B. Sc. Bioscience

Scheme of Examination

Paper	Name of Paper	Max Marks	Total Marks	Min Marks
B.Sc. I Year				
Paper – I	Cell Biology and Genetics	50	100	33
Paper – II	Biodiversity and Systematics of Plants and Microbes	50		
Practical	Based on Paper - I & - II		50	17
B.Sc. II Year				
Paper – I	Ecology, Environmental Biology, Evolution and Behaviour	50	100	33
Paper – II	Biodiversity and Systematics of Invertebrates and Vertebrates	50		
Practical	Based on Paper - I & - II		50	17
B.Sc. III Year				
Paper – I	Plant and Animal Physiology, Development and Biochemistry	50	100	33
Paper – II	Biostatistics, Computer and Bioinformatics	50		
Practical	Based on Paper - I & - II		50	17

22/2/23

22/2/23

22/02/2023

22.2.23

Join our WhatsApp Channel for FREE Question Papers, Syllabus & Exam Updates
More papers: cguniversities.com | Tap here to join
JOIN NOW >

Syllabus

B.Sc. I Year

Paper – I	Cell Biology and Genetics
Unit – I	Cell wall and Cell membrane; Structural components, organization and function. Cytoskeletons. Structure and function of Nucleus, nuclear pore complex, Nucleolus and other subnuclear organelles.
Unit – II	Structure and function of Endoplasmic reticulum, Golgi bodies, Lysosomes, Peroxisomes, Ribosomes, Chloroplast and Mitochondria.
Unit – III	Structure and organization of chromosomes. Cell division in prokaryotes and eukaryotes. Structure, types and function of DNA and RNA. Genetic code. Programmed cell death and Apoptosis. Identification of the genetic material: Experiments of Griffith.
Unit – IV	Molecular mechanism of recombination: Homologous and site specific recombination. Recombination in bacteria: Conjugation, ransformation, Transduction. Basic concept of genetics. Mendelian Genetics: Principle of segregation and independent assortment, monohybrid, dihybrid and trihybrid cross, epistasis.
Unit – V	Mutation: Point mutations, base substitutions, base addition and deletion, Mutant phenotypes and their detection, Spontaneous mutation, Induced mutations, molecular mechanisms of mutations. Concept of transgenic animals and plants.

Paper – II	Biodiversity and Systematics of Microbes and Plants
Unit – I	Bacteria: General characteristics, Structure, nutrition, reproduction. Classification of bacteria- outline of the prokaryotes as per Bergey's Manual 2001. Economic importance of bacteria Virus: General characteristics, structure and classification of viruses. Bacteriophage: λ phage, structure and life cycle. Plant virus: TMV structure and life cycle. Animal virus: HIV structure and life cycle.
Unit – II	Algae: General characters, classification and economic importance, important features and life history of Chlorophyceae; Volvox, Oedogonium. Xanthophycae; Vaucheria. Pheophyceae; Sargusum. Rhodophycae; Polysiphonia.
Unit – III	Fungi: General characters, classification and economic importance, important features and life history of Mastogomycotina; Pythium, Zygomycotina; Mucor. Ascomycotina; Peziza. Basidiomycotina; Agaricus. Deuteromycotina; Colletotrichum. General characters of Lichen.
Unit – IV	Bryophyta: Structure, reproduction and classification of Hepaticopsida- Marchantia; Anthocerotopsida- Anthoceros; Bryopsida- Funaria. Pteridophyta: Important characteristics of Psilopsida, Lycopsida, Sphenopsida, Pteropsida, Lycopodium, Selaginella, Pteris and Marsilea.
Unit – V	General feature of Gymnosperm and their classification: Evolution and diversity of gymnosperm. Geological time scale, fossilization and fossil Gymnosperm. Morphology of vegetative and reproductive parts; anatomy of

22/2/23 23/2/23 22.2.23 22/02/2023

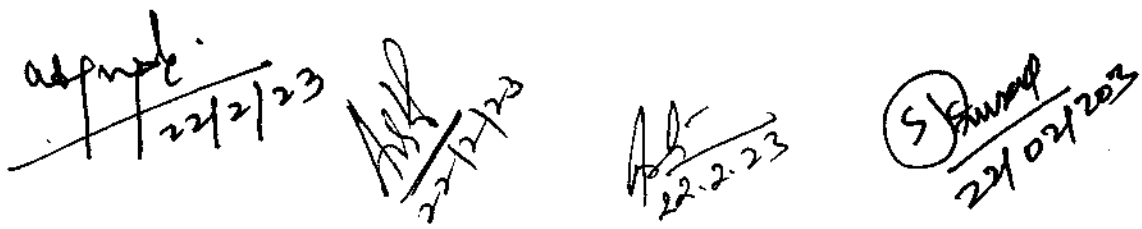
Join our WhatsApp Channel for FREE Question Papers, Syllabus & Exam Updates
More papers: cguniversities.com | Tap here to join
JOIN NOW >

	roots, stem and leaf, reproduction and life cycle of Pinus, Cycas and Ephedera. Classification of angiosperm: Salient features of the systems proposed by Benthem and Hooker, and Engler and Prantl. General account of the families: Brassicaceae, Malvaceae, Fabaceae, Apiaceae, Acanthaceae, Apocyanaceae, Solanaceae, Euphorbiaceae, Liliacea, and Poacea.

Practical	1. Preparation of temporary smear of salivary gland chromosome of Drosophila. 2. Identification of mutant phenotypes of Drosophila / Arabidopsis stock maintained in the department. 3. Bacterial culture liquid and plate for mutation studies. 4. Study of cell structure and measurement from onion leaf peels: demonstration of staining and mounting methods. 5. Study of plastids to examine pigment distribution in plants (Cassia / *Lycopersicon capsicum*). 6. Determination of hill activity in chloroplast of spinach. 7. Isolation and staining of mitochondria using Janus green. 8. Isolation of microorganisms from soil, air and water 9. Microbial culture, staining and identification 10. Study of specimens of representative examples of different class. 11. Study of permanent slides of different material of representative examples as per theory syllabus. 12. Study of disease symptoms in plants. 13. Isolation of Bacteria from various sources and their identification. 14. Isolation of Fungi from various sources and their identification. 15. Examination of fungal flora of different local ponds 16. Morphology and anatomy of Marchantia and Anthoceros 17. Morphology and anatomy of Selaginella and Marsilea 18. Morphology and anatomy of Cycas, Pinus and Ephedra 19. Study of vegetative and reproductive parts of species belonging to families

Join our WhatsApp Channel for FREE Question Papers, Syllabus & Exam Updates
More papers: cguniversities.com | Tap here to join
JOIN NOW >

Books Recommended	1. Antherly, A.G., Girton J.R. and Mc Donald, 1999. The Science of Genetics. Saunders College Publishing Co. Forth Worth, USA. 2. Buchanan, B.B., Gruissem, W. and Jones, R.L. 2000. Biochemistry and Molecular Biology of Plants. American Society of Plant Physiologists, Maryland, USA. 3. David E. Sadava. 1993, Cell Biology: Organelles Structure and Function. Jones and Bartlett Publishers 4. Gardeners, J., Simmons, H.J. and Snustad, D.P. 1991. Principles of Genetics (8th Ed.). John Wiley and Sons N.Y. 5. Lowey 1991. Cell Structure and Function – Science 6. Robertis D. – Cell Biology, Science Publication. 7. Sharma, A.K. and Sharma, A. 1999. Plant Chromosome: Analysis, Manipulation and Engineering, Harwood Academic Publishers, Australia. 8. Singh, B.P. – Fundamentals of Genetics. 9. Snustad, D.P., and Simmons, M.J. 2000. Principles of Genetics (2nd Ed.). John Wiley and Sons. Inc., USA. 10. Verma, P.C. And Agrawal , V.K. – Cell Biology, Genetics, Molecular Biology, Evolution & Ecology, S.Chand Publication. 11. General microbiology By Pawar and Daginawala 12. Microbiology by Pelczar and Reid 13. Microbiology by PD Sharma 14. Saxena and Sarbhai – A textbook of Botany (Angiosperms) 15. Bendre and Kumar – Economic Botany 16. Singh and Jain – Taxonomy of Angiosperms 17. Pandey, B.P. – Textbook of Botany 18. Vashishta, B.R. – Bryophyta 19. Vashishta, P.C. – Pteridophyta 20. Vashishta, P.C. – Gymnosperms



Join our WhatsApp Channel for FREE Question Papers, Syllabus & Exam Updates
More papers: cguniversities.com | Tap here to join
JOIN NOW >

Syllabus	
B.Sc. II Year	
Paper – I	**Ecology, Environmental Biology, Evolution and Behaviour**
Unit – I	Ecology: Definition, Scope and Importance. Ecological factors: Abiotic and biotic factor. Ecosystem: Types of Ecosystem, Components of ecosystem. Energy flow in the Ecosystem: Energy flow models. Food Chains and Food Web. Ecological pyramids. Ecological succession.
Unit – II	Air pollution: Evolution and composition of atmosphere, Chemical and photochemical reactions in the atmosphere, Air pollutants, Control of air pollution. Water pollution: Sources of water pollution, Hydrologic cycle, water quality standards, Eutrophication and algal blooms.
Unit – III	Industrial pollution: Sources and major pollutants. Bioremediation: Types and techniques. Solid waste management. Environmental impact assessment. Pollution control laws and acts.
Unit – IV	Evolution: Basic concepts. Theories of organic evolution Patterns of evolution: Divergent and convergent evolution, parallel evolution, co-evolution. Evolution in action: Variations, mutations, recombination, ploidy, isolation, Natural selection, Concept of species and speciation. Micro and Macroevolution
Unit – V	Concepts and patterns of behaviour. Instinct and learning: Innate behavior, Learned behaviour and types of learning, Genetic basis of behaviour. Control of behavior: Neural, hormonal and pheromonal. Social organization: Communication, Living in groups, Eusocial organization. Migration, orientation and navigation

Paper – II	**Biodiversity and Systematics of Invertebrates and Vertebrates**
Unit – I	General characters and classification of Invertebrates up to orders with examples emphasizing their biodiversity, economic importance and conservation measures. Protozoa: Plasmodium. Protozoa and diseases. Porifera: Sycon. Coelentrata: Obellia. Helminths: Liver fluke
Unit – II	Annelida: Nereis, Metamorphism and Trocophore larvae. Arthropoda: Prawn. Mollusca: Pila. Echinodermata: Star fish, Echinoderm larvae. Hemichordata: Balanoglossus
Unit – III	Chordata: Origin and Classification. Protochordata; Classification up to orders, interrelationships, Urochordates; Amphioxus Agnatha: Petromyzon, Fishes: skin and scales, Migration and Parental care
Unit – IV	Amphibia : Parental care, Neoteny. Reptiles : Extinct reptiles, poisonous and non-poisonous snakes, poisonous apparatus and snake venom

22/2/23 22/2/23 22.2.23 22/02/2023

Join our WhatsApp Channel for FREE Question Papers, Syllabus & Exam Updates
More papers: cguniversities.com | Tap here to join
JOIN NOW >

Unit – V	Birds: Migration, Ratitae, Flight adaptation. Mammals; Aquatic mammal, Dentition in mammal, Prototheria and Affinities

Practical	1. Determination of density, abundance and frequency of biota from grasslands 2. Determination of temperature and pH of the industrial effluents. 3. Determination of phenopthalein, methyl orange and total alkalinities and free and total CO2 of industrial effluents 4. Determination of phosphate, sulphate, nitrate, nitrite and ammonia nitrogen of industrial effluents. 5. Determination of DO of industrial effluents 6. Collection and identification of plants and animal species from different industrial effluent channels. 7. Study of specimens of representative examples of different phylum (Classification up to order). 8. Study of permanent slides of different sections of representative examples as per theory syllabus. 9. Microscopic techniques including unstained and stained permanent mount of animal material. 10. Examination of local fauna of different ponds. 11. Phototactic behaviour in *Mimosa pudica* and fish 12. Learning behaviour of cockroach, mice 13. Reasoning behaviour of mouse and rat 14. Study of representative examples of the different chordates (classification and characters) 15. Simple microscopic techniques through unstained and stained permanent mounts 16. Study of histological slides in accordance with the theory papers. 17. Study of osteology of different chordates

Books Recommended	1. Odum EP: Ecology 2. PD Sharma: Fundamentals of Ecology 3. Moody: Introduction to Evolution 4. Paul L. Bishop - Pollution Prevention: Fundamentals and Practice 5. Marquita K. Hill - Understanding Environmental Pollution: A Primer 6. Daniel Vallero - Fundamentals of Air Pollution, Fourth Edition 7. Kenneth M. Vigil - Clean Water: An Introduction to Water Quality and Pollution Control 8. W.Wesley Eckenfelder - Industrial Water Pollution Control 9. A.G. Clarke - Industrial Air Pollution Monitoring - Gaseous and particulate emissions 10. Harry M. Freeman - Industrial Pollution Prevention Handbook 11. Alcock (2009): Animal Behaviour: An Evolutionary Approach 12. Grier (1984): Biology of Animal Behaviour 13. Lorenz (1981): The Foundation of Ethology 14. Manning & Dawkins (1998): An Introduction to Animal Behaviour 15. Mcfarland (1985): Animal Behaviour: Psychology, Ethology and Evolution 16. Scott (2005): Essential Animal Behaviour 17. Anil Kulshreshtha: Unified Practical Zoology

22/2/23 22/2/23 22-2-23 22/02/2023

Join our WhatsApp Channel for FREE Question Papers, Syllabus & Exam Updates
More papers: cguniversities.com | Tap here to join
JOIN NOW >

	18. Michael Stachowitsch, Sylvie Proidl (Illustrator): The invertebrates: An illustrated glossary 19. L.H. Hyman: The Invertebrata vol I & II 20. Rouer and Parsons – The Vertebrate Body, Saunders 21. Kotpal: Modern text book of Zoology: Invertebrates (11th ed. 2016 Rastogi) 22. Kotpal: Modern text book of Zoology: Vertebrates (4th ed. 2016 Rastogi) 23. Jordan & Verma: Invertebrate Zoology (Reprint 2014, S. Chand) 24. Jordan & Verma: Chordate Zoology (Reprint 2014, S. Chand)

22/2/23 22/2/23 22.2.23 22/02/2023

Join our WhatsApp Channel for FREE Question Papers, Syllabus & Exam Updates
More papers: cguniversities.com | Tap here to join
JOIN NOW >

Syllabus	
B.Sc. III Year	
Paper – I	**Plant and Animal Physiology, Development and Biochemistry**
Unit – I	Plant water relations: Importance of water to plant life, Physical properties of water, Diffusion and Osmosis, Ascent of sap, Physiology of stomatal movement. Transpiration. Photosynthesis: light reaction & dark reaction: C3, C4 and CAM metabolism. Respiration: Aerobic and anaerobic respiration, Glycolysis, Fermentation, Krebs cycle, ETC, oxidative phosphorylation.
Unit – II	Nitrogen Metabolism: Biology of nitrogen fixation; Nitrogenase. Structure, function and regulation of Nitrate Reductase and Nitrite Reductase, Assimilation of Ammonia Photomorphogenesis: Photochemical and biochemical properties of phytochrome Phytohormones: Structure, function and applications of Auxin, Gibberlic acid, Cytokinin, Abscisic acid and Ethylene.
Unit – III	Physiology of digestion and absorption of dietary components Physiology of heart, cardiac cycle, ECG and Blood Coagulation Respiration: mechanism and control of breathing
Unit – IV	Excretion: Physiology of excretion, osmoregulation Physiology of muscle contraction Physiology of nerve impulse, Synaptic transmission Endocrine system and physiology of reproduction
Unit – V	Gametogenesis-spermatogenesis and oogenesis; Mechnism of Fertilization in invertebrates and vertebrates; Types and patterns of cleavage; Blastulation and fate map construction in chick; Gastrulation; Competence, determination, differentiation, induction and regeneration In-vitro fertilization, embryo transfer technique, collection and preservation of gametes; parthenogenesis

Paper – II	**Biostatistics, Computer and Bioinformatics**
Unit – I	Nature and scope of statistical methods and their limitations, Data compilation, classification, tabulation and applications in life sciences, graphical representation, computation of mean, median, mode and standard deviation.
Unit – II	Sampling methods – simple random, stratified, systemic and cluster sampling procedures, analysis of variance, Tests of significance based on *t* and chi-square.
Unit – III	Classification of computers – computer generation, low, medium and high level languages, software and hardware, operating systems, compilers and interpreters, personal, mini, main frame and super computers. Computer memory and its types, Input-output devices, secondary storage media.
Unit – IV	Application software: word-processing software, and spreadsheet. Microsoft excel: Data entry, graphs, formulas and functions Computer networks: Basic concepts on LAN and WAN and internet systems, search engines

22/2/23 22.2.23 22.2.23

Join our WhatsApp Channel for FREE Question Papers, Syllabus & Exam Updates
More papers: cguniversities.com | Tap here to join
JOIN NOW >

Unit – V	Bioinformatics and its relation with molecular biology. Tools (FASTA, BLAST, BLAT, RASMOL), databases (GENBANK, Pubmed, PDB) and software (RASMOL). Data generation; Generation of large scale molecular biology data. (Through Genome sequencing, Protein sequencing, Gel electrophoresis and microarray). Applications of Bioinformatics

Practical	1. Measurement of osmotic potential of cell sap by plasmolytic method. 2. Determination of osmotic potential of cell sap by gravimetric method. 3. Estimation of Nitrate reductase activity: *In-vivo* and *In-vitro*. 4. Estimation of osmotic potential of cell sap by Chardakows method. 5. Extraction and estimation of chlorophyll-a, chlorophyll-b and total chlorophyll content. 6. Bioassay of Auxin using wheat coleoptiles. 7. Bioassay of Cytokinin by using cucumber cotyledons. 8. To determine Percent germination, Germination index, Mean daily germination and Peak value of given seed lots. 9. Microscopic examination & preparation of tissues in selected animal models 10. Virtual dissection of alimentary canal in mammalian and non-mammalian models (Alternative methods: By Clay/Thermacol/drawing/Model etc.) 11. Qualitative and quantitative determination of digestive enzymes 12. Virtual dissection of cranial nerves in selected animal models (Alternative methods: By Clay/Thermacol/drawing/Model etc.) 13. Chemical analyses of urine 14. Study of structure of egg of hen and vital staining of the embryo 15. Window preparation in hen egg 16. Whole mount preparations of chick embryos 17. Types of egg-study 18. Live gametes under microscope 19. Living chick embryo-observations 20. Construction of frequency distribution curve. 21. Computation of measures of central tendency and dispersion. 22. Exercises on presentation of data. 23. Hypothesis testing: *t-test*, χ^2*-test.* 24. Study of different components of a computer system. 25. Exercise on word processing package (MS Word) 26. Exercise on Excel package. 27. Exercise on Internet use 28. Primer designing and specificity verification 29. Sequence identification, sequence similarity match or sequence BLAST 30. Identification of conserved regions of following genes and proteins and determination of homology [sequance similarity] in different plants and animals: a- Gene sequence of 18SrRNA, Actin, Tubulin, Superoxide dismutase, Ctalase b- Late embryogenic abundant protein [LEA], Heat shock proteins

22/2/23 22/2/23 22.2.23 22/02/2023

Join our WhatsApp Channel for FREE Question Papers, Syllabus & Exam Updates
More papers: cguniversities.com | Tap here to join
JOIN NOW >

	[HSP] and peroxiredoxins [Prx] 31. Identification of SNPs & SNP database

Books Recommended	1. Fosket DF: Plant Growth & Development 2. Leopold AC & Kriedemann PE: Plant Growth & Development 3. L Taiz & E Zeiger: Plant Physiology 4. BB Buchanan, W Gruissem & RL Jones Biochem. & Molecular Biology of Plants 5. MB Wilkins: Advanced Plant Physiology 6. JA Hopkins: Introduction to Plant Physiology 7. FB Salisburry & CW Ross: Plant Physiology 8. Animal Physiology: Mechanisms and Adaptations - Roger Eckert, David J. Randall, George Augustine, Published by W.H. Freeman, 1988 9. Textbook of Medical Physiology - Arthur C. Guyton, Published by Saunders, 2000 10. Review of Medical Physiology - William F. Ganong, Published by McGraw-Hill Professional, 2005 11. Human Physiology – C.C. Chatterjee, Published by Medical Allied Agency, Kolkata, 2002 12. Balinsky: Introduction to Embrology, CBS College Publishers 13. Berril, NJ: Developmental Biology, Tata-McGraw Hill 14. Davenport: An outline of animal developmental, Addison-Werley 15. Gilbert SF: Developmental Biology, Sinauer Associates, Massachusetts 16. Grant: Biology of Development Systems 17. Subramanyam, T: Developmental Biology, Narosa Publising House 18. Rao, KV: Developmental Biology: A Modern Synthesis, Oxford-IBH Publishers 19. Campbell RC: Statistics for biologists 20. Snedecor GW & Cochran WG: Statistical Methods 21. Sokal RR & Rohlf FJ: Introduction to Biostatistics 22. Zar JH: Biostatistical Analysis 23. Khan and Khanum: Fundamentals of Biostatistics 24. Shrivastava Chetan: Fundamentals of Information Technology 25. S.K. Bajpai & D.S. Yadav: Introduction to Computer & C Programming 26. S. Banerjee: MS Word –2000 Thumb Rules & Details 27. S. Govindrajan, M. Chandrashekaran, A.A. Haq, T.R. Narayanan: Introduction to Computer Science 28. Gupta Kamlesh, Chawla P.K.: An Introduction to Computer Science 29. Animesh K. Datta (2007) "Basic Biostatistics and it's application"First Edition, New Central Book Agency, Ltd, Kolkata. 30. Baxevanis, A.D. and Francis Ouellellette, B.F. (1998) "Bioinformatics–a practical guide" 31. Mount, D. (2004) "Bioinformatics: Sequence and Genome Analysis"; Cold Spring Harbor Laboratory Press, New York. 32. Sharma, V. Munjal, A. and Shankar, A. (2008) "A text book of Bioinformatics" first edition, Rastogi Publication, Meerut – India.

22/2/23 22.2.23 22/02/2023

Join our WhatsApp Channel for FREE Question Papers, Syllabus & Exam Updates
More papers: cguniversities.com | Tap here to join
JOIN NOW >