KHAJA BANDANAWAZ UNIVERSITY
EDUCATING HUMANITY
(A Religious Minority University)
(University established by an Act No.18 of Karnataka State Legislature)

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خواجہ بندہ نواز یونیورسٹی

KHAJA BANDANAWAZ UNIVERSITY, KALABURAGI

FACULTY OF SCIENCE

DEPARTMENT OF BIOTECHNOLOGY

Unit 1 Molecules and their interaction relevant to Biology:
Structure and function of biomolecules (carbohydrates, lipids, proteins, nucleic acids and vitamins), Principles of biophysical chemistry (pH, buffer, reaction kinetics, Bioenergetics, glycolysis, oxidative phosphorylation, coupled reaction, Principles of catalysis, enzymes and enzyme kinetics, enzyme regulation, Conformation of proteins and nucleic acids; Metabolism of carbohydrates, lipids, amino acids nucleotides and vitamins**.**

Unit 2

Cellular Organization: Membrane structure and function, Structural organization and function of intracellular organelles, Organization of genes and chromosomes, Cell division and cell cycle.

Unit 3

Fundamental Processes of Molecular Biology: DNA replication, repair and recombination, RNA synthesis and processing, Protein synthesis and processing, Control of gene expression at transcription and translation level.

Unit 4

Cell communication and cell signalling: Host parasite interaction, virus induced cell transformation, pathogen-induced diseases in animals and plants, cell-cell fusion in both normal and abnormal cells. Cell signalling Hormones and their receptors, oncogenes, tumour suppressor genes, cancer and the cell cycle, virus-induced cancer, Innate and adaptive immune system.

Unit 5

Plant and Animal Biotechnology:

Plant Tissue Culture, Media and its components, Transgenic plants, Disease resistant, Drought resistant plant and applications. Animal Cell culture techniques, Culture media and types. Transgenic animals and applications in various therapies

Unit 7

Environmental Biotechnology:

Biodiversity, its threats, and conservation, Values and types of Biodiversity. Conservation: In-situ and Ex-situ Conservation. Pollution of air, water and soil, and the control measures.

Unit 8

Food Microbiology and Preservation:

Biochemical changes in food (rancidity, enzymic browning, nutritional changes, flavour changes). Mechanism of action of exotoxins (enterotoxins) and endotoxins. Microbial food poisoning. Natural preservatives, pasteurization, dehydration, canning, irradiation, refrigeration, canning, pickling of food.

Unit 10

Applied Biology: Microbial fermentation and production of small and macro molecules; Application of immunological principles- vaccines, diagnostics. Tissue and cell culture methods for plants and animals; Transgenic animals and plants, molecular approaches to diagnosis and strain identification.

Genomics and its application to health and agriculture, including gene therapy; Bioresource and uses of biodiversity. Breeding in plants and animals, including marker – assisted selection; Bioremediation and phytoremediation; Biosensors

References:

1. Alberts, B., Hopkin, K., Johnson, A., Morgan, D., Lewis J., Raff M., Roberts, K., & Walter, P., (2019). Essential Cell Biology, International student edition, 5th ed., New York: W. W. Norton & Co.
2. Buchanan, B. B., Gruissem, W., & Jones, R. L. (2015). Biochemistry and Molecular Biology of Plants, 2nd ed, United States: Wiley Blackwell.
3. De, A. K., (2019). Environmental Chemistry, 9th ed., New Delhi: New Age International Pvt. Limited.
4. Freshney, R. I. (2016). Culture of Animal Cells: A Manual of Basic Technique and Specialized Applications, 7th ed., United States:WileyBlackwell.
5. Lee, B. H. (2015). Fundamentals of Food Biotechnology, 2nd ed., United Kingdom: Wiley- Blackwell Publishers.
6. Owen, J., Jenni P. J., & Stranford, S. (2018). Kuby Immunology, 8th ed., New York: W. H. Freeman.
7. Stanburry, P. F., Whitaker, A., & Hall, S. (2016). Principles of Fermentation Technology, 2nd ed., United Kingdom: Butterworth Heinemann.
8. Tropp, B. E. (2020). Molecular Biology: Genes to Proteins, 5 th ed., New York: Jones & Bartlett Learning.
9. Voet, D., & Voet, J. G. (2016). Biochemistry, 5th ed., Hoboken, New Jersey: J. Wiley & Sons.
10. Wolpert, L. (2011). Developmental Biology: A Very Short Introduction, 1st ed., United Kingdom: Oxford University Press.