

UNIVERSITY OF MYSORE
DEPARTMENT OF STUDIES IN BIOTECHNOLOGY
SYLLABUS FOR ENTRANCE EXAMINATION FOR ADMISSION TO M.Sc. IN BIOTECHNOLOGY

Unit-I: Biomolecules

Structure and functions of carbohydrates (Mono-, oligo- and poly saccharides), amino acids, proteins (primary, secondary and tertiary structure), lipids and nucleic acids

Unit –II: Microbiology

Basic microbiological techniques, structure, classification and reproduction of bacteria, virus and fungi, Microbial nutrition and growth, antimicrobial agents, Biological nitrogen fixation, Microbial diseases, Food spoilage, preservation

Unit –III: Enzymology

Isolation and purification of enzymes, nomenclature and classification of enzymes, Enzyme kinetics, Factors affecting enzyme activity, Mechanism of enzyme action, Co enzymes and cofactors, Applications of enzymes: clinical, analytical and biotechnological.

Unit –IV: Metabolism

Carbohydrate metabolism- Glycolysis, gluconeogenesis, TCA cycle, Bioenergetics- Electron transport chain and oxidative phosphorylation, Photosynthesis, Amino acid metabolism- Glucogenic and ketogenic amino acids, urea cycle, Lipid metabolism- Beta-oxidation and biosynthesis of fatty acids, Metabolism of nucleotides- Biosynthesis and degradation of purines and pyrimidines

Unit –V: Cell Biology and Genetics

Structure and functions of Cell organelles, Cell Division and Cell cycle, Cell-cell interaction and motility, Special cells- Blood cells, Cancer cells

Genetics- Laws of inheritance, Sex-linked inheritance, Mutation- Chemical, physical and biological mutagens, structure of eukaryotic chromosomes, Chromosomal aberrations, Chromosomal disorders, Genetic recombination in bacteria: Transformation, transduction and conjugation.

Unit –VI: Plant Cell & Tissue Culture and Animal Cell Culture

Principles of tissue culture, Organ culture, Micropropagation in plants, Somatic embryogenesis, Suspension culture, Protoplast culture and fusion

Animal Cell Culture- laboratory facilities, chemically defined media, Primary culture, cell lines and cloning, somatic cell fusion

Unit-VII: Molecular Biology and Genetic Engineering

DNA as genetic material, replication of DNA in prokaryotes, gene concept- promoter, introns and exons, *lac* operon, Transcription of prokaryotic genes, genetic code, translation

Genetic engineering- Restriction endonucleases, Taq DNA polymerase, Gene cloning vectors- plasmids, Recombinant DNA technology, isolation of mRNA, preparation of cDNA, gene and cDNA library, Genetic engineering techniques, Southern and Northern blotting, PCR, DNA sequencing

Unit-VIII: Immunology and Medical Biotechnology

Types of immunity, Antigens, Antibodies, Immunization, T-cells, B-cells, Immune disorders, Hypersensitivity, Immunotechniques, immunodiffusion, ELISA, Western blotting

Vaccine production, production of Humulin, gene therapy, *ex-vivo* and *in-vivo* gene therapy, Antisense technology, Transgenic animals

Unit-IX: Microbial Technology and Agricultural Biotechnology

Microbial Technology, primary and secondary metabolites, Microbial production, Vit-C and Penicillin, Microbial pesticides: Fungicides and herbicides,

Agricultural Biotechnology- Biofertilizers and phyto-stimulants, Genetic engineering of crop plants, Gene transfer techniques, Food biotechnology, Food processing, Fruit ripening, genetically modified foods, biotechnology in dairy industry

Unit-X: Environmental Biotechnology and Bioinformatics

Environmental Biotechnology, pollution detection, wastewater treatment, cell immobilization, Biodegradation, Biodegradation, pesticides and surfactants, biomining, Treatment of Industrial wastes, Solid waste management. Genetically engineered microbes for waste treatment, biodegradable plastics

Bioinformatics- DNA databases, genbank sequence databases, Phylogenetic, sequence aligning, Protein databases, dendrograms, Information retrieval from databases, Human Genome Project,

ELIGIBILITY CONDITIONS FOR ADMISSION TO M.Sc. IN BIOTECHNOLOGY

Bachelor's degree in Physical, Biological, Agricultural, Veterinary, Fishery Sciences, Pharmacy, Engineering/ Technology, Medicine (MBBS) OR B.D.S from any University recognized by UGC/ICAR/AICTE/Medical Council with at least 55 % marks (50 % in case of SC/ST and Cat-I candidates) in Optional subjects put together from all the years of the examinations of the course.

Note: As the M.Sc Biotechnology course is funded by the Department of Biotechnology (DBT), Govt. of India, 10 candidates will be selected by DBT through All India Entrance Examination conducted by the Jawaharlal Nehru University and the remaining seats will be filled up as per University of Mysore regulations.