

Biology Syllabus for BS / BSC / Masters / MPhil

Instructions:

The objective of “Champion of Subject” is to test the conceptual abilities of the students and candidates regarding the subject.

- This is the comprehensive syllabus for the “Champion of Subject”.
- Candidates are advised to thoroughly go through and study the syllabus
- The test will comprise of 120 MCQs.
- The time allowed for the test will be 120 min.
- MCQs will cover part or all the syllabus mentioned below.
- Munzill reserved the right to conduct an online or physical test.

BOTANY

- ❖ Algae, Fungi and Bryophytes
- ❖ Pteridophyta and Gymnosperms
- ❖ Anatomy and Embryology
- ❖ Taxonomy of Angiosperms
- ❖ Plant Physiology
- ❖ Plant Pathology
- ❖ Biofuels
- ❖ Biofertilizers
- ❖ Biocides
- ❖ Important Indigenous Medicinal Plants, Multipurpose Trees
- ❖ Industrial Botany

ZOOLOGY

- ❖ Human Diseases
- ❖ Applied Entomology.
- ❖ Structure and Functions of Non-chordates
- ❖ Ecological theories and applications

- ❖ Parasites and Immunity
- ❖ Structure and Functions of Chordates
- ❖ Endocrinology and Neuroscience
- ❖ Comparative Animal Physiology
- ❖ Cell and Receptor Biology
- ❖ Biochemistry and Molecular biology
- ❖ Taxonomy and Biodiversity
- ❖ Evolution and Animal Behaviour
- ❖ Taxonomy and Invertebrate Studies

MICROBIOLOGY

- ❖ General Microbiology
- ❖ Microbial Physiology
- ❖ Immunology
- ❖ Microbial Genetics
- ❖ Genetic Engineering
- ❖ Bioinformatics & Bio-Statistics
- ❖ Microbial Growth and Reproduction
- ❖ Tissue Culture
- ❖ Virology
- ❖ Medical Microbiology
- ❖ Industrial Microbiology
- ❖ Biodegradation & Bioremediation
- ❖ Gene Therapy
- ❖ Environmental microbiology

CELL AND MOLECULAR BIOLOGY & GENETICS

- ❖ Membrane dynamics and cell surfaces
- ❖ Organelles: structure, function, synthesis, and targeting

- ❖ Cytoskeleton: motility and shape
- ❖ Cell cycle: growth, division, and regulation (including signal transduction)
- ❖ Methods & Techniques used in Biology
- ❖ Genetic foundations
- ❖ Chromatin and chromosomes
- ❖ Genome sequence organization
- ❖ Genome maintenance
- ❖ Gene expression and regulation in prokaryotes and eukaryotes: mechanisms
- ❖ Gene expression and regulation: effects
- ❖ Bacteriophages, animal viruses, and plant viruses
- ❖ Recombinant DNA methodology

ORGANISMAL BIOLOGY

- ❖ Internal transport and exchange (Circulatory, respiratory, excretory, and digestive systems)
- ❖ Support and movement
- ❖ Integration and control mechanisms
- ❖ Behaviour (communication, orientation, learning, and instinct)
- ❖ Metabolic rates (temperature, body size, and activity)
- ❖ Reproductive structures
- ❖ Meiosis, gametogenesis, and fertilization
- ❖ Early development (e.g., polarity, cleavage, and gastrulation)

- ❖ Developmental processes (e.g., induction, determination, differentiation, morphogenesis, and metamorphosis)
- ❖ External control mechanisms (e.g., photoperiod)
- ❖ Plant Structure, Function, and Organization, with Emphasis on Flowering Plants
- ❖ Plant Reproduction, Growth, and Development, with Emphasis on Flowering Plants

DIVERSITY OF LIFE

- ❖ Archaea (Morphology, physiology, and identification)
- ❖ Bacteria (Morphology, physiology, pathology, and identification)
- ❖ Protista
- ❖ Fungi
- ❖ Animalia with emphasis on major phyla
- ❖ Plantae with emphasis on major phyla

ECOLOGY AND EVOLUTION

- ❖ Environment/organism interaction
- ❖ Behavioural ecology
- ❖ Population ecology
- ❖ Community ecology
- ❖ Ecosystems
- ❖ Genetic variability
- ❖ Macroevolutionary and microevolutionary processes
 - Gene flow and genetic drift
 - Natural selection and its dynamics
 - Levels of selection (e.g., individual and group)
 - Trade-offs and genetic correlations

- Natural selection and genome evolution
- Synonymous vs. nonsynonymous nucleotide ratios
- ❖ Evolutionary consequences

ENVIRONMENTAL SCIENCE

- ❖ Air pollution and Climate Change
- ❖ Biodiversity & Conservation
- ❖ Environmental Toxicology, Health and Safety
- ❖ Environmental Analysis: Techniques and Instrumentation
- ❖ Environment and Energy Management
- ❖ Industrial & Biomedical Waste Management
- ❖ Environmental Technology
- ❖ Environmental Biotechnology
- ❖ Public awareness of Environment issues

BIOTECHNOLOGY

- ❖ Types of restriction enzymes
- ❖ Methylation, cloning vectors
- ❖ Selection of recombinants
- ❖ Optimization of heterologous protein expression
- ❖ Application of recombinant DNA technology
- ❖ Resistance, metabolic engineering
- ❖ Production of vaccines

BIOCHEMISTRY

- ❖ Biological molecules
- ❖ Enzyme activity, receptor binding, and regulation
- ❖ Major metabolic pathways and regulation

- ❖ Bioanalytical Techniques
- ❖ Nutritional Biochemistry
- ❖ Bioenergetics and Metabolism
- ❖ Plant Biochemistry
- ❖ Clinical Biochemistry