Proposed Academic Year	2020-2021	Last Reviewed Academic Year	
Course Code	AHND 360	Course Title	Nutritional Metabolism
Credit hours	3 (3+0)	Level of study	Bachelor
College / Centre	CAHS	Department	FSHN
Co-requisites		Pre-requisites	AHND 262, AHND 210, AHND 281

1. COURSE OUTLINE

The course introduces the students to introductory topics in nutritional metabolism. The topics include: concepts of nutrients balance, flux, turnover and metabolic pools, energy metabolism at the cellular level, metabolic pathways of synthesis and degradation of lipids, carbohydrates, proteins and amino acids, macronutrient metabolism in major organs and tissues and substrate flux in long term and short term fasting. []

2. AIMS

[This course aims to:

- 1. Students demonstrate knowledge of the anabolic and catabolic processes of carbohydrate metabolism
- 2. Students demonstrate knowledge of the anabolic and catabolic processes of lipids and fatty acids metabolism
- 3. Students demonstrate knowledge of the anabolic and catabolic processes of protein and amino acids metabolism
- 4. Students recognize how the metabolism in different organs and tissues adjust to different nutritional states].

3.	3. LEARNING OUTCOMES, TEACHING, LEARNING and ASSESSMENT METHODS		
(De	erning Outcomes efinitive) on successful completion of course, students will be e to:	Teaching and Learning methods (Indicative)	Assessment (Indicative)
1.	Understanding the principals of metabolic pathways.	Lectures and tutorials	Written examination, quizzes
2.	Understanding the rationale and concepts regarding glucose and glycogen regulation.	Lectures and tutorials	Written examination, quizzes
3.	Recognize how carbohydrates are processed in the human	Lectures and tutorials	Written examination, assignment, quizzes



	body to provide energy via glycolysis, tri-carboxylic acid cycle and the coupling of electron transport system with oxidative phosphorylation		
4.	Demonstrate knowledge of digestion, absorption and transport of fat by lipoproteins and the storage of triglycerols in the adipose tissues	Lectures and tutorials	Written examination, assignment, term project
	5. Demonstrate knowledge of how the human body oxidize fatty acids to produce and store energy for various nutritional states.	Lectures and tutorials	Written examination, quizzes
	6. Identify how the different metabolic pathways are integrated to provide the body vital metabolites needed for building macromolecules and providing energy in post prandial state.	Lectures and tutorials	Written examination, assignment, quizzes

4. ASSESSMENT WEIGHTING

Assessment	Percentage of final mark (%)
Quizzes	15%
Assignment	15%
Mid-Term Exam	30%
Final Exam	40%
TOTAL	100%

5. ACHIEVING A PASS

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

NB *Ensure that ALL learning outcomes are taken into account



6. COURSE CONTENT (Indicative)

Overview, macronutrients (classification); Carbohydrates: classification based on diet, occurrence and function, digestion and absorption.

Major pathways in carbohydrate metabolism (glycolysis, glycogenolysis, gluconeogenesis, glyoxylate cycle), blood glucose regulating hormone, stages of metabolism.

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.

Electron transport chain, net energy production from aerobic respiration, difference between glycolysis and krebs cycle, important sites for reaction.

Lipids

Classification, function, digestion, absorption and transport, triglyceride storage and mobilization.

Hormonal control of lipolysis, oxidation of glycerol, fatty acid activation and beta oxidation. Fatty acid biosynthesis, ketogenesis, synthesis of cholesterol (sources and pathway), bile acid (function), lipid metabolism disease.

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.

Absorption of amino acids di-, and tri-peptides, Defects in protein digestion and absorption, Amino acid metabolism, Biosynthesis of Nonessential Amino Acids.

Amino Acid Catabolism, synthesis of urea, relationship between urea and TCA cycle, ammonia toxicity, Genetic Defects of Amino Acid metabolism

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.

Five phases of glucose homeostasis, Feeding Behaviors, Nutrient Signals Related to Energy Stores, metabolic rate, Factors that Influence BMR

Vitamins & Minerals Associated with Metabolism

Metabolic process, coenzymes in metabolism, thiamin (vitamin B1; function, source, deficiency), riboflavin (vitamin B2

ribotlavin (vitamin B2
Vitamins & Minerals Associated with Metabolism
B3 (niacin), biotin, vitamin B6 Group. Folic acid, vitamin B12, vitamin K, pantothenic acid,
chromium, iodine, sulfur, manganese, iron, zinc, copper



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

7. RECOMMENDED REFERENCES

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, 2013.

Library + online resources:		
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Open Educational Resources:		

