CRT0-417 HUMAN PHYSIOLOGY, BIOCHEMISTRY, AND ENDOCRINOLOGY

I. Course Instructor

Name	Sem, Programme & Batch	Email
Prof. K. J. Benny	B.Sc. Zoology Semester V 2020-2021	bennykj@alberts.edu.in

II. Duration of Course:

No	Activity	Duration
1	Contact hours	50 (Including assignments)
2	Assessment (CAE & ESE)	4
	Total	54
	Remedial Sessions/Peer Tutoring/Tutorials (need based & Optional)	0

III. Course Objectives:

- This course will provide students with a deep knowledge in biochemistry, physiology and endocrinology.
- Defining and explaining the basic principles of biochemistry useful for biological studies for illustrating different kinds of food, their structure, function and metabolism.
- Explaining various aspects of physiological activities of animals with special reference to humans.
- Students will acquire a broad understanding of the hormonal regulation of physiological processes in invertebrates and vertebrates.
- By the end of the course, students should be familiar with hormonal regulation of physiological systems in several invertebrate and vertebrate systems.
- This also will provide a basic understanding of the experimental methods and

designs that can be used for further study and research.

- The achievement of above objectives along with periodic class discussions of current events in science, will benefit students in their further studies in the biological/physiological sciences and health-related fields, and will contribute to the critical societal goal of a scientifically literate citizenry.

IV. Course Delivery Plan

This course is a course requiring lot of student centric learning processes. The teaching methods include lectures, discussions, Assignments/Seminars etc.

Topics	Session No & Date(s)	Methodology and Duration
HUMAN PHYSIOLOGY Module I Nutrition: Nutritional requirements – carbohydrates, proteins, lipids, minerals (Ca, P, Fe, I), vitamins (sources and deficiency disorders). Importance of dietary fibre and antioxidants.Balanced diet, Recommended Dietary Allowance (RDA). Nutrition during pregnancy and lactation, Infant nutrition, Malnutrition(PEM). Digestion: Anatomy and histology of digestive glands (liver, pancreas, salivary, gastric and intestinal). Digestion and absorption of carbohydrates, proteins and fats.Nervous and hormonal control of digestion. Module II Respiration: Phases of respiration (external respiration, gas transport and internal respiration). Respiratory pigments: Haemoglobin, Myoglobin (Structure and Function). Transport of respiratory gases - transport of oxygen, oxyhaemoglobin curve, factors affecting oxyhaemoglobin curve, transport of carbon dioxide,(chloride shift). Control of respiration.Respiratory disturbances (Hypoxia, Hypercapnia, Asphyxia).Physiological effect of smoking, carbon monoxide poisoning, Oxygen therapy and artificial respiration. Circulation: ESR, Haemopoiesis, blood pressure, ECG. Haemostasis (blood coagulation) – clotting	01-Jun-20 03-Jun-20 04-Jun-20 09-Jun-20 10-Jun-20 11-Jun-20 12-Jun-20 16-Jun-20 17-Jun-20 18-Jun-20 24-Jun-20 25-Jun-20 26-Jun-20	Lectures

factors, intrinsic and extrinsic pathways, anticoagulants and its mechanism of action.Cardiovascular diseases (Jaundice, Atherosclerosis, Myocardial infarction, Thrombus, Stroke).Angiogram and angioplasty.	29-Jun-20 01-Jul-20 02-Jul-20 03-Jul-20 08-Jul-20 09-Jul-20 10-Jul-20	
Module III Excretion: Histology of Bowman's capsule and tubular part. Urine formation – glomerular filtration, tubular reabsorption, tubular secretion. Urine concentration – counter current mechanism. Acid – base balance, hormonal regulation of kidney function. Renal disorders (kidney stone, acute and chronic renal failure, and dialysis). Homeostasis: Definition, concept and importance in biological system. Thermal regulation and thermal adaptation in homeotherms. Module IV Nerve physiology: Ultra structure of neuron. Nerve impulse production (resting membrane potential, action potential), transmission of impulse along the nerve fiber, interneuron (synaptic) transmission, neuromuscular junction and transmission of impulses.Neurotransmitters (acetyl choline, adrenalin, dopamine). EEG. Memory, Neural disorders (brief account on Dyslexia, Parkinson's disease, Alzheimer's disease, Epilepsy). Muscle physiology: Ultra structure of striated muscle, muscle proteins (myosin, actin, tropomyosin, troponin), Muscle contraction and relaxation-Sliding Filament Theory, cross bridge	16-Jul-20 17-Jul-20 22-Jul-20 23-Jul-20 24-Jul-20 29-Jul-20 30-Jul-20	Lectures Lectures Lectures

cycle, biochemical changes and ATP production in muscle, Cori cycle. Kymograph, Simple muscle twitch, muscle fatigue, tetanus, rigor mortis.	05-Aug-20 06-Aug-20 07-Aug-20 19-Aug-20	
BIOCHEMISTRY Module V Carbohydrates: Basic structure, biological importance and classification of monosaccharides, oligosaccharides, polysaccharides with examples. Proteins: Basic structure and classification of amino acids; structure, biological importance and classification of proteins with examples. Lipids: Structure of fatty acid, saturated and unsaturated fatty acid, biological importance and classification of lipids with examples. Vitamins and minerals: Major fat soluble and water soluble vitamins. Important minerals and trace elements required for living organisms. Biological importance of vitamins and minerals. Enzymes: Chemical nature of enzymes, enzyme activation, enzyme inhibition, allosteric enzymes, isoenzymes, co-enzymes. Michaelis–Menten enzyme kinetics. Module VI Carbohydrate metabolism: Glycogenesis, Glycogenolysis, Gluconeogenesis, Hexose monophosphate Shunt, Glycolysis, Citric Acid Cycle, Electron Transport Chain and ATP synthesis. Ethanol metabolism. Protein metabolism: Deamination, Transamination, Transmethylation, Decarboxylation, Ornithine cycle. Lipid metabolism: Biosynthesis of fatty acids,	02-Sep-20 03-Sep-20 04-Sep-20 20-Aug-20 21-Aug-20 24-Aug-20 26-Aug-20 16-Sep-20 17-Sep-20 18-Sep-20 23-Sep-20 24-Sep-20 25-Sep-20 28-Sep-20 30-Sep-20 01-Oct-20	Lectures Lectures Lectures Lectures

Beta oxidation, physiologically important compounds synthesized from cholesterol.	05-Oct-20 09-Oct-20 14-Oct-20 15-Oct-20 16-Oct-20	
ENDOCRINOLOGY Endocrinology and reproduction Module VII Endocrine physiology: Hormones – classification and mechanism of hormone action. Major endocrine glands(Histology is not included) their hormones, functions and disorders (hypothalamus, pituitary gland, pineal gland, thyroid gland, parathyroid gland, islets of Langerhans, adrenal gland), Homeostasis and feedback mechanism.	28-Oct-20 30-Oct-20	Lectures

V. Innovative Learning Programmes

VI. Assignments and Seminars

The following Assignment needs to be submitted as individual assignments.

Number	Topics	Activity	Submission Deadline
Assignment	Assignment on given topic	Preparation of assignment	Thursday of 5th Week of Course

Note: Failure to submit the assignment on the date mentioned will result in 0 marks for the assignment. Requests for extension of dates for submission not entertained.

VII. Attendance (one component in class participation):

95-100%	5
90-95%	4

85-90%	3
80-85%	2
75-80%	1
<75	Not eligible for appearing for ESE

VIII. Required reading:

- Albert L. Lehninger, Michael Cox and David L. Nelson; 2004; Biochemistry Lehninger.
- Palgrave - Macmillan.
- Arthur C. Guyton and John E. Hall; 2016; Text Book of Medical Physiology: Guyton, 13th
- edition; Elsevier
- Barrington, E. J. W.; 1975; General and Comparative Endocrinology, Oxford, Clarendon
- Press.
- Bhagavan, N.V.. 2007. Medical biochemistry, fourth edition Academic Press,
- Awapara J, 1968. Introduction to Biological chemistry. Prentice Hall. New Jersey
- Geetha N. 2014. Textbook of Medical Physiology:. Paras Medical Publishers, 3rd edition
- Jain, A K.; 2016; Textbook of Physiology., Avichal Publishing Company
- Martin, C.R. 1985.Endocrine Physiology: Oxford University Press.
- Melmed, Shlomo, Williams, Robert Hardin; 2011; Textbook of Endocrinology: Elsevier,
- 12th edition
- Prosser and Brown,; 1962; Comparative Animal Physiology:, W. B. Saunders Co., West
- Washington Square, Philadelphia 5.
- Rastogi, S. C.; 2007; Outlines of Biochemistry . CBSPublishers, New Delhi.
- Robert K. Murray and Victor W. Rodwell; 2012; Harper's Illustrated Biochemistry, Harper;.
- 29th edition (Lange basic science.)
- Sarada Subramanyam and K. Madhavankutty; 2014; Textbook of human physiology.,
- S.Chand & Company Ltd,
- Satyanarayana U. and Chakrapani, U.; 2013. Biochemistry Elsevier; 4 edition

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ZOO5COT0117- Public Health and Nutrition

1. Course Instructors

Name	Programme, Semester and Batch	Email
	B.Sc. Zoology, Semester 5, 2020-21	
Prof. K J Benny	Module I and II	kjbenny@alberts.edu.in
Ms. Nimila P J	Module V	nimilapj@alberts.edu.in
Dr. Jissa G Krishna	Module III and IV	jissa@alberts.edu.in
Dr. Philomina Joseph	Module VI	philomina@alberts.edu.in

2. Duration of Course:

No.	Activity	Duration
1.	Contact Hours	50
2.	Assessment	4
	Total	54
	Remedial/ Peer Tutoring/ Tutorials (Need based and Optional)	5

3. About the Course:

The course introduces the students to important topics in nutrition and public health. The course covers relevant topics like nutrition, nutritional defects and importance pf physical activity in day today life.

By the end of this course students will be able to;

- Describe the nutritional requirements.
- Explain the role of exercise in day today life.
- Differentiate different type of communicable diseases, its causes, modes of transmission and treatment/ preventive measures.

Pre -requisites

- ✓ Knowledge of nutrients.
- ✓ Basic understanding of biological terminologies.

4. Course Delivery Plan

This course is a course requiring lot of student centric learning processes. The teaching methods include lectures, discussions, field-based assignments etc.

Topics	Date(s)	Methodology

Dimensions and Determination of Health Physical Activity and Health benefits	01-06-2020 02-06-2020	
Effect of exercise on body systems – Circulatory, Respiratory, Endocrine, Skeletal and Muscular	03-06-2020 04-06-2020 05-06-2020 08-06-2020	Lectures
Programmes on Community health promotion (Individual, Family and Society) Dangers of alcoholic and drug abuse, medico-legal implications.	09-06-2020 10-06-2020 11-06-2020 12-06-2020 15-06-2020	
Nutrition and Health Concept of Food and Nutrition, Balanced diet Vitamins, Malnutrition, Deficiency Disease Determining Caloric intake and expenditure Obesity, causes and preventing measures Role of Diet and Exercise, BMI	16-06-2020 17-06-2020 18-06-2020 19-06-2020 22-06-2020 23-06-2020 24-06-2020 25-06-2020 26-06-2020	Lectures
Principles of Accident prevention Health and Safety in daily life. Health and Safety at work. First aid and emergency care. Common injuries and their management. Modern life style and hypokinetic diseases. Diabetes, Cardiovascular Disorders- Prevention and Management.	29-06-2020 30-06-2020 01-07-2020 02-07-2020 03-07-2020 06-07-2020 07-07-2020 08-07-2020 09-07-2020	Lectures
Life skills, emotional adjustment and wellbeing. Yoga, Meditation and Relaxation, Psychoneuroimmunology.	10-07-2020 13-07-2020 14-07-2020 15-07-2020 16-07-2020 17-07-2020 21-07-2020 22-07-2020 23-07-2020 24-07-2020	GD, Lectures.
Public health and water quality. Potable water, Health and Water quality	27-07-2020 28-07-2020	

Faecal bacteria and pathogenic microorganisms transmitted by water. Determination of sanitary quality of drinking water, water purification techniques	29-07-2020 30-07-2020 03-08-2020 04-08-2020 05-08-2020 06-08-2020 07-08-2020 10-08-2020 11-08-2020 12-08-2020	Lectures
Water borne diseases-Cholera and Typhoid. Prevention of Water borne diseases.	13-08-2020 14-08-2020 17-08-2020	
Food borne diseases and Prevention- Botulism, Salmonellosis, Hepatitis A	18-08-2020 19-08-2020 20-08-2020	
Vector borne diseases and Control measures- Chikungunya, Filariasis and Dengue fever.	21-08-2020 24-08-2020 25-08-2020 26-08-2020	
Zoonotic disease- Leptospirosis & its control.	08-09-2020 09-09-2020	Lectures, Activity.
Emerging diseases - Swine flu (H1N1), Bird flu (H5N1), SARS, Anthrax	11-09-2020 14-09-2020 15-09-2020	
Re-emerging diseases –TB, Malaria	16-09-2020 17-09-2020 18-09-2020 23-09-2020 24-09-2020 25-09-2020 28-09-2020 29-09-2020 30-09-2020	

5. Innovative Learning Programmes

Name of Programme	Duration	Type	Proposed Time
Health Report Preparation	2 days	Activity	7th Week

6. Assignments and Seminars

Assignments

The following Assignment needs to be submitted to Google Classroom. Both the assignments & presentation are individual assignments.

No	Topics	Activity	Submission Deadlines
Assignment	Assignment on given topic	Preparation of assignment	Monday of 5th Week of Course
Seminar	PowerPoint presentation on given topic	PowerPoint Presentation.	Thursday of 10th Week of Course

Note: Requests for extension of dates for submission not entertained.

7. Attendance (one component in class participation):

Percentage	Marks
95-100%	5
90-95%	4
85-90%	3
80-85%	2
75-80%	1
<75	Not eligible for appearing for ESE

8. Suggested Readings:

1. Gladys Francis & Mini K.D., (Editors) (2012), Microbiology, Zoological Society of Kerala, Kottayam.

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

3. K Park, (2008) Park's Text Book of Preventive and Social Mediine 18th Edition. Banarasidass Bhenot Publication

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

5. Tom Sanders and Peter Emery. (2004) Molecular basis of human nutrition: Taylor & Francis Publishers Ane Book.

6. Pelczar M.J. Jr. E.C.S. Chane & N.R. Krieg, Microbiology (Concept & Applications). 5th edition. Tata McGraw Publishing Company Ltd.

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ZOO6CRT0219- MICROBIOLOGY AND IMMUNOLOGY

1. Course Instructors

Name	Programme, Semester and Batch	Email
Ms. Nimila P J	B.Sc. Zoology, Semester 5, 2020-21	nimilapj@alberts.edu.in

2. Duration of Course:

No.	Activity	Duration
1.	Contact Hours	50
2.	Assessment	4
	Total	54
	Remedial/ Peer Tutoring/ Tutorials (Need based and Optional)	5

3. About the Course:

The course will cover the history and developments in Microbiology. It overviews viral and bacterial structure, replications and pathogenesis. This course will introduce students to sterilization and disinfection techniques. The course comprehends the basic concepts of immune function and regulation.

By the end of this course students will be able to;

- Recognize the diversity of microbial world, compare their structure, reproduction and growth
- Acquire skills in aseptic techniques, culture and handling of microbes.
- Comprehend the methods for isolation of bacteria in pure cultures
- Assess the microbial load of bacteria from environmental samples.
- Describe about the key concepts of immune system, its role in human health and well-being.

Pre -requisites

- ✓ Knowledge of prokaryotic cell structure.
- ✓ Basic understanding of vertebrate circulatory system.

4. Course Delivery Plan

This course is a course requiring lot of student centric learning processes. The teaching methods include lectures, discussions, field-based assignments etc.

Topics	Date(s)	Methodology
Introduction: History and scope of Microbiology.	02-11-2020 03-11-2020	
Outline classification of Microbes.	04-11-2020	Lectures

(Bacteria,	05-11-2020	
	06-11-2020	
	09-11-2020	
fungi & viruses)	10-11-2020	
Methods in Microbiology: Sterilization and Disinfection - Physical and Chemical methods.	11-11-2020 12-11-2020 13-11-2020	
	16-11-2020	
Culture media –Components of media, Synthetic media, Types-Solid, liquid, semisolid, basal, Selective media, Enrichment media, Differential media.	17-11-2020 18-11-2020 19-11-2020 20-11-2020	
Culture methods: Plating techniques and Isolation of pure colony (Streak, serial dilution & pour, spread) Culture preservation techniques: Refrigeration, deep freezing, freezing under liquid nitrogen, lyophilization.		
	23-11-2020	
Morphology and fine structure of bacteria:	24-11-2020 25-11-2020	Lectures
Size, shape, cilia, pili, flagella, capsule, cell wall and its composition (Gram positive & negative). Cytoplasmic membrane, protoplast, spheroplast, intracellular membrane systems, cytoplasm, vacuoles, genetic material, cell inclusions, bacterial spores-types, formation.	26-11-2020 27-11-2020 30-11-2020 01-12-2020 02-12-2020 03-12-2020 04-12-2020 07-12-2020	
	08-12-2020	
Staining techniques –Simple staining, Differential staining-Gram staining.	09-12-2020 10-12-2020 11-12-2020	
Bacterial Reproduction: Asexual (Binary fission, budding, fragmentation), Bacterial growth Curve, Methods of Recombination (conjugation, transduction, transformation).		
Virology: Structure of viruses; Human, animal, and bacterial virus. Viral replication, -Lytic & lysogeny, cultivation of animal viruses.		

only) Contagious diseases – epidemic, endemic and pandemic, modes of Transmission – food, water, air, vectors and carriers. Diseases: Epidemiology, symptomology, diagnosis and treatment. Bacterial -Clostridium tetani(tetanus), Viral – HIV virus (AIDS), fungal –Candida albicans (candidiasis).	14-12-2020 15-12-2020 16-12-2020 17-12-2020 18-12-2020 19-12-2020 20-12-2020
	Lectures.
Introduction: Immunity, types- Innate and acquired immunity, Passive (Natural and Artificial) and active immunity (Natural and Artificial). Mechanisms of innate immunity - Anatomic barriers, inflammation, phagocytosis.	01-01-2021 04-01-2021 05-01-2021 06-01-2021 07-01-2021 08-01-2021
Overview of immune system: Lymphoid organs- Primary (Thymus, Bone marrow) and Secondary lymphoid organs (lymph nodes, spleen).	11-01-2021 12-01-2021 13-01-2021 14-01-2021 15-01-2021
Cells of the immune system- Lymphocytes: T and B cells, Natural killer cells, memory cells, macrophages.	18-01-2021 19-01-2021 20-01-2021 21-01-2021 22-01-2021
	25-01-2021
	27-01-2021 28-01-2021 29-01-2021 30-01-2021 31-01-2021 01-02-2021
Antigens- Basic properties, Types, haptens, adjuvants.	02-02-2021 03-02-2021 04-02-2021
Antibodies - immunoglobulin structure, classes and functions of	05-02-2021

immunoglobulins. Monoclonal & polyclonal antibodies. Antigen – Antibody reactions- Precipitation, immunodiffusion, Agglutination test, VDRL, WIDAL, ELISA. Types of Immune Response- Immune system in health and disease- Auto immune diseases: Pernicious Anemia, Rheumatoid Arthritis. Immunodeficiency disease - AIDS. Hyper sensitivity- Type I, (Eg. Anaphylaxis) Type II (Transfusion reaction), TypeIII (Arthus reaction) andType IV (Mantoux Test).	08-02-2021 09-02-2021 10-02-2021 11-02-2021 12-02-2021 15-02-2021 16-02-2021 17-02-2021 18-02-2021 19-02-2021 22-02-2021 23-02-2021 24-02-2021 25-02-2021 26-02-2021 28-02-2021 01-03-2021 02-03-2021 03-03-2021 04-03-2021 05-03-2021 08-03-2021 09-03-2021 10-03-2021	Lectures
Vaccines Introduction, Types of vaccines - Live attenuated, killed, toxoids, Current Vaccines, Recent trends in vaccine preparation	12-03-2021 15-03-2021 16-03-2021 17-03-2021 18-03-2021 19-03-2021	Lectures,

5. Assignments and Seminars

Assignments

The following Assignment needs to be submitted to Google Classroom. Both the assignments & presentation are individual assignments.

No	Topics	Activity	Submission Deadlines
Assignment	Assignment on given topic	Preparation of assignment	Wednesday of 3th Week of Course
Seminar	PowerPoint presentation on given topic	PowerPoint Presentation.	Thursday of 5th Week of Course

Note: Requests for extension of dates for submission not entertained.

6. Attendance (one component in class participation):

Percentage	Marks
95-100%	5
90-95%	4
85-90%	3
80-85%	2
75-80%	1
<75	Not eligible for appearing for ESE

7. Suggested Readings:

1. Gladys Francis & Mini K.D., (Editors) (2012), Microbiology, Zoological Society of Kerala Kottayam.

2. Kuby J, Kindt T., Goldsby R. and Osborne B. (2007). Kuby Immunology Sharma K. (2005) Manual of Microbiology: Tools and Techniques, Anes book

3. Susan Panicker & George Abraham (Editors) (2008), Micro Biology and Immunology, Zoological Society of Kerala, Kottayam.

4. Colemen: (2002). Fundamentals of Immunology.

5. Darla J. Wise & Gordon R. Carter: (2004): Immunology A Comprehensive ReviewIowa state University Press. A Blackwell science company,

6. Helen Hapel, Maused Harney Siraj Misbah and Next Snowden: (2006) Essentials of Clinical Immunology Fifth Ed. Blackwell Publishing Company Ltd.

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KOCHI-682 018

St. Albert's College (Autonomous)

ZOO4CRT0119 - DEVELOPMENTAL BIOLOGY

I. Course Instructor

Name	Sem, Programme & Batch	Email
Prof. K J Benny	B.Sc. Zoology Semester 4 2020-21	bennykj@alberts.edu.in

II. Duration of Course:

No	Activity	Duration
1	Contact hours	48(Including assignments)
2	Assessment (CAE & ESE)	6
	Total	54
	Remedial Sessions/Peer Tutoring/Tutorials (need based & Optional)	3

III. Course Objectives:

1. Understand reproductive organs, gametogenesis and fertilization
2. A basic understanding of the experimental methods and designs that can be used for future studies and research.
3. Provides the students awareness of current events in Developmental biology.
4. Differentiate the embryology of chick, frog and humans

IV. Course Delivery Plan

This course helps in the detailed understanding of the reproductive organs, gametogenesis and fertilization in the organisms. It also provides the students on the fundamentals of the embryology of chick, frog and humans and also in inspiring students awareness of current events in developmental biology.

Topics	Session No & Date(s)	Methodology and Duration
Topics	Session No & Date(s)	Methodology and Duration
These are the topics to be covered in the modules		
Introduction: Definition, Scope of developmental biology, sub-divisions (descriptive, comparative, experimental and chemical),	11-11-2019 12-11-2019 13-11-2019 14-11-2019 15-11-2019	Lectures

historical perspectives, basic concepts and theories. Reproductive Physiology: Gonads- anatomy of testis and ovary, spermatogenesis, oogenesis, gonadal hormones and their functions. Hormonal control of human reproduction - Female reproductive cycles (Estrous cycle, Menstrual cycle). Structure of mammalian sperm and egg. Pregnancy, parturition and lactation. Reproductive health and importance of sex education. Egg types: Classification of eggs based on the amount, distribution and position of yolk. Mosaic and regulative, cleidoic and noncleidoic eggs. Polarity and symmetry of egg. Fertilization: Mechanism of fertilization-(Encounter of spermatozoa and Ova, Approach of the Spermatozoon to the Egg, Acrosome Reaction and Contact of Sperm and Ovum, Activation of Ovum, Migration of Pronuclei and Amphimixis,). Significance of fertilization, Polyspermy, Parthenogenesis- Different types and significance.	18-11-2019 19-11-2019 20-11-2019 21-11-2019 22-11-2019	Power point presentations Technical sessions
Cleavage: Types, planes and patterns of cleavage, Cell lineage of Planaria. Influence of yolk on cleavage **Blastulation:** Morula, blastula formation, types of blastula with examples. Fate maps: Concept of fate maps, construction of fate maps (artificial and natural), structure of a typical chordate fate map. Significance of fate map. Gastrulation:Major events in gastrulation. Morphogenetic cell movements. Influence of yolk on gastrulation. Exogastrulation. Concept of germ layers and derivatives.	25-11-2019 26-11-2019 27-11-2019 28-11-2019 29-11-2019 19-12-2021 02-12-2019 03-12-2019 04-12-2019 05-12-2019 06-12-2019 09-12-2019 10-12-2019 11-12-2019	Lectures Museum specimen study Technical sessions

Cell differentiation and gene action: Potency of embryonic cells (Totipotency, Pleuripotency, Unipotency of embryonic cells). Determination and differentiation in embryonic development, Gene action during development with reference to Drosophila (maternal effect genes), Zygotic genes.		
Embryology of Frog: Gametes, fertilization, cleavage, blastulation, fatemap, gastrulation, neurulation, notogenesis. Differentaition of Mesoderm and Endoderm, Development of eye. Metamorphosis of frog, Hormonal and environmental. Embryology of chick: Structure of egg, fertilization, cleavage, blastulation, fate map, gastrulation. Development and role of Primitive streak, Salient features of 18hour, 24 hour, 33 hour & 48 hour chick embryo.Extra embryonic membranes in chick. Human development: Fertilisation, cleavage, blastocyst, implantation, placenta. Gestation, parturition and lactation.Human intervention in reproduction, contraception and birth control. Infertility, Invitro fertilization (test tube baby	01-01-2020 03-01-2020 06-01-2020 07-01-2020 08-01-2020 09-01-2020 10-01-2020 11-01-2020 13-01-2020 14-01-2020 15-01-2020 16-01-2020 17-01-2020 20-01-2020 21-01-2020 22-01-2020 23-01-2020 24-01-2020 25-01-2020	Lectures Power point presentations Technical sessions
Experimental embryology: Spemann's constrict ion experiments, Organizers and embryonic induction. Embryo transfer technology, cloning, stem cell research. Ethical issues. Teratology Dysmorphology, Developmental defects: Teratogenesis, important teratogenic	27-01-2020 28-01-2020 29-01-2020 30-01-2020 31-01-2020 20-02-2021	Lectures

agents.(Radiations, chemicals and drugs, infectious diseases) genetic teratogenesis in human beings, Developmental defects: Prenatal death (miscarriage and still birth). Intrauterine Growth Retardation (IUGR).		
General topics: Classification and functions of placenta in mammals. Prenatal diagnosis (Amniocentesis, Chorionic villi sampling. Ultra sound scanning, Foetoscopy. Maternal serum alpha-fetoprotein. Maternal serum beta-HCG).Regeneration in animals.	03-02-2020 04-02-2020 05-02-2020 06-02-2020 07-02-2020	Lectures Power point presentations Problem based learning methods

V. Innovative Learning Programmes

VI. Assignments and Seminars

Assignments

The following Assignment needs to be submitted to Google Classroom. Both the assignments & presentation are individual assignments.

No	Topics	Activity	Submission Deadlines	
Assignment	Assignment on given topic	Preparation of assignment	Wednesday of 5th Week of Course	Submit the assignment to Google Classroom on or before 9pm
Seminar	PowerPoint presentation on on given topic	PowerPoint Presentation for a presentation of 10 minutes duration	Wednesday of 8th Week of Course	Submit the assignment to Google Classroom on or before 9pm

Note: Failure to upload the assignment to Google Classroom *on the date mentioned will result in 0 marks for the assignment. Requests for extension of dates for submission not entertained.*

VII. Attendance (one component in class participation):

95-100%	5
90-95%	4
85-90%	3
80-85%	2
75-80%	1
<75	Not eligible for appearing for ESE

VIII. Required reading:

1. Anthony S. Fauci, Eugene Braunwald, Dennis L. Kasper,Stephen L. Hauser, Dan L. Longo,
2. J. Larry Jameson and Joseph Loscalzo; 2008; Harriosns Principles of Internal Medicine; Chruch Livingston 17th Ed.
3. Balnisky B.I.; 1981 An Introduction to Embryology, W.B. Saunders and Co.
4. Berril, N..J.; and Kars, G.; 1986. Developmental biology, Mc Graw Hills
5. Dutta 2007 Obstrestics , Church Livingston 17 Ed
6. Majumdar N. N -1985 Vetebrate embryology; Tata McGraw-Hill, New Delhi
7. Melissa A & Gibbs, 2006; A practical Guide to Developmental Biology, Oxford university press (Int. student edition)
8. Scott F. Gilbert; 2003; Developmental biology; Sinauer Associates Inc.,U.S.; 7th Revised edition.
9. Vijayakumarn Nair, K. & George, P. V. 2002. A manual of developmental biology, Continental publications , Trivandrum
10. Taylor D J, Green NPO & G W Stout. (2008) Biological Science third edition. Cambridge University press. Ref pp 748 biology 755

K. J. BENNY
ASSOC... PROFESSOR & HEAD
P.G. ... DEPT OF ZOOLOGY
ST... COLLEGE
K...

St. Albert's College (Autonomous)

ZOO6CRT0319- Biotechnology, Bioinformatics and Molecular Biology

1. Course Instructors

Name	Programme, Semester and Batch	Email
Ms. Nimila P J	B.Sc. Zoology, Semester 6, 2019-20	nimilapj@alberts.edu.in

2. Duration of Course:

No.	Activity	Duration
1.	Contact Hours	50
2.	Assessment	4
	Total	54
	Remedial/ Peer Tutoring/ Tutorials (Need based and Optional)	2

3. About the Course:

The course introduces the students to basic terminologies and techniques in molecular biology and biotechnology. The course also offers introduction to bioinformatics tools.

By the end of this course students will be able to;

- Explain the nature of genetic material and gene concept
- Summarize gene expression and gene regulations
- Create an appreciation about the new developments in biotechnology
- Explain the role of bioinformatics in academic and research fields

Pre -requisites

- ✔ Understanding of genetic material.
- ✔ Idea about prokaryotic and eukaryotic cell structure.
- ✔ Basic knowledge of computer operations.

4. Course Delivery Plan

This course is a course requiring lot of student centric learning processes. The teaching methods include lectures, discussions and assignments / seminars.

Topics	Date(s)	Methodology
Nature of Genetic Materials: Discovery of DNA as genetic material – Griffith's transformation experiments. Avery Macarty and Macleod, Hershey Chase Experiment of Bacteriophage infection		Lectures

Prokaryotic genome; Eukaryotic genome.	05-11-2020	
	06-11-2020	
Structure and. Types of DNA & RNA.DNA replication. Modern concept of gene (Cistron, muton, recon, viral genes)., Brief account of the following-- Split genes (introns and exons), Junk genes, Pseudogenes, Overlapping genes, Transposons.	09-11-2020	
	10-11-2020	
	11-11-2020	
	12-11-2020	
	13-11-2020	
	16-11-2020	
	17-11-2020	
	18-11-2020	
	19-11-2020	
Gene Expressions: Central Dogma of molecular biology and central dogma reverse, one gene- one enzyme hypothesis, One gene-one polypeptide hypothesis Characteristics of genetic code, Contributions of Hargobind Khorana.	20-11-2020	Lectures
	23-11-2020	
	24-11-2020	
	25-11-2020	
	26-11-2020	
	27-11-2020	
	30-11-2020	
	01-12-2020	
Protein synthesis [prokaryotic]: Transcription of mRNA, Reverse transcription, post transcriptional modifications, Translation, Post translational modifications.	02-12-2020	
	03-12-2020	
	04-12-2020	
	07-12-2020	
	08-12-2020	
	09-12-2020	
Gene regulations: Prokaryotic (inducible & repressible systems) Operon concept -Lac operon and Tryptophan operon, Brief account of Eukaryotic gene regulation.	10-12-2020	
	11-12-2020	
		Lectures
Introduction: Scope, Brief History, Scope and Importance	14-12-2020	
	15-12-2020	
Tools and Techniques in Biotechnology: Enzymes (restriction endonucleases, ligases, linkers & adapters), Vectors-[Plasmids, Phage vectors, Cosmids, Artificial Chromosomes] Host cells. Basic steps & techniques in rDNA technology	16-12-2020	
	17-12-2020	
	18-12-2020	
	19-12-2020	
	20-12-2020	
	01-01-2021	
Gene Libraries, Construction of genomic library and cDNA Library.	04-01-2021	
	05-01-2021	
PCR technique and DNA amplification, Brief description of screening methods – Probes, Nucleic Acid hydridization, In situ Hybridization, Fluorescence in situ Hybridization (FISH), Colony hybridization.	06-01-2021	
	07-01-2021	
	08-01-2021	
	11-01-2021	
Methods of transfer of desired gene into target cell. Blotting Techniques- Southern,	12-01-2021	
	13-01-2021	

Northern, Western blotting. DNA Finger printing (DNA Profiling) and its application. Molecular markers - RFLP	14-01-2021 15-01-2021	
		Lectures.
Animal Cell Culture: Brief account on methods, substrates, media and procedure of animal cell culture, Stem Cells, types and potential use, Organismal Cloning-reproductive & therapeutic- brief account only.	18-01-2021 19-01-2021 20-01-2021 21-01-2021 22-01-2021	
Applications of Biotechnology: Applications in Medicine (insulin, growth hormone, gene therapy), Agriculture (GM plants and biopesticides), Environment (bioremediation), Industry (Single Cell Protein) and applications of Fermentation Technology- lactic acid, vitamins, food and beverages.	25-01-2021 27-01-2021 28-01-2021 29-01-2021 30-01-2021 31-01-2021	
Potential Hazards of Biotechnological Inventions: Risks related to genetically modified organisms (GMO) and biologically active products, biological warfare & Biopiracy. Protection of biotechnological inventions. Intellectual Property Rights, Patenting and patent protection.		
	01-02-2021	
Introduction: Definition, importance and role of bioinformatics in life sciences. Computational Biology.	02-02-2021 03-02-2021 04-02-2021 05-02-2021	
Biological databases: Nucleotide sequence databases (NCBI- GENBANK, DDBJ and EMBL). Protein databases - structure and sequence databases (PDB, SWISSPROT and UNIPROT).	08-02-2021 09-02-2021 10-02-2021 11-02-2021	Lectures
Introduction to Sequences alignments: Local alignment and Global alignment, Pair wise alignment (BLAST and FASTA] and multiple sequence alignment. Phylogenetic Tree construction and Analysis	12-02-2021 15-02-2021 16-02-2021 17-02-2021 18-02-2021 19-02-2021	

Molecular visualization software - RASMOL. Basic concepts of Drug discovery pipe line, computer aided drug discovery and its applications. Human Genome Project	22-02-2021 24-02-2021 25-02-2021 26-02-2021 28-02-2021 01-03-2021 02-03-2021 03-03-2021 04-03-2021 05-03-2021 08-03-2021 09-03-2021 10-03-2021	Lectures.

5.

6. Innovative Learning Programmes

Name of Programme	Duration	Type	Proposed Time

7. Assignments and Seminars

Assignments

The following Assignment needs to be submitted to Google Classroom. Both the assignments & presentation are individual assignments.

No	Topics	Activity	Submission Deadlines
Assignment	Assignment on given topic	Preparation of assignment	Monday of 2nd Week of Course
Seminar	PowerPoint presentation on given topic	PowerPoint Presentation.	Thursday of 4th Week of Course

Note: Requests for extension of dates for submission not entertained.

8. Attendance (one component in class participation):

Percentage	Marks
95-100%	5
90-95%	4
85-90%	3
80-85%	2
75-80%	1
<75	**Not eligible for appearing for ESE**

9. Suggested Readings:

1. Singh B.D Biotechnology 2002. Kalyan Publishers New Delhi.

2. Brown C.H., Campbell I & Priest F, G. 1987. Introduction of Biotechnology Blackwell scientific publishers Oxford.

3. Colin Ratledge Bijorn Kristiansesn, 2008. Basic Biotechnology 3 rd ed. Cambridge University.

4. Janarathanan S & Vincent S. 2007. Practical Biotechnology, Method of Protocols. University Press.

5. John E. Smith. Biotechnology Cambridge Low priced ed. (Third Ed) 2005 Madingan, Martinko and Parker 2002, Biology of Microorganisms, Brock Eighth Ed. Prentice Hall.

6. Singh B.D. Biotechnolgy 2002, Kalyan Publishers New Delhi.

7. Sudha Gangal 2007. Biotechnology Principles and & practice of Animal Tissue culture, Universities Press.

8. Bruce Albert, Bray Dennis, Levis Julian, Raff Martin, Roberts Keith and Watson James 2008. Molecular Biology of the Cell, V Edition, Garland publishing Inc., New York and London.

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St. Albert's College (Autonomous)

Z0001-Z006CRT0-417 OCCUPATIONAL ZOOLOGY
(APICULTURE, VERMICULTURE, QUAIL FARMING & AQUACULTURE)

I. Course Instructor

Name	Sem, Programme & Batch	Email
Dr. Jissa G. Krishna	B.Sc. Zoology Semester VI 2020-2021	jissa@alberts.edu.in

II. Duration of Course:

No	Activity	Duration
1	Contact hours	50 (Including assignments)
2	Assessment (CAE & ESE)	4
	Total	54
	Remedial Sessions/Peer Tutoring/Tutorials (need based & Optional)	0

III. Course Objectives:

- To equip the students with self employment capabilities.
- To provide scientific knowledge of profitablefarming.
- To make the students aware of cottage industries.

IV. Course Delivery Plan

This course is a course requiring lot of student centric learning processes. The teaching methods include lectures, discussions, Assignments/Seminars etc.

Topics	Session No & Date(s)	Methodology and Duration
Module 1. APICULTURE Definition, Different species of honey bees, Organization of honey bee colony, Social life and adaptation of honey bees. Communication among honey bees. Bee keeping methods and equipments, Management and maintenance of an apiary, Growth period, honey flow period and dearth period Division of the colony, uniting two colonies, , replacing old queen with new queen, swarming management, monsoon management. Enemies of bees. Diseases of bees,.Bee pasturage. Uses of honey bees, By-products of honey bees, Honey and wax composition. Testing the quality of honey.Extraction of wax, Uses of honey and wax.Royal jelly, Propolis. Apitherapy, Agencies supporting apiculture.	27-01-2021 28-01-2021 29-01-2021 08-02-2021	Lectures 7 hours
MODULE: 2. VERMICULTURE Introduction, Ecological classification of earth worms. Species of earth worms used for vermicultre, Reproduction & life cycle, Role of earth worm in solid waste management, in agriculture, in medicine etc. Preparation of vermibed, Maintenance & monitoring, Preparation of vermicompost, Preparation of vermiwash. Activity : Submission of a report after preparing a vermiculture unit or visiting a vermicomposting unit. **MODULE: 3.QUAIL FARMING (Coturnix coturnix)** Introduction, care of quail chicks, care of adult quails, care of breeding quails, ration for quail, care of hatching eggs, health care, use of quail egg and meat.Sources of quality chicks.	10-02-2021 11-02-2021 12-02-2021 17-02-2021 18-02-2021 20-02-2021 23-02-2021 24-02-2021 25-02-2021 26-02-2021 01-03-2021 03-03-2021 10-03-2021 13-03-2021 26-03-2021	Lectures 28 hours

MODULE: 4. AQUACULTURE. 24 Hrs Advantages and salient features of aquaculture, Types of Aquaculture, Biotic and abiotic features of water, Importance of algae in aquaculture, Common cultivable fishes of Kerala, Fish diseases, Composite fish culture, Integrated fish culture, Carp culture, Prawn culture Mussel culture Pearl culture. Processing & Preservation. Aquarium management - Setting up of an aquarium, Biological filter & Aeration, Breeding of gold fish, gourami (Osphronemus), fighter and Guppy (live bearer). Nutrition and types of feed for aquarium fishes, Establishment of commercial ornamental fish culture unit. Fish Transportation - Live fish packing and transport Common diseases of aquarium fishes and their management. Aquaponics (a brief introduction only). Activity – Setting up of an Aquarium Field visit – Visiting an Aquaculture farm	31-03-2021 15-04-2021 22-04-2021 23-04-2021 26-04-2021 30-04-2021 06-05-2021	Lectures 19 hours

V. Innovative Learning Programmes

Name of Programme	Duration	Type	Proposed Time
Videos of apiculture, sericulture	In between the classes		

VI. Assignments and Seminars

The following Assignment needs to be submitted as individual assignments.

Number	Topics	Activity	Submission Deadline
Assignment	Assignment on given topic	Preparation of assignment	Thursday of 5th Week of Course

Note: Failure to submit the assignment on the date mentioned will result in 0 marks for the assignment. Requests for extension of dates for submission not entertained.

VII. Attendance (one component in class participation):

95-100%	5
90-95%	4
85-90%	3
80-85%	2
75-80%	1
<75	Not eligible for appearing for ESE

VIII. Required reading:

- NPCS Board, The complete book on Beekeeping and honey processing, NIIR Project
- consultancy services, 106E, Kamala nagar, Delhi- 110007.
- Shukla G.S, & Updhyay V.B, Economic zoology ,Rastogi Publ. Meerut.
- Pradip.V.Jabde , Text book of applied zoology, 2005
- Applied Zoology, Study Material Zoological Society of Kerala , CMS college Campus
- Clive. A Edwards, Norman. Q. & Rhonda. 2011. Vermitechnology: earthworms, organic
- waste & environmental management.

- Chauhan, H.V.S. Poultry, Disease, diagnosis and treatment, Wiley eastern Ltd Delhi.
- Otieno.F.O 2014. Quail farming: markets & market strategies
- Pillai T.V.R., Aquaculture, principles and practices.
- Ronald j. Roberts (1978) Fish pathology , Cassel Ltd London.
- Cowey C. B. *et. al.* (1985) Nutrition and feeding in fishes, academy press.
- Farm made aquafeeds. FAO fisheries Technical paper, 343.
- Harisankar J. Alappat& A. Bijukumar, Aquarium Fishes. B. R. Publ. Corporation, Delhi.
- MPEDA, A hand Book on AquafarmingOrnamentalfishes, MPEDA, Kochi.
- Amber Richards. 2014. Aquaponics at home.
- Pradip.V.Jabde. 1993. Text book of applied zoology
- Venkitaraman, P.R,1983, Text book of Economic zoology(SudharsanaPuubl. Kochi)
- Addison Webb, Bee Keepingfor profit and pleasure, Agrobios Ltd.
- Edwards.C.A.&Lafty, J.R.1972 Biology of earthworms(Chapman & Hall Led.London)
- Applied Zoology, Study Material Zoological Society of Kerala , CMS college Campus
- George cust& Peter Bird, Tropical Fresh water Aquaria, Hamlyn London.
- Verreth J. Fish larval nutrition, Chapman & Hall Publ.
- Bone Packer. 2014. Aquaponic system

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St. Albert's College (Autonomous)

ZOO6CBT0117 NUTRITION, HEALTH AND LIFESTYLE MANAGEMENT

I. Course Instructor

Name	Sem, Programme & Batch	Email
Prof. K. J. Benny	B.Sc. Zoology Semester VI 2020-2021	bennykj@alberts.edu.in
Mrs. Nimila P. J.	B.Sc. Zoology Semester VI 2020-2021	nimilapj@alberts.edu.in
Dr. Jissa G. Krishna	B.Sc. Zoology Semester VI 2020-2021	jissa@alberts.edu.in
Dr. Philomina Joseph	B.Sc. Zoology Semester VI 2020-2021	philomina@alberts.edu.in

II. Duration of Course:

No	Activity	Duration
1	Contact hours	68 (Including assignments)
2	Assessment (CAE & ESE)	4
	Total	72
	Remedial Sessions/Peer Tutoring/Tutorials (need based & Optional)	0

III. Course Objectives:

- Provides students with a general concept of health and the parameters that define health and wellness.
- Understands principles of nutrition and its role in health.
- Knowledge regarding food safety, food laws & regulations.
- Knowledge and understanding regarding life style diseases.
- Promotes an understanding of the value of good life style practices, physical fitness and healthy food habits for life style disease management.

IV. Course Delivery Plan

This course is a course requiring lot of student centric learning processes. The teaching methods include lectures, discussions, Assignments/Seminars etc.

Topics	Session No & Date(s)	Methodology and Duration
Module I Nutrition and health: Nutritional requirements of man, classification of major nutrients including protein,vitamins and minerals, water, role of fibre, biological value of food components, food groups and sources, balanced diet, RDA, BMI, BMR, Calorie intake and expenditure, Healthy eating pyramid, Nutrition in infancy, preschool, school, adolescent, pregnancy, lactation and old age. Nutrition in diseases and special conditions. Food safety: Nutrition education, food sanitation and hygiene, food adulteration and consumer protection.	**27-01-2021** **28-01-2021** **29-01-2021** **08-02-2021**	10 Lectures
Module II Understanding of health: Define health, basic concepts, dimensions of health, basic parameters of health care. (Health Parameters: Individual normal standards, devices. 1. Blood pressure, 2. Brain activities and sleep, 3.Focus or attention, 4.Pulse, 5. Body temperature 6. Daily physical activities, 7. Electrocardiogram (ECG), 8.Cardiac fitness 9. Stress,10. Haematological parameters, 11. BMI Module III	**10-02-2021** **11-02-2021** **12-02-2021** **17-02-2021** **18-02-2021** **20-02-2021** **23-02-2021** **24-02-2021**	20 Lectures 20

Introduction to Life style diseases Common life style diseases: Alzheimer's disease and other neural disorders, asthma, cancer, cardio vascular diseases - including hypertension, Atherosclerosis and stroke, chronic obstructive pulmonary disease, Diabetes Mellitus or Type 2 Diabetes, kidney disorders and chronic renal failure, constipation, depression, gastro-intestinal disturbances including diarrhoea and peptic ulcer, liver cirrhosis and other liver diseases, obesity, osteoporosis, occupational lifestyle diseases. Modern lifestyle disorders: sleeping habits, junk food, poor eating habits, anxiety, food poisoning	**25-02-2021** **26-02-2021** **01-03-2021** **03-03-2021** **10-03-2021** **13-03-2021** **26-03-2021**	Lectures
Module IV 10 Hrs Causes of lifestyle diseases: Defects of modern food habits and unbalanced diet options, food adulteration, environmental pollution, poor life style choices, drug abuse, tobacco smoking, alcohol and drug consumption, lack of adequate exercise, wrong body posture, disturbed biological clock, stressful environmental conditions	**31-03-2021** **15-04-2021** **22-04-2021**	5 Lectures
Module V Prevention and control of life style diseases: Healthy life style habits and practices, healthy eating habits, exercise and fitness, good sleep patterns, a strict no to alcohol, drugs, and other illegal drugs. Uncontrollable factors like age, Module V Prevention and control of life style diseases: Healthy life style habits and practices, healthy eating habits, exercise and fitness, good sleep	**23-04-2021** **30-04-2021** **06-05-2021**	13 Lectures

Introduction to Life style diseases Common life style diseases: Alzheimer's disease and other neural disorders, asthma, cancer, cardio vascular diseases - including hypertension, Atherosclerosis and stroke, chronic obstructive pulmonary disease, Diabetes Mellitus or Type 2 Diabetes, kidney disorders and chronic renal failure, constipation, depression, gastro-intestinal disturbances including diarrhoea and peptic ulcer, liver cirrhosis and other liver diseases, obesity, osteoporosis, occupational lifestyle diseases. Modern lifestyle disorders: sleeping habits, junk food, poor eating habits, anxiety, food poisoning	**25-02-2021** **26-02-2021** **01-03-2021** **03-03-2021** **10-03-2021** **13-03-2021** **26-03-2021**	Lectures
Module IV 10 Hrs Causes of lifestyle diseases: Defects of modern food habits and unbalanced diet options, food adulteration, environmental pollution, poor life style choices, drug abuse, tobacco smoking, alcohol and drug consumption, lack of adequate exercise, wrong body posture, disturbed biological clock, stressful environmental conditions	**31-03-2021** **15-04-2021** **22-04-2021**	5 Lectures
Module V Prevention and control of life style diseases: Healthy life style habits and practices, healthy eating habits, exercise and fitness, good sleep patterns, a strict no to alcohol, drugs, and other illegal drugs. Uncontrollable factors like age, Module V Prevention and control of life style diseases: Healthy life style habits and practices, healthy eating habits, exercise and fitness, good sleep	**23-04-2021** **30-04-2021** **06-05-2021**	13 Lectures

patterns, a strict no to alcohol, drugs, and other illegal drugs. Uncontrollable factors like age, gender, heredity and race. Healthy diet: disease prevention through appropriate diet and nutrition, avoiding foods that are high in fats, salt and refined products. Avoid junk food and replace by natural food/ organic food. Physical exercise: Moderate exercise for fitness of body, walking, stretching, right postures of sitting & standing, relaxation and cutting down of stress, sports, aerobic exercise and yoga. Health literacy as a public health goal: Awareness programs in schools, colleges and through mass media.		

V. Innovative Learning Programmes

Name of Programme	Duration	Type	Proposed Time

VI. Assignments and Seminars

The following Assignment needs to be submitted as individual assignments.

Number	Topics	Activity	Submission Deadline

Assignment	**Assignment on given topic**	**Preparation of assignment**	**Thursday of 5th Week of Course**

Note: Failure to submit the assignment on the date mentioned will result in 0 marks for the assignment. Requests for extension of dates for submission not entertained.

VII. Attendance (one component in class participation):

95-100%	**5**
90-95%	**4**
85-90%	**3**
80-85%	**2**
75-80%	**1**
<75	**Not eligible for appearing for ESE**

VIII. Required reading:

- AAPHERD (1980). Health Related Physical Fitness Test Manual. Published by
- Association drive Reston Virginia.
- ACSM (2005). Health Related Physical Fitness Assessment Manual Lippincott Williams
- and Wilkins USA, 3. Begum, M.R. (2006).A Text Book of Foods, Nutrition and Dietetics.
- 2nd Edn. Sterling Low Price Edition.Sterling Publishers Private Ltd., New Delhi.
- Bucher, C.A., (1979). Foundation of Physical Education (5th ed.). Missouri: C.V.Mosby
- co.
- Charles B.C.,et.al, C.A., (2004). Concepts of Fitness and Wellness. Boston: McGraw Hill.
- Delvin, T.M (1997). Text Book of Biochemistry with clinical correlation. 4th Edn. John
- Wiley and Sons Inc.Ltd.U.K.
- Evert, A.B. and Boucher J.L., (2014). New Diabetes Nutrition Therapy Recommendations:
- What You Need to KnowDiabetes Spectr. 2014 May; 27(2): 121– 130.Pubmed Published
- online 2014 May 14. doi: 10.2337/diaspect.27.2.121 8. Fahey,T.P. Insel,M, and W. Roth
- (2005) Fit and Well New York: McGraw Hill Inc.
- Greenberg, and Dintiman B 1997.Wellness Creating a life of Health and Fitness,London

- Allyn and Bacon Inc.
- Kumar, M and Kumar R. 2003 Guide to Healthy Living: Role of food and exercise. Deep
- and Deep Publications.
- Kumar, M. and Kumar R. 2004. Guide to Prevention of Lifestyle Diseases. Deep and
- Deep Publications.Curriculum for B.Sc. Zoology Programme.108
- Les Snowdan. ,(2002). Maggie Humphrey's Fitness walking, Maggie Humphery Orient
- Paper Backs 2002 New Delhi.
- Puri, K., and Chandra.S.S., (2005). Health and Physical Education. New Delhi: Surjeet
- Publications
- Rai, B.C., (2005). Health Education and Hygiene Published by Prakashan Kendra,
- Lucknow.
- Ralph, S., Barger P., Jr. and Leolson E. (1999) Life Fit, 1999 Human Kinetics USA
- Schlenker, E. and J.A.Gilbert. (2014) Essentials of Nutrition and Diet Therapy, Edt.
- RDWilliams. 11e Paperback – Import, 4 Nov 2014
- Sing.MD. (2008). Textbook of Nutritional Health and First Ed:2008 Academic
- excellence.

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