

HUN 1201

Human Nutrition

Course Description

HUN 1201 Human Nutrition

(3)

This is a Human Nutrition course intended for those going into the health professions. Three credit hour basic nutrition course that acquaints the student with each of the major nutrients, nutrient requirements, methods used for planning nutritionally adequate diets and nutrition needs throughout life. Current nutrition issues/controversies are discussed to help the student become astute at identifying nutrition facts and fallacies.

No Pre-requisite or Co-requisite necessary.

Rational/ Impact Assessment

This course helps support the college mission of providing the highest quality post-secondary education, leading to the Associate of Arts and Associate of Science degrees, and further to prepare those going into the health professions more specifically nursing and dental hygiene. HUN 1201 will concentrate on nutrients such as macronutrients and micronutrients and the role these play in the human body. This nutrition course will help students get a basic foundation in human nutrition in preparation for any of the health professions.

Broad Course Objectives

This course supports the departmental goal of providing a foundation in nutrition for those students aspiring to the health professions, mores specifically nursing and dental hygiene. Here are examples of the broad course objectives:

- Food choices and human health
- Nutrition standards and guidelines
- Human digestive system
- Macronutrients and human health
- Micronutrients that include deficiency, toxicity, food sources
- Energy balance and healthy body weight
- Nutrition and physical activity
- Diet and health
- Nutrition in various life stages

Course Outline with Specific Objectives

Chapter 1: Overview of Nutrition & Health

1. Define the terms *nutrition* and *wellness*
2. Explain what a *nutrient* is, and how a *nutrient* is different from a *food*
3. Name the six classes of nutrients, and identify which ones are energy-yielding nutrients
4. Define *kilocalorie* (kcal), and identify how many kcals per gram are provided by carbohydrates, proteins, and fats
5. Identify what each of the following acronyms stand for, and briefly define each: DRI, RDA, AI, EAR, UL, EER, AMDR
6. Recall the AMDR's for carbohydrate, protein, and fat
7. Given a total daily kcal intake, calculate how many grams of carbohydrate, protein, and fat should comprise the diet based on the AMDR's
8. Given total daily intake of carbohydrate, protein, and fat (in grams), calculate total kcals, and percentage of kcals from carbohydrate, protein, and fat
9. Define the terms *over nutrition* and *under nutrition*
10. Name at least three chronic diseases that have a strong nutritional component

11. Explain the relationship between my plate and dietary guidelines (characteristics of a diet and physical activity)
12. Identify and explain key features of the Nutrition Facts Panel, including: Serving Size, Calorie (kcal) information, Nutrient Quantities, %Daily Values
13. Read and interpret the Nutrition Facts Panels from several real food packages
14. Describe the order in which ingredients are listed on a food label
15. Distinguish between Nutrient Claims, Health Claims, and Structure-Function Claims on food labels
16. Explain the difference between a “Registered Dietitian” and a “Nutritionist”
17. Learn to evaluate the credibility of sources of nutrition information
18. Identify at least four specific things people can do to protect themselves from foodborne illness
19. Recognize the “danger zone” for food temperatures

Chapter 2: Digestion & Absorption

1. Distinguish between the terms *digestion* and *absorption*
2. Identify the following anatomical features on a diagram: salivary glands, upper esophageal sphincter, esophagus, lower esophageal sphincter, stomach, pyloric sphincter, small intestine, pancreas, liver, gallbladder, ileocecal valve, large intestine (colon), rectum, anus; Briefly describe the role of each in the processes of digestion and/or absorption
3. Explain the difference between the GI tract and accessory organs
4. Define the terms *bolus*, *chyme*, *peristalsis*, *motility*
5. Identify the following enzymes, the nutrient each one breaks down, and where each one can be found along the GI tract: salivary amylase, pepsin, pancreatic amylase, pancreatic proteases, pancreatic lipase
6. Describe the role of HCl in digestion, and what organ secretes it
7. Explain the purpose of bicarbonate, and what organ secretes it
8. Describe the purpose of bile, what organ makes it, and what organ stores it
9. Define the terms *villi* and *microvilli*
10. Name the body’s two transport systems for nutrients
11. Identify the body’s transport vehicle for lipids

Chapter 3: Carbohydrates

1. Define the following and name three examples of each: *monosaccharides*, *disaccharides*, *polysaccharides*
2. Identify the primary purpose of carbohydrates in the human diet
3. Explain what physiological changes and adaptations take place when there is little or no carbohydrate in the diet (ketosis)
4. Compare and contrast starch and glycogen
5. Describe the structure of dietary fiber
6. Describe the benefits, recommendation, sources of dietary fiber
7. Describe negative effects associated with consuming too much fiber
8. Describe the regulation of blood glucose and identify the two key hormones in this process
9. Describe the relationships between: sugar and obesity, sugar and heart disease, sugar and nutrient deficiencies, sugar and dental caries
10. Describe at least 3 ways to reduce intake of added sugars
11. Define the terms *sugar alcohols*, *nutritive sweeteners*, and *non-nutritive sweeteners*
12. Recognize several examples of non-nutritive sweeteners on food ingredient lists
13. Name the food groups that provide carbohydrates
14. Briefly explain the concept of the glycemic index

Chapter 4: Lipids

1. Define the terms *lipids*, *adipose*
2. Name the six functions of fat in the human body
3. Describe the chemical structure of a triglyceride
4. Distinguish between saturated and unsaturated fatty acids, and between monounsaturated and polyunsaturated fatty acids
5. Explain how the hardness or softness of a fat is related to its chemical structure
6. Define the terms *rancid*, *oxidation*; and explain how these terms relate to the stability of a fat

7. Explain the process of hydrogenation, including how it affects the shelf-life of a fat, as well as how it alters the chemical structure of the fatty acids
8. Distinguish between *cis*- and *trans*-fatty acids, and describe how *trans*-fatty acids behave in the body
9. Name the two essential fatty acids, and describe what the term *essential fatty acid* means
10. Distinguish between omega-6 and omega-3 fatty acids, and the health effects of each
11. Define the term *phospholipid*, and briefly explain the role of phospholipids in foods and in the human body
12. Define the term *sterol*, and identify the most common sterol in the human body
13. Describe how each of the following affects blood cholesterol: saturated fat intake, *trans*-fat intake, dietary cholesterol, monounsaturated fatty acid intake, polyunsaturated fatty acid intake
14. Identify the recommended daily limits for: saturated fat intake, *trans*-fat intake, dietary cholesterol
15. Recognize the functions of fats in foods
16. Give several examples of foods that tend to be high in fat, and foods that tend to be low in fat

Chapter 5: Protein

1. Define the terms *protein*, *amino acid*, *dipeptide*, *tripeptide*, *polypeptide*
2. Recognize the structure of an amino acid
3. Describe the four levels of protein structure (primary, secondary, tertiary, quaternary), denaturation
4. Explain how the shape of a protein dictates its functionality, and what happens to function of a protein when its shape is altered
5. Distinguish among the terms *nonessential amino acid*, *essential amino acid*, and *conditionally essential amino acid*
6. Recall the number of amino acids that make up proteins, and how many of these are considered essential amino acids
7. Provide at least eight examples of roles proteins play in the body
8. Describe and give an example of how proteins function as enzymes
9. Describe and give an example of how proteins function as transporters
10. Describe and give an example of how proteins regulate fluid and electrolyte balance
11. Define the term *edema*
12. Describe and give an example of how proteins regulate acid-base balance
13. Define the terms *pH*, *denaturation*, *acidosis*, *alkalosis*, and *buffer*
14. Describe and give an example of how proteins function as antibodies
15. Describe and give an example of how proteins function as hormones
16. Describe how and when proteins might be used as a source of energy, and what then happens to the nitrogen-containing amine groups
17. Define the terms *severe acute malnutrition (SAM)*, *kwashiorkor*, and *marasmus*
18. Distinguish between the causes and manifestations of kwashiorkor and marasmus
19. Contrast *chronic malnutrition* with *severe acute malnutrition (SAM)*
20. Describe how excess protein intake would affect a patient with kidney disease
21. Identify the RDA for protein in grams/kilogram body weight, and perform calculations using this figure to determine approximately how much protein a person of a given weight would need daily
22. Explain what is meant by high-quality protein, and recognize examples of high-quality protein foods.
23. Define the terms *protein digestibility*, *limiting amino acid*, and *complementary proteins*
24. Describe what is meant by the *protein-sparing effect* of carbohydrate and fat
25. Provide several tips for planning a nutritionally-adequate vegetarian diet
26. Identify nutrients that vegetarians and vegans might not get enough of if the diet is not well-planned

Chapter 6: Energy Balance & Body Composition

1. Describe the physiological responses to feasting and to fasting
2. Describe what causes the body to store fat
3. Name four potential hazards of long-term fasting
4. Name the three components of total energy expenditure
5. Define *basal metabolic rate*, and name several factors that affect it
6. Define *thermic effect of food*, and identify the approximate percentage of total energy expenditure this accounts for
7. Describe how the following five factors affect energy requirements: gender, growth, age, physical activity, and

body composition/size

8. Define BMI, and identify what this acronym stands for
9. Identify the BMI ranges that are classified underweight, normal, overweight, and obese
10. Given a hypothetical person's height and weight, calculate his/her BMI and classify him/her into the appropriate weight category
11. Identify the limitations of the BMI calculation, and for which populations the classifications might not be accurate
12. Distinguish between BMI and *body composition*
13. Describe methods used for body composition assessment
14. Define the terms *central obesity*, and explain how the "apple shaped" body type is related to chronic disease risk
15. Distinguish between *visceral fat* and *subcutaneous fat*
16. Name at least two potential health consequences of being underweight
17. Recognize ways to identify when an advertised weight loss plan is a fad or scam

Chapter 7: Weight Management

1. Describe the relationship between genetics and weight
2. Define and briefly describe the roles of the following proteins in appetite control and energy regulation: *lipoprotein lipase, leptin, ghrelin*
3. Explain how the number of fat cells in an obese person compares to the number of fat cells in a normal weight person, and why it tends to be so difficult for obese individuals to lose weight and maintain it
4. Describe the set-point theory, and how it might affect an individual's efforts to lose weight
5. Describe four environmental factors that can play a role in the development of obesity
6. Distinguish between the terms *appetite* and *hunger*
7. Distinguish between the terms *satiation* and *satiety*
8. Define *clinically severe obesity*
9. Briefly define and describe the following types of weight loss surgery: *gastric bypass, gastric banding, laparoscopic weight-loss surgery (refer to chapter 17)*
10. Name and describe at least five characteristics of a healthful eating plan for weight loss
11. Identify the daily kcal intake threshold below which nutritional adequacy becomes difficult or impossible
12. Identify at least five characteristics of people who successfully maintain their weight loss
13. Discuss strategies that may help underweight adults gain weight
14. Define the terms *anorexia nervosa, bulimia nervosa, and binge eating disorder*; and compare and contrast the characteristics of each of these eating disorders
15. Summarize the recommended physical activity strategies for weight management
16. Identify at least three benefits to including physical activity in a weight reduction plan

Chapter 8: The Vitamins

1. Define *vitamin*
2. Distinguish between the fat-soluble and the water-soluble vitamins, and recognize which ones belong to which group
3. Discuss the differences in the ways fat-soluble vitamins and water-soluble vitamins are absorbed, transported, stored, and excreted
4. Contrast fat-soluble vitamins and water-soluble vitamins with regards to potential for toxicity
5. Define the terms *bioavailability* and *precursor*
6. For each vitamin discussed in this chapter, briefly describe the following:
 - a) Its role(s) in the human body
 - b) Different names and/or different forms of the vitamin
 - c) The recommended intake (RDA or AI)
 - d) Toxicity – what happens if we consume too much?
 - e) Deficiency – what happens if we don't consume enough?
 - f) Examples of good food sources
7. Define the terms *night blindness, keratin, teratogenic, and RAE (retinol activity equivalents)*, and explain how they relate to Vitamin A
8. Define the terms *rickets, osteomalacia, and osteoporosis*, and explain how they relate to Vitamin D

9. Define the terms *erythrocyte hemolysis* and *hemolytic anemia*, and explain how they relate to Vitamin E
10. Define the terms *coenzyme*, *fortification*, and *enrichment*, and explain how they relate to the B-vitamins
11. Define the terms *beriberi* and *pellagra*, and identify which B-vitamin deficiency each is associated with
12. Define the term *NE (niacin equivalents)*, and explain how it relates to the conversion of the amino acid tryptophan to the B-vitamin niacin
13. Define the terms *neural tube defect* and *DFE (dietary folate equivalent)*, and explain how they relate to the B-vitamin folate
14. Define the terms *intrinsic factor* and *pernicious anemia*, and explain how they relate to Vitamin B12
15. Define the terms *scurvy*, *collagen*, *gout*, and explain how they relate to Vitamin C
16. Describe the effect of smoking on Vitamin C requirements
17. Describe the effect of Vitamin C on iron absorption
18. Define the term *phytochemical*
19. Discuss some of the concerns and controversies regarding phytochemical supplements

Chapter 9: Water & The Minerals

1. Identify the functions of water in the body's fluids
2. Describe the process by which the body regulates water intake and excretion
3. Explain how the body uses electrolytes to maintain fluid balance
4. Describe how the body uses its ions to help maintain acid-base balance
5. Distinguish between the trace and major minerals, and recognize which ones belong to which group
6. For each minerals discussed in this chapter, briefly describe the following:
 - a. Its role(s) in the human body
 - b. Know the symbol for each mineral
 - c. The recommended intake (RDA or AI)
 - d. Toxicity – what happens if we consume too much?
 - e. Deficiency – what happens if we don't consume enough?
 - f. Examples of good food sources
7. Identify the factors that contribute to osteoporosis and list current recommendations for calcium intakes for different age groups.
8. Differentiate between the terms "Iron deficiency" and "anemia" and describe the causes of iron deficiency.
9. Describe the major functions of zinc and identify U.S. populations at risk for zinc deficiency.
10. Explain what goiter is and how it is related to iodine deficiency.
11. Describe the role of fluoride in the body.

Chapter 17-18: Nutrition & GI Disorders

1. Define Dysphagia and identify the complications and nutrition intervention for this disease
2. Define GERD and recognize the symptoms, causes and treatment of this disease
3. Understand the complications of gastritis and identify dietary interventions
4. Define peptic ulcer disease and identify symptoms, complications, drug therapy and nutrition therapy for this disease
5. Identify the causes, treatment and prevention of constipation
6. Identify the causes and treatment of diarrhea
7. Define fat malabsorption
8. Define lactose intolerance
9. Identify and compare the two major forms of inflammatory bowel disease: Crohn's disease and ulcerative colitis
10. Define diverticulosis and identify causes, complications and prevention
11. Define IBS and understand the treatment and nutrition therapy for individuals that suffer from this disease

Chapter 20: Nutrition & Diabetes Mellitus

1. Define Diabetes Mellitus
2. Know the symptoms/signs of Diabetes Mellitus
3. Know how to diagnose Diabetes Mellitus
4. Distinguish between Type 1 and Type 2 Diabetes Mellitus
5. Understand the acute complications of Type 1 and Type 2 Diabetes Mellitus

6. Understand the chronic complications of Type 1 and Type 2 Diabetes Mellitus
7. Explain how nutrition can be part of the therapy for Diabetes Mellitus
8. Insulin therapy for Type 1 Diabetes Mellitus
9. Insulin therapy for Type 2 Diabetes Mellitus
10. Explain the effect that exercise has on the management of Diabetes Mellitus
11. Define Gestational Diabetes
12. Understand the effects that Type 1 and Type 2 Diabetes Mellitus have on pregnancy

Chapter 21: Nutrition & CVD

1. Define CVD
2. Define Atherosclerosis
3. Define and distinguish between LDL and HDL, and describe the health implications of each
4. Understand the consequences and causes of Atherosclerosis
5. Explain the role of nutrition in preventing/promoting Atherosclerosis
6. Define Coronary Heart Disease (CHD)
7. List the symptoms of CHD
8. Explain the factors involved in the risk assessment of CHD
9. Explain the role of nutrition in preventing/promoting CHD
10. Define Stroke
11. Define Hypertension
12. Understand the factors that influence blood pressure
13. List the factors that contribute to hypertension
14. List the strategies that are used to treat hypertension
15. Define Heart Failure
16. Understand the consequences of Heart Failure

Chapter 23: Nutrition, Cancer, & HIV

1. Describe how cancer develops and its treatment
2. Identify the dietary factors associated with cancer
3. Discuss the relationship between cancer treatment and nutritional status
4. Discuss the causes of wasting and malnutrition associated with cancer and HIV infections
5. Identify the causes of anorexia, reduced food intake, and nutrient losses in cancer and HIV infections
6. Describe the supportive role nutrition plays in cancer therapy
7. Describe the appropriate nutrition support for a person receiving a bone marrow transplant
8. Explain the course of HIV infection and possible treatments for HIV infections
9. Describe the characteristics of nutrition support for people with HIV infections
10. Identify the ethical issues of nutrition care, particularly with respect to “end of life” decisions

Sport & Exercise

1. Define fitness
2. List the components of fitness
3. Describe the benefits of cardio-respiratory training
4. Describe the benefits of weight training
5. Describe the role of carbohydrates during physical activity and understand the conditions necessary for the body to use them for energy purposes
6. Describe the role of lipids during physical activity and understand the conditions necessary for the body to use them for energy purposes
7. Comment on the safety of amino acid supplements, and for whom they could be particularly dangerous
8. Describe what is meant by “spot reducing”, and whether this is possible
9. Describe what is meant by *female athlete triad*, and identify its three components
10. Define *amenorrhea*, and explain its relationship to early-onset osteoporosis

Alcohol Metabolism

1. Define and list the 3 main types of alcohol
2. Describe and understand the conditions necessary for the production of alcohol (fermentation process)
3. Know the amount of energy that alcohol can yield
4. Describe the metabolic fate of alcohol after it is absorbed. What tissues does it affect?
5. Define oxidation and understand the role and fate of acetaldehyde
6. Define ADH and understand its purpose
7. List the negative effects that excessive alcohol consumption has on the: brain, heart, liver and pancreas
8. Understand the role that alcohol has on the development of cancer

Evaluation

Student progress will be evaluated using 3-5 examinations, assignment essays, and a comprehensive departmental final exam. Exam questions will include multiple choice and true/false. Assignment essay questions include topics such as examination of student's personal profile in accordance with My Plate and their ideal weight. Students will also analyze food labels and discuss them in their assignment essays.