

INTRODUCTORY BIOLOGY COURSE:

Introduction to Cell and Molecular Biology with lab or Introduction to Biology for non-majors

I am sure that this course already has its own textbook, lab manual, and syllabus and laboratory investigations. The following information has a main goal to demonstrate that I am prepared to teach this course.

1. COURSE GOAL:

- To expose students to the way science uses technology to answer in this case biological questions of interest.
- To familiarize students with fundamental biological background to continue their studies by working in a cell/molecular laboratory.

2. POTENTIAL TEXT BOOK AND LAB MANUAL

Potential textbook: Cell and Molecular Biology: Concepts and Experiments. Gerald Karp. John Wiley & Sons.

Potential Lab Manual: Cell and Molecular Biology: Problems Book and Study Guide by Nancy L. Pruitt and Gerald Karp.

3. POTENTIAL SYLLABUS

Tentative Lecture schedule

Week	General topics	Specific topics
1	Introduction to biology	The scientific study of organisms, properties of life, assumptions, methods and limitations of science, underlying themes of biology, and evolution as a unifying concept
2	Basic chemistry and biochemistry	Structure of atoms and molecules, chemical bonds and interactions, acids and bases and pH, chemical reactions and functional groups, properties of water and its importance to living systems, structure and function of carbohydrates, lipids, nucleotide-based compounds and proteins
3	Introduction to cell structure and function	Cell theory, methods of studying cells, structures and functions of prokaryotic and eukaryotic cells
4	Membranes and cell transport	Structures and functions of cell membranes, membrane transport of large and small molecules, osmosis and diffusion
5	Principles of cell metabolism	Chemical reactions and energy, role of ATP in coupled chemical reactions, function of catalysts, how enzymes work, regulation of enzyme activity, factors that affect

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		enzyme activity, biochemical pathways, substrates, products and intermediate products
6	Photosynthesis	Structure and function of chloroplasts, light-dependent reactions, cyclic and non-cyclic, light-independent reactions
7	Respiration and fermentation	Glycolysis, citric acid cycle, electron transport chain and oxidative phosphorylation, aerobic versus anaerobic processes, fermentation
8	Cell cycles	Cell cycle, binary fission in prokaryotes, process and function of meiosis and mitosis, cytokinesis
9	Patterns of inheritance	Genetic terms, genotypic and phenotypic variation, dominant and recessive traits, mendelian model of inheritance, chromosomal aberrations
10	DNA structure and chromosome	Structure of nucleotides and the DNA double helix, replication of DNA, DNA repair mechanisms, mutations
11	Protein synthesis	Genetic code, RNA structure, transcription and processing, translation: protein syntheses, processing and distribution
12	Gene regulation	Gene regulation in prokaryotes (e.g. <i>lac</i> operon), gene regulation strategies in eukaryotes
13	Viruses and Genetic manipulation	Structure and replication of viruses, plasmid and virus vectors, recombinant DNA and cloning techniques, PCR, applications of biotechnology