SYLLABUS

DERGAON KAMAL DOWERAH COLLEGE(AUTONOMOUS)

FOUR YEARS UNDER GRADUATE PROGRAMME (FYUGP)
[AS PER NEP 2020]

ZOOLOGY

(Recommended by Board of Studies in Zoology, D. K. D. C. (Autonomous), in its meetings held on 09.05.2026 and approved by the academic Council meeting held on 30.06.2026 and effective from the session 2026-2027)

FYUG Programme in Zoology (Major)
Department of Zoology
Dergaon Kamal Dowerah College (Autonomous)

PREAMBLE

As recommended by the Board of Studies and approved by the Academic Council of Dergaon Kamal Dowerah College (Autonomous), the Department of Zoology works to implement the relevant components of the National Education Policy (NEP), 2020 for the Four-Year Undergraduate Programme (FYUGP) under the Choice Based Credit System (CBCS).

The following facts are taken into consideration while designing the basic structure of the FYUGP Programme:

1.Flexibility to switch between disciplines of study.

2.Opportunity for learners to select courses of their interest across disciplines.

3.Flexible entry and exit options with UG Certificates, UG Diplomas, or Bachelor's Degrees depending on the number of credits earned.

4.Flexibility for students to switch between institutions so they can engage in multidisciplinary and interdisciplinary learning.

5.Flexibility to switch to alternative modes of learning.

6.Development of knowledge required for self-employment initiatives and an entrepreneurial mindset.

7.Enhancement of critical thinking and real-life problem-solving abilities.

8.Development of the capability to understand global issues, multicultural competence, and digital literacy.

9.Promotion of research skills, communication skills, community engagement, environmental awareness, responsibility, and accountability.

INTRODUCTION

The Four-Year Undergraduate Programme (FYUGP) syllabus in Zoology, designed in the light of NEP-2020, consists of the following components:

- Major (MJ) Courses
- Minor (MN) Courses
- Generic Elective Courses (GEC)
- Ability Enhancement Courses (AEC)
- Value Added Courses (VAC)
- Skill Enhancement Courses (SEC)
- Research Methodology (RM)
- Dissertation (Collection of Data, Analysis, and Report Preparation)
- Major Electives (MJE**)**

The FYUGP degree programme offers certificates, diplomas, and degrees as follows:

UG Certificate

The Certificate Course consists of:

- Two Major Courses
- Two Minor Courses
- Two GECs
- Two AECs
- Two VACs
- Two SECs

UG Diploma

The Diploma Course consists of:

- Eight Major Courses
- Four Minor Courses
- Three GECs
- Two AECs
- Three VACs
- Three SECs

Three-Year UG Degree

The Three-Year UG Degree Course consists of:

- Fifteen Major Courses
- Six Minor Courses
- Three GECs
- Two AECs
- Three VACs
- Three SECs
- Community Engagement (NCC/NSS/Adult Education/Student Mentoring/NGO/Government Institutions, etc.)
- Internship

Four-Year Honours Degree

The Four-Year Honours Degree Course consists of:

- Twenty Major Courses
- Eight Minor Courses
- Three GECs
- Two AECs
- Three VACs
- Three SECs
- Community Engagement (CE)
- Internship (I)
- Research Methodology (RM)
- Dissertation / Two Major Electives (MJE)

AIM OF THE PROGRAMME

The FYUGP Programme in Zoology is designed to teach students how to think critically, logically, and analytically, enabling them to gain a deeper understanding of the subject. The Programme aims

to build a robust foundation in animal biology and foster scientific temper through hands-on laboratory work, field studies, and research activities.

The programme covers a broad range of topics in Zoology and includes practical sessions using modern laboratory equipment, enabling students to correlate and compare recent developments in various branches of biological sciences worldwide.

The programme also aims to:

- Enhance students' skills in Zoology as well as interdisciplinary subjects such as Botany and Chemistry.
- Provide flexibility for students to move from one discipline to another.
- Facilitate mobility between institutions.
- Encourage alternative modes of learning.

PROGRAMME EDUCATIONAL OBJECTIVES (PEOs)

PEO1: Fundamental Knowledge and Skills

Graduates will be well-versed in zoological science concepts and techniques, enabling them to solve challenging problems and pursue advanced studies in Zoology or related fields.

PEO2: Analytical and Critical Thinking

Graduates will acquire analytical and critical thinking abilities needed to formulate, evaluate, and resolve real-world issues using logical reasoning.

PEO3: Application of Zoology

Graduates will be efficient in using scientific tools and zoological concepts to solve problems in a variety of sectors including science, technology, and biotechnology.

PEO4: Communication and Collaboration

Graduates will be able to effectively communicate zoological concepts both orally and in writing, and collaborate in multidisciplinary teams to solve complex problems.

PEO5: Ethical and Professional Responsibilities

Graduates will demonstrate ethical behaviour and professional responsibility, understanding the societal impact of zoological solutions while maintaining professional integrity.

PEO6: Lifelong Learning and Adaptability

Graduates will pursue lifelong learning to keep pace with new developments and trends in Zoology and adapt to changing academic and professional environments.

PEO7: Research and Innovation

Graduates will be equipped with the capacity to conduct independent research, contribute to the advancement of zoological knowledge, and address theoretical and practical problems creatively.

PROGRAMME OUTCOMES (POs)

PO1: Disciplinary Knowledge

Demonstrate comprehensive knowledge and coherent understanding of theoretical and applied aspects of Zoology and interdisciplinary areas of study in a multidisciplinary context.

PO2: Communication Skills

Express zoological ideas clearly through scientific methods, graphical representations, and presentations; communicate complex information effectively to different audiences.

PO3: Moral and Ethical Awareness

Recognise ethical issues relevant to research and professional work and uphold integrity by avoiding plagiarism and intellectual property violations.

PO4: Multicultural Competence

Correlate and compare developments in various branches of biology and collaborate effectively with researchers and communities from diverse cultural backgrounds.

PO5: Information and Digital Literacy

Access and effectively use Information and Communication Technology (ICT) tools for learning, research, and communication.

PO6: Reflective Thinking

Formulate appropriate questions and interpret findings to solve problems in zoology and real-life situations using scientific approaches.

PO7: Cooperation and Teamwork

Collaborate effectively and respectfully with diverse teams in pursuit of common academic and professional goals.

PO8: Research-Related Skills

Formulate research questions and hypotheses, analyse data, demonstrate scientific findings, and design research methodologies and proposals.

PO9: Problem Solving

Apply zoological knowledge creatively and independently to solve practical and theoretical problems in academic, industrial, and societal contexts.

PO10: Critical Thinking

Analyse and synthesise theoretical and practical problems using logical reasoning and analytical thinking while cultivating lifelong learning habits.

PROGRAMME SPECIFIC OUTCOMES (PSOs)

After successful completion of the FYUGP Programme in Zoology, students will be able to:

PSO1

Demonstrate comprehensive knowledge and coherent understanding of core and elective subjects in Zoology.

PSO2

Apply scientific techniques, tools, computational methods, and statistical analysis to solve biological and environmental problems.

PSO3

Develop strong analytical and critical thinking skills to address complex scientific problems using logical reasoning.

PSO4

Use modern laboratory techniques, biological software, and computational tools relevant to Zoology and biological sciences.

PSO5

Communicate scientific ideas and research findings effectively to specialists and non-specialists through oral and written communication.

PSO6

Formulate research questions, conduct literature reviews, apply appropriate methodologies, and present research findings effectively.

PSO7

Utilise the acquired knowledge and skills for national-level competitive examinations, higher studies, research, teaching, and employment opportunities.

TEACHING-LEARNING PROCESS

The outcome-based approach demands a considerable transition from teacher-centred to learner-centred pedagogies and from passive to active and participatory learning methods, especially in undergraduate education.

The programme promotes systematic and sequential acquisition of knowledge and skills. It focuses on practical abilities and understanding the relationship between theory and practice.

Teaching strategies include:

- Classroom discussions
- Student presentations
- Use of prescribed textbooks and reference materials
- E-learning tools
- Self-study materials
- Project work
- Internship activities
- Field studies
- Research activities
- Exploration of industrial and societal needs

ASSESSMENT METHODS

A variety of assessment procedures appropriate to the discipline of Zoology will be used to evaluate students' progress in achieving the programme outcomes.

Continuous evaluation will determine the final grade and will include both in-semester evaluation and end-semester examinations.

In-Semester Evaluation

In-semester evaluation may include:

- Class tests
- Mid-term examinations
- Home assignments
- Laboratory reports
- Practical assessments
- Tutorials
- Quizzes
- Group discussions
- Seminar presentations
- Viva-voce examinations

- Individual and group project reports

End-Semester Evaluation

The final examination will assess students' theoretical understanding, practical skills, analytical abilities, and overall attainment of learning outcomes.

The assessment system aims to:

- Encourage continuous learning
- Develop problem-solving abilities
- Enhance analytical and research skills
- Promote scientific communication and teamwork
- Evaluate practical and field-based competencies

CONCLUSION

The FYUGP Programme in Zoology under NEP-2020 is designed to provide students with strong disciplinary knowledge, practical exposure, research aptitude, ethical awareness, and multidisciplinary competence. The programme prepares graduates for higher education, research, entrepreneurship, competitive examinations, and employment opportunities in diverse fields related to biological sciences.

STRUCTUREOFFOURYEARS UNDERGRADUATE PROGRAMME (FYUGP)AS PER NEP-2020 IN ZOOLOPGY FOR

DERGAON KAMAL DOWERAH COLLEGE (AUTONOMOUS)

Semester	Course with Paper code	Title ofthePaper	Credit
1 (FIRST)	**ZOO1MJ01**	Animal Diversity-I	4
	ZOO1MN01	Animal Diversity-I Minor	4
	GEC1ZOO01	• Natural Resource Management	3
	AEC1A/AEC1B	**Any One:** **AEC1A:** Assamese/ **AEC1B:** Alternative English	4
	SEC1ZOO01	Any one: • Freshwater Aquaculture • Apiculture	3
	VAC1	**Any One:** **VAC1A: Understanding India/** **VAC1B: Health and Wellness**	2
	Total Credit		**20**
2 (SECOND)	**ZOO2MJ02**	Animal Diversity-II	4
	ZOO2MN02	Animal Diversity-II	4
	GEC2ZOO02	Wildlife Conservation and Management	3
	AEC2	AEC: Language and Communication Skills(English)II	4
	SEC2ZOO02	Any one: • Sericulture **(SEC2ZOO02A)** • Aquarium Fish Keeping **(SEC2ZOO02B)**	3
	VAC2	Environmental Education	2
	Total Credit		**20**

FYUGP-ZOOLOGY
SEMESTER I
Title of the Course: Animal Diversity I
Course Code:ZOO1MJ01
Nature of the Course: CORE I
Total Credits: 04
Distribution of Marks : 100 [60 End (Theory: 45, Lab: 15) + 40 IA

Learning Outcomes: 1. Understand the various phyla in Animal Kingdom
2. Compare various organisms based on morphology
3. Classify different groups of animals

UNIT	CONTENT	L	T	P	Total
1	Protista, Parazoa and Metazoa General characteristics and Classification up to order. Structural organization & nutrition of *Amoeba, Euglena*, and *Paramecium*. Locomotion and Reproduction in protista (Protozoa)	10	2	-	12
2	Porifera, Cnidaria& Ctenophora General characteristics and Classification up to order with examples. Canal system in sponges	7	1	-	8
3	Platyhelminthes & Nemathelminthes General characteristics and Classification up to order. Life cycle of *Taenia solium, Fasciola hepatica* and *Ascaris lumbricoides,*Parasitic adaptation in Helminths	7	1	-	8
4	Introduction to Coelomates, Annelida and Arthropods General characteristics and Classification up to order.Metamerism in Annelida. Economic Importance of Arthropoda. **Indian Knowledge System**: Knowledge about Arthropodan species of India	8	1	-	9
5	Onychophora& Mollusca and Echinodermata General characteristics Classification up to order.Evolutionary significance of Onychophoran, Torsion and detorsion in Gastropoda. Water-vascular system in Asteroidea	7	1	-	8
6	Lab Course Study of the following specimens: Protista: Amoeba, Euglena, Paramecium Cnidaria: Obelia, Physalia, Aurelia,Corallium, Gorgonia, Pennatula, Annelids: Nereis, Aphrodite, Pheretima, Hirudanaria	--	-	15	15

	Arthropods: Limulus,Belastoma,Palaemon, Cancer,Periplaneta, Philosamia ricini. Termite and honey bee. Helminths: Ascaris, Taenia, Fasciola. Molluscs:Chiton,Dentalium,Pila,Unio, Octopus Echinoderms:Asterias, Ophiura, Echinus, Antedon *2)* Study of *Sycon*(T.S. and L.S.), *3)* Binary fission and Conjugation in *Paramecium*. 4) Study of mouth parts of Periplaneta *5)* Study of adult *Taenia solium*and*Ascaris lumbricoides* and their life cycles (Slides/micro photographs)				
7	Project report on study/ collection of Arthropodan diversity infesting paddy/tea/ stored grain				
	Total	**39**	**6**	**15**	**60**

MODES OF IN-SEMESTER ASSESSMENT: **(40 Marks)**

• One Internal Examination - **20 Marks**

• Others (any one) - **10 Marks**

o Seminar presentation on any of the relevant topics

o Assignment

o Group Discussion

o Quiz

o Viva-Voce

• Attendance **10 Marks**

SUGGESTED READINGS

- Ruppert and Barnes, R.D. (2006). Invertebrate Zoology, VIII Edition. Holt Saunders International Edition.
- Kingsley J. Textbook of Vertebrate Zoology Publisher: Nabu Press ISBN: 9781171586524
- Barnes, R.S.K., Caalow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). The Invertebrate.
- Invertebrate Zoology by T.C Majupuria

FYUGP-ZOOLOGY
SEMESTER I
Title of the Course : Animal Diversity I-Minor
Course Code :ZOO1MN01
Nature of the Course : Minor-I
Total Credits 04
Distribution of Marks : 100 [60 End (Theory: 45, Lab: 15) + 40 IA

Learning Outcomes: 1. Understand the various phyla in Animal Kingdom
2.Compare various organisms based on morphology
3. Classify different groups of animal

UNIT	CONTENT	L	T	P	Total
1	**Protista, Parazoa and Metazoa** General characteristics and Classification up to order. Structural organization & nutrition of *Amoeba ,Euglena*, and *Paramecium*. Locomotion and Reproduction in protista (Protozoa)	10	2	-	12
2	**Porifera, Cnidaria& Ctenophora** General characteristics and Classification up to order with examples. Canal system in sponges .	7	1	-	`8
3	**Platyhelminthes & Nemathelminthes** General characteristics and Classification up to order. Life cycle of *Taenia solium, Fasciola hepatica*and*Ascarislumbricoides,*Parasitic adaptation in helminthes.	7	1	-	`8
4	**Introduction to Coelomates, Annelida and Arthropods** General characteristics and Classification up to order. Excretion in Annelida. Respiration in Arthropoda **Indian Knowledge System:** Knowledge about Arthropodan species of India	8	1	-	`9
5	**Onychophora& Mollusca and Echinodermata** General characteristics Classification up to order Torsion and detorsion in Gastropoda. Water-vascular system in Asteroidea	7	1	-	8
6	**Lab Course** Study of the following specimens: **Protista:**Amoeba, Plasmodium, Paramecium **Cnidaria:** Obelia, Physalia, Aurelia, Corallium, Gorgonia, Metridium, Pennatula, Fungia, Madrepora **Annelids:**Neries, Aphrodite, Pheretima, Hirudanaria**Arthropods:**Limulus,Belastoma, Daphnia, Palaemon, Cancer,	--	-	15	15

	Brachionus, Bombyx, Periplaneta, Philosamiaricini. Termite and honey bee. **Helminths**: Ascaris, Taenia, Fasciola. **Molluscs:**Chiton,Dentalium,Pila,Unio, Sepia, Octopus and Nautilus. **Echinoderms:**Pentaceros, Asterias, Ophiura, Echinus, Antedon *2)* Study of *Sycon*(T.S. and L.S.), *3)* Study of whole mount of *Euglena*, *Amoeba* and *Paramecium,* Binary fission and Conjugation in *Paramecium.* 4) Study of mouth parts of Periplaneta *5)* Study of adult *Fasciola hepatica*, *Taenia solium* and their life cycles (Slides/micro photographs) 6) Study of adult *Ascaris lumbricoides* and its life stages(Slides/micro-photographs).				
	Total	**39**	**6**	**15**	**60**

MODES OF IN-SEMESTER ASSESSMENT: **(40 Marks)**

• One Internal Examination - **20 Marks**

• Others (any one) - **10 Marks**

o Seminar presentation on any of the relevant topics

o Assignment

o Group Discussion

o Quiz

o Viva-Voce

• Attendance **10 Marks**

SUGGESTED READINGS

- Ruppert and Barnes, R.D. (2006). Invertebrate Zoology, VIII Edition. Holt Saunders International Edition.
- Kingsley J. Textbook of Vertebrate Zoology Publisher: Nabu Press ISBN: 9781171586524
- Barnes, R.S.K., Caalow, P., Olive, P.J.W., Golding, D.W. and Spicer, J.I. (2002). The Invertebrate.
- Invertebrate Zoology by T.C Majupuria

FYUGP-ZOOLOGY
SEMESTER I
Title of the Course: Freshwater Aquaculture
Course Code: SEC1ZOO01
Nature of the Course: SEC I Total Credits: 03

UNITS	CONTENTS	L	T	P	Total Hours
1	Introduction to Aquaculture, Basic concept of Extensive,semiintensive,intensive, superintensive aquaculture, m **Indian Knowledge system**: Freshwater aquaculture in India onoculture, polyculture and integrated fish farming.	7	1	-	8

Distribution of Marks: 75 [45 End (Theory: 30, Lab: 15) + 30 IA

2	Rearing of Larval and brood fishes, Traditional and Chinese hatcheries, feed preparation for carps and catfishes, Live food culture, Transportation of fish seeds and brooders.	7	1	-	8
3	Concept of induced breeding, Induced breeding of Major carps, Brood stock management, management of hatcheries, Water quality management in aquaculture.	4	1	-	5
4	Maintenance of fish health and prophylactic measures, Diagnostic of common fungal, bacterial, protozoan and ectoparasites, Control measures for common fish diseases, Role of immunostimulants in aquaculture.	7	2	-	9
5	**Lab Course:** 1. Study of fishing gears 2. Basic symptoms of fish diseases 3. Demonstration of Induced Breeding (video)	-	-	15	15
	Total	**25**	**5**	**15**	**45**

MODES OF IN-SEMESTER ASSESSMENT: **(30 Marks)**

• One Internal Examination - **10 Marks**

• Others (any one) - **10 Marks**

o Seminar presentation on any of the relevant topics

o Assignment

o Group Discussion

o Quiz

o Viva-Voce

• Attendance **10 Marks**

SUGGESTED READINGS

• D. Kapoor, R. Dayal and A.G. Ponniah: Fish Biodiversity of India, NBFGR Publication, Lucknow.

• R.H. McConnell: Ecological Studies in Tropical Fish Communities, Cambridge University Press.

• T.K. Govindan: Fish Processing Technology, Oxford & IBH, New Delhi

• Fresh Water Aquaculture – Rath

• Hand Book of fish and Fisheries – ICAR

- Fish and Fisheries of India by V.G. Jhingran

FYUGP-ZOOLOGY

SEMESTER I

Title of the Course : Natural Resource Management

Course Code :GEC1ZOO01

Nature of the Course. : Generic Elective Course-I

Total Credits : 03

Distribution of Marks : 75(45 End + 30 IA)

Learning outcomes: 1. Differentiate natural and biological resources of NE India

2. Identify the threats and issues related to the natural resources

3. Execute conservation and management strategies for natural resources

UNIT	CONTENT	L	T	P	Total
1	**Natural resources:** Definition and types. Natural resources of NE India.	6	1	-	7

	Renewable and non-renewable sources of energy				
2	**Sustainable utilization of land and water resources**: Soil pollution and management; water resources (Freshwater, marine, estuarine) Threats and management. **Indian Knowledge System:** Knowledge of Indian Biodiversity: Hotspots, flora and fauna, threats and management	12	1	-	13
3	**Biodiversity:** Definition, types, significance, threats, conservation and management strategies,	10	1	-	11
4	**Contemporary practices in resource management**: EIA, GIS and their use in resource management. Ecological Footprint with emphasis on carbon footprint, Waste management. National and international efforts in resource management and conservation.	12	2	-	14
	Total	**40**	**5**	**-**	**45**

MODES OF IN-SEMESTER ASSESSMENT: **(30 Marks)**

• One Internal Examination - **10 Marks**

• Others (any one) - **10 Marks**

o Seminar presentation on any of the relevant topics
o Assignment
o Group Discussion
o Quiz
o Viva-Voce

• Attendance **10 Marks**

SUGGESTED READING

- Vasudevan, N. (2006). Essentials of Environmental Science, Narosa publishing house, New Delhi.
- Singh, J. S., Singh, S. P., and Gupta, S. (2006). Ecology, Environment and resource Conservation. Anamaya publications, New Delhi

FYUGP- ZOOLOGY (MAJOR)
SEMESTER II
TITLE OF THE COURSE: ANIMAL DIVERSITY II
COURSE CODE: ZOO2MJ02
NATURE OF THE COURSE: CORE II
TOTAL CREDITS: 04
DISTRIBUTION OF MARKS: 100 [60 End (Theory: 45, Lab: 15) +40 IA

UNITS	CONTENTS	L	T	P	TOTAL

1	**Introduction to Chordates** General characteristics and outline classification of Phylum Chordata **Protochordata:** General characteristics and classification of sub-phylum, Urochordata and Cephalochordataupto Classes. Retrogressive metamorphosis in Urochordata **Origin of Chordata** Theories of origin of chordates Advanced features of vertebrates over Protochordata	11	1	-	
2	**Agnatha and Pisces** **Agnatha**: General characteristics and classification of cyclostomes upto Order **Pisces:** General characteristics of Chondrichthyes and Osteichthyes Classification up to Sub-Classes; Accessory respiratory organs in fishes; Swim bladders in fishes. **Indian Knowledge system**: Knowledge of Fish biodiversity of India with special reference to Assam	9	1	-	
3	**Amphibia & Reptilia** **Amphibia:** General characteristics and classification up to Sub-Classes Parental care in Amphibia **Reptilia:** General characteristics and classification up to Sub-Classes Poison apparatus and biting mechanism in snakes	9	1	-	
4	**Aves & Mammals** **Aves:** General characteristics and classification up to Sub-Classes Archaeopteryx as a connecting link Principles and aerodynamics of flight; Flight adaptations, Perching mechanism in Birds **Mammals:** General characters and classificationuptosub class, Affinities of Prototheria Adaptive radiation in locomotory appendages	8	1	-	
5	**Zoogeography** Zoogeographical realms including distribution of vertebrates Theories of distribution of animals Plate tectonic and continental drift theory.	4		-	
6	**LAB COURSE** Study of specimens: **Protochordata**: Balanoglossus, Herdmania, Branchiostoma			15	

	Fishes: Scoliodon, Sphyrna, Pristis, Torpedo, Mystus, Labeo, Anguilla, Hippocampus **Amphibia**: Ichthyophis, Necturus, Bufo, Hyla **Reptilia**: Chelone, Varanus, Naja, Crocodylus, chamaeleon, Draco. **Aves**: Six common birds **Mammalia**: Bat, Funambulus, Loris, Herpestes **Additional Work:** 1. Dissection of Weberian ossicles 2. Study of urinogenital system of fish 3. Chart preparation of poisonous and non-poisonous snakes. 4. Field study(National park/ Sanctuary/ Reserve forest)				
	TOTAL	**41**	**4**	**15**	**60**

MODES OF IN-SEMESTER ASSESSMENT: **(40 Marks)**

• One Internal Examination - **20 Marks**

• Others (any one) - **10 Marks**

o Seminar presentation on any of the relevant topics

o Assignment

o Group Discussion

o Quiz

o Viva-Voce

• Attendance **10 Marks**

SUGGESTED READINGS

- Young, J.Z. (2004). The life of Vertebrates. III Edition. Oxxford university press.
- Pough H. Vertebrate life, VIII Edition, Person International
- Hall B.K. AND Haallgrimson B. (2008). Strickberger's
- Evolution. IV Edition. Jones and Baartlett PublishersInc.
- Vertebrates by R.L Kotpal
- Vertebrate zoology by E.L. Jordan and P.S verma

FYUGP- ZOOLOGY(MINOR)
SEMESTER II
TITLE OF THE COURSE: ANIMAL DIVERSITY II
COURSE CODE: ZOO2MN02
NATURE OF THE COURSE: CORE II
TOTAL CREDITS: 04
DISTRIBUTION OF MARKS: 100 [60 End (Theory: 45, Lab: 15) +40 IA

UNITS	CONTENTS	L	T	P	TOTAL
1	**Introduction to Chordates**	11	1	-	

	General characteristics and outline classification of Phylum Chordata Protochordata: General characteristics and classification of sub-phylum Urochordata and Cephalochordataupto Classes Study of larval forms in protochordates Retrogressive metamorphosis in Urochordata **Origin of Chordata** Theories of origin of chordates Advanced features of vertebrates over Protochordata				
2	**Agnatha and Pisces** Agnatha: General characteristics and classification of cyclostomes upto Order Pisces: General characteristics of Chondrichthyes and Osteichthyes Classification up to Sub-Classes; Accessory respiratory organs in fishes;Swim bladders in fishes. Osmoregulation **Indian Knowledge system**: Knowledge of Fish biodiversity of India with special reference to Assam	9	1	-	
3	**Amphibia & Reptilia** Amphibia: General characteristics and classification up toSub-Classes Parental care in Amphibia Reptilia: General characteristics and classification up to Sub-Classes Poison apparatus and biting mechanism in snakes	9	1	-	
4	**Aves & Mammals** Aves: General characteristics and classification up to Sub-Classes Archaeopteryx as a connecting link Flight adaptations and Migration in Birds **Mammals:** General characters and classification up to Sub class Affinities of Prototheria- Adaptive radiation in locomotory appendages	8		-	
5	**Zoogeography** Zoogeographical realms Theories of distribution of animals Plate tectonic and continental drift theory	4		-	
6	**LAB COURSE** Study of specimens: **Protochordata**: Balanoglossus, Herdmania, Branchiostoma **Fishes**: Scoliodon, Sphyrna, Pristis, Torpedo, Mystus, Labeo, Anguilla, Hippocampus **Amphibia**: Ichthyophis, Necturus, Bufo, Hyla			15	

	Reptilia: Chelone, Varanus, Naja, Crocodylus, Chamaeleon, Draco. **Aves**: Six common birds **Mammalia**: Bat, Funambulus, Loris, Herpestes **Additional Work:** 1. Dissection of Weberian ossicles 2. Study of urinogenital system of fish 3. Chart preparation of poisonous and non-poisonous snakes 4. Project report on local diversity of Fish/Amphibia/ Reptiles /Birds				
	Total	**41**	**4**	**15**	**45**

MODES OF IN-SEMESTER ASSESSMENT: **(30 Marks)**

• One Internal Examination - **10 Marks**

• Others (any one) - **10 Marks**

o Seminar presentation on any of the relevant topics

o Assignment

o Group Discussion

o Quiz

o Viva-Voce

• Attendance **10 Marks**

SUGGESTED READINGS

- Young, J.Z. (2004). The Life of Vertebrates. Oxford University Press.
- Pough H. Vertebrate Life. Pearson.
- Darlington P.J. The Geographical Distribution of Animals.
- Hall B.K. Evolution. Jones and Bartlett Publishers.
- Vertebrates by R.L Kotpal
- Vertebrate zoology by E.L. Jordan and P.S verma

FYUGP-ZOOLOGY
SEMESTER II
Title of the Course : Aquarium Fish Keeping
Course Code :SEC2ZOO02
Nature of the Course : SEC II b Total Credits : 03
Distribution of Marks :75 [45 End (Theory: 30, Lab: 15) + 30 IA

UNITS	CONTENTS	L	T	P	TOTAL

1	**Introduction:** The potential scope of Aquarium Fish Industry as a Cottage Industry, Criteria for the selection of Ornamental fish for aquarium keeping both Exotic and Indigenous species, Biology and sexual dimorphism of some indigenous ornamental fishes (*Puntius sp*, *Channa sp*, Loaches, Barbs and Rasboras)	**7**	**1**	**-**	**5**
2	**Construction and Management of Home aquarium:** Design and construction of tanks, Major aquarium accessories, Physicochemical parameters of aquarium	**6**	**1**	**-**	**5**
3	**Transportation and maintenance:** General Aquarium maintenance –Scope of aquarium fish industry in NE India, Live fish transport - Fish handling, packing and transportation	**6**	**1**	**-**	**10**
4	**Food and feeding :**Use of live fish feed organisms. Preparation and composition of formulated fish feeds **Indian Knowledge System:** Indigenous ornamental fishes of NE-India	**7**	1	-	**10**
5	**Lab Course:** 1)Management of aquarium environment 2)Study of locally availableornamental fishes (Project Report) 3) Acclimatization of fish 4)Preparation of fish feed (video)	**-**	**-**	**15**	**15**
	Total	**26**	**4**	**15**	**45**

MODES OF IN-SEMESTER ASSESSMENT: **(30 Marks)**

• One Internal Examination - **10 Marks**

• Others (any one) - **10 Marks**

o Seminar presentation on any of the relevant topics

o Assignment

o Group Discussion

o Quiz

o Viva-Voce

• Attendance **10 Marks**

SUGGESTED READINGS

• G. Helfman, Bruce B. Collette, D.E. Facey, B. W. Bowen: The Diversity of Fishes: Biology, Evolution, and Ecology, John Wiley & Sons

• R. J. Wootton: Fish Ecology, Springer
• W. Vishwanath, W.S. Lakra and U.K. Sarkar: Fishes of North East India, NBFGR Publication, Lucknow

• Handbook of Fisheries and Aquaculture – ICAR
- Fish and Fisheries of India by V.G. Jhingran

FYUGP-ZOOLOGY SEMESTER I
Title of the Course: Wildlife Management and Conservation
Course code: GEC2ZOO02
Nature of the Course. : Generic Elective Course II
Total Credits: 03
Distribution of Marks: 75 [45 End (Theory: 45) + 30 IA

MODES OF IN-SEMESTER ASSESSMENT: **(30 Marks)**

• One Internal Examination - **10 Marks**

• Others (any one) - **10 Marks**

o Seminar presentation on any of the relevant topics

o Assignment

o Group Discussion

UNITS	CONTENTS	L	T	P	Total Hours
1	**Introduction to Wild Life:** Concept of wildlife, wildlife definition, Values and importance of wild life, Concept of conservation and management, Conservation ethics; Importance of conservation; Causes of depletion; World conservation strategies. **Indian Knowledge System**: Traditional Biodiversity Conservation	10	2	-	12
2	**Population estimation**: Population density, Natality, Birth rate, Mortality, fertility schedules and sex ratio computation;	9	1	-	10
3	**Management planning of wild life in protected areas**: Concept of protected areas, wildlife protected areas in India, Wildlife (Protection) Act 1972, IUCN Red list, Eco tourism / wild life tourism in forests, Human wildlife conflict	10	1	-	11
4	**Protected areas**: National parks & sanctuaries, Community reserve; Important features of protected areas in India with special reference to NE India	11	1	-	12
	Total	**40**	**5**	**-**	**45**

o Quiz

o Viva-Voce

• Attendance **10 Marks**

SUGGESTED READINGS

- Wildlife Ecology conservation and management by John M. Frysell
- Wildlife Conservation and Management by Reena Maathur
- Textbook of Wildlife Management byS K Singh