

**NETAJI SUBHASH ENGINEERING COLLEGE****Technocity , Garia , Kolkata 700152****LESSON PLAN: Biology; BSC-401 for IT**

<b>Sl.No.</b>	<b>Module</b>	<b>Lecture No</b>	<b>Topic Covered</b>	<b>Bloom Taxonomical Activity</b>	<b>Use of Special Resources</b>
1.	1	1	Bring out the fundamental differences between science and engineering by drawing a comparison between eye and camera, Bird flying and aircraft. Discuss how biological observations of 18th Century that lead to major discoveries.	Compare, Distinguish, Relate	Blackboard and chalk
2.	1	2	Examples from Brownian motion by referring to the original observation of Robert Brown and Julius Mayor. These examples will highlight the fundamental importance of observations in any scientific inquiry.	Recall. Interpret	Blackboard and chalk
3	2	3	Hierarchy of life forms at phenomenological level. The underlying criterion, such as morphological, biochemical or ecological be highlighted.	Classify, Identify, Model	Blackboard and chalk
4	2	4	Discuss classification based on (a) cellularity- Unicellular or multicellular (b) ultrastructure- prokaryotes or eucaryotes. (c) energy and Carbon utilization -Autotrophs, heterotrophs, lithotropes (d) Ammonia excretion – aminotelic, uricotelic, ureotelic (e) Habitat- aquatic or terrestrial	Compare, Distinguish, Classify, Model, Identify	Blackboard and chalk
5	2	5	Molecular taxonomy- three major kingdoms of life. A given organism can come under different category based on classification.	Classify, Model, Identify	Blackboard and chalk
6	3	6	To convey that “Genetics is to biology what Newton’s laws are to Physical Sciences” Mendel’s laws, Concept of segregation and independent assortment. Concept of allele.	Perceive, Define	Blackboard and chalk
7	3	7	Gene mapping, Gene interaction, Epistasis. Meiosis and Mitosis be taught as a part of genetics.	Apply, Explain, Solve	Blackboard and chalk
8	3	8	Concepts of recessive and dominance. Concept of mapping of phenotype to genes. Discuss about the single gene disorders in humans.	Compare, Outline, Explain, Analyze	Blackboard and chalk
9	3	9	Discuss the concept of complementation using human genetics.	Discuss	Blackboard and chalk
10	4	10	Biomolecules: To convey that all forms of	Perceive, Analyze	Blackboard

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			life have the same building blocks and yet the manifestations are as diverse as one can imagine		and chalk
11	4	11	Monomeric units and polymeric structures. Discuss about sugars, starch and cellulose.	Analyze, Classify, Define	Blackboard and chalk
12	4	12	Amino acids and proteins. Nucleotides	Perceive, Analyze, Define	Blackboard and chalk
13	4	13	Structure of DNA/RNA. Two carbon units and lipids.	Perceive, Analyze, Define	Blackboard and chalk
14	5	14	Enzymes: To convey that without catalysis life would not have existed on earth	Perceive, Define	Blackboard and chalk
15	5	15	Enzymology: How to monitor enzyme catalyzed reactions. How does an enzyme catalyze reactions. Enzyme classification.	Perceive, Analyze, Classify	Blackboard and chalk
16	5	16	Mechanism of enzyme action. Discuss at least two examples.	Analyze, Explain	Blackboard and chalk
17	5	17	Enzyme kinetics and kinetic parameters. Why should we know these parameters to understand biology? RNA catalysis.	Explain, Interpret	Blackboard and chalk
18	6	18	Information Transfer: The molecular basis of coding and decoding genetic information is universal	Perceive, Analyze	Blackboard and chalk
19	6	19	Molecular basis of information transfer. DNA as a genetic material. Hierarchy of DNA structure- from single stranded to double helix to nucleosomes.	Inspect, Interpret, Analyze	Blackboard and chalk
20	6	20	Concept of genetic code. Universality and degeneracy of genetic code.	Define, Compare	Blackboard and chalk
21	6	21	Define gene in terms of complementation and recombination.	Define, Analyze	Blackboard and chalk
22	7	22	Macromolecular analysis: How to analyse biological processes at the reductionist level	Analyze	Blackboard and chalk
23	7	23	Proteins- structure and function. Hierarch in protein structure. Primary and secondary structure of proteins	Analyze, Classify, Compare	Blackboard and chalk
24	7	24	Tertiary and quaternary structure of proteins. Proteins as enzymes	Analyze, Classify, Compare	Blackboard and chalk
25	7	25	Proteins as transporters receptors and structural elements.	Analyze, Classify, Inspect	Blackboard and chalk
26	8	26	Metabolism: The fundamental principles of energy transactions are the same in physical and biological world.	Perceive, Analyze	Blackboard and chalk
27	8	27	Thermodynamics as applied to biological	Perceive, Compare,	Blackboard

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			systems. Exothermic and endothermic versus endergonic and exergoinc reactions. Concept of $K_{eq}$ and its relation to standard free energy.	Classify, Distinguish	and chalk,
28	8	28-29	Spontaneity. ATP as an energy currency. This should include the breakdown of glucose to $CO_2 + H_2O$ (Glycolysis and Krebs cycle). and synthesis of glucose from $CO_2$ and $H_2O$ (Photosynthesis).	Perceive, Compare, Classify, Distinguish	Blackboard and chalk,
29	8	30	Energy yielding and energy consuming reactions. Concept of Energy change	Interpret, Classify	Blackboard and chalk
30	9	31	Microbiology Concept of single celled organisms. Concept of species and strains. Identification and classification of microorganisms.	Perceive, Classify, Apply	Blackboard and chalk,
31	9	32	Microscopy, Ecological aspects of single celled organisms.	Perceive	Blackboard and chalk
32	9	33	Sterilization and media compositions. Growth kinetics.	Perceive, Apply	Blackboard and chalk