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 Sachin-Hazira Road
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 Bhopal, Madhya Pradesh
Faculty of the specialization			
1	Dr. Jaya Patel	Associate Professor & Head	Sir P. T. Sarvajanik College of Science, Surat
2	Dr. Nitin Solanki	Assistant Professor	Sir P. T. Sarvajanik College of Science, Surat
3	Dr. Neelam Mishra	Adhyapak Sahayak	Sir P. T. Sarvajanik College of Scienc, Surat e

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 Name
Core Course (CC)				
1	I	MJ: CC I	ZOOMJ-S1P1-3CR24	Non Chordates I
2		MJ:CC II	ZOOMJ-S1P2-3CR24	Chordates I and Ecology
3		MJ: Practical-I	ZOOMJ-S1PR1-1CR24	Zoology Practical -I
4		MJ: Practical-II	ZOOMJ-S1PR2-1CR24	Zoology Practical -II
5		MN: CCI	ZOOMN-S1P1-2CR24	Non Chordates & Chordates
6		MN: Practical-I	ZOOMN-S1PR1-2CR24	Zoology Practical -I
7		MDC-I	ZOOMDC-S1P1-4CR25	Human Health and Diseases
8		SEC-I	ZOOSEC-S1P1-2CR24	Aquarium Management
1	**II**	MJ: CCIII	ZOOMJ-S2P3-3CR24	Diversity of Non Chordates and Ecology
2		MJ:CC IV	ZOOMJ-S2P4-3CR24	Evolution, Ethology and Chordates
3		MJ: Practical-III	ZOOMJ-S2PR3-1CR24	Zoology Practical -III
4		MJ: Practical-IV	ZOOMJ-S2PR4-1CR24	Zoology Practical -IV
5		MN: CCII	ZOOMN-S2P2-2CR24	Ecology and Wildlife Biology
6		MN: Practical-II	ZOOMN-S2PR2-2CR24	Zoology Practical- II
7		MDC-II	ZOOMDC-S2P2-4CR24	Aqua Culture
8		SEC-II	ZOOSEC-S2P2-2CR24	Poultry Farming

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

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 and PRACTICAL									
MJ: CC I	Non Chordates I	ZOOMJ-S1P1-3CR24	3	45	3	15	37	38	75
MJ:CC II	Chordates I and Ecology	ZOOMJ-S1P2-3CR24	3	45	3	15	37	38	75
MJ: PRACTICAL-I	Zoology Practical MJ-I	ZOOMJ-S1PR1-1CR24	1	30	1	15	12	13	25
MJ: PRACTICAL-II	Zoology Practical MJ-II	ZOOMJ-S1PR2-1CR24	1	30	1	15	12	13	25
MN: CCI	Non-Chordates & Chordates	ZOOMN-S1P1-2CR24	2	30	2	15	25	25	50
MN: Practical-I	Zoology Practical -I	ZOOMN-S1PR1-2CR24	2	60	2	15	25	25	50
MDC-I	Human Health and Diseases	ZOOMDC-S1P1-4CR25	4	60	4	15	50	50	100
SEC-I	Aquarium Management	ZOOSEC-S1P1-2CR24	2	60	2	30	25	25	50
VAC	Environmental Studies	ENV-S1P1 2CR24	2	30	2	15	25	25	50

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 II									
Major Courses THEORY & PRACTICAL									
MJ: CC III	Diversity of Non-Chordates and Ecology	ZOOMJ-S2P3-3CR24	3	45	3	15	37	38	75
MJ:CC IV	Evolution, Ethology and Chordates	ZOOMJ-S2P4-3CR24	3	45	3	15	37	38	75
MJ: PRACTICAL-III	Zoology Practical-III	ZOOMJ-S2PR3-1CR24	1	30	2	15	12	13	25
MJ: PRACTICAL-IV	Zoology Practical-IV	ZOOMJ-S2PR4-1CR24	1	30	2	15	12	13	25
MN: CCII	Ecology and Wildlife Biology	ZOOMN-S2P2-2CR24	2	30	2	15	25	25	50
MN: Practical-II	Zoology Practical- II	ZOOMN-S2PR2-2CR24	2	60	2	30	25	25	50
MDC-II	Aquaculture	ZOOMDC-S2P2-4CR24	4	60	4	15	50	50	100
SEC-II	Poultry Farming	ZOOSEC-S2P2-2CR24	2	30	2	30	25	25	50

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

Course Name: Non Chordates I

COURSE CODE: ZOOMJ-S1P1-3CR24

THEORY [CREDITS - 03]

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. • Knsow 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.

Course Name: Non Chordates I

COURSE CODE: ZOOMJ-S1P1-3CR24

Question paper Template

Unit	Remembering (1)	Understanding (2)	Applying (3)	Analyzing (4)	Evaluating (5)	Creating (6)	Total
I	45%	55%	-	-	-	-	100%
II	45%	55%	-	-	-	-	100%
III	20%	60%	20%	-	-	-	100%

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.		√				

F.Y. B. Sc. (Zoology)
SEMESTER I
MJ: CC II
Course Name: Chordates I and Ecology

COURSE CODE: ZOOMJ-S1P2-3CR24

THEORY [CREDITS – 03]

Course learning 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 Ecosystems

Learning Outcomes:

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

3.1	**Basics of Ecology:**
	• Definition and Concept of Ecology
	• Scope of Ecology
	• Biotic and Abiotic Components.
	• Types of Ecosystems
	  • 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

Course Name: Chordates I and Ecology

COURSE CODE: ZOOMJ-S1P2-3CR24

Question paper Template

Unit	Remembering (1)	Understanding (2)	Applying (3)	Analyzing (4)	Evaluating (5)	Creating (6)	Total
I	45%	55%	-	-	-	-	100%
II	15%	55%	30%	-	-	-	100%
III	20%	50%	30%	-	-	-	100%

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 ecosystems	√		√			
• Describe importance of ecosystem		√				

F.Y. B. Sc. (Zoology)
SEMESTER – I
MJ: Practical-I
Course Name: Zoology Practical-I
COURSE CODE: ZOOMJ-S1PR1-1CR24
Practical 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 (ZOOMJ-S1PR1-1CR24) [10L]

The following practicals 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	

F.Y. B. Sc. (Zoology) SEMESTER – I
MJ: Practical-II
Course Name: Zoology Practical-II
COURSE CODE: ZOOMJ-S1PR2-1CR24
Practical 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 chordate animals. • Identify the taxonomic status and draw animals with specific features.	
Practical Module – II(ZOOMJ-S1PR2-1CR24) [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 ecosystems • 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 Ecosystems

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 ecosystems		√	√			

F.Y. B. Sc. (Zoology)
SEMESTER I
MN:CC I

Course Name: Non Chordates & Chordates

COURSE CODE: ZOOMN-S1P1-2CR24

THEORY [CREDITS - 02]

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 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.
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.

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

Course Name: Non Chordates & Chordates
COURSE CODE: ZOOMN-S1P1-2CR24
Question paper Template

Unit	Remembering (1)	Understanding (2)	Applying (3)	Analyzing (4)	Evaluating (5)	Creating (6)	Total
I	45%	55%	-	-	-	-	100%
II	50%	50%	-	-	-	-	100%

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
MN: Practical-I

Course Name: Zoology Practical-I

COURSE CODE: ZOOMN-S1PR1-2CR24
Practical [CREDITS - 02]

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 ZOOMN-S1PR1-2CR24)

The following practicals 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
MDC-I
Course Name: Human Health and Diseases
COURSE CODE: ZOOMDC-S1P1-4CR25
THEORY [Credit -04]

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, Leptospirosis, Malaria, and Dengue. • Explain causes and symptoms Chromosomal syndrome and Hormonal syndrome. • Understand basic difference between Phobia and OCD • Understand Symptoms of Phobia and OCD.		
Module 1	**Introduction**	**[07L]**
Learning Objective • Important terms for diseases, Basic difference between certain terminologies like Parasitology, Parasite, Vector, etc.		
Learning Outcomes: • Define pathogens, parasites, vectors and parasitism. • Know different parasites, vectors and pathogens. Differentiate Diseases, Disorders and 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, Leptospirosis, Malaria, and Dengue.		
2.1	• Causes, Symptoms and Prevention of some common regional diseases of South Gujarat: • Filariasis • Leptospirosis • Malaria	8L

	• Dengue	
Module 3	**Syndromes**	**[8L]**
Learning Objectives: This module is intended to • Understand Syndrome (Genetic and Metabolic)		
Learning Outcome: After the successful completion of the module, the learner will be able to • Chromosomal Syndrome and Hormonal Syndrome.		
3.1	Causes and symptoms of genetic syndromes • Down syndrome • Patau syndrome	5L
3.2	Causes and symptoms of metabolic syndromes • Diabetes	3L
Module 4	**Disorders**	**[7L]**
Learning Objectives: This module is intended to • Show difference between Phobia and OCD		
Learning Outcome: After the successful completion of the module, the learner will be able to • Understand basic difference between Phobia and OCD • Symptoms of Phobia and OCD.		
4.1	Cause and symptoms of anxiety disorders • Introduction of Phobia • Aquaphobia • Acrophobia • Obsessive-Compulsive Disorder (OCD)	7L

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.
6. https://my.clevelandclinic.org/health/diseases/21956-acrophobia-fear-of-heights
7. https://my.clevelandclinic.org/health/diseases/22958-aquaphobia-fear-of-water
8. https://my.clevelandclinic.org/health/diseases/9490-ocd-obsessive-compulsive-disorder

Course Name: Human Health and Diseases
COURSE CODE: ZOOMDC-S1P1-4CR25
Question paper Template

Unit	Remembering (1)	Understanding (2)	Applying (3)	Analyzing (4)	Evaluating (5)	Creating (6)	Total
I	45%	55%	-	-	-	-	100%
II	45%	55%	-	-	-	-	100%
III	35%	65%	-	-	-	-	100%
IV	50%	50%	-	-	-	-	100%

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.		√				

F.Y. B. Sc. (Zoology)
SEMESTER I
SEC-I
Course Name: Aquarium Management
COURSE CODE: ZOOSEC-S1P1-2CR24
PRACTICAL [CREDITS - 02]

Course learning outcome		
After the successful completion of the Course, the learner will be able to: • Demonstrate practical skills. • How to prepare aquarium. • Know and explain different types of aquaria. • Understand preparation and management of aquarium. • Explain different aquarium fishes. • Identify aquarium fishes.		
The following practical's are to be taught/studied only with the help of charts, models, videos, photographs, permanent slides, working models etc.		
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 of aquarium • 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	To study some aquarium fishes characteristics with examples • 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**
Demonstrate practical skills.			√			
Know and explain different types of aquaria.	√	√				
How to prepare aquarium.		√	√			
Understand preparation and management of aquarium.	√					
Explain different aquarium fishes.		√				
Identify aquarium fishes.		√				