**Study Plan**

**Biochemistry I**

*(For* ***II year, I semester*** *Medical Students)*

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|  |  | **Material** |
| 1 |  | Metabolic Fuels and Dietary Components *(handout)* |
| 2 |  | Water, Acids, Bases, and Buffers *(handout)* |
| 3 |  | Amino Acids in Proteins; Classification of amino acids, I, II, III and IV structures of proteins *(pp. 76-98; 112-120 cc. 3.1; 3.2; 3.6)* Fibrous proteins. *(pp.103-107 cc. 6.13 - pp. 246-247)* |
| 4 |  | Structure and function of proteins; Hb and Mb; *(pp.353-367 cc. 3.5; 9.6)* |
| 5 |  | Enzymes as Catalysts; classification, mechanism of action; transition state; active centre, coenzyme *(handout; cc. 10.1; 10.2)*  |
| 6 |  | Kinetics of enzymatic reaction; Km; michaelis-menten equation; factors acting on the reaction velocity; Regulation of Enzyme activity *(handout; cc. 10.3; 10.3; 10.5; 10.6; 10.8; 10.9; 10.10; 10.11; 10.12; 10.13; 10.14; 10.15)* **Colloquium *(8 points)*** |
| 7 |  | Cell Signaling by Chemical Messengers: receptors Cell Signaling by Chemical Messengers: messengers  *(pp.504-530 cc. 13.1 -13.5)* |
| 8 |  | General principles and pathways of signal transduction. *(pp.530-537 cc. 13.6)*Cellular Bioenergetics: ATP and O2. sources of acetyl-CoA and metabolism; pyruvatedehydrogenase complex; Reactions of TCA cycle; *(pp.542-54; 546-559 cc. 14.1; 14.2)* |
| 9 |  | Regulation and energetic effect of TCA cycle *(pp.557-558-367 cc. 14.3)* Oxidative Phosphorylation and Mitochondrial Function *(pp.561-577 cc. 3.5; 9.6)* |
| 10 |  | **Colloquium *(8 points)***Synthesis of ATP from glucose. Glycolysis. Functions of glycolysis. Regulation of Glycolysis.*(pp.592-619 cc. 15-1—15.8; cl.look – 15.1; 15.2; 15.6; 15.9)* |
| 11 |  | Gluconeogenesis. regulation of glyconeogenesis. *(pp.619-629 cc. 15.9)* |
| 12 |  | Glycogen synthesis and degradation. Regulation of glycogen metabolism. *(pp.629-643 cc. 15.11; cl.look – 15.7)* |
| 13 |  | Metabolic pathways of carbohydrates. Pentose Phosphate Pathway. Metabolism of fructose and galactose. *(pp.648-652; 625-626; 654 cc. 15.3; 16. 1-16.4; 16.6)*Glycoproteins and proteoglycans. *(pp.659-669 cc. 16.11-16.14.)* |
| 14 |  | Carbohydrates digestion, absorption, transport; *(pp.1049-1051 cc. 25.7)*Changes of blood glucose level and the major hormones of metabolic homeostasis. Insulin and Glucagon, their role in regulation of carbohydrate metabolism *(pp.909-912 cc. 22.3; handout)*  |
| 15 |  | **Colloquium *(9 points)*** |

**Course literature and other teaching materials:**

* Textbook of Biochemistry with Clinical Correlations, Devlin, 7 th edition, John Wiley & Sons, Inc. 2010.

 https://themedicalbiochemistrypage.org/

**Assessment Points for medical Students**

**(II course, I semester)**

Attendance – 3

Academic activity – 30

Colloquiums– 27

**Sum of intermediate assessments - 60 points**

**Final Exam – 40 points**

**Total – 100**

**Study Plan**

**Biochemistry II**

*(For* ***II year, II semester*** *Medical Students)*

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|  |  | **Material** |
| 1 |  | Digestion, absorption and transport of lipids. Transport of lipids during feeding and starvation states. Oxidation of fatty acids. pp.1051-1059; 691-701. cc.25.8-25.11; 17.4-17.7 Metabolism of ketone bodies. Ketogenesis and utilization of ketone bodies. Disorders of ketone bodies metabolism. Hyperketonemia, ketoacidosis. |
| 2 |  | Synthesis of fatty acids.Comparison of Fatty Acid Synthesis and Oxydation. Regulation of Fatty Acid Oxydation. Storage of Fatty Acids as Triacylglycerols. |
| 3 |  | Mobilization of Triacylglycerols. TG/FFA Cycle. Interorgan transport of fatty acids and their primary products. |
| 4 |  | Plasma Lipoproteins. Cholesterol metabolism, Transport of cholesterol with lipoproteins. receptors of lipoproteins, biochemical aspects of atherosclertosis. 678-680; 718-729. cc. 18.3; 18.4 |
| 5 |  | **Colloquium I** . pp.708-718; 729-737. cc. 18-1,2,5. |
| 6 |  | Phospholipids, Prostaglandins and thromboxans. Lipoxygenase and oxyeicosatetraenoic acids. 737-745 |
| 7 |  | Regulation of lipid metabolism, integration of lipid and carbohydrate metabolism. (handout) Digestion of proteins and absorption of amino acids. Pathways of amino acid conversion: transamination, deamination, decarboxylation752-759pp. |
| 8 |  | Detoxication of amonia. Urea cycle Metabolism of particular amino acids. 759-790pp. |
| 9 |  | **Colloquium II**  |
| 10 |  | Iron Metabolism . Biosynthesis of heme. Regulation. Diseases.791-797pp,cc.19.21 |
| 11 |  |  Heme catabolism. Bile pigmentes. Jaundice. 797-801pp,cc. 19.24,19.25,19.26. |
| 12 |  | Purins and pyrimidines. Metabolism of purine and pyrimidine nucleotides. 808-820pp.cc.20.2,20.3. Chemotherapeutic agents that interfere with purine and pyrimidine nucleotide metabolism .831-836pp. |
| 13 |  | Principles of nutrition, microelements, lipid and water-soluble vitamins. 1064-1095 cc.26.1-26.12  |
| 14 |  | Metabolic interactions: starvation-feeding cycle; tissue interaction during nutritional and various hormonal conditionspp. 840-879; 21.1-21.9  |
| 15 |  | **Colloquium III** *(6 points)* |

**Course literature and other teaching materials:**

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* https://themedicalbiochemistrypage.org/

**Assessment Points for medical Students**

**(II course, II semester)**

Attendance – 3

Academic activity –30

Colloquiums – 22

Clinical case study - 5

**Sum of intermediate assessments - 60 points**

**Final Exam – 40 points**

**Totally – 100**