University of Jammu

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

SEMESTER-III

(Examination to be held in 2023, 2024, 2025)

Major Course

Course Code: UMJZOT301 Course Title: Evolutionary Biology

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: UMJZOT302 Course Title: Environmental Biology

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

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

Minor Course

Course Code: UMIZOT303 Course Title: Ecology and Environment

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

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

Multidisciplinary Course

Course Code: UMDZOT304 Course Title: Economic Zoology

Credits: 03 Total no. of lectures: Theory: 45 hours

Maximum Marks: 75
Theory: 75

Skill Enhancement Course

Course Code: USEZOT305 Course Title: Medical Genetics

Credits: 02 Total no. of lectures: Theory/Practical: 45 hours
(15 hours)/(30 hours)

Maximum Marks: 50
Theory/Practical: 50

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN ZOOLOGY UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year 2023, 2024 & 2025)
(MAJOR COURSE)
UGSEMESTER-III

MAJOR CORE COURSE NO.	**:**	**UMJZOT301**
MAJOR CORE COURSE TITLE	**:**	**EVOLUTIONARY 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 evolution and covers the basic aspects of evolutionary biology. After successfully completing this course, the students will be able to understand how the life originated on the Earth and will come to know about the various evidences related to the evolution.

UNIT I: Introduction to Evolution (13 Hrs.)

1.1 Origin of life
- 1.1.1 Biogenesis
- 1.1.2 Abiogenesis
- 1.1.3 Theory of Special Creation
- 1.1.4 Biochemical Origin of Life

1.2 Evidences of Evolution
- 1.2.1 Morphological Evidences
- 1.2.2 Anatomical Evidences
- 1.2.3 Embryological Evidences
- 1.2.4 Paleontological Evidences

UNIT 2: Theories of Evolution (13 Hrs.)

2.1 Lamarckism
2.2 Neo-Lamarckism
2.3 Darwinism

2.4 Neo-Darwinism
2.5 Mutation Theory

UNIT 3: Natural Selection (10 Hrs.)

3.1 Natural Selection-Definition and Types
3.2 Variation
3.3 Elemental Forces of Evolution
- 3.3.1 Mutation
- 3.3.2 Recombination
- 3.3.3 Hybridisation
- 3.3.4 Isolation
- 3.3.5 Founder's Principle
- 3.3.6 Genetic Drift

3.4 Hardy-Weinberg Law

UNIT 4: Patterns of Evolution (10 Hrs.)

4.1 Sequential and Divergent Evolution
4.2 Evolution of Horse
4.3 Evolution of Man
4.4 Animal Distribution- Classification and Pattern
4.5 Zoogeography

Practicum (30 Hrs.)

1. Study of Lamarckism from chart
2. Study of Darwin's finches from chart/model
3. Study of Human Evolution from chart
4. Study of Horse Evolution from chart
5. Study of *Archaeopteryx* from model
6. Study of different types of dinosaurs from models
7. Study of *Latimeri/Sphenodon/*any other fossil
8. Zoogeographic study through maps

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1 Hr and 30 Min	15
External Theory End Semester	100%	3 Hrs	60
Continuous assessment	-	-	10 (Based on Daily Performance only)
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. VB Rastogi. Organic Evolution (Evolutionary Biology).
2. Stephen C Stearns and Rolf F Hoekstra. Evolution-An Introduction.
3. John Gribbin and Mary Gribbin. On the Origin of Evolution.
4. Bernard Wood. Human Evolution-A Very Short Introduction.
5. Balwan WK and Saba N. Genetics and Evolution.
6. Singh and Tomar. Evolutionary Biology.
7. Mandal F B. Introduction to Evolutionary Biology

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN ZOOLOGY
For the Examination to be held in 2023, 2024 & 2025
(MAJOR COURSE)
UG SEMESTER-III
UNDER NEP-2020

MAJOR CORE COURSE NO.	**:**	**UMJZOT302**
MAJOR CORE COURSE TITLE	**:**	**ENVIRONMENTAL 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 environmental biology and covers basic aspects of ecology. After successfully completing this course, the students will be able to understand about the importance and scope of ecology.

UNIT I: Introduction to Ecology (10 Hrs.)

1.1Ecology
- 1.1.1 Definition and Types
- 1.1.2 Branches and Scope

1.2 Environmental Studies: Definition, Aim and Need
1.3 Environment: Definition, Parts and Uses
1.4 Medium
- 1.4.1 Water: Forms, Types and Hydrological Cycle
- 1.4.2 Soil and its types

UNIT 2: Population Ecology (10 Hrs.)

2.1 Population Interaction
- 2.1.1 Mutualism
- 2.1.2 Commensalism
- 2.1.3 Parasitism

2.2 Population Characteristics
- 2.2.1 Density
- 2.2.2 Natality
- 2.2.3 Mortality
- 2.2.4 Age distribution

2.2.5 Population Growth
2.2.6 Population Fluctuation & Equilibrium
2.2.7 Biotic Potential & Dispersal

UNIT 3: Community Ecology (12 Hrs.)

3.1Characteristics of Community
3.2 Ecological succession
3.3 Dynamics of Ecosystem
3.3.1 Energy Flow
3.3.2 Primary & Secondary Production
3.3.3 Food Chain
3.3.4 Food Web
3.3.5 Ecological Pyramids
3.4 Role of Producers in the Ecosystem

UNIT 4: Environmental Pollution (13 Hrs.)

4.1 Air Pollution
4.2 Water Pollution
4.3 Soil Pollution
4.4 Noise Pollution
4.5 Thermal Pollution
4.6 Plastic Pollution

PRACTICUM (30 Hrs.)

1. To measure the pH of a given sample of water.
2. To determine the amount of dissolved oxygen in a sample of water.
3. To determine amount of free Carbon dioxide in a sample of water.
4. To determine total alkalinity of a sample of water.
5. To measure the total hardness of a given sample of water.
6. To study interaction between hermit crab and sea anemone.
7. To study depth and turbidity of local water body using Sacchi disc.
8. To study noise pollution levels in different localities in your surroundings.
9. To study mutualism between *Trichonympha* and termite.

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted forExam	Marks
Internal Theory Assessment	50%	1 Hr and 30 Min	15
External Theory End Semester	100%	3 Hrs	60
Continuous assessment	-	-	10 (Based on daily Performance only)
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 longanswer type question of 7 marks and four short answer type questions of 2 marks each.

Recommended Readings

1. Eugene P Odum and Gary W Baret . Fundamentals of Ecology.
2. Jaboury Gazole. Ecology : A very short Introduction
3. Balwan WK and Saba N. Animal Science & Environmental Issues, Random Publication, Delhi.
4. Michael Bigon, Robert Howarth, Colin Townsend. Essentials of Ecology.
5. Arvind Kumar & L K Singh. Advanced Ecology
6. Shivesh P Singh and Balwan WK. Fish Genetic & Aquatic Environment. Amiga Press Inc.
7. Rasool N and Balwan WK. Environmental studies.
8. Bhatia AL. Text book of Environmental Biology.
9. Neeraj N. Environment and Ecology: A dynamic approach.
10. Dash and Dash. Fundamentals of Ecology
11. Singh, J.S., S.P & Gupta, S.R. 2006. Ecology, Environment and Resource conservation. Anamaya Publ., New Delhi, 688 pp.

UNIVERSITY OF JAMMU

SYLLABI AND COURSE OF STUDY IN ZOOLOGY

For the Examination to be held in Year 2023, 2024 & 2025

(MINOR COURSE)

UG SEMESTER-III

UNDER NEP-2020

MINOR CORE COURSE NO.	**:**	**UMIZOT303**
MINOR CORE COURSE TITLE	**:**	**ECOLOGY AND ENVIRONMENT**
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 environmental biology and covers basic aspects of ecology. After successfully completing this course, the students will be able to understand about the importance and scope of ecology.

UNIT I: Introduction to Ecology (10 Hrs.)

1.1 Ecology
- 1.1.1 Definition and Types
- 1.1.2 Branches and Scope

1.2 Environmental Studies: Definition, Aim and Need

1.3 Environment: Definition, Parts and Uses

1.4 Medium
- 1.4.1 Water: Forms, Types and Hydrological Cycle
- 1.4.2 Soil and its types

UNIT 2: Population Ecology (10 Hrs.)

2.1 Population Interaction
- 2.1.1 Mutualism
- 2.1.2 Commensalism
- 2.1.3 Parasitism

2.2 Population Characteristics
- 2.2.1 Density
- 2.2.2 Natality
- 2.2.3 Mortality
- 2.2.4 Age distribution
- 2.2.5 Population Growth

2.2.6 Population Fluctuation & Equilibrium
2.2.7 Biotic Potential & Dispersal

UNIT 3: Community Ecology (12 Hrs.)

3.1Characteristics of Community
3.2 Ecological succession
3.3 Dynamics of Ecosystem
3.3.1 Energy Flow
3.3.2 Primary & Secondary Production
3.3.3 Food Chain
3.3.4 Food Web
3.3.5 Ecological Pyramids
3.4 Role of Producers in the Ecosystem

UNIT 4: Environmental Pollution (13 Hrs.)

4.1 Air Pollution
4.2 Water Pollution
4.3 Soil Pollution
4.4 Noise Pollution
4.5 Thermal Pollution
4.6 Plastic Pollution

PRACTICUM (30 Hrs.)

1. To measure the pH of a given sample of water.
2. To determine the amount of dissolved oxygen in a sample of water.
3. To determine amount of free Carbon dioxide in a sample of water.
4. To determine total alkalinity of a sample of water.
5. To measure the total hardness of a given sample of water.
6. To study interaction between hermit crab and sea anemone.
7. To study interaction between hermit crab and sea anemone.
8. To study depth and turbidity of local water body using Sacchi disc.
9. To study noise pollution levels in different localities in your surroundings.
10. To study mutualism between *Trichonympha* and termite.

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1 Hr and 30 Min	15
External Theory End Semester	100%	3 Hrs	60
Continuous assessment	-	-	10 (Based on daily Performance only)
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 longanswer type question of 7 marks and four short answer type questions of 2 marks each.

Recommended Readings

1. Eugene P Odum and Gary W Baret . Fundamentals of Ecology.
2. Jaboury Gazole. Ecology : A very short Introduction
3. Balwan WK and Saba N. Animal Science & Environmental Issues, Random Publication, Delhi.
4. Michael Bigon, Robert Howarth, Colin Townsend. Essentials of Ecology.
5. Arvind Kumar & L K Singh. Advanced Ecology
6. Shivesh P Singh and Balwan WK. Fish Genetic & Aquatic Environment. Amiga Press Inc.
7. Rasool N and Balwan WK. Environmental studies.
8. Bhatia AL. Text book of Environmental Biology.
9. Neeraj N. Environment and Ecology: A dynamic approach.
10. Dash and Dash. Fundamentals of Ecology
11. Singh, J.S., S.P & Gupta, S.R. 2006. Ecology, Environment and Resource conservation. Anamaya Publ., New Delhi, 688 pp.

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN ZOOLOGY UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year 2023, 2024 & 2025)
(MULTIDISCIPLINARY COURSE)
UG SEMESTER-III

MULTIDISCIPLINARY COURSE NO. : UMDZOT304
MULTIDISCIPLINARY COURSE TITLE : ECONOMIC ZOOLOGY
CREDIT : 03
MAXIMUM MARKS : 75
I) External (University Exam) : 60
II) Internal Assessment : 15
DURATION OF UNIVERSITY EXAM : 03 Hours

Objectives and Expected Learning Outcomes

The course will acquaint the students with basic understanding of the epidemiology, economic zoology and parasitology. Upon successful completion of this course, the student should be able to havesome knowledge of epidemiology of common infectious diseases, management of poultry & Cattle breeds and about the immunity.

Unit 1: Epidemiology (12 Hrs.)

1.1 Epidemiology: Definition, Scope and Applications.
1.2 Communicable Diseases: Cause, Mode of transmission, Symptoms,Prevention and Treatment of :
1.2.1 Tuberculosis
1.2.2 AIDS
1.2.3 Covid-19
1.3 Non-communicable Diseases: Cause, Mode of transmission, Symptoms, Prevention and Treatment of
1.3.1 Hypertension
1.3.2 Cancer
1.3.3 Diabetes

Unit 2: Economic Zoology (13 Hrs.)

2.1 Apiculture
2.1.1 Apiculture: Definition, Status and Scope
2.1.2 Products of Apiculture and their uses
2.1.3 Life Cycle of Honey bee
2.2 Sericulture
2.2.1 Sericulture; Definition, Status and Scope
2.2.2 Life cycle of Silkworm
2.2.3 Silk: Types & Uses

Unit 3: Dairy and Poultry Farming (10 Hrs.)

3.1 Introduction to Dairy
3.2 Cattle Breeds: Characters of Red Sindhi, Sahiwal & Jersey
3.3 Introduction to Poultry farming
3.4 Poultry Breeds: Characters of Rhode Island Red, White Leghorn &Black Minorca

Unit 4: Parasitology **(10 Hrs.)**

4.1 Immunity: Definition & its types.
4.2 Concept and Types of Symbiotic Relationships
4.3 Parasite, Vectors and Hosts
- 4.3.1 Parasites: Definition and Types
- 4.3.2 Vectors: Definition and Types
- 4.3.3 Vector borne Diseases: Dengue and Malaria
- 4.3.4 Host: Definition and Types

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in Examination	Time allotted for Exam	Marks
Internal Theory Assessment	50%	1 Hr and 30 Min	15
External Theory End Semester	100%	3 Hrs	60

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.

Books Recommended:

1. Food ,Nutrition and Health By Shashi Goyal and Pooja
2. Food,Nutrition and Health Ist Edition By Linda Tapsell,Oxford
3. Principles of Therapeutics Nutrition and Diabetics By A Vantina Sharma,CBS Publishers and Distributors Pvt.Ltd.
4. Elia Metal (eds): Clinical Nutrition ,Wiley Blackwell,A John Wiley and Sons Ltd.
5. Introduction to human nutrition By Wiley- Blackwell and A John Wiley and Sons.

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN ZOOLOGY UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year 2023, 2024 & 2025)
(SKILL ENHANCEMENT COURSE)
UG SEMESTER-III

SKILL ENHANCEMENT COURSE NO.	:	**USEZOT305**
SKILL ENHANCEMENT COURSE TITLE	:	**MEDICAL GENETICS**
CREDIT	:	**02**
MAXIMUM MARKS	:	**50**
I) External (University Exam)	:	**40**
II) Internal Assessment	:	**10**
DURATION OF UNIVERSITY EXAM	:	**02 Hours and 30 Minutes**

Objectives and Expected Learning Outcomes

The course will acquaint the students with basic understanding of the clinical genetics. The course also gives an account of the genetic disorders, diagnosis of chromosomal disorders and genetic counseling. After completing this course the learners will be able to increase their skill, attitudes and knowledge towards causes of genetic diseases and understand about the importance of karyotype and scope of human clinical genetics.

UNIT-1: Introduction to Medical Genetics (7 Hrs.)

1.1 Medical Genetics: Introduction and its importance in Healthcare
1.2 Chromosomal Disorders
  1.2.1 Down's syndrome
  1.2.2 Klinefelter's syndrome
  1.2.3 Turner's syndrome
1.3 Genetic Counselling
1.4 Gene Therapy

Unit-2: Developmental & Biochemical Genetics (8 Hrs.)

2.1 Genetic Basis of Sex
  2.1.1 Mechanism of Sex Determination
  2.1.2 Dosage Compensation
  2.1.3 Sex Limited and influenced genes
2.2 Introduction to Prenatal Diagnosis
2.3 Basic concept of Human fertility and Infertility
2.4 Sex linked inheritance
  2.4.1 Haemophilia
  2.4.2 Color Blindness

Unit-3: Practical Genetics (30 Hrs.)

3.1 Sex Chromatin (Barr body)
3.2 Human Karyotype
3.2.1 Normal Human Male
3.2.2 Normal Human Female
3.3 Introduction to chromosome preparation from peripheral blood
3.4 Drawing and Interpreting a Pedigree
3.5 Study of clinical features of common human genetic disorders (through photographs)

NOTE FOR PAPER SETTERS:

Total Marks of the USEZOT-305 is 50 of which 20% marks shall be reserved for internal assessment (10 marks). Remaining 80% of the marks (40 marks) shall be reserved for external examination to be conducted by the University/Colleges.

Internal Assessment Test (10 Marks)
Internal Assessment Paper of 10 Marks shall consist of Theory Question/s of 5 Marks from Unit I/II and 5 Marks of Practical Exercise from Unit III.

External End Semester University / College Examination
External Theory Exam shall be of 40 Marks and consist of 2 sections:
Section A: Four (4) short answer questions representing all Units/Syllabi i.e., atleast one question from eachUnit. Each question shall be of 2.5 marks (All Compulsory)
Section B: Six (6) long answer questions (Three to be attempted) representing whole of the syllabi i.e., twoquestions from each unit. Each question shall be of 10 marks.

RECOMMENDED READINGS

1. Jorde, Carey, Bamshad and White. Medical Genetics.
2. Gangane SD. Human Genetics, Elsevier Publications.
3. Alice Marcus. Human Genetics: An overview. Narosa Publications.
4. Saba N and Balwan WK. Cytogenetics, Random Publications, New Delhi.
5. Kapur and Suri. Basic Human Genetics. Jaypee Brothers medical publishers, Delhi.
6. Balwan WK. Genetics. Virgo Publishers, New Delhi
7. Lewis. Human Genetics.