UNIVERSITY OF JAMMU

(NAAC ACCREDITED 'A GRADE' UNIVERSITY)
Baba Sahib Ambedkar Road, Jammu-180006 (J&K)

Academic Section
Email: academicsectionju14@gmail.com

NOTIFICATION
(22/Sept./Adp/27)

It is hereby notified for the information of all concerned that the Vice-Chancellor, in anticipation of the approval of the Academic Council, is pleased to authorize the adoption of the Syllabi and Courses of Study in the subject of **Zoology** of Semesters **Ist and IInd** for **Four Year Under Graduate Programme** under the **Choice Based Credit System** as per **NEP-2020 (as given in the annexure)** for the examinations to be held in the years as per the details given below:

Subject	Semester	for the examination to be held in the years
Zoology	Semester-I	December 2022, 2023 and 2024
	Semester-II	May 2023, 2024 and 2025

The Syllabi of the courses is available on the University website: www.jammuuniversity.ac.in

Sd/-
DEAN ACADEMIC AFFAIRS

No. F. Acd/II/22/5506-5550.
Dated:18-09-2022
Copy for information and necessary action to:

1. Special Secretary to the Vice-Chancellor, University of Jammu for information of Hon'ble Vice-Chancellor
2. Dean, Faculty of Life Science
3. HOD/Convener, Board of Studies in **Zoology**
4. Sr. P.A.to the Controller of Examinations
5. All members of the Board of Studies
6. Confidential Assistant to the Controller of Examinations
7. I/C Director, Computer Centre, University of Jammu
8. Deputy Registrar/Asst. Registrar (Conf. /Exams. UG/ Exam Eval Non-Prof/CDC)
9. Incharge, University Website for Uploading of the notification.

Sumila Sharma 16/9/22
Deputy Registrar (Academic)

Department of Zoology
University of Jammu
Course Scheme of Syllabus
Bachelor of Zoology (General/Honors/Honors with Research)
(As per the Guidelines of National education Policy-2020)

SEMESTER-I

S No	Course Type	Course No.	Course Title	Credits	Marks				Total marks
					Theory		Practical		
					Mid Semester	End Exam	Assessment	Exam	
1.	Major	UMJZOT101	Biomolecules & physiology of life sustaining systems	4(3T+1P)	15	60	10	15	100
2.	Minor	UMIZOT102	Basics of biochemistry & physiology-I	4(3T+1P)	15	60	10	15	100
3.	MDC	UMDZOT103	Biodiversity threats & conservation strategies	3	15	60	NA	NA	75
4.	SEC	USEZOT104	Introduction to clinical biochemistry	2	5	40	NA	5	50

SEMESTER-II

S No	Course Type	Course No.	Course Title	Credits	Marks				Total marks
					Theory		Practical		
					Mid Semester	End Exam	Assessment	Exam	
1.	Major	UMJZOT201	Basics in Cell Biology	4(3T+1P)	15	60	10	15	100
2.	Minor	UMIZOT202	Cytology	4(3T+1P)	15	60	10	15	100
3.	MDC	UMDZOT203	Applied Zoology	3	15	60	NA	NA	75
4.	SEC	USEZOT204	Medical Parasitology	2	5	40	NA	5	50

University of Jammu

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

SEMESTER-I

(Examination to be held in December 2022, 2023, 2024)

Major Course

Course Code: UMJZOT101

Course Title: Biomolecules and Physiology of life sustaining 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

Minor Course

Course Code: UMIZOT102

Course Title: Basics of Biochemistry and Physiology-1

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: UMDZOT103

Course Title: Biodiversity threats and conservation Strategies

Credits: 03

Total no. of lectures: Theory: 45 hours

Maximum Marks: 75
Theory: 75

Skill Enhancement Course

Course Code: USEZOT104

Course Title: Introduction to clinical biochemistry

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 Dec- 2022, 2023 & 2024)
(MAJOR COURSE)
UG SEMESTER-I

MAJOR CORE COURSE NO.	**:**	**UMJZOT101**
MAJOR CORE COURSE TITLE	**:**	**BIOMOLECULES AND PHYSIOLOGY OF LIFE SUSTAINING SYSTEMS**
CREDITS	**:**	**04 {03 (Theory) +1 (Practical)}**
MAXIMUM MARKSTHEORY	**:**	**75**
I) External Theory (University Exam)	**:**	**60**
II) Internal Assessment	**:**	**15**
DURATION OF UNIVERSITY THEORY 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 structure of biomolecules and covers basic aspects of life sustaining processes. After successfully completing this course, the students will be able to understand about the importance and scope of biochemistry; to understand the structure and biological significance of carbohydrates, amino acids, proteins, lipids and nucleic acids; to learn biochemical tests for amino acids, carbohydrates,proteins and nucleic acids.

UNIT I: Structure and Function of Biomolecules (13 Hrs.)

1.1 Structure and Biological importance of Carbohydrates (Monosaccharides, Disaccharides, Polysaccharides)
1.2 General Structure and Properties of Amino acids; Essential and Non- EssentialAmino acids
1.3 General characters and classification of Proteins
1.4 Classification and Functions of Lipids
1.5 Fatty acids: Saturated and Unsaturated
1.6 Enzymes: Nomenclature and Classification; Mechanism of Enzyme Action

UNIT 2: Physiology of Digestion (10 Hrs.)

2.1 Food and its components
2.2 Digestion
2.2.1 Mechanical Digestion of Food
2.2.2 Chemical digestion of Food
2.3 Absorption
2.3.1 Carbohydrates
2.3.2 Lipids
2.3.3 Proteins

UNIT 3: Respiration in Humans (10 Hrs.)

3.1 Respiration: External and internal

3.2 Mechanics of Pulmonary Ventilation
3.3 Respiratory Volumes and Capacities
3.4 Mechanism of Gaseous Exchange across respiratory membranes
3.5 Mechanism of Transport of Oxygen and Carbon dioxide in blood

UNIT 4: Blood, Human Heart and Renal Physiology (12 Hrs.)

4.1 Components of Blood and its functions
4.2 Blood Groups: ABO, MN & Rh – factor
4.3 Detailed structure of Human Heart
4.4 Working of Human Heart: Cardiac Cycle and Heart Sounds
4.5 Structure of Kidney and its functional unit (Nephron).
4.6 Mechanism of Urine Formation (Uropoiesis)

Practicum (30 Hrs.)

1. Qualitative tests to identify functional groups of carbohydrates in given solution (Glucose,Fructose, Sucrose, Lactose)
2. Simple lab tests for detection of Carbohydrates.
3. Simple lab tests for detection of Proteins.
4. Simple lab tests for detection of Fats.
5. Quantification of protein in a sample by Lowry's method.
6. Histological studies of Mammalian Duodenum, Liver, Pancreas, Lung, Blood and Kidneyfrom permanent slides.
7. Study of activity of salivary amylase under optimum conditions.
8. Examination of Human Blood groups.
9. To prepare Haemin crystals using Human blood.
10. Prepare and examine blood smear to study Erythrocytes and Leucocytes.

NOTE FOR PAPER SETTING

Examination Theory/Practical	Syllabus to be covered in 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	-	-	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.

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. Nelson, D.L. & Cox, M.M. (2017). Lehninger Principles of Biochemistry (7th edition) Worth.
2. Berg, J.M.; Tymoczko, J.L. and Stryer, L. (2012). Biochemistry (7th edition) Freeman.
3. Zubay, G. (2017). Biochemistry (4th edition) McGraw-Hill.
4. Balwan, W.K & Saba N (2018). The DBS Handbook of Biochemistry.
5. Conn, E.E.; Stumpf, P.K.; Bruening, G. and Doi, R.H. (2006) Principles of Biochemistry (5th edition) Wiley.
6. Singh H.R. Animal Physiology and Biochemistry.
7. Vander, A.; Sherman, J. and Luciano, D.(2003) Human Physiology (9th edition).
8. Guyton, A.C. *et al*. (2008) Textbook of Medical Physiology (12th edition) W.B. Saunders Co.
9. Wahied K. B. (2017). Animal Physiology and Biochemistry, Paradise press, New Delhi.
10. Withers, P.C. *et al.* (1992) Comparative Animal Physiology (1st edition) Brooks Cole.
11. Tortora G.J and Derrickson B.H (2009) Principles of Anatomy and Physiology (XII Edition), John Wiley &Sons, Inc.

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN ZOOLOGY UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year Dec- 2022, 2023 & 2024)
(MINOR COURSE)
UG SEMESTER-I

MINOR CORE COURSE NO.	**:**	**UMIZOT102**
MINOR CORE COURSE TITLE	**:**	**BASICS OF BIOCHEMISTRY & PHYSIOLOGY-I**
CREDITS	**:**	**04 {03 (Theory) + 01(Practicals)}**
MAXIMUM MARKS THEORY	**:**	**75**
I) External Theory (University Exam)	**:**	**60**
II) Internal Assessment	**:**	**15**
DURATION OF UNIVERSITY THEORY 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 structure of biomolecules and covers basic aspects of life sustaining processes. After successfully completing this course, the students will be able to understand about the importance and scope of biochemistry; to understand the structure and biological significance of carbohydrates, amino acids, proteins, lipids and nucleic acids; to learn biochemical tests for amino acids, carbohydrates,proteins and nucleic acids.

UNIT I: Structure and Function of Biomolecules (13 Hrs.)

1.1 Structure and Biological importance of Carbohydrates (Monosaccharides, Disaccharides, Polysaccharides)
1.2 General Structure and Properties of Amino acids; Essential and Non- EssentialAmino acids
1.3 General characters and classification of Proteins
1.4 Classification and Functions of Lipids
1.5 Fatty acids: Saturated and Unsaturated
1.6 Enzymes: Nomenclature and Classification; Mechanism of Enzyme Action

UNIT 2: Physiology of Digestion (10 Hrs.)

2.1 Food and its components
2.2 Digestion
  2.2.1 Mechanical Digestion of Food
  2.2.2 Chemical digestion of Food
2.3 Absorption
  2.3.1 Carbohydrates
  2.3.2 Lipids

2.3.3 Proteins

UNIT 3: Respiration in Humans (10 Hrs.)

3.1 Respiration: External and internal
3.2 Mechanics of Pulmonary Ventilation
3.3 Respiratory Volumes and Capacities
3.4 Mechanism of Gaseous Exchange across respiratory membranes
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4.1Components of Blood and its functions
4.2 Blood Groups: ABO, MN & Rh – factor
4.3 Detailed structure of Human Heart
4.4 Working of Human Heart: Cardiac Cycle and Heart Sounds
4.5 Structure of Kidney and its functional unit (Nephron).
4.6 Mechanism of Urine Formation (Uropoiesis)

Practicum (30 Hrs.)

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2. Simple lab tests for detection of Carbohydrates.
3. Simple lab tests for detection of Proteins.
4. Simple lab tests for detection of Fats.
5. Quantification of protein in a sample by Lowry's method.
6. Histological studies of Mammalian Duodenum, Liver, Pancreas, Lung, Blood and Kidneyfrom permanent slides.
7. Study of activity of salivary amylase under optimum conditions.
8. Examination of Human Blood groups.
9. To prepare Haemin crystals using Human blood.
10. Prepare and examine blood smear to study Erythrocytes and Leucocytes.

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 Minutes	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.

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. Nelson, D.L. & Cox, M.M. (2017). Lehninger Principles of Biochemistry (7th edition) Worth.
2. Berg, J.M.; Tymoczko, J.L. and Stryer, L. (2012). Biochemistry (7th edition) Freeman.
3. Zubay, G. (2017). Biochemistry (4th edition) McGraw-Hill.
4. Balwan, W.K and Saba N (2018). DBS Handbook of Biochemistry. DBS Imprints, New Delhi.
5. Conn, E.E.; Stumpf, P.K.; Bruening, G. and Doi, R.H. (2006) Principles of Biochemistry (5th edition) Wiley.
6. Singh H.R. Animal Physiology and Biochemistry.
7. Vander, A.; Sherman, J. and Luciano, D.(2003) Human Physiology (9th edition).
8. Guyton, A.C. *et al*. (2008) Textbook of Medical Physiology (12th edition) W.B. Saunders Co.
9. Wahied K. B. (2017). Animal Physiology and Biochemistry, Paradise press, New Delhi.
10. Murray, R.K., Granner D.K., Mayes, P.A., Rodwell V.W. (20009). Harper's Illustrated Biochemistry (XXVIII Edition) Large Medical Books/Mc-Grawhill
11. Withers, P.C. *et al.* (1992) Comparative Animal Physiology (1st edition) Brooks Cole.

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN ZOOLOGY UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year Dec- 2022, 2023 & 2024)
(MULTIDISCIPLINARY COURSE)
UG SEMESTER-I

MULTIDISCIPLINARY COURSE NO.	**:**	**UMDZOT103**
MULTIDISCIPLINARY COURSE TITLE	**:**	**BIODIVERSITY THREATS & CONSERVATION STRATEGIES**
CREDITS	**:**	**03**
MAXIMUM MARKS	**:**	**75**
I) External (University Exam)	**:**	**60**
II) Internal Assessment	**:**	**15**
TIME DURATION	**:**	**03 Hours**

Objectives and Expected Learning Outcomes

To acquaint the students with basic understanding of the biodiversity, its threats, conservation strategies and management and planning of ecotourism opportunities. Upon successful completion of this course, the student should be able to identify and manage for ecological impacts to soil, water, vegetation, and wildlife resulting from recreation and tourism development.

Unit 1: Environment and Health **(13 Hrs.)**

1.1 Pollution: Introduction and its Types
1.2 Air Pollution
- 1.2.1 Effect of Quality of Air on Health
- 1.2.2 Emphysema: Symptoms, Prevention and Treatment

1.3 Water Pollution
- 1.3.1 Effect of Quality of Water on Health
- 1.3.2 Cholera & Diarrhoea: Symptoms, Prevention and Treatment

1.4 Global Warming: Causes and Consequences
1.5 Ozone Depletion: Causes and its impact on Human Health

Unit 2: Introduction to Biodiversity and Wild Life **(10 Hrs.)**

2.1 Concept of biodiversity and its levels
- 2.1.1 Alpha, beta and gamma diversity

2.2. Wildlife: Introduction & Its Values
2.3 Jammu & Kashmir as a rich resource of wild life
2.4 Wild life Depletion
- 2.4.1 Causes and Prevention of Depletion of Wildlife

Unit 3: Wild Life Conservation **(10 Hrs.)**

3.1Wildlife Conservation
- 3.1.1 Introduction to Wildlife Conservation
- 3.1.2 In situ and ex situ conservation.
- 3.1.3 Concept and types of Protected areas
- 3.1.4 Red Data Book

3.2 Human Wild conflict: Causes and control measures

Unit 4: Ecotourism **(12 Hrs.)**

4.1 Ecotourism: Definition and Types (Extreme & Mass Ecotourism)
4.2 Environmental, socio-cultural and economic impacts of ecotourism
4.3 Ecotourism Planning & Development
4.4 Role of Media in Tourism
4.5 Endemic animal species of Jammu & Kashmir
4.6 Wildlife protected areas as venues of ecotourism in J&K

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 Minutes**	**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.

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. Environmental Chemistry by Sodhi
2. Principles of Environmental chemistry by Manhan
3. Environmental Hazards & Human health by R.B. Philip
4. Wildlife and Forest Conservation by Sinha, P.C. Anmol Publishing Pvt., New Delhi.
5. Wildlife management by Robert, G.H. W.H. Freeman and Co., San Francisco, U.S.A.
6. Biodiversity and its conservation in India by Negi, S.S. Indus Publishing Co., New Delhi.
7. Wild Life conservation and management by Reena Mathur
8. Text book of Wild Life Management by S. K. Singh
9. Wood, M. E. (2002). Ecotourism: Principles, Practices and Policies for Sustainability
10. Biodiversity and Conservation by W.K. Balwan & N Rasool, Book Enclave Publishers, Jaipur.
11. Principles of Ecology by Verma P.S and V.R. Agarwal (New Delhi S. Chand)

UNIVERSITY OF JAMMU
SYLLABI AND COURSE OF STUDY IN ZOOLOGY UNDER CBCS AS PER NEP - 2020
(For the Examination to be held in Year Dec- 2022, 2023 & 2024)
(SKILL ENHANCEMENT COURSE)
UG SEMESTER-I

SKILL ENHANCEMENT COURSE NO. : **USEZOT104**
SKILL ENHANCEMENT COURSE TITLE : **INTRODUCTION TO CLINICAL BIOCHEMISTRY**
CREDITS : **02**
MAXIMUM MARKS : **50**
I) **External (University Exam)** : **40**
II) **Internal Assessment** : **10**
DURATION OF UNIVERSITY EXAM : **2 Hours and 30 Minutes**

Objectives and Expected Learning Outcomes

To acquaint the students with basic understanding of the biological techniques, clinical pathology and practical biochemistry. The course also gives an account of the health and disease surveillance, health interventions, and implementation of disease prevention strategies. After completing this course the learners will be able to increase their skill, attitudes and knowledge towards causes of diseases and Understand about the importance and scope of biochemistry.

UNIT-I: Fundamentals of Biological Techniques (7 Hrs.)

1.1 Microscopy: Principle & Types (Simple, Compound, Phase contrast)
1.2 Ultracentrifugation: Principle & Types
1.3 Spectrophotometry: Principle & Types
1.4 Electrophoresis: Principle & Types (Agarose Gel electrophoresis &Polyacrylamide Gel electrophoresis)

Unit-II: Basic Clinical Pathology (8 Hrs.)

2.1 Clinical Pathology: Definition and Scope
2.2 Common Metabolic Disorders: Diabetes, Hypertension, Obesity
2.3 Importance of CSF Examination
2.4 Renal Function Test
2.5 Liver Function Test
2.6 Urine Examination
2.7 Physiology of Blood
  2.7.1 Clotting Factors
  2.7.2 Haemostasis

Unit-III: Practical Biochemistry (30 Hrs.)

3.1 Solution/Strengths of Chemicals: Percentage, Normality, Molarity, Molality,Osmolarity, ppm, ppb
3.2 Blood Glucose level by using Glucometer.
3.3 Recording of Blood Pressure and Pulse rate.
3.4 Differential staining of Human blood corpuscles using Leishman stain
3.5 Counting of WBC in blood using Hemocytometer
3.6 Counting of RBC in blood using Hemocytometer

3.7 Clotting time and its significance
3.8 Determination of Blood Group
3.9 Blood Sample Collection and Preservation

NOTE FOR PAPER SETTERS

Total Marks of the USEZOT-104 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 beconducted by the University/Colleges.

Internal Assessment Test (10 Marks)

Internal Assessment Paper of 10 Marks shall consist of Theory Question/s of 5 Marksfrom 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 each unit. 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., two questions from each unit. Each question shall be of 10 marks

RECOMMENDED READINGS

1. Text book of Clinical Biochemistry by S.S. Haque.
2. Text Book of Biochemistry by Dr. Prasad R. Manjeshwar.
3. Clinical Pathology by Balwan W K and Balwan W K, Random Publications, New Delhi.
4. Practical Clinical Biochemistry by Rajni Chawla
5. Text Book of Clinical Biochemistry by Ramnik Sood
6. Animal Physiology & Biochemistry by W.K.Balwan, Paradise Publications New Delhi.
7. Clinical Biochemistry by Nanda Maheshwari.

University of Jammu

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

SEMESTER-II

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

Major Course

Course Code: UMJZOT201 Course Title: Basics in Cell 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: UMIZOT202 Course Title: Cytology

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: UMDZOT203 Course Title: Applied Zoology

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

Maximum Marks: 75
Theory: 75

Skill Enhancement Course

Course Code: USEZOT204 Course Title: Medical Parasitology

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 May- 2023, 2024 & 2025)
(MAJOR COURSE)
UG SEMESTER-II

MAJOR CORE COURSE NO.	**:**	**UMJZOT201**
MAJOR CORE COURSE TITLE	**:**	**BASICS IN CELL 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 a detailed insight into basic concepts of cellular structure and function. It alsogives an account of the complex regulatory mechanisms that control cell function. Student at the completion of course will be able to understand the functioning of cell and its organelles and the intricate cellular mechanisms involved; to understand the basic principle of life, how a cell divides leading to the growth of an organism and also reproduces to form a new organism.

UNIT I: Cell as Basic Unit of Life (12 Hrs.)

1.1 Cell Theory: Cell Shape, Size and Number
1.2 Cell Types: Eukaryotic and Prokaryotic; Similarities an d Differences
1.3 Eukaryotic Cell: Ultrastructure of Eukaryotic cell (Animal cell)
1.4 Prokaryotic Cell: Ultrastructure of Prokaryotic cell (Bacteria)
1.5 Plasma Membrane: Chemical composition and Structure (Fluid Mosaic Model)
1.6 Functions of Plasma Membrane

UNIT 2: Intracellular Compartments (13 Hrs.)

2.1 Structure, Chemical composition and Functions of following:
- 2.1.1 Mitochondria
- 2.1.2 Endoplasmic Reticulum
- 2.1.3 Golgi apparatus
- 2.1.4 Ribosomes
- 2.1.5 Centrioles and Basal bodies
- 2.1.6 Lysosomes
- 2.1.7 Cytoskeleton

2.2 Nucleus and Nucleolus
- 2.2.1 Nucleo-cytoplasmic interaction
- 2.2.2 Nucleus: Structure and Function

2.2.3 Nucleolus: Structure and Function

UNIT 3: Organization of Chromosomes (10 Hrs.)

3.1 Structure of chromatin: Heterochromatin and Euchromatin
3.2 Eukaryotic Chromosome
3.2.1 Composition and Morphology
3.3 Ultrastructure of Eukaryotic Chromosome
3.3.1 Nucleosome model
3.3.2 Solenoid model

UNIT 4: Cell division and Cell Cycle (10 Hrs.)

4.1 Cell Cycle: Definition and Control of Cell cycle
4.2 Cell division: Mitosis and its significance
4.2.1 Meiosis and its significance
4.2.2 Synaptonemal Complex: Structure and Functions
4.2.3 Comparison between Mitosis and Meiosis

Practicum (30 Hrs.)

1. Study of Principle and Working of Compound Microscope.
2. Study of Prokaryotic Cell with the help of Model/Chart/Photomicrograph.
3. Study of Eukaryotic Cell with the help of Model/Chart/Photomicrograph.
4. Study of Mitochondria with the help of Model/Chart/Photomicrograph.
5. Study of Golgi apparatus with the help of Model/Chart/Photomicrograph.
6. Study of Nucleus with the help of Model/Chart/Photomicrograph.
7. Study of Mitosis with the help of Permanent slide/ Model/Chart/Photomicrograph
8. Study of Meiosis with the help of Permanent slide/ Model/Chart/Photomicrograph.
9. To make temporary slides of Mitotic division in Onion Root Tip.
10. To make a temporary mount of *Lactobacillus* with Gram Staining.

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.

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. Cell Biology by C.B. Powar.
2. Fundamental concepts of Cell Biology by K.G. Purohit
3. Cell Biology and Molecular Biology by P.C. Vasishta and P.S.Gill
4. Animal Cytology and Evolution by M.J.D. White.
5. Cytogenetics by N Saba and W K Balwan, Random Publications, New Delhi.
6. Cell Biology and Genetics by PK Gupta.
7. Cell and Molecular Biology by De Robertis E.D.P.

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

(MINOR COURSE)

UG SEMESTER-II

MINOR CORE COURSE NO.	**:**	**UMIZOT202**
MINOR CORE COURSE TITLE	**:**	**CYTOLOGY**
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 MARKSPRACTICALS	**:**	**25**
I) Continuous assessment	**:**	**10**
II) Final examination	**:**	**15**

Objectives and Expected Learning Outcomes

The course provides a detailed insight into basic concepts of cellular structure and function. It alsogives an account of the complex regulatory mechanisms that control cell function. Student at the completion of course will be able to understand the functioning of cell and its organelles and the intricate cellular mechanisms involved; to understand the basic principle of life, how a cell divides leading to the growth of an organism and also reproduces to form a new organism.

UNIT I: Cell as Basic Unit of Life (12 Hrs.)

1.1 Cell Theory: Cell Shape, Size and Number
1.2 Cell Types: Eukaryotic and Prokaryotic; Similarities and Differences
1.3 Eukaryotic Cell: Ultrastructure of Eukaryotic cell (Animal cell)
1.4 Prokaryotic Cell: Ultrastructure of Prokaryotic cell (Bacteria)
1.5 Plasma Membrane: Chemical composition and Structure (Fluid Mosaic Model)
1.6 Functions of Plasma Membrane

UNIT 2: Intracellular Compartments (13 Hrs.)

2.1 Structure, Chemical composition and Functions of following:
- 2.1.1 Mitochondria
- 2.1.2 Endoplasmic Reticulum
- 2.1.3 Golgi apparatus
- 2.1.4 Ribosomes
- 2.1.5 Centrioles and Basal bodies
- 2.1.6 Lysosomes
- 2.1.7 Cytoskeleton

2.3 Nucleus and Nucleolus
- 2.2.1 Nucleo-cytoplasmic interaction
- 2.2.2 Nucleus: Structure and Function

2.2.3 Nucleolus: Structure and Function

UNIT 3: Organization of Chromosomes (10 Hrs.)

3.1Structure of chromatin: Heterochromatin and Euchromatin
3.2Eukaryotic Chromosome
3.2.1Composition and Morphology
3.3 Ultrastructure of Eukaryotic Chromosome
3.3.1 Nucleosome model
3.3.2 Solenoid model

UNIT 4: Cell division and Cell Cycle (10 Hrs.)

4.1 Cell Cycle: Definition and Control of Cell cycle
4.2 Cell division: Mitosis and its significance
4.2.1 Meiosis and its significance
4.2.2 Synaptonemal Complex: Structure and Functions
4.2.3 Comparison between Mitosis and Meiosis

Practicum (30 Hrs.)

1. Study of Principle and Working of Compound Microscope.
2. Study of Prokaryotic Cell with the help of Model/Chart/Photomicrograph.
3. Study of Eukaryotic Cell with the help of Model/Chart/Photomicrograph.
4. Study of Mitochondria with the help of Model/Chart/Photomicrograph.
5. Study of Golgi apparatus with the help of Model/Chart/Photomicrograph.
6. Study of Nucleus with the help of Model/Chart/Photomicrograph.
7. Study of Mitosis with the help of Permanent slide/ Model/Chart/Photomicrograph
8. Study of Meiosis with the help of Permanent slide/ Model/Chart/Photomicrograph.
9. To make temporary slides of Mitotic division in Onion Root Tip.
10. To make a temporary mount of *Lactobacillus* with Gram Staining.

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.

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.Fundamental concepts of Cell Biology by K.G.Purohit
2.Cell Biology and Molecular Biology by P.C.Vasishta and P.S.Gill
3.Animal Cytology and Evolution by M.J.D.White
4.Cytogenetics by N Saba and W K Balwan, Random Publications, New Delhi
5.Cell Biology and Genetics by P K Gupta
6.Cell and Molecular Biology by De Robertis E.D.P.
7.Cell Biology by V.B. Rastogi
8.Molecular Cell Biology by W K. Balwan and N. Saba, Alpha Publications, New Delhi.
9. Cell biology by C.B. Powar.

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(For the Examination to be held in Year May- 2023, 2024 & 2025)

(MULTIDISCIPLINARY COURSE)

UG SEMESTER-II

MULTIDISCIPLINARY COURSE NO. : UMDZOT203
MULTIDISCIPLINARY COURSE TITLE : APPLIED ZOOLOGY
CREDITS : 03
MAXIMUM MARKS : 75
I) External (University Exam) : 60
II) Internal Assessment : 15
TIME DURATION : 03 Hours

Objectives and Expected Learning Outcomes

To acquaint the students with basic understanding of the Epidemiology, Economic Zoology & Parasitology. Upon successful completion of this course, the student should be able to have some 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
2.1.4 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.

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. Book of Bee Keeping by Sharma P.L. and Singh, S.H.
2. Prospective in Indian Apiculture by R.C. Mishra.
3. Rearing queen bees in India by M.C. Suryanarayana et. al.
4. Bee Keeping in India by G. K. Ghosh.
5. Applied Zoology by W.K. Balwan and A.K. Verma
6. Poultry by Banerjee, G C (1982), Oxford and IBM Publication
7. DBS Handbook of Poultry Management by W.K. Balwan and A.K.Verma.
8. Economic Zoology by Shukla and Upadhyay.
9. Education of Communicable and Non-Communicable Diseases S.L. Goel Published by Deep& Deep Publications Pvt. Ltd., 2009
10. Apiculture & Sericulture by W.K.Balwan, 2021.
11. Entomology and Pest Management by Pedigo L P. Prentice Hall Publication

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(For the Examination to be held in Year May- 2023, 2024 & 2025)
(SKILL ENHANCEMENT COURSE)
UG SEMESTER-II

SKILL ENHANCEMENT COURSE NO.	:	**USEZOT204**
SKILL ENHANCEMENT COURSE TITLE	:	**MEDICAL PARASITOLOGY**
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

To introduce general parasitology and impart advanced knowledge on parasitological research methods. After completing this course the learners will be able to develop and implement public health interventions, to engage with health systems and public health initiatives and to increase their skill, attitudes and knowledge towards causes of diseases.

UNIT-I: General Parasitology (7 Hrs.)

1.1 Parasitology: Definition, History and Scope
1.2 Parasitism and Parasitoids
1.3 Present Status of Parasitic Diseases in India with special reference to Jammu &Kashmir
1.4 Emerging and Re-emerging infectious Diseases
- 1.4.1 Covid-19
- 1.4.2 Dengue
- 1.4.3 Enteric Fever

Unit-II: Public Health Concerns (8 Hrs.)

2.1 Public Health: Definition, Scope & Functions
2.2 Dimension & Determinants of Health
2.3 Public Health problems and issues
2.4 Health programs in India for AIDS, Leprosy, Tuberculosis, Malaria, Visceral Leishmaniasis and Filariasis
2.5 Antibiotic Resistance

Unit-III: Diagnostic Parasitology (30 Hrs.)

3.1 Sampling Techniques
- 3.1.1 Blood
- 3.1.2 Stool
- 3.1.3 Urine
- 3.1.4 Sputum
- 3.1.5 Swabs

3.2 Study of Parasites through Permanent Prepared Slide/Charts: *Plasmodium*, *Entamoeba*, *Leishmania, Schistosoma, Ascaris, Enterobius, Fasciola, Taenia solium or any other available parasite.*

3.3 Field survey on Common communicable diseases of respective areas.

3.4 Field survey on status of important vectors and reservoirs.

3.5 General methods of microscopic preparations (killing, fixing, washing, dehydration, staining, destaining, mounting) of any vertebrate parasite available.

NOTE FOR PAPER SETTERS

Total Marks of the USEZOT-204 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 beconducted 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 each unit. 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., two questions from each unit. Each question shall be of 10 marks

SUGGESTED READINGS

1. Medical Parasitology by C P Baveja and V Baveja, Arya Publishing Company.
2. Parasitology (Protozoology & Helminthology) by K.D Chatterjee.
3. Medical Parasitology by D. R. Arora and Brij Bala Arora.
4. Applied Zoology by W.K. Balwan and A.K. Verma.
5. Medical Microbiology & Parasitology By B.S. Nagoba and Asha Pichare, Elsevier.
6. Parasitology by S C Chatterjee.