BSHND 112: MACRONUTRIENTS IN HUMAN NUTRITION

Course Learning Outcomes:

- To abreast knowledge about the normal nutrient metabolism in healthy human
- To understand interactions between the intake, absorption, transport, processing, storage, catabolism and excretion of nutrients and the regulation of metabolic homeostasis in the intact organism

Content Theory:

1. **Carbohydrates:**
   - Nature,
   - Structures
2. **Classification and functions of carbohydrates:**
   - Monosaccharaides,
   - Disaccharides,
   - Oligosaccharides,
   - Polysaccharaides
3. **Digestion and absorption of carbohydrates:**
   - Glycolitic pathway,
   - Glycolysis,
   - Glycogenesis,
   - Glycogen catabolism,
   - Tricarboxylic acid cycle and pentose phosphate pathway
4. **Biosynthesis of carbohydrates:**
   - Gluconeogenesis;
   - Regulation of carbohydrate metabolism pathways;
   - Cho metabolism in diabetes;
5. **Proteins:**
   - Structural features,
   - Characteristics,
   - Functions;
6. **Amino acids:**
   - Biosynthesis and degradation,
   - Food sources (on the basis of their functions in human body);
   - Digestion and absorption;
7. **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, classification.

8. **Fatty acids**:
   - Saturated,
   - Unsaturated,
   - Polysaturated,
   - Glycerol,
   - Cholesterol,
   - Sterol;
   - Lipoprotein systems (blood lipids);
9. **Fats biosynthesis:**
   - Lipids,
   - Phospholipids and sphingolipids;
10. **Lipid biosynthesis:**
    - Cholesterol,
    - Sterol;
    - Lipid oxidation;
11. **Essential fatty acids:**
    - Sources,
    - Health benefits;
    - Adipose tissues;
    - Digestion,
    - Absorption,
    - Metabolism and transportation of lipids;
    - Oxidation of fatty acids (beta oxidation);
    - Ketone bodies.

Teaching-Learning Strategies:

Teaching will be a combination of class lectures, class discussions, and group work. Short videos/films will be shown on occasion.

Assignments:

The sessional work will be a combination of written assignments, class quizzes, presentation, and class participation/attendance.

Assessments and Examination:

Sessional Work: 25 marks

Midterm Exam: 35 marks

Final Exam: 40 marks

Recommended Readings:

1. Berdanier, C.D. & Zempleni, J. (2009). Advances Nutrition: Macronutrients, micronutrients and Metabolism. CRC Press, Taylor & Francis Group, Boca Raton, FL, USA.
2. Byrd-Bredbenner, C., Moe, G., Beshgetoor, D. & Berning, J. (2015). Wardlaw's Perspectives in Nutrition. (10th ed.) McGraw-Hill Education, Columbus, OH, USA.
3. David, L.N., Lehninger, A.L. & Cox, M.M. (2013). Lehninger Principles of Biochemistry. (6th ed.). W.H. Freeman and Company, New York.
4. Gropper, S.S. & Smith J.L. (2013). Advanced Nutrition and Human Metabolism. (6th ed.). Cengage Learning, Belmont, CA, USA.