

# GUJARAT TECHNOLOGICAL UNIVERSITY

**Pharm.D.**

**1st year**

**Subject Name:** Medicinal Biochemistry

**Subject Code:** 818803

Teaching Scheme (Hours)				Evaluation Scheme (Marks)				Total Marks
Theory	Tutorial	Practical	Total	Theory		Practical		
				External	Internal	External	Internal	
3	1	3	7	70	30	70	30	200

Sr. No.	Course Contents	Hours	Module Weightage
<b>1</b>	<b>Introduction to biochemistry:</b> Cell and its biochemical organization, transport process across the cell membranes. Energy rich compounds; ATP, Cyclic AMP and their biological significance.	<b>5</b>	<b>5.5%</b>
<b>2</b>	<b>Enzymes:</b> Definition; Nomenclature; IUB classification; Factor affecting enzyme activity; Enzyme action; enzyme inhibition. Isoenzymes and their therapeutic and diagnostic applications; Coenzymes and their biochemical role and deficiency diseases.	<b>7</b>	<b>8%</b>
<b>3</b>	<b>Carbohydrate metabolism:</b> Glycolysis, Citric acid cycle (TCA cycle), HMP shunt, Glycogenolysis, gluconeogenesis, glycogenesis. Metabolic disorders of carbohydrate metabolism (diabetes mellitus and glycogen storage diseases); Glucose, Galactose tolerance test and their significance; hormonal regulation of carbohydrate metabolism.	<b>16</b>	<b>18%</b>
<b>4</b>	<b>Lipid metabolism:</b> Oxidation of saturated ( $\beta$ -oxidation); Ketogenesis and ketolysis; biosynthesis of fatty acids, lipids; metabolism of cholesterol; Hormonal regulation of lipid metabolism. Defective metabolism of lipids (Atherosclerosis, fatty liver, hypercholesterolemia).	<b>12</b>	<b>13%</b>
<b>5</b>	<b>Biological oxidation:</b> Coenzyme system involved in Biological oxidation. Electron transport chain (its mechanism in energy capture; regulation and inhibition); Uncouplers of ETC; Oxidative phosphorylation;	<b>7</b>	<b>8%</b>
<b>6</b>	<b>Protein and amino acid metabolism:</b> protein turn over; nitrogen balance; Catabolism of Amino acids (Transamination, deamination & decarboxylation). Urea cycle and its metabolic disorders; production of bile pigments; hyperbilirubinemia, porphoria, jaundice. Metabolic disorder of Amino acids.	<b>12</b>	<b>13%</b>
<b>7</b>	<b>Nucleic acid metabolism:</b> Metabolism of purine and pyrimidine nucleotides; Protein synthesis; Genetic code; inhibition of protein synthesis; mutation and repair mechanism; DNA replication (semiconservative /onion peel models) and DNA repair mechanism.	<b>10</b>	<b>11%</b>
<b>8</b>	<b>Introduction to clinical chemistry: Cell;</b> composition; malfunction; Roll of the clinical chemistry laboratory.	<b>2</b>	<b>2%</b>

9	<b>The kidney function tests:</b> Role of kidney; Laboratory tests for normal function includes- a) Urine analysis (macroscopic and physical examination, quantitative and semiquantitative tests.) b) Test for NPN constituents. (Creatinine /urea clearance, determination of blood and urine creatinine, urea and uric acid) c) Urine concentration test d) Urinary tract calculi. (stones)	5	5.5%
10	<b>Liver function tests:</b> Physiological role of liver, metabolic, storage, excretory, protective, circulatory functions and function in blood coagulation. a) Test for hepatic dysfunction-Bile pigments metabolism. b) Test for hepatic function test- Serum bilirubin, urine bilirubin, and urine urobilinogen. c) Dye tests of excretory function. d) Tests based upon abnormalities of serum proteins. Selected enzyme tests.	5	5.5%
11	<b>Lipid profile tests:</b> Lipoproteins, composition, functions. Determination of serum lipids, total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides.	3	3.5%
12	<b>Immunochemical techniques</b> for determination of hormone levels and protein levels in serum for endocrine diseases and infectious diseases Radio immuno assay (RIA) and Enzyme Linked Immuno Sorbent Assay (ELISA)	3	3.5%
13	<b>Electrolytes:</b> Body water, compartments, water balance, and electrolyte distribution. Determination of sodium, calcium potassium, chlorides, bicarbonates in the body fluids.	3	3.5%

### Course Materials:

#### Text books (Theory)

- Harpers review of biochemistry - Martin
- Text book of biochemistry – U.Satyanarayana
- Text book of clinical chemistry- Alex kaplan&LaverveL.Szabo

#### Reference books (Theory)

- Principles of biochemistry –Lehninger
- Text book of biochemistry –Ramarao

## Pharm.D. 1st year MEDICINAL BIOCHEMISTRY

*Practical (3 Hours/ Week, 6 Credits, 90 Hours)*

Sr. No.	Experiments
1	Qualitative analysis of normal constituents of urine.*
2	Qualitative analysis of abnormal constituents of urine.*
3	Quantitative estimation of urine sugar by Benedict's reagent method.**
4	Quantitative estimation of urine chlorides by Volhard's method.**

5	Quantitative estimation of urine creatinine by Jaffe's method.**
6	Quantitative estimation of urine calcium by precipitation method.**
7	Quantitative estimation of serum cholesterol by LibermannBurchard's method.**
8	Preparation of Folin Wu filtrate from blood.*
9	Quantitative estimation of blood creatinine.**
10	Quantitative estimation of blood sugar Folin-Wu tube method.**
11	Estimation of SGOT in serum.**
12	Estimation of SGPT in serum.**
13	Estimation of Urea in Serum.**
14	Estimation of Proteins in Serum.**
15	Determination of serum bilirubin**
16	Determination of Glucose by means of Glucoseoxidase.**
17	Enzymatic hydrolysis of Glycogen/Starch by Amylases.**
18	Study of factors affecting Enzyme activity. (pH& Temp.)**
19	Preparation of standard buffer solutions and its pH measurements (any two)*
20	Experiment on lipid profile tests**
21	Determination of sodium,calcium and potassium in serum.**

\*\* indicate major experiments & \* indicate minor experiments

### Scheme of Practical Examination

	Internal/ Sessional	External
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
<b>Max. marks</b>	<b>20</b>	<b>70</b>
<b>Duration</b>	<b>3 hours</b>	<b>4 hours</b>

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance)

### Course Materials:

#### Reference books (Practical)

- Practical Biochemistry-David T.Plummer.
- Practical Biochemistry-Pattabhiraman.