



B. P. PODDAR INSTITUTE OF MANAGEMENT AND TECHNOLOGY

(Approved by A.I.C.T.E & Affiliated to MAKAUT)

Poddar Vihar, 137, VIP road, Kolkata - 700052

Phone No. +91-33-4061 9174 / 75 / 76

E-Mail: info@bppimt.ac.in Website: www.bppimt.ac.in

Lesson Plan

Serial No.	Lecture / Tutorial No.	Lecture Topics	Textbook / Reference	Teaching Pedagogy #
Module 1 : Introduction to Biology				
1	L1	Importance of Biology as a scientific discipline; Comparison between Eye and Camera; Bird flying and Aircraft.	T1, R1	S/P, C&T
2	L2	Major biological discoveries of 18 th Century; Brownian motion and the origin of thermodynamics (Findings of Robert Brown and Julius Mayor).	T1, R1	S/P
Module 2 : Classification systems				
3	L3	Classification based on (a) cellularity (b) ultrastructure (c) energy and carbon utilisation (d) Ammonia excretion (e) Habitat	T1, R1	S/P, C&T
4	L4	Major kingdoms of life; Model organisms (<i>E. coli</i> , <i>S. cerevisiae</i> , <i>D. melanogaster</i> , <i>C. elegans</i> , <i>A. thaliana</i> , <i>M. musculus</i>)	T1, R1	S/P
5	T1	Tutorial 1: Understanding and comparing classification criteria of multiple organism (Discussion)	T1, R1	GD
Module 3 : Genetics				
6	L5	Cell cycle: Meiosis and Mitosis	T1, R4	C&T
7	L6	Mendel's laws: Concepts of allele, dominance and recessive; Law of segregation.	T1, R4	C&T
8	L7	Law of independent assortment; Gene mapping; Gene interaction, Epistasis. Single gene disorders in humans and Pedigree analysis; Complementation (genetics)	T1, R4	S/P, C&T
9	T2	Tutorial 2: Mendelian crosses - Determining genotypes and phenotypes using Punnett Squares (Problem solving)	T1, R4	C&T



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Module 4 : Biomolecules				
10	L8	Biomolecules: sugars, starch and cellulose.	T1, R2, R3	S/P, C&T
11	L9	Biomolecules: amino acids and proteins; nucleotides and DNA/RNA.	T1, R2, R3	S/P, C&T
12	L10	Biomolecules: two carbon units and lipids.	T1, R2, R3	S/P, C&T
13	T3	Tutorial 3: Exploring structure of carbohydrates, nucleic acids and lipids (Visualisation and Discussion)	T1, R2, R3	S/P, GD
Module 5 : Enzymes				
14	L11	Enzymology: Principles of enzyme catalysis, enzyme function	T1, R2, R3	S/P
15	L12	Enzyme classification. Mechanism of enzyme action with examples.	T1, R2, R3	S/P, C&T
16	L13	Enzyme kinetics and kinetic parameters. Significance of enzyme kinetics, RNA catalysis.	T1, R2, R3	S/P
17	T4	Tutorial 4: Understanding enzyme kinetics using Michaelis - Menten equation (Problem solving & Plotting)	T1, R2, R3	C&T
Module 6 : Information Transfer				
18	L14	Search for genetic material; Concept of Central Dogma (Replication, Transcription, Translation)	T1, R3, R4	S/P, C&T
19	L15	Tutorial 5: Mechanisms of Replication, Transcription and Translation (Visualisation and Discussion)	T1, R3, R4	S/P, GD
20	L16	Hierarchy of DNA organization; Genetic code; Genetic complementation and recombination.	T1, R3, R4	S/P
21	T6	Tutorial 6: DNA sequence transcription, codon identification, translation (Problem solving)	T1, R3, R4	C&T
Module 7 : Macromolecular analysis				
22	L17	Reductionist approach in Biology; Proteins - structure and function. Hierarchy in protein structure.	T1, R2, R3	S/P, C&T



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23	T7	Tutorial 7: Exploring structure of various proteins (Visualisation and Discussion)	T1, R2, R3	S/P, GD
24	L18	Proteins as enzymes, transporters.	T1, R2, R3	S/P
25	L19	Proteins as receptors and structural elements.	T1, R2, R3	S/P
26	T8	Tutorial 8: Exploring biological role of various proteins (Case study and Discussion)	T1, R2, R3	S/P, GD
Module 8 : Metabolism				
27	L20	Exothermic and endothermic versus endergonic and exergonic reactions; Concept of K_{eq} and ΔG° ; ATP - Structure and Function.	T1, R2, R3	S/P, C&T
28	T9	Tutorial 9: ATP - the Universal Energy Currency (Discussion)	T1, R2, R3	GD
29	L21	Cellular Respiration (Glycolysis, Pyruvate Oxidation, Kreb's cycle, Oxidative phosphorylation); Photosynthesis (Z scheme, Cyclic & Noncyclic phosphorylation, Calvin cycle)	T1, R2, R3	S/P, C&T
30	T10	Tutorial 10: Electron transport chains in respiration and photosynthesis (Visualisation and Discussion)	T1, R2, R3	S/P, GD
Module 9 : Microbiology				
31	L22	Concept of species and strains. Identification and classification of microorganisms. Microscopy: Light Microscopy, Fluorescence Microscopy, Confocal Microscopy, Electron Microscopy.	T1, R5	S/P
32	L23	Sterilization techniques and media compositions, Ecological aspects and Growth kinetics of single celled organisms.	T1, R5	S/P, C&T
33	T11	Tutorial 11: Microbial growth kinetics (Problem solving)	T1, R5	C&T, GD

Teaching Methods: C&T-Chalk & Talk; S/P-Slides/PPT; Videos; SEM: Seminar; DEMO; CHART; ET/GL: Expert Talk/Guest Lecture; QUIZ; GD-Group discussion; RTCS: Real time case studies; JAR-Journal article review; PD-Poster design; OL-Online lecture/Google classroom



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Textbooks (T)

T1. Biology for Engineers; Wiley India, 1st edition, 2018

Reference Books (R)

R1. Biology: A global approach: Campbell, N. A.; Reece, J. B.; Urry, Lisa; Cain, M, L.; Wasserman, S. A.; Minorsky, P. V.; Jackson, R. B. Pearson Education Ltd

R2. Outlines of Biochemistry, Conn, E.E; Stumpf, P.K; Bruening, G; Doi, R.H., John Wiley and Sons

R3. Principles of Biochemistry (V Edition), By Nelson, D. L.; and Cox, M. M.W.H. Freeman and Company

R4. Molecular Genetics (Second edition), Stent, G. S.; and Calender, R.W.H. Freeman and company, Distributed by Satish Kumar Jain for CBS Publisher

R5. Microbiology, Prescott, L.M J.P. Harley and C.A. Klein 1995. 2nd edition Wm, C. Brown Publishers