Biological Sciences

Outline and Overview

July 2014 – Dec. 2014

Second Year of Chemical Engineering

Dr. Ratnesh Jain
UGC Assistant Professor

Prerequisite

There are no formal prerequisites for this course, but we do presuppose high school-level biology and chemistry (especially familiarity with the fundamental aspects of chemical structure).

Exam Grading

- **Continuous assessment (CA) - 30 %**
  Quiz, assignments, presentations

- **1 mid-term exam – 30 %**

- **1 Final exam (cumulative) – 40 %**

Reading

1. Essential Cell Biology by Bruce Alberts, Dennis Bray, Karen Hopkin, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter

2. Lehninger Biochemistry

3. Microbiology by Purohit

Course Overview

Cell Structure and Function :Prokaryote, eukaryote, archaebacteria, extremophiles, Structure and function of Microbial (bacteria, yeast, fungi, algae, virus), Plant and Animal cells and cellular organelles. Mitochondria, chloroplasts, cell membrane, cell wall, sub- cellular fractionation, Cell division-Mitosis, Meiosis

Biological Macromolecules : structure and function of Carbohydrartes, Proteins, Nucleic Acids and Lipids Importance of stereo specificity of biological molecules

Microbiology: Microbial growth kinetics, growth of virus/phages, Microbial growth media, Approaches for sterilization and pasteurization

Biochemistry: metabolism & anabolism / catabolism, Primary and secondary
metabolism, Central metabolic pathways (glycolysis, citric acid cycle, gluconeogenesis), Interconversion of metabolites, Regulation of metabolic pathways, Bioenergetics Photosynthesis, Bioinorganic chemistry-trace metals

Course Overview

Enzymology: Structure & function relations of enzymes; Classification, inhibition and regulation Enzyme purification and characterization, Coenzymes

Genetics: Nucleic acid metabolism (DNA RNA synthesis) and protein synthesis, Mendelian genetics, Bacterial genetics (transformation, transduction, conjugation), Induction/repression, Mutation

Thank you

Contact

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Course Details

http://www.nano-medicine.co.in/biological-sciences.html