

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

Nutrition 155 –introduction to Human Nutrition

3 hours lecture, 3 units

Catalog Description

This course is an introduction to the fundamentals of nutrition science, integrating concepts and research from biology, biochemistry, microbiology, physiology, and psychology to explain the interaction between nutrients and the human body. Current nutrition guidance models and approaches to medical nutrition are analyzed with an emphasis on evidence-based findings. A discussion of food selection, the nutritional components of food, metabolism and risks associated with excesses or deficiencies throughout the lifecycle are also discussed.

Prerequisite

None

Course Content

- 1) Nutrition and its connection to health
 - a. Chronic disease, the role of genetics and various lifestyle factors
 - b. Nutrition Guidance Models
 - c. Nutrient Composition of Food
 - d. Supplements and their place in a balanced nutrient consumption pattern
 - e. Plant-based phytochemicals and their influence on health and disease
- 2) Scientific Inquiry
 - a. Evaluating Health Claims
 - b. Sequential steps of the scientific method
 - c. Peer-reviewed journals
 - d. Scientific consensus
 - e. Types of research studies
 - f. Evidence-based guidelines and limitations of research
 - g. Advantages and limitations of epidemiology and experimental research
 - h. Evaluation tools and techniques related to reviewing current research finding
- 3) Digestion, absorption, storage and waste removal
 - a. The organization of life from atoms to organisms
 - b. Exploring the systems of the body and their relationship to nutrition
 - c. Hormonal regulation of glucose metabolism, hunger, and satiety
 - d. The anatomy and physiology of the digestive system
 - e. Enzymatic, chemical and mechanical breakdown of food particles into molecules small enough to cross the epithelial cells lining the small intestine for absorption
 - f. Transportation of absorbed molecules to the appropriate fluid system into the body for distribution throughout the body
 - g. How the molecules are metabolized, converted, or stored
 - h. Removal of waste products from the body
 - i. Accessory organs of digestion and their roles in digestion
 - j. Diseases of the gastrointestinal tract
- 4) Carbohydrates
 - a. Biological functions of carbohydrates
 - b. Chemical Structure, classification, and major food sources
 - c. Process of digestion, absorption, and metabolism

- d. Biological effects of fiber
 - e. Metabolic pathways of glucose, role of insulin and glucagon in blood glucose regulation Page 2 of 4 NUTR 155 Introduction to Nutrition
 - f. Blood sugar regulation and organ dysfunctions in prediabetes, diabetes, and hyperglycemia
 - g. Recommended guidelines for carbohydrate, fiber, and free sugars in health and disease
 - h. Lactose Intolerance
 - i. Inadequate carbohydrate Intake; Ketosis vs Ketoacidosis
- 5) Lipids: Triglycerides, phospholipids and sterols
- a. Chemical structure, classification, and major food sources of lipids
 - b. Process of digestion, absorption, and metabolism
 - c. Major steps in anabolism and catabolism of lipids
 - d. Lipoprotein metabolism in the development of atherosclerosis and nutrition recommendations to reduce risk of CHD
 - e. Nutrient recommendations for lipid intake in health and disease
 - f. Tools for identification of nutrients and classification of food sources
- 6) Protein and amino acids
- a. Chemical structure, bonding, classification, and major food sources
 - b. Process of digestion, absorption, and metabolism
 - c. Major steps in anabolism and catabolism of protein
 - d. Biologic process involved in protein synthesis, transamination, and gluconeogenesis
 - e. Nutrigenomics and current research
 - f. Nutrient recommendation for protein in health, impact of physical activity, disease, and across the lifespan
 - g. Evaluation of protein quality
 - h. Biological impacts of protein excess and deficiencies
 - i. Tools for identification of nutrients, adequacy of plant-based diets, and classification of food sources
- 7) Chemical structure and biological functions of micronutrients and water
- a. Biological roles and sources of vitamins, minerals, and phytochemicals and the impact of excess and deficiency
 - b. Provitamin conversion and vitamins involved in energy metabolism and impacts of excess and deficiency
 - c. Hydration status, electrolytes in fluid balance, muscle contraction, role in HTN and blood pressure regulation
 - d. Biologic functions of antioxidant nutrients and phytochemicals
 - e. Process of bone formation, modeling, and remodeling across the lifecycle and the associated nutrients and disorder
- 8) Biologic and psychologic factors associated with weight regulation
- a. Factors influencing energy balance and the role in weight regulation
 - b. Functions of Ghrelin, GLP1, Insulin and Leptin
 - c. Measurement and critical components of calorie expenditure including basal metabolism, food and adaptive thermogenesis, and physical activity
 - d. Measurement and classification of obesity and distribution of adiposity
 - e. Scientific research regarding causation and treatments for overweight and obesity
 - f. Pathophysiology and classification of disordered eating
- 9) Nutrition needs throughout the lifecycle
- a. Nutrient and energy requirements during pregnancy and lactation
 - b. Specific nutrient needs and psychological factors related to each stage of the lifecycle

Course Objectives

Students will be able to:

- 1) Explain the scientific basis and uses of food and nutrient guides, including Dietary Reference Intakes, and apply the scientific method to nutritional research and an understanding of contemporary nutrition issues.

- 2) Describe the chemical structure and biological functions of macronutrients, their major food sources, and the anabolic and catabolic metabolism of selected macronutrients, including the role of enzymes in energy metabolism.
- 3) Outline the steps for evaluating nutritional status, discuss the limitations of various techniques, and assess the nutritional adequacy of an individual's diet while proposing specific changes to reduce chronic disease and malnutrition.
- 4) Describe the role of vitamins and minerals and their effects on metabolism, including the consequences of deficiencies and excesses.
- 5) Explain the components of energy balance and how they impact weight management.
- 6) Understand accessibility issues related to hunger, malnutrition food production, and nutrition interventions.
- 7) Evaluate the effects of aging throughout the lifespan, injury, and disease on nutrient requirements.

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation, one of which must be written essay exams, skills demonstration or, where appropriate, the symbol system.

- 1) Quizzes and exams that measure students' ability to identify, explain, describe and/or provide examples of nutritionally balanced foods and healthy eating habits.
- 2) Daily food log assignment in which students record their daily personal diets and compare their nutritional intake to daily recommended allowances.
- 3) Reading assignments on current issues in nutrition, such as a review of a current popular fad diet and discussion of the nutritional content and sufficiency of this diet.

Special Materials Required of Student

None

Minimum Instructional Facilities

Smart classroom

Method of Instruction

- 1) Lecture and group discussion
- 2) Multimedia
- 3) Individual projects

Out-of-Class Assignments

- 1) **Reading:** Assigned chapters, current event articles
- 2) **Writing:** Dietary Analysis journal and reflections, discussion posts and responses, chapter summaries, and more.
- 3) **Other:** Food label project, exam reviews, online homework with apps (e.g. MyFitnessPal, Calorie Counter, Lose It!, etc) and more

Texts and References

- 1) Required (representative example):
 - a. Wardlaw, *Contemporary Nutrition*. 12th edition. McGraw-Hill, 2024 Release.
 - b. Schiff, Wendy J. *Nutrition for Healthy Living*. McGraw-Hill, 2025.
 - c. Blake, Joan Salge. *Nutrition and You*. 6th edition. Pearson, 2023.
- 2) Supplemental: None

Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- 1) Examine the sources and roles of macronutrients and micronutrients utilizing food labels, dietary intake logs and evaluation/reflection questions.
- 2) Explain the nutritional needs and challenges throughout the human lifespan and the role of dietary planning to make informed dietary decisions for each age category (including but not limited to plant-based diets, cultural and ethnic practices, etc.)
- 3) Describe the relationship between good nutrition and good health and the importance of variety, balance, adequacy, moderation, and calorie control.