



SIR P. T. SARVAJANIK COLLEGE OF SCIENCE, SURAT.

Autonomous

(Affiliated with Veer Narmad South Gujarat University)

Reaccredited 'A+' 3.35 CGPA by NAAC, College with Potential for Excellence



Sir P. T. Sarvajani College of Science

Autonomous

Affiliated to Veer Narmad South Gujarat University, Surat

Re-Accredited 'A+' with CGPA 3.35

SYLLABUS

For

SEM I & II

Program: M.Sc.

Course: ZOOLOGY

For

Academic year

2026-27

(NEP 2020)

Effective from June 2026



SIR P. T. SARVAJANIK COLLEGE OF SCIENCE, SURAT.

Autonomous

(Affiliated with Veer Narmad South Gujarat University)

Reaccredited 'A+' 3.35 CGPA by NAAC, College with Potential for Excellence



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. Sarvajani 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. Sarvajani 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. Sarvajani College of Science
2	Dr. Nitin Solanki	Assistant Professor	Sir P. T. Sarvajani College of Science
3	Dr. Neelam Mishra	Adhyapak Sahayak	Sir P. T. Sarvajani College of Science



SIR P. T. SARVAJANIK COLLEGE OF SCIENCE, SURAT.

Autonomous

(Affiliated with Veer Narmad South Gujarat University)

Reaccredited 'A+' 3.35 CGPA by NAAC, College with Potential for Excellence



Programme Outcomes

PO Number	PO Statement
PO1	To impart basic knowledge of various branches of Zoology and to understand the unity of life with the rich diversity of organisms and their ecological and evolutionary significance.
PO2	To appreciate the complexities of biological organisation and address scientifically controversial issues in a rational way. To acquire basic skills in the observation and study of nature, biological techniques, experimental skills and scientific investigation
PO3	To assess the scope of animal biology and select particular areas for further study. To address the socio-economic challenges related to animal sciences and to facilitate students for taking up and shaping a successful career in Zoology and its related subjects
PO4	To inculcate transformational impact on the quality of education and to inspire the students to adopt scientific temper and live with scientific values.
PO5	To make the students aware of applications of Zoology and to highlight the potential of various branches to become an entrepreneur.



SIR P. T. SARVAJANIK COLLEGE OF SCIENCE, SURAT.

Autonomous

(Affiliated with Veer Narmad South Gujarat University)

Reaccredited 'A+' 3.35 CGPA by NAAC, College with Potential for Excellence



Acknowledgement

At the outset, I would like to thank 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 compilation of the restructured syllabus.

Chairperson

Board of Studies in Zoology



SIR P. T. SARVAJANIK COLLEGE OF SCIENCE, SURAT.

Autonomous

(Affiliated with Veer Narmad South Gujarat University)

Reaccredited 'A+' 3.35 CGPA by NAAC, College with Potential for Excellence



Course Content

Sr. No	Semester	Course Type	Course Code	Course Name
1	I	CC - I	ZOOMSC-S1P1-4CR26	Biology of Non Chordates
2		CC - II	ZOOMSC-S1P2-4CR26	Biology of Chordates
3		CC - III	ZOOMSC-S1P3-4CR26	Ecology and Ethology
4		Practical CC - I	ZOOMSC-S1PR1-2CR26	Zoology Practical - I
5		Practical CC - II	ZOOMSC-S1PR2-2CR26	Zoology Practical - II
6		Practical CC - III	ZOOMSC-S1PR3-2CR26	Zoology Practical - III
7		Indian Knowledge System (IKS)	ZOOMSC-S1IKS-2CR26	Ancient Health Science
8		Skill Enhancement Course (SEC)	ZOOMSC-S1SECPR-2CR26	Apiculture
1	II	CC - IV	ZOOMSC-S2P4-4CR26	Animal Physiology
2		CC - V	ZOOMSC-S2P5-4CR26	Wildlife Biology and Conservation
3		CC - VI	ZOOMSC-S2P6-4CR26	Developmental Biology
4		Practical CC - IV	ZOOMSC-S2PR4-2CR26	Zoology Practical - IV
5		Practical CC - V	ZOOMSC-S2PR5-2CR26	Zoology Practical - V
6		Practical CC- VI	ZOOMSC-S2PR6-2CR26	Zoology Practical -VI
7		Vocational course	ZOOMSC-S2VOC-2CR26	Fisheries
			ZOOMSC-S2VOCPR-2CR26	Practical -Vocational Course



SIR P. T. SARVAJANIK COLLEGE OF SCIENCE, SURAT.

Autonomous

(Affiliated with Veer Narmad South Gujarat University)

Reaccredited 'A+' 3.35 CGPA by NAAC, College with Potential for Excellence



M.Sc. Syllabus with effect from the Academic year 2026-27 Distribution of Credit M.Sc. Zoology Syllabus

Course types	Course Name	Course Code	Credits	Hour	Module	Lectures per module (1 Hr)	Examination		
							Internal Marks	External Marks	Total Marks
SEMESTER I									
THEORY									
CC-I	Biology of Non Chordates	ZOOMSC-S1P1- 4CR26	4	60	4	15	50	50	100
CC-II	Biology of Chordates	ZOOMSC-S1P2- 4CR26	4	60	4	15	50	50	100
CC-III	Ecology and Ethology	ZOOMSC-S1P3- 4CR26	4	60	4	15	50	50	100
IKS-1	Ancient Health Science	ZOOMSC-S1IKS1- 2CR26	2	30	2	15	25	25	50
PRACTICAL									
SEC-1	Apiculture (Practical)	ZOOMSC-S1SECPR-2CR26	2	60	-	-	25	25	50
PCC1	Biology of Non Chordates Zoology Practical- I	ZOOMSC-S1PR1- 2CR26	2	60	-	-	25	25	50
PCC2	Biology of Chordates Zoology Practical- II	ZOOMSC-S1PR2- 2CR26	2	60	-	-	25	25	50
PCC3	Ecology and Ethology Zoology Practical- III	ZOOMSC-S1PR3- 2CR26	2	60	-	-	25	25	50
Total			22						550



SEMESTER II									
THEORY									
CC-IV	Animal Physiology	ZOOMSC- S2P4- 4CR26	4	60	4	15	50	50	100
CC- V	Wildlife Biology and Conservation	ZOOMSC- S2P5- 4CR26	4	60	4	15	50	50	100
CC-VI	Developmental Biology	ZOOMSC- S2P6- 4CR26	4	60	4	15	50	50	100
VOC	Fisheries	ZOOMSC- S2VOC- 2CR26	2	30	2	15	25	25	50
PRACTICAL									
PCC IV	Animal Physiology Zoology Practical- IV	ZOOMSC- S2PR4- 2CR26	2	60	2	15	20	30	50
PCCV	Wildlife Biology and Conservation Zoology Practical- V	ZOOMSC- S2PR5- 2CR26	2	60	-	-	25	25	50
PCCVI	Developmental Biology Zoology Practical- VI	ZOOMSC- S2PR6- 2CR26	2	60	-	-	25	25	50
PVOC1	Practical- Fisheries	ZOOMSC- S2VOCPR- 2CR26	2	60	-	-	25	25	50
Total			22						550



M. Sc. (Zoology) SEMESTER II
CC-IV
Course Code: ZOOMSC-S2P4-4CR26
Course Name: Animal Physiology (Credits -4)

Course Learning Outcome

At the end of this course, Students will be able to:

- To know about physiology of animals.
- Understand the physiology of mammals and various metabolic processes.
- Understand vital processes like Respiration and Excretion.
- Develop understanding of neurons, Nerve impulse and neuromuscular co-ordination.
- Recognize and explain the sense organs and their functions in various animals Explain the thermoregulation with example.

Module 1	Scope and branches of Physiology	[15L]
-----------------	---	--------------

Learning Objectives:

This module is intended to

- Scopes and branches
- Thermoregulation of different animals in different ways

Learning Outcome:

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

- Information about different branches.
- Understand Thermoregulation

1.1	a) Importance and scopes of physiology b) Branches of physiology;	
1.2	Thermoregulation and cold tolerance a) Basic principle of metabolism b) heat balance and exchange c) Endotherm Vs Ectotherm;	
1.3	a) Counter-current heat exchanger b) Torpor, Hibernation & Aestivation c) Adaptation to very cold environments	
Module 2	Ionic & Osmotic Balance	[15L]

Learning Objectives:

This module is intended to

Osmoregulation of different animals

Learning Outcomes:

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

- Explain different term such as Osmoregulation, osmoconforming, osmoregulatory.



• Compare different osmoregulatory organ.		
2.1	Osmoregulation vs osmoconforming	
2.2	a) Osmoregulation in aquatic and terrestrial environment b) Kidney function and diversity	
2.3	a) Other Osmoregulatory organ b) Nitrogenous waste excretion	

Module 3	Physiology of Muscular System	[15L]
-----------------	--------------------------------------	--------------

Learning Objectives:

This module is intended to

- How muscle and nervous systems are correlated.

Learning Outcome:

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

- Evaluate different theories of muscular contraction.
- Connect two physiology processes.

3.1	Theories of muscular contraction molecular mechanism and regulation of muscular contraction.	
3.2	Neurophysiology: Structural and functional organization of the nervous system Physical basis of neuronal function Communication along and between neuron.	

Module 4	Sensory Transduction	[15L]
-----------------	-----------------------------	--------------

Learning Objectives:

This module is intended to

- Different Sensory organs and their functions.

Learning Outcome:

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

- Recognize and explain the sense organs and their functions in various animals.

4.1	Sensing the environment Phonoreceptor – Physiology of equilibrium	
4.2	Vision and Photoreceptor Chemoreceptors - Taste and Smell	



4.3	Machenoreceptor : Tactile Echolocation :Bats..	
References: 1. G. J. Tortora: Principle of Anatomy and Physiology 2. Hoar: General and Comparative physiology 3. Dr. P.V. Jabade: General Physiology 4. B. K. Berry: Animal Physiology 5. C. C. Chatterjee: Human Physiology 6. Goel and Shastri: Textbook of Animal Physiology 7. K.S. Nelson: Animal Physiology 8. Holurn: Principles of Physiology and Biochemistry 9. Bell and Davidson: Textbook of Physiology and Biochemistry 10. Withers: Comparative Animal Physiology 11. Mohan P. Arora: Animal Physiology 12. R. C. Sobti; Animal Physiology.		

Mapping CO_PO

Course Learning Outcomes	Programme Outcomes					
	1	2	3	4	5	6
To know about physiology of animals.	X					
Explain the thermoregulation with example.		X				
Recognize and explain the sense organs and their functions in various animals.	X					
Evaluate different theories of muscular contraction					X	
Develop understanding of neurons, Nerve impulse and neuromuscular co-ordination.	X					
Understand vital processes like Respiration and Excretion.		X				
Understand the physiology of mammals and various metabolic processes.		X				



M. Sc. (Zoology) SEMESTER II CC-V

Course Code: ZOOMSC-S2P5-4CR26

Course Name: Wildlife Biology and Conservation (Credits -4)

Course Learning Outcome		
At the end of this course, Students will be able to: Understand wildlife biology and conservation methods and its importance		
- To make the students equipped with the knowledge of wildlife resources of India having emphasis to the principles and applications of various wildlife management techniques. - To study about economic importance of animals and health care of wild animals. - Enlist all wildlife of India.		
Module 1	Conservation of Wildlife	[15L]
Learning Objectives: This module is intended to Understand wildlife biology and its importance and wildlife of India		
Learning Outcome: After the successful completion of the module, the learner will be able to - Understand red data book, Key stone Spp. Umbrella Spp., - Understand biogeographic Zones of India. - Explain wildlife of India - Describe wildlife conservation methods		
1.1	Aims of wildlife conservation Concept of Red data Book, Keystone species, Umbrella species and Flagship species	
1.2	Conservation Strategy Wildlife of India Indian board of Wildlife, CITES, IUCN Wildlife protection act 1972	
1.3	Biogeographic zones and Zoogeography of India Climate change and its effects on Wildlife.	
Module 2	Animal Behaviour and Ecology	[15L]



Learning Objectives:

This module is intended to

Understand animal behaviour and ecology

Learning Outcome: After the successful completion of the module, the learner will be able to

	- Understand behavior of animal by interaction with each other. - Gain knowledge of interaction - Explain Predator and prey interaction. - Explain Lotka – Volterra model.	
2.1	Behavioural ecology Food and feeding Foraging as a Major Activity of Animals	
2.2	Predation and Predator –Prey Interactions Lotka - Volterra Model of Predator –Prey Interactions Optimal Foraging Theory (OFT)	
2.3	Ecological Monitoring Species – Area Curve Population Studies Population Estimation.	
Module 3	Conservation and Applied Sciences	[15L]
Learning Objectives: This module is intended to Understand Wildlife conservation and wildlife health		
Learning Outcome: After the successful completion of this module students will be able to - Explain Human wildlife interaction - Describe Illegal trades of wildlife - Explain wildlife health		
3.1	Human – Wildlife Interaction: Conflict mitigation strategies, participatory rural appraisal and the human dimensions of conservation, illegal trades of wildlife	
3.2	Wildlife Forensics: Morphological and molecular species identification, CITES enforcement and anti-poaching protocols	
3.3	Wildlife health and Disease : Zoonotic Disease and basic animal rescue approaches	



Module 4	Tracking and Capturing Methods in Wildlife Biology	[15L]
Learning Objectives: This module is intended to understand Tracking and capturing methods in wildlife biology		
Learning Outcome: After the completion of this module learner will be able to • Explain some modern techniques in wildlife ecology • Describe types of camera and its application in wildlife • Explain fingerprinting method and its importance		
4.1	Modern Techniques in Wildlife Ecology and Habitat Analysis – Bioacoustics – Bird Net, Merlin, Animal identification: iNaturalist, Ebird M-STrIPES app – Monitoring System for Tiger	
4.2	Biotelemetry and Radio-Tracking method and its applications Remote Sensing and Geographic Information System and its applications, Camera Trapping – Types of camera and its applications	
4.3	Ecological and Conservation Genetics DNA Fingerprinting method and its applications	
References: 1. Wildlife Ecology and Conservation – M. Balakrishnan 2. Wildlife Management and Conservation – M.M. Ranga 3. Ecology and Environment. P.D. Sharma 4. Wildlife Forensic Investigation: Principles and Practice – John E. Cooper and Margaret E. Cooper 5. Human wildlife Conflict Management: Prevention and problem Solving – Russell F. Reidinger Jr. 6. Zoo and Wild Animal medicine – by Murray E. Fowler and R. Eric Miller 7. Human Dimensions of Wildlife Management – Daniel J. Decker, Shawn J. Riley and William f. Siemer		



**M. Sc. (Zoology) SEMESTER II
CC-VI**

Course Code: ZOOMSC-S2P6-4CR26

Course Name: Developmental Biology (Credits -4)

Course Learning Outcome		
At the end of this course, Students will be able to:		
- Gain knowledge of basic history of developmental biology - Know the different theories of embryology. - Explain spermatogenesis and oogenesis - Describe placenta and its types - Abnormal development and teratological defects to understand how and why things go wrong during development - Explain regeneration in various groups of animal		
Module 1	Historical Review and Theories of Developmental Biology	[15L]
Learning Objectives	- Explain Different theories of Development. - Know types of eggs - Understand fate map	
Learning Outcome:After the successful completion of the module, the learner will be able to - Explain different theories like, Preformation Theory, Epigenetic Theory, etc. - Understand types of eggs - Describe Fate map		
1.1	a) Important Theories of Development Preformation theory, Epigenetic theory Pangenesis theory,Germ Layer Concept Baer’s Law B) Biogenetic Law or Recapitulation Theory Mosaic theory, Regulative theory.	
1.2	Types of eggs Cleavage and its types Fate map	
Module 2	Embryology	[15L]



Learning Objectives:

This module is intended to

- Three germinal layers.
- Formation of organ from germinal layer.

Learning Outcome:

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

- Concept of fate map and organogenesis in frog.

2.1	Structure of sperm and ova, Spermatogenesis, Oogenesis Fertilization – Acrosomal reaction Developmental stages of Chick embryo- Morula, Blastula, gastrula, 24 hours, 33 hours, 48 hours, 62 hours, 72 hours	
-----	---	--

2.2	Placenta and its types, Menstrual cycle Implantation	
Module 3	Teratology	[15L]

Learning Objectives:

This module is intended to

- Concept of Teratogenesis.
- Embryomata and Teratomata.

Learning Outcome:

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

- Basic concept of teratogenesis.
- Understand concept of conjoined twins.
- Examine abnormal development and teratological defects to understand how and why things go wrong during development.

3.1	Stages Sensitivity of foetus in Teratogenesis Twinning and Double Monsters in Man Equal Conjoined Twins Unequal Conjoined Twins	
3.2	Embryomata and Teratomata Causative Factors in Teratogenesis.	
3.3	Malformations in the External Structures of the Body -Malformations in Legs and Arms -Malformations in Hands and Feet -Persistence of Tail -Gigantism and Dwarfism	



Module 4 Regeneration		[15L]
Learning Objectives: This module is intended to • Regeneration of certain organ. • Which organ or cell can regenerate.		
Learning Outcome: After the successful completion of the module, the learner will be able to □ Understand cells responsible for regeneration. □Basic of regeneration.		
4.1	Regeneration in Various Groups of Animal Mechanism of Regeneration - Wound Healing or Preblastema Phase - Blastema Formation	
4.2	Histology of Regeneration.	
4.3	Physiological Aspects of Regeneration Factors that Influence Regeneration	
4.4	Polarity in Regeneration Induction in Regeneration Regeneration Field	
References: 1. Foundation Of Embrology Bradley M.Patten, McGrow Publication 2. Fertilization In Animals Brain Dale, ArlondHeiniman, GulabVazeraniPublicati 3. Development Biology N.J. Berril, Tata McGraw Hill Publication N. Delhi 4. Embryology Of Vertebrates - Nelson		



M. Sc. (Zoology) SEMESTER II VOC

Course Code: ZOOMSC-S2VOC-2CR26

Course Name: Fisheries (Credit – 02)

Course Learning Outcome

At the end of this course, Students will be able to: Introduce the principles and practices of food fish farming and fish seed production. Explain different methods of fish breeding and induced breeding techniques.		
Module 1	Aquaculture – Core Concepts	[15L]
Learning Objective:	Introduce the basic concepts, scope and importance of aquaculture.	
Learning Outcome:	• Explain the concept, scope, history and present status of aquaculture. • Differentiate between extensive, semi-intensive and intensive aquaculture systems. • Identify major cultivable fish groups used in aquaculture. • Describe the basic structure and components of a fish culture pond/farm.	
1.1	Overview of Aquaculture (Scope, brief history, present status) • Main Aquaculture Approaches (Extensive, semi-intensive, intensive)	
1.2	Species & Farm Basics (Cultivable fish groups, basic pond/farm structure) • Modern Techniques (Biofloc, RAS, cage culture, aquaponics)	
Module 2	Breeding of Fishes for Fish Seed	[15L]
Learning Objectives: This module is intended to		
• Introduce the basic principles of fish breeding and fish seed production. • Explain different natural and artificial methods of fish breeding.		
Learning Outcome: After the successful completion of the module, the learner will be able to		
• Explain the basic principles of fish breeding and seed production. • Describe artificial fertilization by stripping and different fish breeding methods. • Explain induced breeding, Bundh breeding and pond breeding methods. • Describe the principle of hypophysation and the role of hormones in induced breeding.		
	Breeding of Fishes for Fish Seed • Artificial fertilization by stripping • Induced breeding of fishes • Pond breeding methods • Methods for difficult-to-spawn fishes • Bundh breeding • Induced breeding by hypophysation • Natural and synthetic hormones • Ecological factors influencing spawning	



	• Influence of photoperiod • Influence of temperature	
Reference: 1. Aquaculture: Principles and Practices – T. V. R. Pillay & M. N. Kutty (WileyBlackwell) 2. Fish and Fisheries – B. N. Yadav (Daya Publishing) 3. Handbook of Fisheries and Aquaculture – ICAR, New Delhi 4. Textbook of Aquaculture Engineering – Odd-Ivar Lekang (Wiley) 5. Ornamental Fish Culture and Aquarium Management – R. P. Sinha & S. S. Sinha 6. Textbook of Fish Health – Edward Noga (Wiley-Blackwell) 7. Fish Diseases and Disorders (Vol. 1–3) – P. T. K. Woo (CABI) 8. Inland Fisheries of India – N. K. Chakraborty (Oxford & IBH)		

M. Sc. (ZOOLOGY) SEMESTER II
Course Code: ZOOMSC-S2PR4-2CR26
Course Name: Zoology Practical -IV (Credits -2)

Course Learning Outcome		
After the successful completion of the Course, the learner will be able to: • Develop practical skills in laboratory techniques specific to zoology, including microscopy and physiological experiments. • Apply these skills to conduct research and analyse data.		
Module 1	Animal Physiology	
Learning Objectives:	This module is intended to major aspect of animal physiology.	
Learning Outcome:	After the successful completion of the module, the learner will be able to • Acquire a deep understanding of animal physiology, including the study of organ systems, homeostasis, and physiological processes in animals. • Analyse how animals' function at the cellular and systemic levels.	



1.1	- To study thermoregulation by using various body insulating materials. - To demonstrate the principle of Osmosis. - Determination of GFR - Physiological characteristics of Cardiac muscle, medullated and non- medullated nerves. - To study photoreceptor in human.	
Course Code: ZOOMSC-S2PR5-2CR26 Course Name: Zoology Practical -V (Credit -2) Wildlife Biology and Conservation		
Learning Objectives: This module is intended to aware students about wildlife biology and its conservation techniques		
Learning Outcome: After the successful completion of the module, the learner will be able to - Understand habitat ecology, biodiversity and importance of natural resources and their conservation. - Develop respect for nature and wildlife and understand relation between man and environment. - Identify different population counting techniques. - Interpret different capturing techniques.		
	- Biogeographic zones of India. - Population estimation by Line-transect count - Capture – Mark – Recapture (CMR) Technique	
	- To assess population growth by Population Density (D) and Relative Density (RD) - Different types of pug mark pattern of wild animals - Educational excursion. - Illegal trade of wild animal – Tiger, Elephant, musk deer, crocodile, Tortoise	
Course Learning Outcome		
After the successful completion of the Course, the learner will be able to: - Study regeneration of certain cell and organ. - Basic concept of teratology.		
Course Code: ZOOMSC-S2PR6-2CR26 Course Name: Zoology Practical -VI (Credit -02) Developmental Biology		



Learning Objectives:

This module is intended to understand
ART techniques, regeneration and chick embryology

Learning Outcome:

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

- In addition, students will also examine abnormal development and teratological defects to understand how and why things go wrong during development.
- Explain and identify normal embryological anatomy and identify anomalies in development of various tissues through a comparison of normal and abnormal development.

	1. To study developmental stages of frog. 2. To study identical and non-identical twins. 3. Models pertaining to ART (Assisted reproductive techniques). 4. To study different types of regeneration: I. Regeneration of Salamander limbs II. Regeneration in hydra III. Regeneration of human liver 5. Types of Eggs. 6. Types of placenta 7. Menstrual cycle 8. Developmental stages of Chick embryo- Morula, Blastula, gastrula, 24 hours, 33 hours, 48 hours, 62 hours, 72 hours 9. Temporary mounting of chick embryo by window methods (hours identification)	
--	--	--

M. Sc. (ZOOLOGY) SEMESTER II

Course Code: ZOOMSC-S2VOCPR-2CR26

Course Name: Practical-Vocational Course

Course Learning Outcome

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

- Demonstrate knowledge of basic aquaculture farm structures, pond components, and culture systems.
- Demonstrate basic techniques involved in fish breeding, including artificial fertilization and induced breeding.
- Explain the role of natural and synthetic hormones, hypophysation, and environmental factors in fish spawning.



Practical 1: Study of Cultivable Fish Species Identification of important cultivable food fishes. Study of their distinguishing morphological characters. Classification of selected cultivable fishes. Practical 2: Study of Fish Farm and Pond Structure Study of basic components of a fish culture pond. Identification of inlet, outlet, bund, drainage and other farm structures. Preparation of a labelled diagram of a fish culture pond. Practical 3: Study of Different Aquaculture Systems Study of extensive, semi-intensive and intensive culture systems. Comparative study of conventional and modern aquaculture systems. Practical 4: Study of Modern Aquaculture Techniques Demonstration/study of: Biofloc system RAS Cage culture Aquaponics Comparison of their basic principles and applications. Practical 5: Study of Induced Breeding in Fishes Principle and procedure of induced breeding. Study of breeding hapa/hatching facilities. Flow chart of induced breeding process. Practical 6: Study of Hypophysation and Hormonal Induction Principle of hypophysation. Study of natural and synthetic hormones used in fish breeding. Preparation/interpretation of a flow chart for induced breeding. Practical 7: Study of Fish Eggs and Early Development Identification of fertilized and unfertilized eggs. Study of embryonic and early larval developmental stages. Practical 8: Study of Ecological Factors Affecting Spawning Effect of temperature on fish spawning. Effect of photoperiod on spawning. Study of other environmental factors influencing reproduction. Practical 9: Field Visit to Fish Farm/Hatchery Study of fish farm structure. Observation of breeding and hatchery facilities. Study of fish seed production and nursery practices.	