UNIVERSITY OF JAMMU

SYLLABI AND COURSE OF STUDY IN ZOOLOGY

For the Examination to be held in Year 2022, 2023 & 2024

MAJOR ZOOLOGY COURSE

(UMJZO)

UG SEMESTER I & II

UNDER NEP-2020

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

MAJOR CORE COURSE NO.	**:**	**UMJZOT-101**
MAJOR CORE COURSE TITLE	**:**	**BIOMOLECULES AND PHYSIOLOGY OF LIFE SUSTAINING SYSTEMS**
CREDITS	**:**	**03 (THEORY)**
MAXIMUM MARKS	**:**	**75**
I) External (University Exam)	**:**	**60**
II) Internal Assessment	**:**	**15**
MINIMUM PASS MARKS		
I) External	**:**	**22**
II) Internal	**:**	**05**
DURATION OF UNIVERSITY EXAM	**:**	**02 Hours and 30 Minutes**

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 (15 Hrs.)

1.1 Structure and Biological importance of Carbohydrates (Monosaccharides, Disaccharides, Polysaccharides)
1.2 General Structure and Properties of Amino acids; Essential and Non- Essential Amino 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 and Respiration in Humans (15 Hrs.)

2.1 Mechanical and Chemical digestion of Food
2.2 Absorption of Carbohydrates, Lipids and Proteins
2.3 Mechanics of Pulmonary Ventilation
2.4 Respiratory Volumes and Capacities
2.5 Mechanism of Gaseous Exchange across respiratory membranes
2.6 Mechanism of Transport of Oxygen and Carbon dioxide in blood

UNIT 3: Blood, Human Heart and Renal Physiology (15 Hrs.)

3.1 Components of Blood and its functions
3.2 Blood Groups: ABO, MN & Rh – factor
3.3 Detailed structure of Human Heart
3.4 Working of Human Heart: Cardiac Cycle and Heart Sounds
3.5 Structure of Kidney and its functional unit (Nephron).
3.6 Mechanism of Urine Formation (Uropoiesis)

NOTE FOR CONDUCTING EXAMINATION IN UMJZOT-101 & PAPER SETTERS

Total Marks of the MJZOT-101 is 75. 20% marks shall be reserved for internal assessment (15 marks). 80% of the marks (60 marks) shall be reserved for external examination to be conducted by the University/Colleges.

Internal Assessment Test (15 Marks)

The Internal assessment under NEP-2020 shall be of 1 hour duration and shall comprise of two parts:

Part A: Total weightage of Part A will be 06 marks and shall comprise of Five short answer questions selecting atleast from one to two units (50% of syllabus covered). A candidate will have to attempt any three questions each carrying 02 marks.

Part B: Total weightage of Part B will be 09 marks and shall comprise of two long answer questions from first one to two units. A candidate will have to attempt only one question of 9 Marks.

For Paper Setters: External End Semester University Examination

The External Examinations in Theory shall be of 60 Marks and consist of 3 sections:

Section A: It shall be of 09 Marks and comprise of Three short answer type questions, one from each of the units and carrying 03 Marks each. Answers should be precise having 70-80 words only and without any detailed explanation (All Compulsory).

Section B: It shall be of 21 Marks and will comprise of Three Medium answer type questions, two from each of the units and carrying 07 Marks each. A candidate will have to attempt one question from each unit. Answers should be comprehensive having 250-300 words only and with detailed explanation.

Section C: It shall be of 30 Marks and will comprise of Three long answer type questions, one from each of the units. A candidate will have to attempt only Two questions and will carry 15 Marks each. Answers should be of 500-600 words with detailed analysis/explanation/critical evaluation to the question.

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). 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. W. K. Balwan (2019). Animal Physiology and Biochemistry, Paradise press, New Delhi.
10. Withers, P.C. *et al.* (1992) Comparative Animal Physiology (1st edition) Brooks Cole.

MAJOR CORE COURSE NO.	**:**	**UMJZOT-101**
MAJOR CORE COURSE TITLE	**:**	**BIOMOLECULES AND PHYSIOLOGY OF LIFE SUSTAINING SYSTEMS**
CREDITS	**:**	**01 (PRACTICAL)**
MAXIMUM MARKS	**:**	**25**
I) Internal Assessment	**:**	**10**
II) External Practical	**:**	**15**
DURATION	**:**	**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 Kidney from 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.

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(MAJOR COURSE)
UG SEMESTER-II
UNDER NEP-2020

MAJOR CORE COURSE NO.	**:**	**UMJZOT-201**
MAJOR CORE COURSE TITLE	**:**	**BASICS IN CELL BIOLOGY**
CREDITS	**:**	**03 (THEORY)**
MAXIMUM MARKS	**:**	**75**
I) External (University Exam)	**:**	**60**
II) Internal Assessment	**:**	**15**
MINIMUM PASS MARKS		
I) External	**:**	**22**
II) Internal	**:**	**05**
DURATION OF UNIVERSITY EXAM	**:**	**02 Hours and 30 Minutes**

Objectives and Expected Learning Outcomes

The course provides a detailed insight into basic concepts of cellular structure and function. It also gives 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 (18 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: Chromosome and Cell Cycle (15 Hrs.)

3.1. Eukaryotic Chromosome: Composition and Morphology

3.1.1. Ultrastructure of Eukaryotic Chromosome (Nucleosome and Solenoid model)

3.2. Cell Cycle: Definition and Control of Cell cycle

3.3. Cell division: Mitosis and its significance

3.3.1. Meiosis and its significance

3.3.2. Synaptonemal Complex: Structure and Functions

3.3.3. Comparison between Mitosis and Meiosis

NOTE FOR CONDUCTING EXAMINATION IN UMJZOT-201 & PAPER SETTERS

Total Marks of the MJZOT-201 is 75. 20% marks shall be reserved for internal assessment (15 marks). 80% of the marks (60 marks) shall be reserved for external examination to be conducted by the University/Colleges.

Internal Assessment Test (15 Marks)

The Internal assessment under NEP-2020 shall be of 1 hour duration and shall comprise of two parts:

Part A: Total weightage of Part A will be 10 marks and shall comprise of eight short answer questions selecting atleast from two units (50% of syllabus covered). A candidate will have to attempt any five questions each carrying 2 marks.

Part B: Total weightage of Part B will be 5 marks and shall comprise of two long answer questions from first two units. A candidate will have to attempt only one question of 5 Marks.

For Paper Setters: External End Semester University Examination

The External Examinations in Theory shall be of 60 Marks and consist of 3 sections:

Section A: It shall be of 09 Marks and comprise of Three short answer type questions, one from each of the units and carrying 03 Marks each. Answers should be precise having 70-80 words only and without any detailed explanation (All Compulsory).

Section B: It shall be of 21 Marks and will comprise of Three Medium answer type questions, two from each of the units and carrying 07 Marks each. A candidate will have to attempt one question from each unit. Answers should be comprehensive having 250-300 words only and with detailed explanation.

Section C: It shall be of 30 Marks and will comprise of Three long answer type questions, one from each of the units. A candidate will have to attempt only Two questions and will carry 15 Marks each. Answers should be of 500-600 words with detailed analysis/explanation/critical evaluation to the question.

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.

MAJOR CORE COURSE NO.	**:**	**UMJZOT-201**
MAJOR CORE COURSE TITLE	**:**	**BASICS IN CELL BIOLOGY**
CREDITS	**:**	**01 (PRACTICAL)**
MAXIMUM MARKS	**:**	**25**
I) Internal Assessment	**:**	**10**
II) External Practical	**:**	**15**
DURATION	**:**	**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.