Macronutrients in Human Nutrition

Course No.	Title of Course	Credit Hours
HND-102	Macronutrients in Human Nutrition	3(3-0)

Learning Outcomes

After completing the course, the students will be able to:

•Diagnose macronutrient deficiency disorders

•Treat patients suffering from nutritional deficiency disorders through diet therapy

• Prepare diet plan focusing on macronutrient deficiency

SDGs addressed in the course:

SDG # 3 (Health and Well-being)

SDG # 4 (Quality Education)

Teaching Mode: This course will be taught in hybrid learning mode offering a substantial portion of contents and course activities online through learning management system.

Course Contents

Theory

Carbohydrates (CHO) Nature and structures; Classification and functions of carbohydrates: Monosaccharaides. disaccharides, oligosaccharides, polysaccharides; Digestion and absorption of carbohydrates: Glycolytic pathway, glycolysis, glycogenesis, glycogen catabolism, tricarboxylic acid cycle and pentose phosphate pathway; Biosynthesis of carbohydrates: Gluconeogenesis; Regulation of carbohydrate metabolism pathways; CHO metabolism in diabetes; Proteins: Structural features, characteristics, functions; Amino acids: Biosynthesis and degradation, food sources (on the basis of their functions in human body); Digestion and absorption; Metabolic fates of amino acids: Deamination, transamination; Urea cycle; Ketogenic amino acids; Glucogenic amino acids; Protein metabolism in liver and kidney diseases; Protein energy malnutrition; Lipids: Nature and classification; Fatty acids: saturated, unsaturated, polysaturated, glycerol, cholesterol, sterol; Lipoprotein systems (blood lipids); Fats biosynthesis: Lipids, phospholipids and

sphingolipids; Lipid biosynthesis: cholesterol, sterol; Lipid oxidation; Essential fatty acids: sources and health benefits; Digestion, absorption, metabolism and transportation of lipids; Oxidation of fatty acids (beta oxidation); Ketone bodies.

Week wise Lecture Plan

Week No	Description
1.	Carbohydrates (CHO) Nature and structures
2.	Classification and functions of carbohydrates
3.	Digestion and absorption of carbohydrates
4.	Glycolytic pathway Glycolysis, glycogenesis Glycogen catabolism
5.	Tricarboxylic acid cycle and pentose phosphate pathway
6.	Biosynthesis of carbohydrates
7.	Gluconeogenesis
8.	Regulation of carbohydrate metabolism pathways
9.	**MID SEMESTER EXAMS**
10.	CHO metabolism in diabetes
11.	Structural features of Proteins Characteristics and functions of Amino acids
12.	Digestion and absorption Metabolic fates of amino acids-Deamination, transamination
13.	Urea cycle Ketogenic and Glucogenic amino acids Protein metabolism in liver and kidney diseases
14.	Protein energy malnutrition;
15.	Nature and classification of Lipids Fatty acids-saturated, unsaturated, poly-saturated, Cholesterol and its pathways

16.	Lipoprotein systems (blood lipids) Fats biosynthesis: Lipids, phospholipids and sphingolipids Essential fatty acids: sources and health benefits
17.	Digestion, absorption, metabolism and transportation of lipids Oxidation of fatty acids (beta oxidation); Ketone bodies.
18.	**END SEMESTER EXAMINATION**

Text Book:

1. David, L.N., A.L. Lehninger and M.M. Cox. 2013. Lehninger Principles of Biochemistry.
6th Ed. W.H. Freeman and Company, NY, USA.

Suggested Readings:

1. Berdanier, C.D. and J. Zempleni. 2009. Advanced Nutrition: Macronutrients, Micronutrients and Metabolism. CRC Press, Taylorand Francis Group, Boca Raton, FL, USA.
2. Byrd-Bredbenner, C„ O. Moe, D. Beshgetoor and J. Beming. 2015. WardlaWs Perspectives in Nutrition. 10“’ Ed. McGraw-Hill Education, Columbus, Oil. USA.
3. Gropper, S.S. and J.L. Smith. 2013. Advanced Nutrition and Human Metabolism. 6th Ed. Cengage Learning, Belmont, CA, USA.