Vijaya College, RV Road, Bengaluru-560004
Department of Chemistry and Bio-Chemistry

NAAC criteria-1: CURRICULAR ASPECTS for the academic years **2024-25**

1. Academic Planner with unitisation of the entire syllabus

(on hourly basis)

Teacher ; SAS

Name of the Department	**Bio Chemistry**	**Portions Covered on Hrs Basis**
Semester	**VI NEP**	**P-7**
Week/Month & Date (Preferably)	**Day**	1. Laws of thermodynamics and their application to biological systems
1st week of Feb2025	1	2. Free energy change and its significance in biological reactions
	2	3. Equilibrium constant and its relationship to free energy change
	3	4. Energy charge and its role in cellular metabolism
	4	5. ATP cycle and its importance in energy transfer
2nd week of Feb 2025	1	6. Phosphorylation potential and phosphoryl group transfers
	2	7. Chemical basis of high standard energy of hydrolysis of ATP
	3	8. Oxidative phosphorylation and its mechanism
	4	INTERNALS
3rd week of Feb 2025	1	Points 9-16: Electron Transport Chain and ATP Synthesis
	2	
	3	9. Proton gradient generation and its role in ATP synthesis
	4	10. Redox loop and Q-cycle in electron transport chain
4rd week of Feb 2025	1	11. Proton pumping and its mechanism
	2	12. The electron transport chain and its components
	3	13. Peter Mitchell's Chemiosmotic hypothesis and Proton motive force
	4	14. Fo-F1 ATP synthase - structure and mechanism of ATP synthesis
1st week of March 2025	1	15. Importance of ATP synthesis in cellular metabolism
	2	16. Regulation of ATP synthesis
	3	
	4	Points 17-24: Metabolism of Carbohydrates

2st week of March 2025	1	
	2	17. Anabolism and catabolism of carbohydrates
	3	18. Glycolysis - reactions and energetics
	4	19. Entry of fructose, galactose, mannose, and lactose into glycolytic pathway
3rd week of March 2025	1	20. Fates of pyruvate - conversion to lactate, alcohol, and acetyl CoA
	2	21. Cori's cycle and its significance
	3	22. TCA cycle - reactions and energetics
	4	23. Amphibolic and integrating roles of TCA cycle
4th week of March 2025	1	24. Anaplerotic reactions
	2	and their importance
	3	Points 25-32: Regulation of Carbohydrate Metabolism
	4	INTERNALS
1st week of April 2025	1	25. Regulatory steps of glycolysis
	2	26. Regulatory steps of TCA cycle
	3	27. Gluconeogenesis and its significance
	4	28. Glycogenolysis and its regulation
2nd week of April 2025	1	29. Pentose phosphate pathway and its significance
	2	30. Importance of carbohydrate metabolism in cellular energy production
	3	31. Regulation of carbohydrate metabolism by hormones and other factors
	4	32. Disorders of carbohydrate metabolism
3rd week of April 2025	1	Disorders of carbohydrate metabolism
	2	Points 33-40: Metabolism of Lipids
	3	Introduction to lipid metabolism
	4	33. Introduction to lipid metabolism
4th week of April 2025	1	34. Hydrolysis of triacylglycerols and transport of fatty acids
	2	35. β-oxidation of saturated and unsaturated fatty acids
	3	36. ATP yield from fatty acid oxidation
	4	37. Biosynthesis of saturated and unsaturated fatty acids
1st week of May 2025	1	38. Fatty Acid Synthase complex and its role in fatty acid synthesis
	2	39. Lipogenesis (de novo synthesis of fatty acid)
	3	40. Elongation of fatty acid)
	4	(mitochondrial elongation
2nd week of May 2025	1	Points 41-48: Lipid Metabolism
	2	(continued)
	3	41. Biosynthesis of TAG and phospholipids
	4	42. Cholesterol metabolism and its significance
3rd week of May 2025	1	43. Importance of lipid metabolism in cellular energy production
	2	44. Regulation of lipid metabolism by hormones and other factors
	3	45. Disorders of lipid metabolism

	4	46. Lipid metabolism and its relationship to other metabolic pathways
4th week of May 2025	1	47. Role of lipids in cellular structure and function
	2	48. Lipid metabolism and disease
	3	Revision
	4	Revision

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1. Academic Planner with unitisation of the entire syllabus (on hourly basis)

Teacher; SAS

Name of the Department	**Bio Chemistry**	**Portions Covered on Hrs Basis**
Semester	**VI P-8**	
Week/Month & Date (Preferably)	**Day**	1. Introduction to Molecular Biology:
1st week of Feb 2025	1	- Identification of DNA as genetic material
	2	- Experiments of Griffith, Hershey, and Chase
	3	- Overview of structure of DNA
	4	2. Chromosomal Organization:
2nd week of Feb 2025	1	- Prokaryotes and eukaryotes
	2	- Gene and gene concept: cistron, muton, recon, and replicon
	3	3. Central Dogma:
	4	- Central dogma of molecular biology and its modification
3rd week of Feb 2025	1	4. Replication:
	2	- Types of replication: conservative, semi-conservative, and dispersive
	3	- Evidence for semi-conservative replication: Meselson and Stahl experiment
	4	- Mechanism of semi-conservative replication: steps involved, enzymes, and proteins
4rd week of Feb 2025	1	- Properties of DNA polymerase I
	2	- Outline of DNA replication in eukaryotes
	3	5. Transcription:

	4	- Transcription in prokaryotes: RNA polymerase, mechanism of initiation, promoters, and enhancers
1st week of March 2025	1	- Role of sigma factor
	2	- Termination: Rho-dependent and independent
	3	- Reverse transcription
	4	- Overview of eukaryotic transcription: eukaryotic RNA polymerases
2st week of March 2025	1	- Post-transcriptional mRNA processing: capping, splicing, and polyadenylation
	2	INTERNALS
	3	Unit II: Translation and
	4	Wobble hypothesis
3rd week of March 2025	1	1. Genetic Code:
	2	- Characteristics of genetic code
	3	- Regulation of Gene Expression
	4	2. Translation:
4th week of March 2025		- Mechanism of translation: amino acid activation, charging of tRNA, initiation, elongation, and termination
		- Post-translational modification
		- Inhibition of protein synthesis by antibiotics
		3. Mutation:
1st week of April 2025	1	- Concept of mutation
	2	- Mutagens: chemical and physical
	3	- Molecular basis of mutation: spontaneous and induced mutations
	4	- Point mutations: missense, nonsense, and frame shift mutations
2nd week of April 2025	1	4. Regulation of Gene Expression:
	2	- General aspects of regulation
	3	- Transcriptional regulation: inducible and repressible systems
	4	- Operon concepts: lactose and tryptophan operons
3rd week of April 2025	1	- Brief account of eukaryotic gene expression regulation
	2	Overview and Nature of Antigen and Antibody
	3	Nature of Antigen
	4	Antibody
4th week of April 2025	1	1. Organs of the Immune System:
	2	- Anatomy and functions of lymphoid tissues
	3	- Haematopoiesis
	4	2. Cellular Components of the Immune System:
1st week of May 2025	1	- Granulocytes: neutrophil, eosinophil, basophil, and mast cell
	2	- Mononuclear cells: lymphocytes, monocytes, macrophages, NK cells, and dendritic cells
	3	3. Antigen:
	4	- Concept of antigenic determinants and immunogens
	1	- Factors that influence immunogenicity

2nd week of May 2025	2	- Classes of antigen: epitopes, haptens
	3	4. Antibody: Hypervariable and constant regions
	4	- Molecular structure: general features, light and heavy chains
3rd week of May 2025		-Revision