University of Jammu

Syllabi of Zoology for FYUP under CBCS as per NEP-2020

SEMESTER-IV

(Examination to be held in 2024, 2025, 2026)

Major Course

Course Code: UMJZOT401 Course Title: Physiology of Controlling and Coordinating Systems

Credits: 04 {03(Theory) + 01(Practical)} Total no. of lectures: Theory: 45 hours
Practical: 30 hours

Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Major Course

Course Code: UMJZOT402 Course Title: Parasitology

Credits: 04 {03(Theory) + 01(Practical)} Total no. of lectures: Theory: 45 hours
Practical: 30hours

Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Major Course

Course Code: UMJZOT403 Course Title: Principles of Genetics

Credits: 04 {03(Theory) + 01(Practical)} Total no. of lectures: Theory: 45 hours
Practical: 30hours

Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Major Course

Course Code: UMJZOT404 Course Title: Wildlife: Conservation and Management

Credits: 04 {03(Theory) + 01(Practical)} Total no. of lectures: Theory: 45 hours
Practical: 30hours

Maximum Marks: 100
Theory: 75
Practical/Tutorial: 25

Minor Course

Course Code: UMIZOT303 Course Title: Wildlife Biology
Credits: 04{03(Theory) + 01(Practical)} Total no. of lectures: Theory: 45 hours
Practical: 30hours

Maximum Marks: 100
Theory: 75
Practical/Tutorial: 2

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN ZOOLOGY UNDER CBCS
AS PER NEP - 2020
(For the Examination to be held in Year 2024, 2025 & 2026)
(MAJOR COURSE)

UG SEMESTER-IV

MAJOR CORE COURSE NO. : UMJZOT401
MAJOR CORE COURSE TITLE: PHYSIOLOGY OF CONTROLLING AND COORDINATING SYSTEMS

CREDITS : 04 {03 (THEORY) + 01 (Practical)}
MAXIMUM MARKS : 75
I) External (University Exam) : 60
II) Internal Assessment : 15
DURATION OF UNIVERSITY EXAM : 03 Hours
MAXIMUM MARKS PRACTICALS : 25

I) Continuous Assessment : 10
II) Final Examination : 15

Objectives and Expected Learning Outcomes

The main objective of this course is to obtain knowledge about the functioning of various systems of organisms and their interrelationship for well-coordinated function. This course will provide an in depth study for better application of mind to further approach towards biology; would make students well equipped with the processes of body and its functioning and would help them in understanding both homeostasis mechanisms and homeostatic imbalances of various body systems.

Unit 1: Neuro-physiology (9 Hrs)

1.1 Neuron: Structure and Classification
1.2 Synapses: Types and Functions
1.3 Nerve Impulse:
1.3.1 Generation and transmission
1.3.2 Factors affecting nerve impulse transmission
1.4 Synaptic Transmission,and neurotransmitters (Common types)

Unit 2: Muscle Physiology (9 Hrs)

2.1 Muscular Tissue: Types, structure and characteristics
2.2 Ultrastructure of skeletal muscle and its chemical composition
2.3Neuromuscular junction and Motor Unit
2.4 Molecular and chemical basis of muscle contraction

2.5 Red and White Skeletal Muscles

Unit 3: **Reproductive Physiology** **(12 Hrs)**

3.1 Histology of mammalian testis and ovary
3.2 Spermatogenesis and oogenesis in Mammals
3.3 Menstrual Cycle in Primates
3.4 Fertilization: Types and Mechanism
3.5 Neuroendocrine control of Reproduction

Unit 4: Homeostatic Physiology **(15 Hrs)**

4.1 Chemical nature of Hormones
4.2 Vertebrate Endocrine Glands: Pituitary, Thyroid, Parathyroid, Pancreas, and Adrenal; secretions and their actions, effect of hyposecretion and hypersecretion
4.3 Concept of Homeostasis and role of feedback mechanism in regulation of hormonal secretion
4.4 Osmoregulatory mechanisms
4.5 Thermoregulation

Practicum **(30 Hrs.)**

1. Study of histology of Mammalian gonads (Testis and Ovary) using permanent Slides
2. Study of different stages of gametogenesis from permanent slides of mammalian gonads
3. Study of general morphology and histology of endocrine glands from permanent slides: Pituitary, Thyroid,Parathyroid, Pancreas and Adrenals
4. Preparation of permanent stained slide of skeletal muscle to study its structure
5. Recording of simple muscle twitch with electrical stimulation.
6. Study of different disorders of endocrine malfunction using charts / photographs

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be coveredin Examination	Time allotted forExam	Marks
Internal Theory Assessment	50%	1 Hr & 30 Minutes	15
External Theory End Semester	100%	3 Hrs	60
Continuous assessment (Based on Daily Performance only)	-	-	10
Final Examination	-	-	15

External End Semester Theory Examination will have two sections (A & B){Total marks 60}
Section A : Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabii.e., two questions from each unit. Each question shall be of 12 marks. Candidates are required to attempt four questions in all, selecting one from each unit.

Internal Assessment {Total marks 15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one longanswer type question of 7 marks and four short answer type questions of 2 marks each.

Recommended Readings

1. Tortora, G.J. and Derrickson, B.H. (2009). Principles of Anatomy and Physiology, XII Edition, JohnWiley & Sons, Inc.
2. Widmaier, E.P., Raff, H. and Strang, K.T. (2008) Vander's Human Physiology, XI Edition, McGraw Hill
3. Guyton, A.C. and Hall, J.E. (2011). Textbook of Medical Physiology, XII Edition, Harcourt Asia Pvt.Ltd/W.B. Saunders Company
4. Randal D, Burggren W, French K. (2001) Eckert –Animal physiology: Mechanics and Adaptations. V Edition. W. H. Freeman and Co.
5. Nagabhushnam- A text book of Animal Physiology. Oxford and IBH
6. Arora M. P. (2018). Animal Physiology. VII Edition. Himalayan Publishing House, India
7. Singh, H.R. & Neeraj Kumar (2017) Animal Physiology and Biochemistry, Vishal Publishing Co.

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN ZOOLOGY
UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year 2024, 2025 & 2026)

(MAJOR COURSE)

UG SEMESTER-IV

MAJOR CORE COURSE NO.	**:**	**UMJZOT402**
MAJOR CORE COURSE TITLE	**:**	**PARASITOLOGY**
CREDITS	**:**	**04 {03 (THEORY) + 01 (Practical)}**
MAXIMUM MARKS	**:**	**75**
I) External (University Exam)	**:**	**60**
II) Internal Assessment	**:**	**15**
DURATION OF UNIVERSITY EXAM	**:**	**03 Hours**
MAXIMUM MARKS PRACTICALS	**:**	**25**
I) Continuous Assessment	**:**	**10**
II) Final Examination	**:**	**15**

Objectives and Expected Learning Outcomes

The course provides introduction to Parasitology and covers the basic aspects of Host parasite relationship. After successfully completing this course students will be able to understand the knowledge of parasites and their ecological relationship with various hosts, their distribution in Animal kingdom and various diseases caused by them.

Unit I: Introduction to Parasitology **(9 Hrs)**

1.1 Definition and scope of Animal parasitology
1.2 Host parasite relationship and specificity
1.3 Parasite, Parasitoid and vectors (Mechanical and Biological)
1.4 Parasitic adaptations
1.5 Degree of Parasitism and Hyperparasitism
1.6 Concept of Host and Host types

Unit 2: Parasitic protozoans and platyhelminthes-morphology, life cycle, epidemiology, pathogenicity, prophylaxis and diseases caused (9 Hrs.)

2.1 *Entamoeba histolytica*
2.2 *Plasmodium vivax*
2.3 *Fasciolopsis buskii*

2.4 *Taenia solium*
2.5 *Schistosoma haematobium*

Unit 3: Parasitic nematodes and arthropods - morphology, life cycle, epidemiology, pathogenicity, prophylaxis and diseases caused (12 Hrs.)

3.1 *Ascaris lumbricoides*
3.2 *Wuchereria bancrofiti*
3.3 *Ancyclostoma duodenale*
3.4 Importance and Control of
  3.4.1 Ticks and Mites
  3.4.2 Head and Body louse
  3.4.3 Fleas and Bed bug

Unit 4: Parasitic Vertebrates-general description, diet and feeding habits (15 Hrs)

4.1 Remora and Jawless fishes
4.2 Vampire Bat
4.3 Candiru (Toothpick fish)
4.4 Cookicutter shark
4.5 Hood Mocking bird

Practicum (30 Hrs.)

1. Salient features of *Entamoeba histolytica, Giardia intestinalis, Plasmodium vivax* through permanent slides/microphotographs
2. Salient features of *Fasciolopsis buskii, Schistosoma haematobium*, *Taenia solium* through permanent slides/photomicrographs.
3. Salient features of *Ascaris lumbricoides, Ancyclostoma duodenale, Wuchereria bancroftii* through permanent slides/photomicrographs.
4. Study of Head and Body louse through permanent slides/photomicrographs.
5. Study of Bed bug (*Cimex*) through permanent slides/photomicrographs.
6. Study of Flea (*Xenopsylla cheopis*) through permanent slides/photomicrographs.
7. Study of parasitic vertebrates through permanent slides/photomicrographs.
8. Study of Ticks and Mites through permanent slides/photomicrographs.
9. Field survey on common communicable disease of respective areas.
10. Project report on common diseases, their causative agent and vectors involved.

NOTE FOR PAPER SETTING:

Examination Theory/Practical	Syllabus to be coveredin Examination	Time allotted forExam	Marks
Internal Theory Assessment	50%	1 Hr & 30 Minutes	15
External Theory End Semester	100%	3 Hrs	60
Continuous assessment (Based on Daily Performance only)	-	-	10
Final Examination	-	-	15

External End Semester Theory Examination will have two sections (A & B){Total marks 60}

Section A: Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabii.e., two questions from each unit. Each question shall be of 12 marks. Candidates are required to attempt four questions in all, selecting one from each unit.

Internal Assessment {Total marks 15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one longanswer type question of 7 marks and four short answer type questions of 2 marks each.

Recommended Readings

1. K.D Chatterjee-Parasitology: Protozoology and Helminthology
2. Arora D.R. and Arora B-Medical Parasitology
3. Smith J.D-Introduction to Parasitology
4. Meyer, Olsen and Schimdt's-Essentials of Parasitology
5. H.S Singh, P. Rastogi-Parasitology (Medical Zoology)
6. C.P Baveja, V Baveja-Parasitology
7. CKJ Paniker-Textbook of Medical Parasitology

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(MAJOR COURSE)

UG SEMESTER-IV

MAJOR CORE COURSE NO.	**:**	**UMJZOT403**
MAJOR CORE COURSE TITLE	**:**	**PRINCIPLES OF GENETICS**
CREDITS	**:**	**04 {03 (THEORY) + 01 (Practical)}**
MAXIMUM MARKS	**:**	**75**
I) External (University Exam)	**:**	**60**
II) Internal Assessment	**:**	**15**
DURATION OF UNIVERSITY EXAM	**:**	**03 Hours**
MAXIMUM MARKS PRACTICALS	**:**	**25**
I) Continuous Assessment	**:**	**10**
II) Final Examination	**:**	**15**

Objectives and Expected Learning Outcomes

The main objective of this course is to provide students with a basic understanding on hereditary. Thecourse provides an introduction to Mendelian genetics, their principles and gene interactions The paper helps in highlighting the scope and significance of genetics by imbibing the principles of hereditary and genetic transmission and to appreciate the concepts genotype and phenotype. It also includes the application of recombination, changes in chromosome number and structure and physicalmapping.

Unit-1 Inheritance Biology **(13 Hrs)**

1.1 History, Scope and Significance of Genetics
1.2 Pre-Mendelian Genetic Concepts: Preformation & Epigenesis; Germplasm Theory
1.3 Terminology in Genetics: Alleles or Allelomorphs; Homozygous and Heterozygous; Dominant and Recessive; Genotype and Phenotype
1.4 Mendelian Genetics: Mendel's Experiment on Pea Plant and reasons of his success, Monohybrid Cross and Law of Dominanceand Law of Segregation, Dihybrid Cross and Law of Independent Assortment
1.5 Test Cross, Back Cross, Reciprocal Cross and their Significance
1.6 Extensions of Mendelian Principles
1.7 Multiple Alleles (ABO Blood Groups and Rh factor in Humans), Incomplete Dominance, Co-dominance, Complementary and Supplementary Interactions, Epistasis and Pleiotropy, Lethal Genes
1.8 Chromosomal Theory of Inheritance

Unit-2 Sex-Determination,Extra-Chromosomal Inheritance and Specialized Chromosomes (10 Hrs)

2.1 Sex Chromosomes, their functions and mechanism of chromosomal sex determination
2.2 Environmental and hormonal sex determination
2.3 Sex Chromatin bodies (Barr Bodies) and dosage compensation
2.4 Sex-limited genes; Sex-influenced genes; Sex-linked inheritance (eye color in *Drosophila*, Haemophilia in humans)
2.5 Extra-chromosomal inheritance: shell coiling in snails and kappa particles in *Paramecium*
2.6 Specialized chromosomes
2.6.1Polytene chromosomes
2.6.2 Lampbrush chromosomes

Unit-3 Linkage and Crossing Over (10 Hrs)

3.1 Linkage
3.1.1 Discovery; Chromosomal Theory of Linkage and Significance of Linkage
3.1.2 Types of Linkage: Complete and Incomplete; Strength of Linkage and factors affecting it
3.1.3 Linkage Groups (*Drosophila*, maize and man)
3.2 Crossing Over
3.2.1 Definition, Types, Mechanism and Theories of Crossing Over; Factors influencing Crossing over Cytological evidences of Crossing Over
3.2.2 Genetic Mapping
3.3 Linkage Maps and their Construction: Determination of Linkage Group; Determination of Map Distance: Two-Point Test Cross; Determining Order of genes and map distance: Three-point Test Cross
3.4 Interference and Coefficient of Coincidence

Unit-4 Chromosomal Aberrations and Mutations (12 Hrs)

4.1 Structural Chromosomal Aberrations
4.1.1 Deletions (Deficiencies)
4.1.2 Duplications
4.1.3 Inversions
4.1.4 Translocations
4.2 Numerical Chromosomal Aberrations
4.2.1 Aneuploidy
4.2.2 Euploidy
4.3 Karyotyping and its use in detection of chromosomal aberrations in humans.
4.4 Mutations
4.4.1 Classification of Mutations and significance of Mutations
4.4.2 Spontaneous Mutations : Mutation rates and Frequencies
4.4.3 Induced Mutations and Mutagens (Physical and Chemical)

Practicum (30 Hrs)

1. Study of Sex Chromatin in Human Buccal Smear and demonstration of dosage compensation.
2. Construction of Linkage maps using data from *Drosophila* crosses.
3. To study the Mendelian laws and verification of Monohybrid Mendelian Ratio by Chi-square analysis.
4. To study the Mendelian laws and verification of Dihybrid Mendelian Ratio by Chi-square analysis.
5. Determination of ABO blood groups as an example of multiple allelism.
6. Preparation of Human Karyotype for study of chromosomal aberrations with respect to number, translocation, deletion, etc.

7. Preparation and study of Polytene Chromosomes of Midge fly / *Drosophila.*

NOTE FOR PAPER SETTING:

Examination Theory/Practical	Syllabus to be coveredin Examination	Time allotted forExam	Marks
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External Theory End Semester	100%	3 Hrs	60
Continuous assessment (Based on Daily Performance only)	-	-	10
Final Examination	-	-	15

External End Semester Theory Examination will have two sections (A & B){Total marks 60}

Section A : Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabi i.e., two questions from each unit. Each question shall be of 12 marks. Candidates are required to attempt four questions in all, selecting one from each unit.

Internal Assessment {Total marks 15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one long answer type question of 7 marks and four short answer type questions of 2 marks each.

Recommended Readings

1. Gardner, E.J., Simmons, M.J., Snustad, D.P. (2008). Principles of Genetics. VIII Edition. Wiley India
2. Snustad, D.P., Simmons, M.J. (2016). Principles of Genetics. VII Edition. John Wiley and Sons Inc
3. Klug, W.S., Cummings, M.R., Spencer, C.A. (2012). Concepts of Genetics. X Edition. Benjamin Cummings
4. Russell, P. J. (2009). Genetics- A Molecular Approach. III Edition. Benjamin Cummings
5. Fletcher H. and Hickey I. (2015). Genetics. IV Edition. GS, Taylor and Francis Group, New York and London.
6. Gupta P. K. (2019). Genetics. Rastogi Publications, India
7. Rastogi V. B. (2019). Genetics. IV Edition. MEDTECH
8. Gupta P. K. (2020). Cytogenetics. II Edition. Rastogi Publications, India
9. Pierce B. A. (2020) Genetics: A Conceptual Approach. VII Edition. W.H. Freeman & Co.
10. Verma P. S., Agarwal V. K. (2010) Genetics. IX Edition. S. Chand & Co. Ltd., India
11. Singh B. D. (2009). Genetics, II Edition. Kalyani Publishers, India

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(MAJOR COURSE)

UG SEMESTER-IV

MAJOR CORE COURSE NO.	**:**	**UMJZOT404**
MAJOR CORE COURSE TITLE	**:**	**WILDLIFE: CONSERVATION AND MANAGEMENT**
CREDITS	**:**	**04 {03 (THEORY) + 01 (Practical)}**
MAXIMUM MARKS	**:**	**75**
I) External (University Exam)	**:**	**60**
II) Internal Assessment	**:**	**15**
DURATION OF UNIVERSITY EXAM	**:**	**03 Hours**
MAXIMUM MARKS PRACTICALS	**:**	**25**
I) Continuous Assessment	**:**	**10**
II) Final Examination	**:**	**15**

Objectives and Expected Learning Outcomes

The course provides an introduction to the wildlife conservation and management and covers its basic aspects. After successfully completing the course, students will be able to understand the importance of wildlife and the scientific point of view in understanding management of wildlife resources, their conservation and their importance.

Unit 1: Introduction to Wildlife (10 hrs.)

1.1 Definition of Wildlife and importance of its study
1.2 Wildlife habitats: Definition, types and importance
1.3 Physical and biological parameters
1.4 Important Wild animals and their zoological nomenclature (Birds and mammals)
1.5 Endangered wild fauna of India
1.6 Red Data Book

Unit 2: Wildlife Depletion and management (10 hrs.)

2.1 Causes of depletion of wildlife and its prevention
2.2 Management and restoration of degraded habitat
2.3 Preservation of General Genetic Diversity of Wild Fauna
2.4 Wildlife status in J&K (Jammu and Kashmir as rich resource of wildlife)
2.5 Human Wildlife Conflict: Causes and Control measures

Unit 3: Wildlife Conservation (15 hrs.)

3.1 Introduction to Wildlife Conservation: In situ and ex situ conservation
3.2 Concept and Types of Protected Areas (National Parks, Sanctuaries, Biosphere Reserves)
3.3 Important protected areas of J&K
3.4 Wildlife Conservation projects of Government of India: Project Tiger, Project Gir Lion, Project Hangul, Project Musk Deer
3.5 Wildlife Protection Act

Unit 4: Wildlife Tourism and Trade (10 hrs.)

4.1 Ecotourism: Concept and types
4.2 Wildlife Protected Areas as venue of Ecotourism
4.3 Trade in wild animals: Challenges and solutions
4.4 Wildlife tourism places in Jammu and Kashmir
4.5 Community involvement in wildlife conservation

Practicum (30hrs.)

1. Study of Endangered wild birds through Models/Photomicrographs
2. Study of Endangered wild mammals through Models/Photomicrographs
3. Study of Types of feet and claws in birds
4. Study of Beaks and Feathers in Birds
5. Identification and Study of Venomous snakes of India
6. Plot the important National Parks of India on a Map
7. Plot the important Wildlife Sanctuaries of India on a Map
8. Demonstration of Basic Equipments needed for wildlife study (compass, binoculars, Cameras and lenses, range finder and GPS
9. Visit to a Zoological Park/Sanctuary at a nearby place
10. Project report on wildlife in nearby locality/village/jungle

NOTE FOR PAPER SETTING:

Examination Theory/Practical	Syllabus to be coveredin Examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1 Hr & 30 Minutes	15
External Theory End Semester	100%	3 Hrs	60
Continuous assessment (Based on Daily Performance only)	-	-	10
Final Examination	-	-	15

External End Semester Theory Examination will have two sections (A & B){Total marks 60}

Section A: Four short answer questions representing all units/syllabi i.e., one question from each unit. Each question shall be of 3 marks.

Section B: Eight long answer questions (Four to be attempted) representing whole of the syllabii.e., two questions from each unit. Each question shall be of 12 marks. Candidates are required to attempt four questions in all, selecting one from each unit.

Internal Assessment {Total marks 15}

Fifteen (15) marks for theory paper in a subject reserved for internal assessment shall have one longanswer type question of 7 marks and four short answer type questions of 2 marks each.

Recommended Readings

1) S.K. Singh – Textbook of Wildlife Management
2) M.V. Reddy – Wildlife Biodiversity Conservation
3) Bolton, M – Conservation and The Use of Wildlife Resources
4) Singh, M.P Dey, S and Singh, B.S – Conservation of Biodiversity and Natural Resources
5) M.G. Chitkara – Wildlife
6) Teage R.D. – A Manual of Wildlife Conservation

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(MINOR COURSE)

UG SEMESTER-IV

MINOR CORE COURSE NO.	**:**	**UMIZOT405**
MINOR CORE COURSE TITLE	**:**	**WILDLIFE BIOLOGY**
CREDITS	**:**	**04 {03 (THEORY) + 01 (Practical)}**
MAXIMUM MARKS	**:**	**75**
I) External (University Exam)	**:**	**60**
II) Internal Assessment	**:**	**15**
DURATION OF UNIVERSITY EXAM	**:**	**03 Hours**
MAXIMUM MARKS PRACTICALS	**:**	**25**
I) Continuous Assessment	**:**	**10**
II) Final Examination	**:**	**15**

Objectives and Expected Learning Outcomes

The course provides an introduction to the wildlife biology and covers its basic aspects. After successfully completing the course, students will be able to understand the importance of wildlife and the scientific point of view in understanding management of Wildlife Resources, their conservation and their importance.

Unit 1: Introduction to Wildlife (10 hrs.)

1.1 Definition of Wildlife and importance of its study
1.2 Wildlife habitats: Definition, types and importance
1.3 Physical and biological parameters
1.4 Important Wild animals and their zoological nomenclature (Birds and mammals)
1.5 Endangered wild fauna of India
1.6 Red Data Book

Unit 2: Wildlife Depletion and management (10 hrs.)

2.1 Causes of depletion of wildlife and its prevention
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