Sir P. T. Sarvajanik College of Science

Autonomous

Affiliated to Veer Narmad South Gujarat University, Surat

Re-Accredited 'A^{+}' with CGPA 3.35

SYLLABUS

FOR

SEM - I

Program: B. Sc.

Course: ZOOLOGY

For

Academic year

2024-25

(NEP-2020)

Effective from June 2024

SIR P. T. SARVAJANIK COLLEGE OF SCIENCE, SURAT.
Autonomous
(Affiliated with Veer Narmad South Gujarat University)

Board of Studies in Zoology

Undergraduate and Post graduate

	Name	Designation	Institute/Industry
Head of the Department			
1	Dr. Jaya Patel	Chairperson	Sir P. T. Sarvajanik College of Science
Two experts from other than the parent University			
1	Dr. Nikunj Bhatt	Associate Professor	Department of Zoology, V. P. & R. P. T. P. Science College, (Autonomous), Vallabh Vidyanagar, Anand
2	Dr. Amol Patwardhan	Assistant Professor	K. J. Somaiya College of Science and Commerce (Autonomous), Mumbai
Subject Expert nominated by Vice-Chancellor			
1	Dr. Krupal Patel	Assistant Professor	Department of Zoology, Govt. Arts, Commerce & Science College, Limbayat, Surat
Meritorious Alumnus			
1	Mr. Bhavesh Chevli	Chief of Manufacturing	Envision Scientific Pvt. ltd
Experts from outside the Autonomous College, whenever special courses of studies are to be formulated, to be nominated by the Principal.			
1	Dr. Arun Dholakia	Retd. Associate professor	Department of Zoology, Sir P.T.Sarvajanik College of Science, Surat
Representative from Industry/corporate sector/allied area			
1	Ms. Pinal Patel	Board of Member	TINSA, Ecological Foundation
Faculty of the specialization			
1	Dr. Jaya Patel	Associate Professor & Head	Sir P. T. Sarvajanik College of Science
2	Dr. Nitin Solanki	Assistant Professor	Sir P. T. Sarvajanik College of Science
3	Dr. Neelam Mishra	Adhyapak Sahayak	Sir P. T. Sarvajanik College of Science

Acknowledgement

At the outset, I would like to thank our, Principal Dr. Pruthul R. Desai for his guidance and support during the curriculum restructuring process. I am also grateful to all the esteemed members of the Board of Studies, for their constructive suggestions and contributions.

Above all, I am deeply indebted to all the young and vibrant colleagues in the Department of Zoology for the long and arduous work they have put in during the compiling of the restructured syllabus.

Dr. Jaya M. Patel
Chairperson
Board of Studies in Zoology

Graduate Attributes (GA)

After the successful completion of modules in different courses of B. Sc., the learner will be able to:

- Continue life-long learning as an autonomous learner
- Continuously strive for excellence in education
- Apply and nurture critical and creative thinking
- Promote sustainable development practices
- Promote co-operation over competition
- Balance rights with responsibilities
- Understand and respect diversity & difference
- Not be prejudiced by gender, age, caste, religion, or nationality.
- Use education as a tool for emancipation and empowerment of humanity

Programme Outcomes (PO)

PO1 - Students gain knowledge and skill in the fundamentals of animal sciences,

PO2- Understands the complex interactions among various living organisms.

PO3 – Analyse complex interactions among the various animals of different phyla, their distribution and their relationship with the environment.

PO4 – Apply the knowledge of internal structure of cell, its functions in control of various metabolic functions of organisms.

PO5 – Understands the complex evolutionary processes and behaviour of animals.

PO6 – Correlates the physiological processes of animals and relationship of organ systems.

PO7 – Understanding of environmental conservation processes, protection of endangered species and its importance.

PO8 – Apply the knowledge to explore small scale business like sericulture, aquaculture, apiculture, vermiculture, animal husbandry and poultry farm.

PO9 – Understands about various concepts of genetics and its importance in human health.

PO10 – Apply the knowledge and understanding of Zoology to one's own life and work.

PO11 – Develops empathy and love towards the animals.

Content

Sr. No	Semester	Course number	Course Code	Course title
Core Course (CC)				
1	I	MJ: CC I	ZO-MJ-101	Non-Chordates
2		MJ:CC II	ZO-MJ-102	Chordates and Ecology
3		PRACTICAL	ZOP-MJ-101	Lab Course MJ-101
4		PRACTICAL	ZOP-MJ-102	Lab Course MJ-102
5		ME CCI	ZO ME- 101	Non-Chordates & Chordates
6		ME Practical	ZOP ME- 101	Lab Course ME-101
7		MDC	ZO-MDC- 101	Human Health and Diseases
8		PRACTICAL	ZOP-MDC- 101	Lab Course MDC -101
9		SEC	ZO-SEC- 101	Aquarium Management
10		PRACTICAL	ZOP-SEC 101	Lab Course SEC-101
		ENV		Environmental Studies
1	**II**	MJ: CC I	ZO-MJ-201	Diversity of Non- chordates and Ecology
2		MJ:CC II	ZO-MJ-202	Evolution, Ethology and Type Study
3		PRACTICAL	ZOP-MJ-201	Lab Course MJ - 201
4		PRACTICAL	ZOP-MJ-202	Lab Course MJ - 202
5		ME CCI	ZO ME- 201	Ecology and Wild Life Biology
6		ME Practical	ZOP ME- 201	Lab Course ME - 201
7		MDC	ZO-MDC 201	Aqua Culture
8		Practical	ZOP-MDC 201	Lab Course MDC-201
9		SEC	ZO-SEC 201	Poultry Farming
		ENV		Environmental Studies

Detailed B. Sc. Zoology Syllabus

F. Y. B. Sc. Syllabus with effect from the Academic year 2024-25

Course No.	Course Title	Course Code	Credits	Hour	Module	Lectures per module (1 Hr)	Examination		
							Internal Marks	External Marks	Total Marks
SEMESTER I									
Major Courses THEORY & PRACTICAL									
ZO-MJ- 101	ZO Major Paper I		3	45	3	15	35	35	70
ZO-MJ- 102	ZO Major Paper II		3	45	3	15	35	35	70
ZO-MN-101	ZO Minor Paper I		2	30	2	15	25	25	50
ZO- MDC-101	ZO – MDC 101		2	30	2	15	25	25	50
ZO-SEC-101	ZO-SEC-101		1	15	1	15	13	13	26
ZOP- MJ-101 & 102	ZOP-MJ I & II		1 + 1	4	2	2	30	30	60
ZOP- ME-101	ZOP ME –		2	4	2	2	25	25	50
ZOP- MDC- 101	ZOP MDC		2	4	2	2	25	25	50
ZOP- SEC-101	ZOP– SEC		1	2	1	2	12	12	24
SEMESTER II									
Major courses THEORY & PRACTICAL									
Z-MJ- 201	Zoology Major Paper I		3	45	3	15	35	35	70
Z-MJ- 202	Zoology Major Paper II		3	45	3	15	35	35	70
Z-ME- 201	Zoology Minor Paper I		2	30	2	15	25	25	50
Z-MDC- 201	Z-MDC- 201		2	30	2	15	25	25	50
Z-SEC- 201	Z-SEC- 201		1	15	1	15	13	13	26
ZOP- MJ-201	ZOP- MJ Paper1 & 2		1 + 1	4	2	2	30	30	60
ZOP- ME-201	ZOP -ME		2	4	2	2	25	25	50
ZOP- MDC- 201	ZOP- MDC		2	4	2	2	25	25	50

F.Y.B. Sc. (Zoology)
SEMESTER I
Core Course-I
(CREDITS: THEORY-3, PRACTICALS-1)

NON-CHORDATES

COURSE CODE: ZO-MJ-101 THEORY [CREDITS - 03]

NON-CHORDATES		
Course learning outcome		
After successfully completing this course, students will be able to: • Know various disciplines of zoology. • Explain general characters of invertebrate phyla. • Identify difference animals of difference phylum. • Know and explain difference system of liver fluke. • Understand and explain pathogenicity and parasitic adaptations of liver fluke.		
Module 1	**Basics of Zoology and General characteristics of Non- Chordate Phyla**	**[10L]**
Learning Objective • Differentiate animals as per taxonomy.		
Learning Outcomes: • Know various disciplines of zoology. • Explain general characters of invertebrate phyla. Differentiate different animals as per their phylum.		
1.1	**Scope, Disciplines and Career in Zoology.**	**[4L]**
1.2	**General characteristics of Non- Chordate Phyla:** • Protozoa, • Porifera, • Cnidaria, • Platyhelminthes, • Aschelminthes, • Annelida.	**[6L]**
Module 2	**General Characteristics of Non- Chordate Phyla**	**10L**
Learning Objective		

Ensure acquiring the awareness on the basics of the zoology and to understand the different features and diversities of Non chordates

Learning Outcomes:

Understand the general taxonomic rules on animal classification, the principles and methods of taxonomy.

2.1	**General Characteristics of Non- Chordate Phyla:** • Arthropoda • Mollusca • Echinodermata • Hemichordata	**[10L]**
Module 3	**Non-Chordate animal type study: *Fasciola hepatica* (Liver Fluke)**	**[10L]**

Learning Objective

- Systematic position of liver fluke and detail study of different systems of liver fluke.

Learning Outcomes:

- Describe the morphology, habit and habitat of liver fluke.
- Systematic position and various systems in Liver fluke.

3.1 Fasciola *hepatica* (Liver Fluke):

- Systematic position, habit and habitat
- External features, body wall
- Digestive system
- Respiratory system
- Excretory system
- Nervous system,
- Reproductive system
- Life cycle and development pathogenesis, parasitic adaptations.

References:

1. Ruppert and Barnes, R.D. (2006). *Invertebrate Zoology*, VIII Edition. Holt Saunders International Edition.

2. Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). *The Invertebrates: A New Synthesis*, III Edition, Blackwell Science

3. Modern Text Book of Zoology (invertebrate) R.L.Kotpal,Rastogi Publication, Meerut, India.
4. Invertebrate Zoology- E.L.Jordan & P.S.Verma
5. Invertebrate Zoology- T.C. Majupuria, Pradeep Publication, Jalandhar, India.
6. A manual of Practical Zoology Invertebrates- P.S.Verma, S. Chand & Co. Ltd. New Delhi, India.
7. A manual of Practical Zoology Chordates- P.S.Verma, S. Chand & Co. Ltd. New Delhi, India.
8. Modern zoology –Dr. Ramesh Gupta,Prakash Publication,12th Edition, Muzaffarnagar (UP)
9. Ruppert and Barnes, R.D. (2006). *Invertebrate Zoology*, VIII Edition.Holt Saunders

International Edition.
10. Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). *The Invertebrates: A New Synthesis*, III Edition, Blackwell Science
11. Modern Text Book of Zoology (invertebrate) R. L. Kotpal, Rastogi Publication, Meerut, India.

Mapping of COs and POs

Course Outcomes	**Programme Outcomes**					
	1	**2**	**3**	**4**	**5**	**6**
Know various disciplines of zoology.	√					
Explain general characters of invertebrate phyla.		√				
Identify and difference animals of difference phylum.			√			
Know and explain difference system of liver fluke.		√				
Understand and explain pathogenicity and parasitic adaptations of liver fluke.		√				

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F .Y. B. Sc. (Zoology) SEMESTER I
Major Course- II

Chordates and Ecology

COURSE CODE: ZO-MJ-102 THEORY [CREDITS – 03]

Course outcome		
After successfully completing this course, students will be able to: • Know and explain general characteristics of vertebrate. • Identify the taxonomic status and evolutionary significance of entire chordates. • Impaired the knowledge on ecological adaptations. • Identify and explain scales of Pisces. • Identify venomous & non-venomous snakes. • Draw and know different types of beak and feet structure of birds. • Differentiate prototheria, metatheria & eutheria. • Understand basic of ecology. • Explain and draw types of ecosystem. • Describe importance of ecosystem.		
Module 1	**Chordates General Characteristics**	**[10L]**
Learning Objective Taxonomy of Chordates from Protochordates to class Mammals.		
Learning Outcomes: • This course is intended to provide students with a fundamental grasp of the diversity of the Phylum Chordata with a focus on their origin, major traits, classification, distribution, and functioning. • This course will enlighten students on the concept of chordate diversity, organisation, adaptation, and taxonomic position.		
1.1	**General Characteristics of Chordates :** • Protochordates • Pisces • Amphibian • Reptiles • Aves • Mammals	**[10L]**
Module 2	**Chordate Amplifications**	**[10L]**
Learning Objective: Specification of each class or phylum.		
Learning Outcomes:		

- Identify and classify different animals of vertebrate class.
- Know and explain scales of Pisces.
- Identify venomous & non-venomous snakes.
- Differentiate venomous and non-venomous snakes characteristics.
- Draw and explain different types of beak and feet of birds.

2.1	• Pisces - Types of scales • Amphibia - Parental care • Reptiles – Venomous and Non-Venomous snakes • Aves – Modification of beak and feet • Mammals – Salient features of Prototheria, Metatheria and Eutheria	**[10L]**
Module 3	**Ecology**	**[10L]**

Learning Objective:

- Fundamentals of Ecology
- Types of Ecosystem

Learning Outcomes:

- Know basic of Ecology
- Explain types of Ecosystem and its importance

3.1	**Basics of ecology:**
	• Definition and Concept of Ecology
	• Scope of Ecology
	• Biotic and Abiotic Components.
	• Types of Ecosystem
	  ◦ Natural Ecosystem
	  ◦ Artificial Ecosystem
	  ◦ Structure of Ecosystem	

References:

1. Kardong, K.V. (2005) *Vertebrates' Comparative Anatomy, Function and Evolution*. IV
2. Edition.McGraw-Hill Higher Education.
3. Kent, G.C. and Carr R.K. (2000). *Comparative Anatomy of the Vertebrates*.IX Edition.
4. The McGraw-Hill Companies.
5. Young, J. Z. (2004). *The Life of Vertebrates*.III Edition.Oxford University press.
6. Modern Text Book of Zoology (vertebrate) R.L.Kotpal, Rastogi Publication, Meerut, India.
7. Intruduction to Chordates- T.C. Majupuria, Pradeep Publication, Jalandhar, India.
8. Kardong, K.V. (2005) *Vertebrates' Comparative Anatomy, Function and Evolution*.IVthEdition.McGraw-Hill Higher Education.
9. Kent, G.C. and Carr R.K. (2000). *Comparative Anatomy of the Vertebrates*.
10. IX Edition.The McGraw-Hill Companies
11. Young, J. Z. (2004). *The Life of Vertebrates*.III Edition.Oxford Universitypress.
12. Modern Text Book of Zoology (vertebrate) R.L. Kotpal, Rastogi Publication, Meerut, India.
13. Chordates and Invertebrates- Titles by N.Arumugam, Saras Publi., Kanyakumari, India.
14. Ecology and environment by P.D.Sharma.

15.General Animal Ecology by T.N. Ananthakrishnan
16.Ecology by N.S. Subrahmanyam
17.Fundamentals of Ecology by E.P.Odum

Mapping of CLOs and PSOs

Course Learning Outcomes	**Programme Outcomes**					
	1	**2**	**3**	**4**	**5**	**6**
• Know and explain general characteristics of vertebrate.	√	√				
• Identify the taxonomic status and evolutionary significance of entire chordates.		√				
• Impaired the knowledge on ecological adaptations.	√					
• Identify and explain scales of Pisces.	√	√				
• Identify venomous & non-venomous snakes.	√	√				
• Draw and know different types of beak and feet structure of birds.	√		√			
• Differentiate prototheria, metatheria & eutheria.	√		√			
• Understand basic of ecology	√					
• Explain and draw types of ecosystem	√		√			
• Describe importance of ecosystem		√				

F .Y. B. Sc. (Zoology) SEMESTER - I

COURSE TITLE: LAB COURSE I

COURSE CODE: ZOP –MJ-101 Credit- 01

Course Learning Outcome	
After the successful completion of the Course, the learner will be able to: • Identify various animals based on morphological features of non- chordate and chordate animas. • Identify developmental stages of Liver fluke.	
Practical Module – I (Based on ZOP-MJ-101)	**[10L]**
The following practical's are to be taught/studied only with the help of charts, models, videos, photographs, permanent slides, working models etc.	
1	Study of the following specimens: • Amoeba • Euglena • Paramecium • Sycon • Hyalonema
2	Study of the following specimens: • Physalia • Jelly fish • Sea anemone • Tapeworm • Ascaris; Male and Female
3	Study of the following specimens: • Nereis • Pheretima • Hirudinaria • Crab • Centipede • King crab • Silver fish • Cockroach • Butterfly
4	Study of the following specimens:

	• Chiton • Dentalium • Pila • Ostrea • Octopus • Starfish • Brittle star • Sea urchin • Sea cucumber • Balanoglossus
5	Study of the following permanent slides: Liver fluke: Larva stages.miracidium, sporocyst, redia, cercaria

Practical Module - II (Based on ZOP-MJ-102– II) [10L]

The following practicals are to be taught/studied only with the help of charts, models, videos, photographs, permanent slides, working models etc.

- Know and explain general characteristics of vertebrate.
- Identify the taxonomic status and draw animals with specific features.
- Identify and explain scales of Pisces.
- Identify and will draw venomous & non-venomous snakes.
- Draw and know different types of beak and feet structure of birds.
- Differentiate prototheria, metatheria & eutheria with an example.
- Explain and draw types of ecosystem
- Describe importance of ecosystem

1	1. Study of the following specimens: • Herdmania • Branchiostoma • Petromyzon, • Shark • Pristis • Torpedo (Electric Ray Fish) • Rohu • Flying Fish • Ichthyophis • Salamander • Bufo • Hyla
2	Study of the following specimens: • Chelone • Hemidactylus

	• Chamaeleon • Russel's Viper • Indian Cobra • Crocodylus • Gavialis (Gharial)
3	Study of the following specimens: • Pigeon • Peacock • Sparrow • Platypus • Kangaroo • Bat • Dolphin
4	Amphibia: To study parental care in: Ichthyophis, Alytes (Midwife Toad), Hyla, Pipa Americana, *Rhinoderma darwinii* and Desmognathus
5	Reptiles: Identification of venomous and non-venomous snakes with key: Dhaman, Python, Russell's Viper, Krait, Cobra, Sea Snake
6	Aves: Modification Beak and Feet
7	Mammals: Duck bill platypus, Kangaroo, Dolphin
8.	Types of Ecosystem

Mapping of CLOs and PSOs

Course Learning Outcomes	**Programme Outcomes**					
	1	**2**	**3**	**4**	**5**	**6**
Identify various animals based on morphological features of non-chordate and chordate animas.	√					
Identify developmental stages of Liver fluke	√					
Know and explain general characteristics of vertebrate.	√	√				
Understand and explain pathogenesis and parasitic adaptations of liver fluke.	√	√				
Systematic position and various systems in Liver fluke.		√				
Identify the taxonomic status and draw animals with specific features.			√			
Identify and explain scales of Pisces.		√				
Identify and will draw venomous & non-venomous snakes.		√	√			
Draw and know different types of beak and feet structure of birds.	√		√			
Differentiate prototheria, metatheria & eutheria with an example			√			
Explain and draw types of ecosystem		√	√			

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

Minor Course- I

COURSE TITLE: Non- Chordates and Chordates

COURSE CODE: ZO-ME-101

Non- Chordates and Chordates		
After successfully completing this course, students will be able to: • Know various disciplines of zoology. • Explain general characters of invertebrate phyla. • Identify difference animals of difference phylum. • Know and explain general characteristics of vertebrate. • Able to state the general characters, structural organisation and classification of chordate. • Identify and classify difference animals of vertebrate class. • Explain prototheria, metatheria & eutheria.		
Module 1	**Non- Chordates**	**[10L]**
Learning Objective • Taxonomy of non-chordate and chordate.		
Learning Outcomes: • Explain general characters of invertebrate phyla. • Identify difference animals of difference phylum. • Describe general taxonomic scales on animal classification • Learn the concepts and approaches of taxonomy • Know and explain general characteristics of vertebrate. • Identify and classify difference animals of vertebrate class.		
1.1	**Scope, Disciplines and Career in Zoology.**	**[4L]**
1.2	**General Characteristics of Non- Chordate Phyla:** • Protozoa • Porifera • Cnidaria • Platyhelminthes • Aschelminthes • Annelida	**[6L]**
Module 2	**Chordates**	**[10L]**
Learning Objective Specification of each class from Pisces to mammal.		
Learning Outcomes: • Able to state the general characters, structural organisation and classification of chordate.		

- Identify and classify difference animals of vertebrate class.
- Explain prototheria, metatheria & eutheria.

2.1	**General Characteristics of Chordates :** • Protochordates • Pisces • Amphibian • Reptiles • Aves • Mammals	

References:

1. JawaidAhsan, Sinha, S. P. 2008. A Handbook of Economic Zoology. S.Chand and Co. Publ. 272 pages.(For Poultry)
2. Ruppert and Barnes, R.D. (2006). *Invertebrate Zoology*, VIII Edition. Holt Saunders International Edition.
3. Kardong, K.V. (2005) *Vertebrates' Comparative Anatomy, Function and Evolution*.IVthEdition.McGraw-Hill Higher Education.
4. Kent, G.C. and Carr R.K. (2000). *Comparative Anatomy of the Vertebrates*. IX Edition.The McGraw-Hill Companies.
5. Barnes, R.S.K., Calow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I.(2002). *The Invertebrates: A New Synthesis*, III Edition, Blackwell Science.
6. Young, J. Z. (2004). *The Life of Vertebrates*.III Edition.Oxford Universitypress.
7. Modern Text Book of Zoology (vertebrate) R.L. Kotpal, Rastogi Publication, Meerut, India.
8. Modern Text Book of Zoology (invertebrate) R.L. Kotpal, Rastogi Publication, Meerut, India.
9. Invertebrate Zoology- E.L. Jordan & P.S.Verma
10. Invertebrate Zoology- T.C. Majupuria, Pradeep Publication, Jalandhar,India.
11. A Text Book of Histology – Leslie P. Gartner-4thedi.-Amazone.
12. Intruduction to Chordates- T.C. Majupuria, Pradeep Publication, Jalandhar,India.
13. A manual of Practical Zoology Invertebrates- P.S.Verma, S. Chand & Co.Ltd. New Delhi, India.
14. A manual of Practical Zoology Chordates- P.S.Verma, S. Chand & Co.Ltd. New Delhi, India.

Mapping of CLOs and PSOs

Course Learning Outcomes	**Programme Outcomes**					
	1	**2**	**3**	**4**	**5**	**6**
Know various disciplines of zoology.	√					
Explain general characters of invertebrate phyla.		√				
Identify difference animals of difference phylum.		√				
Know and explain general characteristics of vertebrate.	√	√				

Able to state the general characters, structural organisation and classification of chordate.	√					
Identify and classify difference animals of vertebrate class.	√	√				
Explain prototheria, metatheria & eutheria.		√				

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

Minor Course- I

COURSE TITLE:

COURSE TITLE: LAB COURSE

COURSE CODE: ZOP-ME Credit- 01

Course Learning Outcome

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

- Explain general characters of invertebrate phyla.
- Identify difference animals of difference phylum.
- Know and explain general characteristics of vertebrate.
- Identify and classify difference animals of vertebrate class.
- Explain prototheria, metatheria & eutheria.

PRACTICAL Module (Based on ZOP-ME-101)

The following practical's are to be taught/studied only with the help of charts, models, videos, photographs, permanent slides, working models etc.

1	Study of the following specimens: • Amoeba • Euglena • Sycon • Hyalonema
2	Study of the following specimens: • Physalia • Jelly fish • Sea anemone • Tapeworm • Male and female Ascaris
3	Study of the following specimens: • Nereis • Pheretima • Hirudinaria
4	1. Study of the following specimens: • Herdmania • Branchiostoma • Petromyzon, • Shark • Torpedo (Electric Ray Fish) • Rohu

	• Ichthyophis • Salamander • Bufo	
5	Study of the following specimens: • Chelone • Hemidactylus • Chamaeleon • Russel's Vipera • Crocodylus	
6	Study of the following specimens: • Peacock • Sparrow • Platypus • Kangaroo • Bat	

Mapping of COs and PSOs

Course Learning Outcomes	**Programme Outcomes**					
	1	**2**	**3**	**4**	**5**	**6**
Explain general characters of invertebrate phyla.	√	√				
Identify difference animals of difference phylum.	√	√				
Know and explain general characteristics of vertebrate.		√				
Identify and classify difference animals of vertebrate class.		√				
Explain prototheria, metatheria & eutheria..		√				

F .Y. B. Sc. (Zoology)
SEMESTER - I
COURSE CODE: ZO- MDC-101 THEORY
[CREDITS - 02]

Human Health and Diseases		
Course learning outcome		
After successfully completing this course, students will be able to: • Define pathogens, parasites, vectors and parasitism. • Know different parasites, vectors and pathogens. • Differentiate diseases, disorders & syndrome. • Explain causes, symptoms and prevention of some common diseases like Filariasis, Leptospyrosis, Malaria, and Dengue.		
Module 1	**Introduction**	**[07L]**
Learning Objective Important terms for diseases, Basic difference between certain terminologies like Parasitology, parasite, Vector, etcs.		
Learning Outcomes: • Define pathogens, parasites, vectors and parasitism. • Know different parasites, vectors and pathogens. • Differentiate Diseases, Disorders & Syndrome.		
1.1	Definition and introduction of Pathogens, Parasites, Vectors, Parasitism Difference between Diseases, Disorders and Syndrome	**[7L]**
Module 2	**Causes, Symptoms and Prevention**	**[8L]**
Learning Objective Include awareness of south Gujarat diseases.		
Learning Outcomes: • Explain causes, symptoms and prevention of some common diseases like Filariasis, Leptospyrosis, Malaria, and Dengue.		
2.1	• Causes, Symptoms and Prevention of some common regional diseases of South Gujarat: • Filariasis • Leptospyrosis • Malaria • Dengue	**[8L]**
References: 1. Food hygiene & sanitation- Roday.S ,tataMcGraw hill publishing company ltd.		

2. Food science- B.Srilakshmi.
3. MohiniSethi, catering management, New age international publishers.
4. Sri Lakshmi.B – Food science, New Age International Publishers.
5. Park K (2011). Park's Textbook of Preventive and Social Medicine, 21st EditionM/sBanarasidasBhanot Publishers, Jabalpur, India.

Mapping of CLOs and PSOs

Course Learning Outcomes	Programme Outcomes					
	1	2	3	4	5	6
Define pathogens, parasites, vectors and parasitism.	√					
Know different parasites, vectors and pathogens.	√					
Differentiate diseases, disorders & syndrome.			√			
Explain causes, symptoms and prevention of some common diseases like Filariasis, Leptospyrosis, Malaria, and Dengue.		√				

SEMESTER - I

COURSE TITLE: LAB COURSE I

COURSE CODE: ZOP- MDC-101 [CREDITS - 01]

Course Learning Outcome

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

- Describe about diseases.
- Understand about causative agent of diseases
- Explain how to prevention diseases.

PRACTICAL Module – I (Based on MDC -101)

The following practical's are to be taught/ studied only with the help of charts, models, videos, photographs, permanent slides, working models etc.

1	To study Difference among Diseases, Disorders and Syndrome
2	To study Difference among Pathogens, Parasites, Vectors
3	To study causal organisms of • Filariasis • Leptospyrosis • Malaria • Dengue

Mapping of CLOs and PSOs

Course Learning Outcomes	Programme Outcomes					
	1	2	3	4	5	6
Describe common diseases.		√				
Understand about causative agent of diseases	√					
Explain how to prevention diseases.		√				

SEMESTER I
F .Y. B. Sc. (Zoology)
COURSE CODE: ZO-SEC-101
THEORY [CREDITS - 02]

Aquarium Management		
Course learning outcome		
After successfully completing this course, students will be able to: • Know and explain different types of aquaria. • Understand preparation and management of aquarium. • Explain different aquarium fishes. • Identify aquarium fishes.		
Module 1	Introduction of Aquarium	[07L]
Learning Objective Basics of Aquarium and construction of Aquarium.		
Learning Outcomes: • Know and explain different types of aquaria. • Understand preparation and management of aquarium		
1.1	Types of aquaria, Preparation and management of aquarium	[7L]
Module 2	Aquarium Fishes	[8L]
Learning Objective Ornamental Fish for Aquarium.		
Learning Outcomes: • Explain different aquarium fishes. • Identify aquarium fishes.		
2.1	• Common Gold fish • Lion fish • Black molly • Angel fish • Sword tail fish	[6L]

	• Pearl Gourami	

References:

1. An Introduction to fishes-S.S.Khanna.
2. Fish and Fisheries of India-V.G.Jhingran.
3. Fish and Fisheries –A.R.Shukla
4. Fish and Fisheries-B.N.Yadav.
5. Ichthyology-Lagler,Bardach,Passino & Miller
6. Fundamentals of Ichthyology-Gupta,Guhalwat,Yadav,Jain
7. Fundamentals of Ichthyology-S.P.Biswas
8. General and Applied Ichthyology-S.K.Gupta,P.C.Gupta.
9. An Introduction to fishes-G.S.Sandhu.
10. Fish Biology-C.B.L.Srivastava
11. A Textbook of Fish Biology and Fisheries- S.S.Khanna and H.R.Singh

Mapping of CLOs and PSOs

Course Learning Outcomes	**Programme Outcomes**					
	1	**2**	**3**	**4**	**5**	**6**
Know and explain different types of aquaria.	√	√				
Understand preparation and management of aquarium.	√					
Explain different aquarium fishes.		√				
Identify aquarium fishes.		√				

SEMESTER I
COURSE TITLE: LAB COURSE I
COURSE CODE:

SEC-ZOP -101 THEORY [CREDITS - 01]

Course Learning Outcome
After the successful completion of the Course, the learner will be able to: • Demonstrate practical skills. • How to prepare aquarium.
PRACTICAL Module – I (Based on SEC-101) [10L]
The following practicals are to be taught/studied only with the help of charts, models, videos, photographs, permanent slides, working models etc.

1	To study different types of aquarium
2	Preparation of aquarium
3	To study some aquarium fishes characteristics with examples • Common Gold fish • Lion fish • Black molly • Angel fish • Sword tail fish • Pearl Gourami

Mapping of CLOs and PSOs

Course Learning Outcomes	**Programme Outcomes**					
	1	**2**	**3**	**4**	**5**	**6**
Demonstrate practical skills.			√			
How to prepare aquarium.		√	√			

F.Y.B. Sc. (Zoology)
SEMESTER I
ENVIRONMENTAL STUDIES

THEORY [CREDITS - 02]

ENVIRONMENTAL STUDIES		
Course learning outcome		
After successfully completing this course, students will be able to: • Get the knowledge the structural and functional components of ecosystem. • They understand the interaction of living components of environment. • They can also deduce the interaction of living and non-living components and their balance in nature. • Able to apply their knowledge of conservation practically. • Demonstrated an Understood of ecological relationships between organisms and their environment. • Presented an overview of diversity of life forms in an ecosystem. • Explained and identified the role of the organism in energy transfers		
Module 1	**Introduction**	**[10L]**
Learning Objective: Different branches of Environment		
Learning Outcomes: • They understand the interaction of living components of environment. • They can also deduce the interaction of living and non-living components and their balance in nature. • Able to apply their knowledge of conservation practically.		
1.1	• Multi-Disciplinary Nature of Environmental Studies • Definition of Environment • Scope of Environmental Studies • Importance of Environmental Studies and Natural Resources • Productive Value of Nature • Aesthetic/ Recreational Value of Nature • Institutions working for Environment (BNHS, WWF-I, CSE, CEE, BSI, ZSI etc.)	**[10L]**
Module 2	Ecosystem	**[10L]**
Learning Objective : Types of Ecosystem		
Learning Outcomes: • Demonstrated an Understood of ecological relationships between organisms and their environment. • Get the knowledge the structural and functional components of ecosystem. • Presented an overview of diversity of life forms in an ecosystem.		

• Explained and identified the role of the organism in energy transfers.		
2.1	• Concept of an Ecosystem • Structure and Functions of an Ecosystem • Producers, Consumers and Decomposers • Energy flow in the Ecosystem: • The Water Cycle • The Carbon Cycle • The Oxygen Cycle • The Nitrogen Cycle • The Energy Cycle and Integration of Cycles in Nature • Ecological Succession	**[10L]**

References:

1. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Sounders. Reference Books:
2. Groom. B. & Jenkins. M. 2000.Global Biodiversity: Earth's Living Resources in the 21st Century. World Conservation Press, Cambridge, UK.
3. Gurevitch, J., Scheiner, S. M., & Fox, G. A. 2002. The Ecology of Plants. Sinauer associates incorporated.
4. Loreau, M. & Inchausti, P. 2002. Biodiversity and Ecosystem functioning: Synthesis and Perspectives. Oxford University Press, Oxford, UK.
5. Pandit, M.K., White, S.M.& Pocock, M.J.O. 2014. The contrasting effects of genome size, chromosome number and ploidy level on plant invasiveness: a global analysis. New Phytologist 203: 697-703

Mapping of CLOs and PSOs

Course Learning Outcomes	**Programme Outcomes**					
	1	**2**	**3**	**4**	**5**	**6**
Get the knowledge the structural and functional components of ecosystem.	√					
They understand the interaction of living components of environment.	√					
Explained and identified the role of the organism in energy transfers		√				
Demonstrated an Understood of ecological relationships between organisms and their environment.			√			
Able to apply their knowledge of conservation practically.			√			