



SOMAIYA
VIDYAVIHAR

K J Somaiya College of Science & Commerce
Autonomous (Affiliated to University of Mumbai)

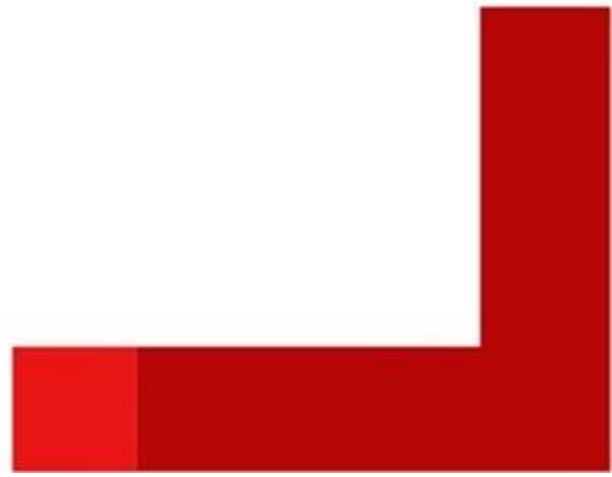


**Learning Outcomes based Curriculum Framework
(LOCF)
For**

**F.Y.B.Sc and M.Sc
ZOOLOGY (Autonomous)**

**Under NEP Programme Guidelines
From**

**Academic year
2023-24**





F.Y. B. Sc. (ZOOLOGY) SEMESTER I

Core Course- I

COURSE TITLE: Study of Non-Chordates and General Ecology

COURSE CODE: 23US1ZOCC1NCE

[CREDITS - 02]

Course learning outcomes

After the successful completion of the Course, the learner will be able to -

1. Discuss various levels of organization in the animal kingdom.
2. Classify the given non-chordate up to class level based on its characteristic features.
3. Summarize characteristics and classification of Arthropoda, Mollusca, and Echinodermata
4. Justify various minor phyla as connecting links

Module I

Levels of organization, Protista, Acoelomate and Pseudocoelomate metazoa

[15L]

Learning objectives

The module is intended to -

- Explain the basic concepts in levels of organization.
- Describe and classify kingdom Protista and Acoelomate and Pseudocoelomate metazoa phyla
- Discuss examples of each class.

Learning outcomes

After the successful completion of the module, the learner will be able to -

- Differentiate between unicellular, multicellular, tissue and organ level of organization.
- Define - acoelomate, pseudocoelomate, coelomate organism and metamerism.
- Enlist the general characteristics of Kingdom Protista
- Describe general characteristics of Phylum Porifera to Acoelomate and Pseudocoelomate metazoa phyla
- Classify the examples of above-mentioned phyla up to class level

<p>1.1</p>	<p>Unicellular organization</p> <p>1.1.1 Kingdom: Protista, Classification upto phylum level</p> <p>1.1.2 Locomotion using Cilia, Flagella and Pseudopodia</p> <p>1.1.3 Conjugation in Paramecium</p> <p>1.1.4 Pathogenicity of <i>Plasmodium vivax</i></p>	<p>2L</p> <p>1L</p> <p>1L</p> <p>1L</p>
<p>1.2</p>	<p>Multicellular organization</p> <p>1.2.1 Colonization level- Phylum Porifera, Classification upto class level, Canal system and Spicules in Sponges.</p> <p>1.2.2 Division of labour (tissue grade organization)- Phylum Cnidaria, Classification upto class level</p> <p>1.2.3 Polymorphism in Cnidaria, Coral reefs and association with symbiotic algae</p>	<p>3L</p> <p>1L</p> <p>1L</p>
<p>1.3</p>	<p>Triploblastic Organization</p> <p>1.3.1 Phylum Ctenophora - Characteristics and evolutionary significance</p> <p>1.3.2 Triploblastic acoelomate and pseudocoelomate organization</p> <p>1.3.2.1 Acoelomate organization - Phylum Platyhelminthes,</p> <p>1.3.2.2 Pseudocoelomate organization – Phylum Nematelminthes, Classification upto class level</p> <p>1.3.3 Morphological and physiological adaptations for parasitic life.</p> <p>1.3.4 Phylum Rotifera - characteristics</p>	<p>1L</p> <p>2L</p> <p>1L</p> <p>1L</p>
<p>References:</p> <ol style="list-style-type: none"> 1. Invertebrate Zoology By E.I.jordan & Dr. P.s. Verma, S .CHAND & COMPANY PVT. LTD 2. Zoology, Stephen A. Miller and John P. Harley, Tenth Edition, McGraw Hill Education, 2016. 3. Invertebrates, Richard C. Brusca, Wendy Moore, Stephen M. Shuster, Third Edition, Sinauer Associates, Inc., Publishers USA, 2015. 		

Module II	Coelomate metazoa- Annelida to Echinodermata	[15L]
<p>Learning objectives</p> <p>The module is intended to -</p> <ul style="list-style-type: none"> ● Illustrate the intricacies of classical zoology with respect to higher Non-Chordates and Minor Phylum. ● Describe the characteristics and classes of phylum Annelida, Arthropoda, Mollusca and Echinodermata ● Integrate the adaptive characteristics of animals belonging to minor Phyla. 		
<p>Learning outcomes</p> <p>After the successful completion of the module, the learner will be able to</p> <ul style="list-style-type: none"> ● Elaborate the concepts of Classical Zoology. ● Catalog various higher order Non-chordates to their respective Phyla and classes. ● Investigate the reasons for a separate taxonomic group of minor phyla. ● Explain minor phyla as the evolutionary link between the major phyla. 		
<p>2.1</p>	<p>Triploblastic coelomate organization -</p> <p>2.1.1 Phylum Annelida- General characteristics, Classification up to Class level</p> <p>2.1.2 Reproduction in Earthworm, Heteronereis</p> <p>2.1.3 Parasitic adaptations in Leech</p>	<p>2L</p> <p>1L</p> <p>1L</p>
<p>2.2</p>	<p>Animals with jointed appendages -</p> <p>2.2.1 Phylum Arthropoda-General characteristics, Classification upto Class level</p> <p>2.2.2 Metamorphosis in butterfly</p> <p>2.2.3 Phylum Onychophora - characteristics and evolutionary</p>	<p>2L</p> <p>1L</p> <p>1L</p>
<p>2.3</p>	<p>Animals with mantle -</p> <p>2.3.1 Phylum Mollusca-General characteristics, Classification upto class level</p> <p>2.3.2 Significance of mantle and Foot,</p> <p>2.3.3 Torsion in Mollusca, Locomotion in Sepia</p>	<p>2L</p> <p>1L</p> <p>1L</p>



2.4	Animals with enterocoel 2.4.1 Phylum Echinodermata-General characteristics, Classification upto class 2.4.2 Water vascular system in Seastar 2.4.3 Nutrition in Seastar	1L 1L 1L
References: 1. Modern Textbook of Zoology Invertebrates, R.L. Kotpal, 12th Edition, Rastogi Publication, January 2019. 2. Invertebrate Zoology, E.L. Jordan and P.S. Verma, 5th Edition, S. Chand Publication. 3. Invertebrate Zoology, Robert D. Barnes, Seventh Edition, Cengage Publication, January 2006		



F.Y. B. Sc. (ZOOLOGY) SEMESTER I

Core Course- II

COURSE TITLE: Hemichordates and Chordates

COURSE CODE 23US1ZOCC2HAC

[CREDITS - 02]

Course learning outcomes

After the successful completion of the Course, the learner will be able to -

1. Classify hemichordates, pisces and tetrapods up to order level.
2. Describe unique characteristics of Hemichordates, Protochordates and Vertebrates.
3. Identify the animals at least up to class level

Module I

Study of Phylum Hemichordata to Chordate Superclass Pisces

[15L]

Learning objectives

This module is intended to -

- Identify key features of hemichordata
- Enlist the general characters of chordata
- Classify chordata with reasons
- Explain adaptations of chordata
- Identify examples of each class

Learning outcomes

After the successful completion of the module, the learner will be able to -

- Enumerate the unique characteristics of Hemichordata
- Discuss unique features of Protochordates, Agnatha, Gnathostomata- Pisces
- Recognize diversity from Hemichordata, Protochordata till Pisces

1.1

1.1.1 Natural scheme of animal classification

1.1.2 Basis of classification – symmetry, diploblastic and triploblastic organization, coelom

2L

1.2

Phylum Hemichordata – habit, habitat, characteristics, and classification. Features of tornaria larva

2L

1.3	Phylum Chordata - habit, habitat, characteristics, and classification.	1L
1.4	Subphylum Cephalochordata - habit, habitat, characteristics, and classification. Larva and metamorphosis	2L
1.5	Subphylum Urochordata - habit, habitat, characteristics, and classification. Larva and metamorphosis	2L
1.6	Characteristics of Subphylum Vertebrata	1L
1.7	1.7.1. Division Agnatha – Class Cyclostomata – habit, habitat, characteristics, and classification. 1.7.2. Extant and extinct species. Comparison with Gnathostomata.	2L
1.8	Superclass Pisces 1.8.1. Characteristics of pisces 1.8.2. Class Placodermi 1.8.3. Class Chondrichthyes (Subclass Selachii) 1.8.4. Class Osteichthyes (Subclass Actinopterygii – Chondrostei, Holostei, Teleostei; Subclass Sarcopterygii)	3L
<p>References:</p> <ul style="list-style-type: none"> ● Chordate Zoology, E.L.Jordan, P.S. Verma, S. Chand & Company Ltd. ● The life of Vertebrates; J.Z. Young; ELBS - Oxford University Press Third edition, 2006. ● Textbook of chordate Zoology, Vol. II, G.S. Sandhu, H. Bhaskar Campus Book International, First edition, 2005. ● The Phylum Chordata: Biology of Vertebrates and their Kin, 1987, H. H. Newman, Distributor Satish book enterprise, Agra. ● A text book of Zoology, 1984, R. D. Vidyarthi, S. Chand and Co., New Delhi. ● Comparative Anatomy of the Vertebrates, G. C. Kent, R. K Carr, 9th Edn., 2001, McGraw Hill, Boston, USA. ● https://www.vedantu.com/animal/hemichordate ● https://www.embibe.com/exams/phylum-hemichordata/ ● https://ucmp.berkeley.edu/chordata/cephalo.html ● https://www.vedantu.com/animal/cephalochordate ● https://www.encyclopedia.com/plants-and-animals/zoology-and-veterinary-medicine/zoology-general/urochordata ● https://www.notesonzoology.com/phylum-chordata/urochordata-characters-and-its-classification-zoology/3591 ● https://www.vedantu.com/biology/cyclostomata 		

- <https://www.faunafondness.com/super-class-pisces/>
- <https://collegedunia.com/exams/cyclostomata-characteristics-classification-and-examples-science-articleid-3365>
- <https://byjus.com/biology/pisces/>
- <https://edurev.in/t/94227/Pisces-Characteristics--Example--Classification-An>

Module II	Study of Tetrapoda - Amphibia to Mammalia	[15L]
------------------	--	--------------

Learning objectives

This module is intended to -

- Describe basic classification of Tetrapoda up to order level.
- Explain various morphological adaptations evolved in them for better survival.
- Identify examples of each class

Learning outcomes

After the successful completion of the module, the learner will be able to -

- Summarize the classification of Tetrapoda up to order level.
- Identify various Tetrapoda adaptations
- Compare between various classes of Tetrapoda

1.1	Classification of tetrapods	1L
1.2	Class Amphibia – Characteristics and classification of Lissamphibia (Extant amphibians) – Order Gymnophiona, Order Urodela, Order Anura	2L
1.3	Class Reptilia - Characteristics and classification of extant reptilian orders – Order Rhynchocephalia, Order Squamata, Order Chelonia, Order Crocodilia	3L
1.4	Birds as glorified reptiles	1L
1.5	Class Aves – General characteristics	1L
1.6	Class Aves – Selected avian orders - Struthioniformes, Rheiformes, Casuariiformes, Apterygiformes, Passeriformes, Piciformes, Columbiformes, Galliformes, Anseriformes, Ciconiiformes,	3L

	Falconiformes, Strigiformes	
1.7	Class Mammalia – General characteristics	1L
1.8	Class Mammalia – Selected mammalian orders - Monotremata, Marsupialia, Insectivora, Chiroptera, Primates, Rodentia, Legomorpha, Cetacea, Sirenia, Carnivora, Proboscidea, Perrisodactyla, Artiodactyla	3L

References

- Modern textbook of Zoology – Vertebrates; Professor R.L. Kotpal; Rastogi publication; Third Edition 2012.
- Vertebrate Zoology; V. K. Agarwal; S.Chand Publication; 2012.
- Fundamentals of Zoology, Dr. K.C. Ghosh and Dr. B. Manna, New Central book Agency (P) Ltd.
- Chordate Zoology Volume II, Prof. N. Arumogam. Saras Publication.
- Chordate Anatomy Mohan P. Arora, Himalaya Publishing House, First edition.
- Chordate Zoology, E.L.Jordan, P.S. Verma, S. Chand & Company Ltd.
- The life of Vertebrates; J.Z. Young; ELBS - Oxford University Press Third edition, 2006.
- Textbook of chordate Zoology, Vol. II, G.S. Sandhu, H. Bhaskar Campus Book International, First edition, 2005.
- The Phylum Chordata: Biology of Vertebrates and their Kin, 1987, H. H. Newman, Distributor Satish book enterprise, Agra.
- A text book of Zoology, 1984, R. D. Vidyarthi, S. Chand and Co., New Delhi.
- Comparative Anatomy of the Vertebrates, G. C. Kent, R. K Carr, 9th Edn., 2001, McGraw Hill, Boston, USA.
- <https://www.faunafondness.com/class-amphibia/>
- <https://www.rmlscollege.ac.in/wp-content/uploads/2021/07/Classification-of-amphibia.pdf>
- <https://byjus.com/biology/amphibia/>
- <http://ppup.ac.in/download/econtent/pdf/SKULL%20TYPES%20IN%20REPTILES.pdf>
<https://byjus.com/biology/reptilia/>
- https://surendranathcollege.ac.in/new/upload/MANISH_KANTI_BISWASClassification%20of%20Reptilia2021-01-19Classification%20of%20Reptilia.pdf
- https://www.kngac.ac.in/elearning-portal/ec/admin/contents/4_18KP1ZELZ1_2020120508325071.pdf.



F. Y. B. Sc. (ZOOLOGY) SEMESTER I - Practical
COURSE CODE: 23US1ZOCCP1
Credit- 02

Core course I	Study of Non-Chordates and General Ecology
	<ol style="list-style-type: none">1. Study of Unicellular organization - Amoeba, paramecium, Euglena, Plasmodium, Entamoeba.2. Study of Metazoa - Types of Zooids in Porifera, Obelia colony, Types of polyp and medusa3. Study of Acoelomate, Pseudocoelomate and Coelomate organization4. Study of Types of symmetry, Segmentation and Cephalization5. Mounting of foraminiferans shells, it's diversity and evolutionary significance6. Identification of types of Spicules7. Study of types of Coral reefs and Coral reefs in India8. Study of lfe cycle of <i>Taenia solium</i> and <i>Ascaris</i>9. Study of types of shells in Mollusca10. Observation of Digestive, Reproductive system, ink gland, etc of Sepia11. Study of Social life of wasp / ants / termite12. Study of Crustacean larvae13. Study of Echinoderm larvae and their affinities with Chordata <p>Suggested Field work/Project work- internal assessment</p> <ol style="list-style-type: none">1. Morphometric analysis of molluscan shells2. Diversity in campus- Spiders/ centipede/ millipede
Core course II	Hemichordates and Chordates
	<ol style="list-style-type: none">1. Identification of invertebrate Phyla - Identification of representatives animals each from Hemichordate, Urochordate and Cephalochordata



2. Identification of Cyclostomes
3. Identification of different subclasses of Pisces
4. Comparison between bony and cartilaginous fish
5. Study of fins in fish
6. Mounting of scales in fish
7. Study of beak in birds
8. Study of feet in birds
9. Study of feathers in birds
10. Comparison between amphibian orders
11. Study of Neoteny in amphibians
12. Comparison between turtle and tortoise
13. Comparison between alligator, crocodile, and gharial
14. Study of venomous and non-venomous snakes
15. Study of snake venom

Suggested field work and Projects

1. Visit To Museum - Assignment submission for internal assessment
2. Campus Trail- Assignment submission for internal assessment
3. Visit to Zoo - Assignment submission for internal assessment



F.Y. B. Sc. (ZOOLOGY) SEMESTER II

Core Course- I

COURSE TITLE: Life Processes

COURSE CODE: 23US2ZOCC1LPR

[CREDITS - 02]

Course learning outcomes		
<p>After the successful completion of the Course, the learner will be able to -</p> <ol style="list-style-type: none"> 1. Describe the various processes taking place in animals 2. Explain each process in detail with respect to its evolution among animals 3. Elaborate the significance of all the life processes 4. Enlist examples of the various processes taught to them 		
Module I	Nutrition, Respiration and Excretion	[15L]
<p>Learning objectives</p> <p>The module is intended to -</p> <ul style="list-style-type: none"> ● Make the learner aware of the various processes involved in different animals and its significance to life 		
<p>Learning outcomes</p> <p>After the successful completion of the module, the learner will be able to -</p> <ul style="list-style-type: none"> ● Define the various life processes like nutrition, respiration and excretion ● Explain each process in detail ● Compare the processes between different animal groups ● Describe the importance of the various life processes. 		
1.1	<p>Nutrition 1.1.1 Concept of nutrition in animals, types of animals based on nutrition- Autotrophic, heterotrophic, parasitic, saprophytic herbivores, carnivores, omnivores, sanguivores,</p>	1L

	<p>1.1.2 Types of Nutrition- phagocytosis, filter, deposit, fluid, bulk, suction</p> <p>1.1.3 Stages - ingestion,digestion,absorption, assimilation, egestion</p> <p>1.1.4 Examples of digestive systems - Cockroach, shark, pigeon, cattle.</p>	<p>1L</p> <p>1L</p> <p>2L</p>
1.2	<p>Respiration</p> <p>1.2.1 Introduction to respiration: definition and mechanism</p> <p>1.2.2 Types of respiratory organs in the animal world- simple diffusion, spiracles, gills, skin, lungs</p> <p>1.2.3 Concept of cellular Respiration, Aerobic, anaerobic, Significance of the various stages of respiration-glycolysis, TCA cycle, oxidative phosphorylation, ETC</p> <p>1.2.4 Examples- Amoeba, cockroach, fish, frog, Pigeon, Rat</p>	<p>1L</p> <p>2L</p> <p>1L</p> <p>1L</p>
1.3	<p>Excretion</p> <p>1.3.1 Concept of excretion- metabolic waste, nitrogenous waste</p> <p>1.3.2 Modes of excretion in the animal world- ammonotelism, uricotelism, ureotelism, guanotelism</p> <p>1.3.3 Organs of excretion in the animal kingdom- contractile vacuoles, nephridia, malpighian tubule, renal gland, coxal gland, kidney</p> <p>1.3.4 Examples -Amoeba, cockroach, fish, frog, pigeon, rat</p>	<p>1L</p> <p>1L</p> <p>2L</p> <p>1L</p>
<p>Reference</p> <ol style="list-style-type: none"> Chordate Zoology By E.l.jordan & Dr. P.s. Verma, S .CHAND & COMPANY PVT. LTD Zoology For Degree Students , V K Agrawal, S. Chand Invertebrate Zoology By E.l.jordan & Dr. P.s. Verma, S .CHAND & COMPANY PVT. LTD 		

Module II		Nervous system, Circulation and Reproduction	[15L]
Learning objectives			
The module is intended to -			
<ul style="list-style-type: none"> ● Make the learner aware of the various processes involved in different animals and its significance to life 			
Learning outcomes			
After the successful completion of the module, the learner will be able to			
<ul style="list-style-type: none"> ● Define the various life processes like Nervous system, Circulation and Reproduction ● Explain each process in detail ● Compare the processes between different animal groups ● Describe the importance of the various life processes. 			
2.1	<p>Nervous system</p> <p>2.1.1 Nervous System- Definition, and Types of nervous system : Central Nervous System and peripheral nervous system.</p> <p>2.1.2 Components of the nervous System: Brain, Spinal cord, Neuron and its types, ganglion</p> <p>2.1.3 Types Of Nerves: Sensory Nerve, motor nerve, mixed neuron and autonomic nervous system</p> <p>2.1.4 Reflex action and reflex arc, voluntary and involuntary response, working of synapse</p> <p>2.1.5 Nervous System of Earthworm and Shark</p>	<p>1L</p> <p>1L</p> <p>1L</p> <p>1L</p> <p>1L</p>	
2.2	<p>Circulation</p> <p>2.2.1 Concept of circulation, circulatory fluids- water, hemolymph, blood and lymph. Functions of Circulatory system</p> <p>2.2.2 Components of circulatory systems: heart, blood vessels: arteries, veins and capillaries</p> <p>2.2.3 Types of Circulation- Single, double, Open and Closed</p>	<p>1L</p> <p>1L</p> <p>1L</p>	



	2.2.4 Types of heart- Neurogenic and myogenic heart, Structure of heart in Cockroach, shark, frog, crocodile, pigeon, rat	2L
2.3	reproduction	
	2.3.1 Modes of Reproduction : Asexual and Sexual and its significance.	1L
	2.3.2 Asexual Reproduction - Binary Fission, Multiple Fission, Budding, Fragmentation, Regeneration and Parthenogenesis.	1L
	2.3.3 Sexual Reproduction - Reproductive Organs and their Functions	
	2.3.4 Process of Fertilization and its Types- Internal Fertilization and External Fertilization.	1L
		2L
References: <ol style="list-style-type: none">1. Textbook of Animal Physiology by Dr. P. B REDDY.2. Essentials of Animal Physiology by S. C. Rastogi.3. Animal physiology by Dr. P. S. Verma and V. K. Agarwal		



F.Y. B. Sc. (ZOOLOGY) SEMESTER II
Core Course- II
COURSE TITLE: Genetics and Evolution
COURSE CODE:23US2ZOCC2GEV
[CREDITS - 02]

Course learning outcomes

After the successful completion of the Course, the learner will be able to

1. Demonstrate basic concepts of genetics and Mendelian laws using crosses and examples
2. Recall Non-Mendelian inheritance and its types with examples.
3. Describe epistasis, lethal genes and cytoplasmic inheritance with examples
4. Elaborate the role of genetic counselor
5. recall the experiments based on origin of life
6. Discuss different evidence of evolution, significant concepts in evolution, evolutionary theories and stages of Horse, Elephant and Human evolution
7. analyze phylogenetic tree for given species

Module I	Genetics	[15L]
-----------------	-----------------	--------------

Learning objectives

The module is intended to -

- explain the concepts Mendelian and non Mendelian genetics and its application in day to day to day life

Learning outcomes

After the successful completion of the module, the learner will be able to -

- Define basic Terminologies in genetics
- Demonstrate Mendelian laws of inheritance using different types of crosses

- Identify the type of epistasis
- Explain the concepts of lethal gene and extranuclear inheritance

1.1	Introduction: Basic terminologies in genetics, Concept of Gene, Genotype, Phenotype, Allele, Dominant, Recessive	1L
1.2	Mendelian Genetics: 1.2.1 Mendel's Laws of inheritance of characters 1.2.2 Monohybrid and Dihybrid cross, Test Cross	3 L
1.3	Deviation from Mendel's laws of inheritance 1.3.1 Incomplete dominance, co- dominance 1.3.2 Gene Interaction- Epistasis: recessive, dominant, double recessive and double dominant epistasis	3L
1.4	Lethal genes and types 1.4.1 Dominant lethal genes 1.4.2 Recessive lethal genes 1.4.3 Conditional lethal genes 1.4.4 Gametic lethal genes	3L
1.5	Extranuclear inheritance 1.5.1 Cytoplasmic inheritance: Kappa particles in Paramecium. 1.5.2 Maternal inheritance- shell coiling in Limnaea	3L
1.6	Applications of Genetics: Role of Genetic Counsellor	2L

Reference:

1. Genetics, Verma P. S. and Agarwal V. K., S. Chand and Co., New Delhi.
2. Genetics, fourth edition, Veer Bala Rastogi, Medtech, India.
3. Genetics, 2014, 4th rev Edn., 3rd reprint, Gupta P. K., Rastogi Publications, Meerut.
4. Fundamentals of Genetics, fourth edition, B.D Singh.
5. Genetics, 2004, 1st Edn. Sarin, C., Tata McGraw Hill, New Delhi.
6. Principles of Genetics, 2006, 8th Edn., Gardner E. J., Simmons M. J. and Snustad D. P.,

Wiley India Pvt Ltd.		
7. Genetics, 1985, 3rd revised Edn., Strickberger M. W., Macmillan USA.		
Module II	Evolution	[15L]
Learning objectives		
This module is intended to		
<ul style="list-style-type: none"> To make learners understand basic concepts, theories and applications of evolutionary biology 		
2.1	2.1.1 Origin of life: Miller- Urey Experiment, Oparin Haldane concept, 2.1.2 Spontaneous origin of life and experiments that disproved it: Francesco Redi's Experiment and Louis Pasteur's Experiment, 2.1.3 Big bang theory 2.1.4 Evidence of Organic Evolution i)Morphological and Anatomical Evidence- Homologous and Analogous organs, connecting links and vestigial organs ii) Palaeontological Evidence: Fossils, Types of Fossils, Process of Fossilization	1L 1L 1L 2L
2.2	2.2.1 Theories of evolution - 2.2.1.1 Darwin's theory of origin of life 2.2.1.2 Lamarck's theory of inheritance of Acquired characters 2.2.1.3 Hugo de Vries theory of Mutation 2.2.1.4 The theory of Modern synthesis 2.2.2 Elemental forces of evolution - Variation, Mutation, Migration, Selection, genetic drift 2.2.3 Types of Natural selection 2.2.4 Characteristics of a Species, Speciation, types. Of speciation - Sympatric and allopatric, types of reproductive barrier and isolation 2.2.5 Continental drift and its implications on evolution	1L 1L 1L 1L 2L 1L 1L 1L



	2.2.6 Phylogenetic tree - Clade, branch, node, rooted and unrooted tree, monophyletic, paraphyletic and polyphyletic groups	1L
--	---	----

References:

1. Strickberger's Evolution by Monroe W. Strickberger (Author), Brian K. Hall (Author), Benedikt Hallgrimsson (Author), Publisher - Jones & Bartlett; 4th edition (6 December 2007).
2. Textbook of Biodiversity, KV Krishnamurthy, Science Publishers, USA, 2010



F. Y. B. Sc. (ZOOLOGY) SEMESTER II - Practical
COURSE CODE:23US2ZOCCP1
Credit- 0

Core course I	Life Processes
	<ol style="list-style-type: none">1. Effect of pH on activity of enzyme amylase2. Detection of constituents of urine - normal and abnormal3. Detection of Ammonia as excretory product of fish4. Detection of Uric Acid from bird excreta5. Study of Blood Pressure6. Study of Electrocardiogram (ECG)7. Study of T.S of Spinal cord8. Study of blood smear- frog and human9. Modes of Reproduction in Protista and their significance10. Study of systems in Earthworm: Digestive, Reproductive, Nervous and Excretory.
Core course II	Genetics and Evolution
<ol style="list-style-type: none">123456789	<ol style="list-style-type: none">1 Problems based on Pedigree analysis2 Problems in genetics based on Mendelian Inheritance3 Problems based on epistasis4 Evidence of evolution - analogy, homology, connecting links5 Identification of fossils6 Geological timescale and events of mass extinction7 Carbon dating and its applications8 Interpretation of Phylogenetic tree9 Study of genetic drift