S.S.D. Girls' College, Bathinda

Multidisciplinary Course Based On NEP-2020

B.Sc. / B.Sc. (Honours)

Session: 2025-26

SYLLABUS

B.Sc. (Med.) Part-II (SEMESTER-III)

SUBJECT: MAJOR ZOOLOGY - BIOCHEMISTRY AND PHYSIOLOGY

PAPER CODE: BM301

Max Marks: 70 **Total Teaching hours: 3 Hrs/week**
Pass Marks: 35% **Time Allowed: 3 hours**
Theory Paper: 50 **Paper Code: BM301**
Internal Assessment: 20 marks **Credit: 03**

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C, Section A and B will have four questions each from the respective section of syllabus and will carry 8 marks each. Section C will consist of 9 short-answer type questions (8-10 lines) which will cover the entire syllabus uniformly and will carry 2 marks in all.

INSTRUCTIONS FOR CANDIDATES

Candidates are required to attempt two questions from each section A and B and the entire section C, which is compulsory.

SECTION A

- Carbohydrate metabolism: Glycolysis, Citric acid cycle, Pentose phosphate pathway, Gluconeogenesis, Glycogenesis, Glycogenolysis.
- Protein metabolism: Transamination, Deamination, Urea cycle.
- Lipid metabolism: β-oxidation of fatty acids - Palmitic acid, Linoleic acid; Fatty acid biosynthesis.
- Enzymes: Nomenclature and classification; Cofactors; Specificity of enzyme action; Isozymes; Mechanism of enzyme action; Enzyme kinetics; Derivation of Michaelis- Menton equation, Factors affecting rate of enzyme catalyzed reactions; Enzyme inhibition.

SECTION B

- Digestion: Physiology of digestion in the alimentary canal; Absorption of carbohydrates, proteins, lipids
- Respiration: Transport of Oxygen and carbon dioxide in blood, Oxygen dissociation curve of haemoglobin, Bohr effect, chloride shift, Haldane effect and control of breathing.
- Excretion: Mechanism of Urine formation, Counter-current Mechanism, Osmoregulation
- Cardiovascular system: Blood clotting, Origin and conduction of the cardiac impulse, Cardiac cycle.
- Nerve: Resting membrane potential, Origin of Action potential and its propagation in myelinated and non-myelinated nerve fibres, synapse and myoneural junction.
- Muscle: Molecular and chemical basis of muscle contraction.

Course Outcomes

- Explain key biochemical processes including glycolysis, TCA cycle, pentose phosphate pathway, gluconeogenesis, glycogenesis, glycogenolysis, transamination, deamination, urea cycle, and β-oxidation and biosynthesis of fatty acids
- Describe enzyme nomenclature, classification, cofactor roles, specificity, isozymes, and explain enzyme action through Michaelis-Menten kinetics, enzyme inhibition, and factors influencing catalytic activity.
- Understand the process of digestion and nutrient absorption, oxygen and carbon dioxide transport, urine formation and osmoregulation, blood clotting and cardiac physiology, and control of respiration.
- Describe the origin and propagation of nerve impulses, synaptic transmission, and the molecular basis of muscle contraction in vertebrates

PRACTICAL

Multidisciplinary Course Based On NEP-2020
B.Sc. / B.Sc. (Honours)
B.Sc.-II (Med.) Part-II Semester-III Major Zoology
2025-26 Syllabus
Practical Paper: BIOCHEMISTRY AND PHYSIOLOGY
Practical Paper Code: BM301P

Total Marks: 30
Practical Marks: 20 marks
Internal Assessment: 10 marks
Pass marks: 35%

Time Allowed: 3 hours
Total Teaching hours: 2 hours/week
Credit: 1

1. Identification of food stuffs: starch, glucose, proteins and fats in a given solution.

2. Demonstration of osmosis and diffusion.

3. Demonstration of presence of amylase in saliva, denaturation with change of pH and temperature.

4. Analysis of urine for urea and glucose.

5. Determination of coagulation and bleeding time of blood in man.

6. Determination of blood groups of human blood sample.

7. Recording of blood pressure of man.

8. Estimation of haemoglobin content.

9. Preparation of slide to study TLC and DLC.

10. Preparation and study of human blood smear.

11. Study of permanent mount of striated muscles.

12. Study of permanent mount of myelinated nerve fibre.

INSTRUCTIONS FOR PRACTICAL PAPER

1. Performance and write-up of any one (Exp. 1-4)

2. Performance and write-up of any one (Exp. 5-8)

3. Identification of permanent slide (Exp 11-12)

4. Preparation of Permanent stained slide (Exp. 9-10)

5. Viva-Voce

6. Practical note book

S.S.D. Girls' College, Bathinda

Multidisciplinary Course Based On NEP-2020

B.Sc. / B.Sc. (Honours)

Session: 2025-26

SYLLABUS

B.Sc. (Med.) Part-II (SEMESTER-IV)

SUBJECT: MAJOR ZOOLOGY - MOLECULAR BIOLOGY

PAPER CODE: BM401

Max Marks: 70
Pass Marks: 35%
Theory Paper: 50
Internal Assessment: 20 marks

Total Teaching hours: 3 Hrs/week
Time Allowed: 3 hours
Paper Code: BM401
Credit: 03

INSTRUCTION FOR THE PAPER SETTER

The question paper will consist of three sections A, B and C, Section A and B will have four questions each from the respective section of syllabus and will carry 8 marks each. Section C will consist of 9 short-answer type questions (8-10 lines) which will cover the entire syllabus uniformly and will carry 2 marks in all.

INSTRUCTIONS FOR CANDIDATES

Candidates are required to attempt two questions from each section A and B and the entire section C, which is compulsory.

SECTION A

1. The nature of genetic material: DNA Structure, Watson and Crick-model, Polymorphism of DNA Helix.

2. Replication of DNA: Enzymes and mechanism involved in DNA replication (prokaryotes and eukaryotes). DNA damage and repair.

3. Transcription: Mechanism of Transcription in Prokaryotes and Eukaryotes.

4. RNA Processing: Concept of introns and exons, spliceosome machinery and splicing pathways.

SECTION B

5. Translation (Prokaryotes and Eukaryotes): Various steps and mechanism involved in protein synthesis.

6. Transcription Regulation: Principles of transcriptional regulation in prokaryotes with examples from lac and trp operons. Transcription Regulation in Eukaryotes.

7. Recombinant DNA technology: Introduction to the concept of Recombinant DNA Technology: Enzymes involved, vectors, transformation techniques (microbial), Construction and screening of DNA libraries.

8. Application of recombinant DNA technology: Application in medicine: vaccines, detection of genetic diseases (Sickle cell anemia), gene therapy.

Course outcomes

- Describe the structure of DNA, including the Watson-Crick model and polymorphic forms, and explain DNA replication mechanisms in both prokaryotes and eukaryotes, including enzymes and DNA repair systems.
- Explain the process of transcription and its regulation in prokaryotes (e.g., lac and trp operons) and eukaryotes, and understand RNA processing including introns, exons, and splicing mechanisms.
- Describe the detailed mechanism of protein synthesis (translation) in prokaryotes and eukaryotes, including the initiation, elongation, and termination steps.
- Explain the enzymes, vectors, and transformation methods used in Recombinant DNA Technology, and discuss its applications in medicine, including vaccine development, disease diagnosis (e.g., sickle cell anemia), and gene therapy.

SUGGESTED READINGS

1. Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th edition. John Wiley & Sons.Inc.

2. De Robertis, E.D.P. and De Robertis, E.M.F. 2006. Cell and Molecular Biology. 8th edition. Lippincott Williams and Wilkins, Philadelphia.

3. Becker, W.M., Kleinsmith, L.J., Hardin. J. and Bertoni, G. P. 2009. The World of the Cell. 7th edition. Pearson Benjamin Cummings Publishing, San Francisco.

4. Watson, J. D., Baker T.A., Bell, S. P., Gann, A., Levine, M., and Losick, R., 2008 Molecular Biology of the Gene 6th edition. Cold Spring Harbour Lab. Press, Pearson Pu

PRACTICAL

Multidisciplinary Course Based On NEP-2020
B.Sc. / B.Sc. (Honours)
B.Sc.-II (Med.) Part-II Semester-IV Major Zoology
2025-26 Syllabus
Practical Paper: MOLECULAR BIOLOGY

Practical Paper Code: BM401P

Total Marks: 30
Practical Marks: 20 marks
Internal Assessment: 10 marks
Pass marks: 35%

Time Allowed: 3 hours
Total Teaching hours: 2 hours/week
Credit: 1

1. Isolation of DNA
2. Quantitative estimation of DNA using spectrophotometer
3. Separation of DNA by Electrophoresis and visualisation through Gel Documentation
4. Demonstration of SDS-Polyacrylamide Gel Electrophoresis (SDS-PAGE)
5. Demonstration of DNA amplification using PCR
6. Study and interpretation of electron micrographs/ photograph showing

(a) DNA replication

(b) Transcription

(c) Split genes

7. Southern, Northern and Western Blotting Techniques
8. Visit to Molecular research Lab

INSTRUCTIONS FOR PRACTICAL PAPER

1. Isolation of DNA/Quantitative estimation of isolated DNA
2. Separation of DNA/Proteins through Agarose Gel Electrophoresis or SDS-PAGE
3. Demonstration of PCR/Southern/Northern or Western Blot techniques
4. Identification of Photomicrographs pertaining to Expt. 6
5. Viva-Voce
6. Practical note book and Field report