



Karmaveer Bhaurao Patil University, Satara

Syllabus for

B. Sc. I (Zoology)

Under

Faculty of Science and Technology

(As per NEP 2020)

With effect from Academic Year 2024-2025

Syllabus for B.Sc. I (Zoology)

PREAMBLE:

The Bachelor of Science (B.Sc.) Programme in Zoology is designed in accordance with the National Education Policy (NEP) 2020 and the Curriculum and Credit Framework for Undergraduate Programmes of the University Grants Commission (UGC). The programme provides students with a strong foundation in Zoology while incorporating recent developments in biological sciences. It combines theoretical knowledge with practical training to help students understand the diversity of animal life, biological processes, and their importance in nature and society.

The curriculum includes Major, Minor, Open Elective (OE), Ability Enhancement Courses (AEC), Skill Enhancement Courses (SEC), Vocational Skill Courses (VSC), Value Education Courses (VEC), Indian Knowledge System (IKS), laboratory work, field visits, projects, and experiential learning. This multidisciplinary approach enables students to acquire scientific knowledge, technical skills, communication abilities, ethical values, and professional competence.

The B.Sc. Zoology (Honours) programme provides students with an in-depth understanding of the fundamental and advanced concepts of Zoology through a well-structured curriculum that combines classroom learning, laboratory work, field studies, and experiential learning. The programme encourages scientific thinking, critical analysis, and practical application of biological concepts while offering flexibility through multidisciplinary and skill-based courses as envisaged in NEP 2020. It prepares students for higher education, competitive examinations, entrepreneurship, and diverse career opportunities in education, healthcare, biotechnology, environmental management, fisheries, wildlife conservation, agriculture, and other allied fields of life sciences.

The B.Sc. Zoology (Honours with Research) programme is intended for students who wish to pursue advanced studies and research in Zoology and related disciplines. In addition to the regular Honours curriculum, students undertake research methodology, independent research projects, scientific writing, and data analysis under the guidance of faculty members. This pathway develops research aptitude, analytical thinking, innovation, and problem-solving skills, preparing graduates for postgraduate studies, doctoral research, research institutions, and careers in academia, industry, and scientific organizations.

The programme emphasizes observation, experimentation, critical thinking, scientific inquiry, and problem-solving. It also encourages students to participate in research activities, biodiversity conservation, environmental protection, community engagement, and lifelong learning. The curriculum has been designed to enhance employability, promote

entrepreneurship, and prepare students for higher education, research, and various career opportunities in biological sciences and allied fields.

Overall, the programme aims to develop knowledgeable, skilled, responsible, and environmentally conscious graduates who can contribute effectively to scientific advancement and the sustainable development of society.

A. GENERAL OBJECTIVES OF THE PROGRAMME:

The Bachelor of Science (B.Sc.) Programme in Zoology aims to:

1. To provide students with a sound understanding of the fundamental concepts and principles of Zoology and allied biological sciences.
2. To develop scientific knowledge, practical skills, and analytical abilities through laboratory work, field studies, and experiential learning.
3. To encourage scientific thinking, curiosity, observation, critical analysis, and problem-solving while studying biological systems.
4. To create awareness about biodiversity, wildlife conservation, environmental protection, and the sustainable use of natural resources.
5. To enable students to apply zoological knowledge in agriculture, fisheries, biotechnology, healthcare, wildlife management, and other allied fields.
6. To develop communication skills, leadership qualities, teamwork, professional ethics, and social responsibility among students.
7. To encourage students to undertake research, innovation, and project-based learning for the advancement of biological sciences.
8. To prepare students for higher education, competitive examinations, research, entrepreneurship, and employment in government, private, and industrial sectors.
9. To promote multidisciplinary learning by integrating Zoology with other branches of science and emerging technologies.
10. To develop lifelong learners who can continuously update their knowledge and contribute to society through scientific understanding and ethical practices.

B. PROGRAMME OBJECTIVES (POs):

Within a few years after graduation, the graduates of the B.Sc. Zoology Programme will be able to:

PO 1: Apply the knowledge and practical skills acquired during the programme in higher education, research, industry, healthcare, agriculture, fisheries, wildlife conservation, and other allied fields.

PO 2: Pursue postgraduate studies, research, professional careers, and competitive examinations through continuous learning and scientific inquiry.

PO 3: Work effectively as responsible professionals by demonstrating leadership, teamwork, communication skills, ethical values, and social responsibility.

PO 4: Apply scientific knowledge and modern technologies to solve biological, environmental, and societal problems in a sustainable manner.

PO 5: Contribute to the conservation of biodiversity, environmental protection, and the overall development of society through scientific awareness and professional competence.

C. PROGRAMME OUTCOMES (POs)

After successful completion of the B.Sc. Zoology Programme, students will be able to:

PO1. Acquire a comprehensive understanding of the concepts, principles, and applications of Zoology and allied biological sciences.

PO2. Explain the structure, function, diversity, evolution, and ecological importance of animals.

PO3. Apply scientific knowledge and practical skills to study biological processes and solve problems related to animal sciences.

PO4. Perform laboratory experiments, field studies, and scientific investigations using appropriate methods and instruments.

PO5. Analyze, interpret, and present scientific observations and experimental data in a systematic manner.

PO6. Apply zoological knowledge to biodiversity conservation, environmental management, public health, agriculture, fisheries, and other applied fields.

PO7. Communicate scientific ideas effectively through oral presentations, reports, seminars, and scientific writing.

PO8. Work individually as well as in teams while demonstrating leadership, cooperation, and professional ethics.

PO9. Recognize the importance of biodiversity conservation, environmental sustainability, and responsible use of natural resources.

PO10. Develop research aptitude, scientific attitude, and innovative thinking for lifelong learning.

PO11. Use modern scientific techniques, digital resources, and information technology for learning and research.

PO12. Prepare for higher education, research, entrepreneurship, and employment in biological sciences and related disciplines.

D. Programme Specific Outcomes (PSOs):

After successful completion of the Bachelor of Science (B.Sc.) Programme in Zoology, students will be able to:

PSO1. Acquire a sound understanding of animal diversity, taxonomy, anatomy, physiology, genetics, ecology, evolution, molecular biology, developmental biology, biotechnology, and other major areas of Zoology, and apply this knowledge to understand biological processes and animal life.

PSO2. Develop practical skills in laboratory work and field studies, including the use of scientific instruments, specimen identification, microscopy, biological techniques, field surveys, and scientific data collection required for higher studies, research, and professional practice.

PSO3. Apply the knowledge of Zoology to agriculture, fisheries, sericulture, apiculture, vermiculture, public health, wildlife conservation, environmental management, animal husbandry, and other applied areas through skill-based and vocational learning.

PSO4. Plan and carry out laboratory experiments, field investigations, project work, and research activities, analyze the results scientifically, and communicate the findings effectively through reports, presentations, and scientific writing.

PSO5. Understand the significance of Indian Knowledge Systems related to animal sciences, traditional practices, biodiversity conservation, and sustainable use of biological resources, and appreciate their relevance in the present-day context.

PSO6. Develop professional ethics, scientific attitude, environmental awareness, respect for biodiversity, concern for animal welfare, and social responsibility while applying zoological knowledge for the benefit of society.

PSO7. Strengthen communication skills, leadership qualities, teamwork, critical thinking, digital literacy, and problem-solving abilities through multidisciplinary learning, value education, open electives, and experiential learning activities.

PSO8. Prepare for higher education, research, competitive examinations, entrepreneurship, and employment in universities, research institutions, government organizations, industries, healthcare, biotechnology, environmental consultancy, and other allied life science sectors.

1. **Title:** Zoology

2. **Year of Implementation:** The syllabus will be implemented from June, 2024 onwards.

3. **Duration:** The course shall be a full time.

4. **Eligibility:** 12th Pass with Science, MCVC or Equivalent

5. **Teachers Qualification:**

As per rules and regulations of KBP University, Satara and Govt. of Maharashtra & UGC

Eligibility of the Core Faculty:

1) Assistant Professor: Master of Science in Zoology/ Zoology with NET/ SET.

2) Assistant Professor: Doctorate Degree in Zoology

6. **Pattern:** Semester examination.

7. **Medium of Instruction:** English.

8. **Course Structure: (NEP2.0)**

Sem (Level)				OE	VSC/ SEC	AEC/ VEC/ IKS	OJT/ FP/ CEP/ CC/ RP	Total Credits	Degree/ Cum. Cr. MEME
	Course I	Course II	Course III						
Sem I (4.5)	DSC I (2)	DSC I (2)	DSC I (2)	OE I (2) (P)	-	IKS I (2) (Generic)	-	22	UG Certificate: 44
	DSC II (2)	DSC II (2)	DSC II (2)						
	DSC P I (2)	DSC P I (2)	DSC P I (2)						
Sem II (4.5)	DSC III (2)	DSC III (2)	DSC III (2)	OE II (2)	-	VEC I (2)	-	22	
	DSC IV (2)	DSC IV (2)	DSC IV (2)			DEGG and IIC			
	DSC P II (2)	DSC P II (2)	DSC P II (2)						
Credits	12	12	12	4	-	4	-	44	Exit option: 4 Cr. NSQF/Intern ship/Skill Courses

Level 4.5, Semester I

Course Title	Theory			Practical		
	Course Code	Credits	Lectures Per Week	Course Code	Credits	Lectures Per Week
Animal Diversity I	BZT 111	2	4	BZP 113	4	4
Animal Physiology	BZT 112	2				
Instrumentation Studies (OE)	--	--	--	BZPOE1	2	2
Introduction to Indian Knowledge System (IKS)	BZTIKS1	2	2			

Level 4.5, Semester II

Course Title	Theory			Practical		
	Course Code	Credits	Lectures Per Week	Course Code	Credits	Lectures Per Week
Cell & Molecular Biology and Evolutionary Biology	BZT 121	2	4	BZP 123	2	4
Genetics	BZT 122	2				
Scientific Philosophy	--	--	-	BZPOE2	2	2
Democracy, Election and Indian Constitution (VEC)	BZTVEC1	2	2	--	--	--

OE= Open Elective

SEC: Skill Enhancement Course

IKS: Indian Knowledge System

VEC: Value Education Course

Evaluation Structure

Semester - I

Course Name	Course Code	Internal Evaluation			ESE	Total Marks	Credits
		CCE-I	CCE-II	CCE-III			
Animal Diversity I	BZT 111	10	10	10	30	50	2
Animal Physiology	BZT 112	10	10	10	30	50	2
Practical Course – I	BZP 113	20			30	50	2

Semester – II

Course Name	Course	Internal Evaluation			ESE	Total Marks	Credits
		CCE-I	CCE-II	CCE-III			
Cell Biology and Evolutionary Biology	BZT 121	10	10	10	30	50	2
Genetics	BZT 122	10	10	10	30	50	2
Practical Course – II	BZP 123	20			30	50	2

CCE*- Out of three CCE marks best of two CCE marks consider



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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Zoology

Programme: B.Sc. I

Semester – I

Type : Major

Marks: 50

Credits : 02 (30 Hrs)

From: A. Y. 2026-27

Name of Course: BZT 111: Animal Diversity I

Course Objectives: Students should be able to,

- 1) Learn the animal classification.
- 2) Understand the canal system in Sycon.
- 3) Acquire knowledge about types of corals and parasitic adaptations of Tapeworm and Ascaris.
- 4) Identify the species in pearl culture and species of earthworm used for vermicomposting

Course Outcomes: Students will be able to,

- 1) Differentiate animal classification.
- 2) Explain the canal system in Sycon.
- 3) Describe types of corals and parasitic adaptations of Tapeworm and *Ascaris*.
- 4) Classify the species in pearl culture and the species of earthworm used for vermicomposting

Module	Title and Contents	Hrs
Module -1	Kingdom – Protista	07
	1.1 General characters and classification up to classes	
	1.2 Locomotory organelles and locomotion in Protozoans	
	Phylum – Porifera	
	1.3 General characters and classification up to classes	
Module -2	1.4 Canal system in <i>Sycon</i>	08
	Phylum – Cnidaria	
	2.1 General characters and classification up to classes	
	2.2 Types and Importance of corals.	
	Phylum – Platyhelminthes	
Module -3	2.3 General characters and classification up to classes	08
	2.4 Life history of <i>Taenia solium</i> and its parasitic Adaptations.	
	Phylum – Nematelminthes	
	3.1 General characters and classification up to classes	
	3.2 Life history of <i>Ascaris lumbricoides</i> and its parasitic adaptations.	
Module -4	Phylum – Arthropoda	07
	3.3 General characters and classification up to classes	
	3.4 Vision in Arthropods.	
	3.5 Metamorphosis in insects.	
	Phylum – Annelida	
Module -4	4.1 General characters and classification up to classes	07
	4.2 Earthworm species used for vermicomposting	

	4.3	Preparation of vermicompost bed.	
	Phylum– Mollusca		
	4.4	General characters and classification up to classes	
	4.5	Scope of Pearl culture and species used in Pearl culture	
	Phylum– Echinodermata		
	4.6	General characters and classification up to classes	
	4.7	Water vascular system in Asteroidea	
Reference Books:-			
1. E.L. Jordan. Invertebrate Zoology 12th Edition. (S Chand & Co Ltd, India, 2013) Pages 848. 2. Brian Hall and Bendedikt Hallgrimsson (2008). Strickberger’s Evolution. IV Edition, (Jones and Barlett publishers Inc., 2008) Pages 760. 3. Edward Ruppert and Robert Barnes, Invertebrate Zoology, VIII Edition. (Thomson Press: India, 2006) Pages 998. 4. Dhami. Invertebrate Zoology 10th Edition.(New Delhi, R. Chand & Company, 2003) 5. R.L. Kotpal. Modern Text Book of Zoology: Invertebrate 10thEdition. (Rastogi Publications, New Delhi, 2003). 6. Robert Barnes, Peter Calow, Olive, P.J.W., Golding, D. W. and Spicer , J.I. The Invertebrates: A New Synthesis, III Edition, (Oxford, Wiley Blackwell Science, 2002) Pages:512.			
Evaluation Pattern: 60:40			
Total Marks: 50			
Internal Examination: 20 Marks CCE- I: 10 Marks CCE- II: 10 Marks CCE- III: 10 Marks CCE*- Out of three CCE marks best of two CCE marks consider		End Semester Examination: Question -1 Question -2 Question -3	



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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Zoology

Programme: B.Sc. I

Semester – I

Type : Major

Marks: 50

Credits : 02 (30 Hrs)

From: A. Y. 2026-27

Name of Course: BZT 112: Animal Physiology

Course Objectives: Students should be able to,

- 1) Learn the digestion and absorption in the alimentary canal in humans.
- 2) Understand the mechanism of pulmonary ventilation and urine formation.
- 3) Acquire special assessment techniques which may be used in the physical examination of the cardiovascular system, including blood pressure and electrocardiogram (ECG).
- 4) Compare the reproductive physiology of males and females.

Course Outcomes: Students will be able to,

- 1) Explain the digestion and absorption in alimentary canal in human.
- 2) Describe the mechanism of pulmonary ventilation and urine formation.
- 3) Apply special assessment techniques which may be used in the physical examination of the cardiovascular system, including blood pressure and electrocardiogram (ECG).
- 4) Interpret the reproductive physiology of male and female in human.

Module	Title and Contents		Hrs
Module -1	Digestion		07
	1.1	Physiology of digestion in the alimentary canal.	
	1.2	Absorption of carbohydrates, proteins, and lipids.	
Module -2	Respiration		08
	2.1	Pulmonary ventilation	
	2.2	Transport of oxygen and carbon dioxide in blood	
	Excretion		
	2.3	Structure of nephron	
	2.4	Mechanism of urine formation, Counter – current Mechanism	
Module -3	Cardiovascular system		08
	3.1	Composition of blood	
	3.2	Structure of heart, Origin and conduction of the cardiac impulse, Cardiac cycle	
	Blood Pressure		
	3.3	Measurement of systolic & diastolic pressure, cardiac output	
	ECG measurement		
	3.4	Physiological measurement & significance	
Module -4	Reproductive Physiology		07
	4.1	Reproduction and Endocrine glands: Physiology of Male reproduction: Hormonal control of spermatogenesis.	
	4.2	Physiology of female reproduction: Hormonal control of menstrual cycle.	

Reference Books:-	
1. A. P. Krishna, Fundamentals of Medical Physiology, Ist Edition (Innovative Publisher, 2021) Pages 596. 2. Harvey Pough, Vertebrate life , VIII Edition, (Pearson International,2012) Pages 720. 3. Arthur Guyton, and John Hall, Textbook of Medical Physiology, XII Edition, (Harcourt Asia Pvt .Ltd /W.B. Saunders Company, 2011) Pages1112. 4. Gerard Tortora, and Bryan Derrickson, Principles of Anatomy and Physiology, XI Edition , (John Wiley & Sons , Inc., 2009). 5. Brian Hall and Bendedikt Hallgrimsson. Strickberger's Evolution, IV Edition, (Jones and Barlett publishers Inc., 2008) Pages 760. 6. Eric Widmaier, Hershel Raff and Kevin Strang, Vander's Human Physiology, XI Edition, (Boston: McGraw Hill Higher Education, 2008) Pages 770. 7. John Young, The Life of Vertebrates, III Edition. (Oxford university press, 2004)	
Evaluation Pattern: 60:40	
Total Marks: 50	
Internal Examination: 20 Marks CCE- I: 10 Marks CCE- II: 10 Marks CCE- III: 10 Marks CCE*- Out of three CCE marks best of two CCE marks consider	End Semester Examination: Question -1 Question -2 Question -3



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Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Zoology

Programme: B.Sc. I

Semester – I

Type : Major

Marks: 50

Credits : 02 (60 Hrs)

From: A. Y. 2026-27

Name of Course: BZP 113: Practical I

Course Objectives: Students should be able to,

- 1) Learn animals with different phyla, their distribution and their relationship with the environment.
- 2) Develop practical skills in various hematological practicals.
- 3) Explain the importance of health and hygiene.
- 4) Differentiate of bloods of different species depending upon the shape of the crystal.

Course Outcomes: Students will be able to,

- 1) Know animals with different phyla, their distribution and their relationship with the environment.
- 2) Develop practical skill in various hematological practical's.
- 3) Explain the importance of health and hygiene.
- 4) Differentiate blood of different species depending upon the shape of the crystal.

Practical No.	Title and Contents	Hrs
1	Study of <i>Amoeba</i> , <i>Euglena</i> , <i>Plasmodium</i> , <i>Paramecium</i> , w.r.t. classification and locomotion	4
2	Study of the following Phylum w.r.t Classification and morphological peculiarities: Study of <i>Sycon</i> , <i>Hyalonema</i> and <i>Euplectella</i> , <i>Obelia</i> , <i>Physalia</i> , <i>Aurelia</i> , <i>Tubipora</i> , <i>Metridium</i>	4
3	Phylum: Platyhelminthes: <i>Taenia solium</i> , Male and female	4
	Phylum: Nematelminthes: <i>Ascaris lumbricoides</i>	4
	Phylum: Annelida: <i>Aphrodite</i> , <i>Nereis</i> , <i>Pheretima</i> , <i>Hirudinaria</i>	4
4	Phylum: Arthropoda:- <i>Palaemon</i> , <i>Cancer</i> , <i>Limulus</i> , <i>Palaemon</i> , <i>Scolopendra</i> , <i>Julus</i> , <i>Periplaneta</i> , <i>Apis</i>	4
5	Phylum: Mollusca:- <i>Chiton</i> , <i>Dentalium</i> , <i>Pila</i> , <i>Unio</i> , <i>Loligo</i> , <i>Sepia</i> , <i>Octopus</i>	4
6	Phylum: Echinodermata:- <i>Pentaceros</i> , <i>Ophiura</i> , <i>Echinus</i> , <i>Cucumaria</i> , <i>Antedon</i>	4
7	Study of the following:	4
	i. T.S. and L.S. of <i>Sycon</i>	4
	ii. Life history <i>Taenia</i> and <i>Ascaris</i> and their parasitic adaptations.	4
8	Demonstration and Preparations of hemin crystals.	4
9	Measurement of Blood Pressure by Sphygmomanometer.	4
10	Recording of ECG.	4
11	Study of Earthworm species used for Vermicomposting	4
12	Study of different types of corals	4
13	Study of species used in pearl culture	4

14	Identification eye structure of arthropod under Scanning Electron Microscope (SEM)	4
15	Study Tour: Visit to Natural History Museum and submission of report./ Visit to sea shore/ Visit to any suitable place to study animal diversity.	4

Reference Books:-

1. A. P. Krishna, Fundamentals of Medical Physiology, 1st Edition (Innovative Publisher, 2021) Pages 596.
2. Harvey Pough, Vertebrate life, VIII Edition, (Pearson International, 2012) Pages 720.
3. Arthur Guyton, and John Hall, Textbook of Medical Physiology, XII Edition, (Harcourt Asia Pvt .Ltd /W.B. Saunders Company, 2011) Pages1112.
4. Gerard Tortora, and Bryan Derrickson, Principles of Anatomy and Physiology, XI Edition, (John Wiley & Sons , Inc., 2009).
5. Brian Hall and Bendedikt Hallgrimsson. Strickberger's Evolution, IV Edition, (Jones and Barlett publishers Inc., 2008) Pages 760.
6. Eric Widmaier, Hershel Raff and Kevin Strang, Vander's Human Physiology, XI Edition, (Boston: McGraw Hill Higher Education, 2008) Pages 770.
7. John Young, The Life of Vertebrates, III Edition. (Oxford university press, 2004)

Evaluation Pattern: 60:40

Total Marks: 50

Internal Evaluation • Internal Work - 20 Marks	End Semester Practical Examination: Question -1 Question-2 Question- 3
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Faculty of Science and Technology

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Board of Studies in Zoology

Programme: B.Sc. I

Semester – II

Type : Major

Marks: 50

Credits : 02 (30 Hrs)

From: A. Y. 2026-27

Name of Course: BZT 121: Cell & Molecular Biology and Evolutionary Biology

Course Objectives: Students should be able to,

- 1) Learn about cells and cell organelles.
- 2) Define structure of organelles and chromosomal abnormality.
- 3) Acquired the knowledge about evolution theories
- 4) Identify types of fossils and causes of extinctions

Course Outcomes: Students will be able to,

- 1) Gain knowledge about cell and cell organelles.
- 2) Classify structure of organelle and chromosomal abnormality.
- 3) Categorize the different evolution theories.
- 4) Differentiate the types of fossils and causes of extinction.

Module	Title and Contents	Hrs
Module -1	Cell Structure	08
	1.1 Cell theory and diversity in cell size and shape	
	Structure of Nucleus	08
	1.2 Nucleus with reference to Nuclear Membrane, Nucleoplasma, Chromatin and nucleolus.	
	1.3 Structure of Chromosome	
	1.4 With reference to morphology and organization (Nulceosome), Polytene Chromosome	
Module -2	Ultra Structure and Functions of the following	08
	2.1 Plasma Membrane (Fluid Mosaic Model)	
	2.2 Mitochondria, Endoplasmic reticulum, Golgi Complex, Lysosome	
	Diseases related chromosomes abnormality	
	2.3 Sex linked-Klinefelter's, and Turner's Syndrome	
	2.4 Autosomal Diseases – Down's, Edward's and Patau's Syndrome.	
Module -3	History of Life	08
	3.1 Major Events in History of Life	
	Introduction to Evolutionary Theories	
	3.2 Lamarckism, Hugo De Varies Theory, Darwinism, Neo- Darwinism	
Module- 4	Direct Evidences of Evolution	06
	4.1 Types of fossils, Incompleteness of fossil record, dating of fossils	
	Extinction	
	4.2 Mass extinction:- Causes, Names of five major extinctions, K-T extinction in detail	

	4.3	Role of Extinction in evolution	
Reference Books:-			
1. Eduardo De Robertis and De Robertis EME – Cell and Molecular Biology, 8th Edition. (Lea and Febiger, U.S., 2006) Pages 720. 2. C.B. Powar – Cell biology, (Himalaya Pub.House, 2010). Pages 215. 3. N. Arumugam, Cell biology, (Saras Publication, 2012). Pages 238. 4. P. S. Verma & V. K. Agarwal, Cell biology , genetics , molecular biology, Evolution and Ecology, (S. Chand and Company Ltd., 2005) Pages 1291. 5. R.P. Meyyan , N , Arumugam – Genetics & Evolution (Saras Publication, 2015). 6. P. K. Gupta – Cell and Molecular Biology V Edition (Rastogi Publication, 2017 Delhi) Pages 1192. 7. Mark Ridley, Evolution, III Edition, (Blackwell Publishing, 2004) Pages 778. 8. Nicholas Barton, Derek Briggs, Jonathan Eisen, David Goldstein, and Nipam Patel. Evolution. (Cold spring, Harbour Laboratory Press., 2007) Pages 833. 9. Brian Hall and Bendedikt Hallgrimsson. Strickberger’s Evolution, IV Edition, (Jones and Barlett publishers Inc., 2008) Pages 760. 10. Neil Campbell and Jane Reece (2011), Biology, IX Edition, (Benjamin, Cummings, 2011) Pages 1263.			
Evaluation Pattern: 60:40			
Total Marks: 50			
Internal Examination: 20 Marks		End Semester Examination:	
CCE- I: 10 Marks		Question -1	
CCE- II: 10 Marks		Question -2	
CCE- III: 10 Marks		Question -3	
CCE*- Out of three CCE marks best of two CCE marks consider			



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Board of Studies in Zoology

Programme: B.Sc. I

Semester – II

Type : Major

Marks: 50

Credits : 02 (30 Hrs)

From: A. Y. 2026-27

Name of Course: BZT 122: Genetics

Course Objectives: Students should be able to,

- 1) Gain a basic understanding on human genetics and hereditary.
- 2) Define various terms of Genetics.
- 3) Real life situations and one's life the principles of human heredity.
- 4) Learn about chromosomal aberrations and its consequences.

Course Outcomes: Students will be able to,

- 1) Understand Mendelian genetics, their principles and gene interaction.
- 2) Apply the principles of Rh blood groups.
- 3) Identify and describes various chromosomal mutations.
- 4) Interpret the clinical implications of genetic disorders.

Module	Title and Contents		Hrs
Module -1	Introduction to Genetics		08
	1.1	Mendel's work on transmission of traits, Molecular basis of Genetic information. Mendelian and post Mendelian Genetics	
	1.2	Principles of Inheritance, Incomplete dominance and co-dominance, gene interaction, Multiple alleles w.r.t. ABO, Rh blood groups and coat colour in rabbit.	08
Module -2	Linkage, Crossing over		06
	2.1	Linkage and process of crossing over	
	2.2	Coupling and repulsion theory, Cytological evidences of crossing over.	
Module -3	Mutations		08
	3.1	Chromosomal mutations: Deletion, Duplication, Inversion, Translocation	
	3.2	Aneuploidy and polyploidy	
	3.3	Induced gene mutation	
	3.4	Genetic Counseling, Importance, Diagnosis of genetic / inherited diseases.	
Module- 4	Sex Determination		08
	4.1	Chromosomal theory of sex determination e.g. Insects	
	4.2	Sex linked inheritance- Colorblindness and Haemophilia	

Reference Books:-

1. Verma P.S. and Agarwal V .K. – Genetics , S. Chand and company
2. Strickberger – Genetics . C Millian publications
3. Winchester –Genetics Oxford publication
4. Pritam Verma & Vishnu Agarwal, Cell biology, Genetics , molecular biology, Evolution and Ecology, (S.

Chand Publisher, 2004), 1292 pp.

5. R.P. Meyyan , N , Arumugam – Genetics & Evolution

6. Eldon Gardner, Michael Simmons, Peter Snustad, (2008), Principles of Genetics, VIII Edition, (Wiley, 2008) Pages 740.

7. Peter Snustad and Michael Simmons, ‘Principles of Genetics’, V Edition , (John Wiley and Sons Inc., 2009) Pages 848.

8. William Klug, Michael Cummings and Charlotte Spencer, Concepts of Genetics. X Edition, (Benjamin Cummings, 2012).

9. Peter Russell, Genetics A Molecular Approach III Edition. (Benjamin cummings, 2009).

10. Anthony Griffiths, Susan Wessler, Richard Lewontin, and Sean Carroll. Introduction to Genetic Analysis. IX Edition , (W.H. Freeman and Company, 2007) Pages 800.

Evaluation Pattern: 60:40

Total Marks: 50

Internal Examination: 20 Marks

CCE- I: 10 Marks

CCE- II: 10 Marks

CCE- III: 10 Marks

**CCE*- Out of three CCE marks best of two
CCE marks consider**

End Semester Examination:

Question -1

Question -2

Question -3



Karmaveer Bhaurao Patil University, Satara

(A State Public University Est. u/s 3(6) of MPUA 2016)

Faculty of Science and Technology

Yashavantrao Chavan Institute of Science, Satara

Board of Studies in Zoology

Programme: B.Sc. I

Semester – II

Type : Major

Marks: 50

Credits : 02 (60 Hrs)

From: A. Y. 2026-27

Name of Course: BZP 123: Practical II

Course Objectives: Students should be able to,

- 1) Acquire basic knowledge of Blood groups and its medical applications.
- 2) Learn Mendelian Inheritance and post-mendelian modifications.
- 3) Co-relate human genetics with real life situations.
- 4) Learn about fossil evidences.

Course Outcomes: Students will be able to,

- 1) Interpret importance of blood group.
- 2) Solve various genetic examples.
- 3) Illustrate the process of evolution.
- 4) Form various plaster cast model and known their importance in fossil evidences.

Practical No.	Title and Contents	Hrs
1	Demonstration/Identification of ABO and Rh blood groups	4
2	Demonstration/ Cytological Preparations Mitochondria –Stained preparation of mitochondria from onion peeling / Hydrilla leaf /Oral mucosa by using Janus Green B .	4
3	Polytene Chromosome – Stained preparation of Polytene chromosome larva / Drosophila larva.	4
4	Study of fossil evidences from plaster cast models and pictures.	4
5	Darwin's Finches with diagrams / cut outs of beaks of different species	4
6	Study of Human Karyotypes	4
7	Study of Diagnostic Tests for Inherited Genetic Disorders	4
8	Study of Human Genetic traits (any five)	4
9	Example based on Monohybrid and dihybrid cross	4
10	Example based on Incomplete dominance and Co- dominance	4
11	Example based on Multiple alleles	4
12	Example based on linkages	4
13	Example based on crossing over	4
14	Example based on gene interaction	4
15	Example based on gene mapping	4

Reference Books:-

1. Practical Zoology by Kotpal 2007.
2. Brian Hall and Benedikt Hallgrímsson. Strickberger's Evolution, IV Edition, (Jones and Barlett publishers Inc., 2008) Pages 760.
3. Edward Ruppert and Robert Barnes, Invertebrate Zoology, VIII Edition. (Holt Saunders International Edition, 2006). Pages 928.
4. Harvey Pough, Vertebrate life, VIII Edition , (Pearson International, 2009).
5. John Young. The Life of Vertebrates , III Edition. (Oxford university press, 2004).
6. Practical Zoology by Verma & Agarwal.
7. Robert Barnes, Peter Calow, Olive, P.J.W. , Golding ,D. W. and Spicer , J.I. The Invertebrates: A New Synthesis, III Edition, (Oxford, Wiley Blackwell Science, 2002) Pages:512.

Evaluation Pattern: 60:40

Total Marks: 50

Internal Evaluation:

- Internal Work – 20 Marks

End Semester Examination:

- Question- 1
Question- 2
Question- 3