दुर्ग विश्वविद्यालय, दुर्ग (छ.ग.)

पाठ्यक्रम

परीक्षा – 2020–21

बी.एससी. भाग–2

B.Sc. Part-2

(Approved by Board of Studies)
Effective from July 2017

HEMCHAND YADAV VISHWAVIDYALAYA, DURG (C.G.)

B.Sc. II

BIOTECHNOLOGY

PAPER – I

MOLECULAR BIOLOGY & BIOPHYSICS

M.M. 50

UNIT-I

1. Nucleic Acid: Bases, Nucleosides and Nucleotides, DNA and RNA structure.
2. Plasmids.
3. Transposons: Repetitive elements, LINEs & SINEs, Structure of Gene.

UNIT-II

1. DNA Replication: Enzymes involved and mechanism of DNA Replication in Prokaryotes.
2. Mutation: Molecular level of Mutation, Types of Mutagens, Spontaneous and Induced Mutation.
3. DNA Repair: NER, BER and Mismatch Repair.

UNIT-III

1. Genetic Code: Features, Condon Assignment and Wobble hypothesis.
2. Transcription: Initiation, Elongation and Termination in Prokaryotes.
3. Translation: Initiation, Elongation and Termination Translation machinery in Prokaryotes. Operon-Concept of Operator, Regulator, Promoter gene, Inducer and Co-repressor.

UNIT –IV

1. Biophysics : Introduction, Scope and Application
2. Principle, Structure, Functions of the following:
   a. Microscopy b. Colorimeter and Spectroscopy c. Electrophoresis
   d. Centrifugation e. Chromatography.

UNIT –V

1. Radioisotopes techniques: Measurement of radioactivity, Ionization Chambers, Geiger Muller and Scintillation Counter.
2. Autoradiography and DNA Fingerprinting.
3. Biosensor.

B.Sc. II
BIOTECHNOLOGY

PAPER II

RECOMBINANT DNA TECHNOLOGYAND GENOMICS

M.M. 50

UNIT-I

5. Recombinant DNA technology: General concept. Steps in gene cloning and application.
6. Host controlled Restriction Modification System, Ligases and Polymerases, Klenow fragment, Taq, Pfu polymerase and Nuclease (Endo, Exo and restriction endonuclease).
7. Modification Enzyme (Kinase, Phosphates and terminal deoxynucleotidyl transferase). Reverse Transcriptase.

UNIT –II

5. Vectors: Plasmid, Bacteriophages, Cosmid, SV40 and Expression vectors.
6. Gene Library: Genomic and cDNA library.
7. Selection and Screening of Recombinants: Genetic and Hybridization methods.

UNIT –III

3. PCR: Types of PCR, Steps (Denaturation, Annealing and Extension); Applications, Advantages and Limitation of PCR.
4. Molecular Marker-RFLP, RAPD and Micro array.
5. Human Genome Project.

UNIT-IV

1. Basic concept of Gene Transfer Methods: Microinjection, Electroporation, Lipofection and Microprojectile.
2. Gene Therapy: *In vivo* and *Ex vivo*, Germ line and Somatic gene therapy.
3. Basic idea of Stem cell technology: Types of stems cell cultures and their Significance.

UNIT-V

5. Introduction to Bioinformatics: History, Objective and Application.
6. Major Bioinformatics Resource – NCBI , Types of Databases (Primary and Secondary Databases) , BLAST and FASTA
7. Basic concept of Genomics and Proteomics

List of Practical's

MOLECULAR BIOLOGY, BIOPHYSICS, RECOMBINANT DNA TECHNOLOGY AND GENOMICS

4. Isolation of DNA from Plant cell.
5. Estimation of DNA by DPA method.
6. Isolation RNA from yeast cells

Experiment based on-

9. Centrifugation
10. Spectrophotometer/Colorimeter
11. Electrophoresis
12. Paper chromatography/TLC

Experiment based on Bioinformatics -

4 Retrieve DNA /Protein sequence from Biological Data Bases (NCBI).
5 Use of tools studied

SCHEME FOR PRACTICAL EXAMINATION

Time: 4 hrs. M.M.: 50

1. Experiment based on DNA/RNA	10 marks
2. Experiment based on Instruments	10 marks
3. Experiment based on Bioinformatics	10 marks
4. Spotting	10 marks
5. *Viva - Voce*	05 marks
6. Record / Sessional	05 marks