Course Descriptor
FSHNN462 Nutrition and Metabolism

ACADEMIC YEAR	Spring 2020-2021		
Course Code & Title	FSHNN462 Nutrition and Metabolism		
Credit hours	3	**Level of study**	Bachelor
College / Centre	College of Applied and Health Sciences		
Co-requisites		**Pre-requisites**	FSHN N262, FSHN N362, FSHN N370

1.   COURSE OUTLINE

The course content focuses on the metabolism, requirements, deficiencies and excesses of nutrients. Essential macro and micronutrients will be covered with the greatest emphasis on macronutrients. Nutrient utilization will be traced from the food source to digestion and absorption, transport, storage, and excretion. Each metabolic pathway dependent on specific nutrients will be evaluated with an emphasis on how the macronutrients facilitate specific biochemical functions. The basis of how nutrient deficiencies and excesses result in metabolic abnormalities with functional and potentially toxic consequences will be detailed.]

2.   AIMS

[To enable the students in understanding the mechanisms of digestion and absorption for each nutrient. Students will be able to identify the role of each nutrient in their respective metabolic pathway. Students will be able to describe and recognize deficiency and toxicity symptoms associated with each nutrient.]

3.   LEARNING OUTCOMES, TEACHING, LEARNING and ASSESSMENT METHODS

Learning Outcomes (Definitive) Upon successful completion of this course, students will be able to:	Teaching and Learning methods (Indicative)	Assessment (Indicative)
1. Demonstrate knowledge and understanding of the need for water, fluid balance, metabolic fuels. Factors affecting choice of foods and disorders of appetite.	Discussion, lecture, in-class activities	Assignment, Quiz, Written exam
2. Demonstrate knowledge and understanding the basic terminologies of enzyme and metabolic reaction, factors affecting rate of reaction, classification of enzymes.	Discussion, lecture, in-class activities	Assignment, Quiz, Written exam

3.	Understand the basic principles and role of ATP in metabolism, transportation across cell membrane, Muscle contraction. Role of mitochondria in ETC.	Discussion, lecture, in-class activities	Assignment, Quiz, Written exam
4.	Display knowledge and understanding of digestion and absorption in GI tract and classification of carbohydrates, fats and protein and understanding of mechanism involved in energy yielding metabolism.	Discussion, lecture, in-class activities	Assignment, Quiz, Written exam
5	Understanding the role of vitamins and mineral in metabolism.	Discussion, lecture, in-class activities	Assignment, Quiz, Written exam

4. ASSESSMENT WEIGHTING

Assessment	Percentage of final mark (%)
QUIZ (1+2)	20
Midterm	25
Assignment	10
Online activity	5
Final	40
TOTAL	**100%**

5. ACHIEVING A PASS

Students will achieve **xx** credit hours for this course by passing **ALL** of the course assessments *[alternatively, list the compulsory pass assessments*]* and achieving a **minimum overall score of xx%**

*NB *Ensure that ALL learning outcomes are taken into account*

6. COURSE CONTENT (Indicative)

LECTURE TOPIC	TIME (HOURS)
Introduction and Overview: Need for water and metabolic fuels, the relationship between food intake, energy expenditure, and body weight, mechanisms to control food intake, factors influencing choices of foods, anorexia and bulimia nervosa	3

Enzyme and metabolic pathway: terminologies regarding enzymes and metabolic reactions, reaction equilibrium, factors affecting rate of reaction and types of enzymes.	3
Role of ATP in Metabolism: Exo and endothermic reactions, roles of ATP and proton gradients in active transport, role of ATP in muscle contraction, regulation of mitochondrial electron transport chain and oxidative phosphorylation	3
Classification, Digestion and absorption of carbohydrates	3
Lipids Classification, function, digestion, absorption and transport, triglyceride storage and mobilization.	3
Hormonal control of lipolysis, oxidation of glycerol, fatty acid activation and beta oxidation.	3
Fatty acid biosynthesis, ketogenesis, synthesis of cholesterol (sources and pathway), bile acid (function), lipid metabolism disease	3
Protein metabolism Basic concepts, classes of amino acids, function of protein, sources, digestion and absorption of proteins, digestion of protein by gastric secretion, digestion of proteins by pancreatic enzymes, Products of pancreatic digestion, enzymes responsible for protein digestion.	3
Absorption of amino acids di-, and tri-peptides, Defects in protein digestion and absorption, Amino acid metabolism, Biosynthesis of Nonessential Amino Acids.	3
Amino Acid Catabolism, synthesis of urea, relationship between urea and TCA cycle, ammonia toxicity, Genetic Defects of Amino Acid metabolism	3
Redox reactions, mechanism of ATP synthesis, stages of glycolysis, fate of pyruvate, fermentation, cori cycle, glycolysis with enzymes, oxidation of pyruvate and Kreb's cycle.	3
Electron transport chain, net energy production from aerobic respiration, difference between glycolysis and krebs cycle, important sites for reaction.	3
State of the body Summary of metabolic reactions, nutrient pools, interconversion pathways of nutrients, absorptive and Post-absorptive States, Insulin Effects on Metabolism, Hormonal and Neural Controls of the Post absorptive State.	3
Glucose homeostasis, Feeding Behaviors, Nutrient Signals Related to Energy Stores, metabolic rate, Factors that Influence BMR.	3
Vitamins & Minerals Associated with Metabolism Vitamin A, Vitamin D, Vitamin E, Vitamin K, Vitamin B , Vitamin C, calcium, cobalt, copper , iron and molybdenum, selenium)	3

TOTAL HOURS	**45+15**
Plus **RECOMMENDED INDEPENDENT STUDY HOURS**	
TOTAL COURSE HOURS	**60**

7. RECOMMENDED READING

Core text/s:

1. David A. Bender. Introduction to Nutrition and Metabolism, 2014, Fifth Edition, CRC Press, Taylor and Francis Group, New York.
2. Advanced Nutrition and Human Metabolism, 6th Ed, Wadsworth Cengage Learning, 2012

Library + online resources: