

# Virginia Western Community College

## DNH 150

### Nutrition

#### **Prerequisites**

Successful completion of BIO 141/142; DNH 111, DNH 115, DNH 120, DNH 141, DNH 142, DNH 145, DNH 146, and DNH 216.

#### **Course Description**

Studies nutrition as it relates to dentistry and general health. Emphasizes the principles of nutrition as applied to the clinical practice of dental hygiene.

**Semester Credits: 2**

**Lecture Hours: 2**

**Lab/Clinical/Internship Hours: 0**

#### **Required Materials**

##### **Textbook:**

Nutrition – Concepts and Controversies. Whitney, Eleanor and Sizer, Fancis. 14<sup>th</sup> Edition. Wadsworth Publishing, 2016. ISBN: 9781305627994

#### **Course Outcomes**

**At the completion of this course, the student should be able to:**

- To provide a foundation in the science of nutrition and the role of nutrition in the prevention and control of dental disease.
- Demonstrate a knowledge of basic nutrition principles
- To recognize the influence of cultural, socioeconomic and psychological factors on the dietary patterns and habits of clients.
- To examine the nutritional needs of clients during specific stages of growth and development, such as infancy and childhood, adolescence and old age.
- To assess the nutritional needs of special clients, such as the orally, physically, and mentally handicapped, the diabetic, the pregnant, and the post-operative client.
- Demonstrate the skills needed to plan, implement and evaluate nutrition education/analysis sessions with clients
- To increase awareness of the anticipated changes in food production, and need for research in seeking answers to nutritional needs for the future.

## **Topical Description**

### **Unit 1: Food Choices and Human Health; Nutrition Standards and Guidelines; the Remarkable Body and Carbohydrates**

- The Diet and Health Connection
- Healthy People 2010: Nutrition for the Nation
- The Human Body and Its Food
- The Science of Nutrition
- Nutrient Recommendations
- Dietary Guidelines for Americans
- Diet Planning with the USDA Food Guide
- The Body's Cells
- Body Fluids and the Cardiovascular System
- Hormonal and Nervous Systems
- The Immune System
- The Digestive System
- Excretory System
- A Close Look at Carbohydrates
- The Need for Carbohydrates
- From Carbohydrates to Glucose
- Refined, Enriched, and Whole-Grain Foods
- The Body's Use of Glucose
- Diabetes
- Management of Diabetes
- Hypoglycemia

### **Unit 2: The Lipids: Fats, Oils, Phospholipids and Sterols; Proteins, Amino Acids and Vitamins**

- Introducing the Lipids
- Usefulness of Fats in the Body
- Usefulness of Fats in Food
- Triglycerides: Fatty Acids and Glycerol
- Saturated Versus Unsaturated Fatty Acids
- Phospholipids and Sterols
- Digestion and Absorption of Fats
- Transport of Fats
- Storage and Usage of Body Fats
- Dietary Fat, Cholesterol and Health
- Essential Polyunsaturated Fatty Acids
- Processing on Unsaturated Fats
- The Structure of Proteins
- Variety of Proteins

- Denaturation of Proteins
- Digestion and Absorption of Dietary Protein
- Roles of Body Proteins
- Amino Acids to Glucose
- Food Protein: Need and Quality
- Nitrogen Balance
- Protein Deficiency and Excess
- Definition and Classification of Vitamins
- Fat Soluble Vitamins: Vitamins A, D, E, K; Roles and Consequences of Deficiency
- Water Soluble Vitamins: Vitamins B and C; Roles and Consequences of Deficiency

Unit 3: Water and Minerals; Energy Balance and Healthy Body Weight; Nutrients' Physical Activity and the Body's Response

- Why is Water the Most Indispensable Nutrient?
- The Body's Water Balance
- Safety and Sources of Drinking Water
- Body Fluids and Minerals
- The Major Minerals: Roles in the Body, Deficiencies and Toxicities
- The Trace Minerals: Roles in the Body, Deficiencies and Toxicities
- The Problems of Too Little or Too Much Body Fat
- Risks from Central Obesity
- The Body's Energy Balance
- Energy In and Energy Out
- Estimating Energy Requirements
- Body Weight Versus Body Fatness
- Body Mass Index
- Measures of Body Composition and Fat Distribution
- Hunger and Appetite
- Inside and Outside the Body Causes of Obesity
- How the Body Gains and Loses Weight
- Achieving and Maintaining a Healthy Body Weight
- Eating Disorders
- Benefits of Fitness
- Physical Activity Guidelines
- The Essentials of Fitness
- The Active Body's Use of Fuels
- Vitamins and Minerals – Keys to performance
- Fluids and Temperature Regulation in Physical Activity

#### Unit 4: Diet and Health; Oral Manifestations of Nutrient Deficiencies; Life Style Nutrition

- Nutrition and Immunity
- The Concept of Risk Factors
- Cardiovascular Diseases
- Nutrition and Hypertension
- Nutrition and Cancer
- Dental Caries: Primary Factors to Consider
- Periodontal Diseases: Systemic and Behavioral Risk Factors
- Nutritional Guidance: Determining the Need and Developing a Plan
- Pregnancy: The Impact of Nutrition on the Future
- Increased Need for Nutrients During Pregnancy
- Weight Loss After Pregnancy
- Teen Pregnancy
- Alcohol and Pregnancy
- Lactation
- Feeding the Infant
- Feeding a Healthy Young Child
- Mealtimes and Snacking
- Nutrient Deficiencies and Brain Impairment
- Food Allergy, Intolerance, and Aversion
- Nutrition in Adolescence
- Eating Patterns and Nutrient Intakes
- The Later Years
- Energy and Activity
- Protein Needs; Carbohydrates and Fiber; Fats and Arthritis; Vitamin Needs, Water and the Minerals
- Food Choices of Older Adults

#### **Unit Objectives**

##### Unit 1 Objectives

- Describe the roles of nutrients in the body.
- Discuss the ways that nutrition affects health.
- List several personal life choices that affect health.
- List the most vital nutrient, the three energy-yielding nutrients, and the two-helper nutrients.
- Describe ways that food conveys emotional satisfaction and hormonal stimuli.
- Discuss the roles of the phytochemicals.
- Describe the research process.
- Explain the expression of cultural traditions and social values through food choices.

- List four proposed U.S. nutrition-related health objectives.
- List the foods that form the basis of a nutritious diet.
- List, define and give examples of the five characteristics of a healthy diet.
- Define Recommended Dietary Allowances and Dietary Reference Intakes.
- Discuss the standards used on food labels.
- Describe activities that are recommended for implementing nutrition recommendations.
- Discuss how foods are grouped in the Daily Food Guide.
- Describe how the Food Guide Pyramid provides guidance to achieving adequacy, balance, moderation, and variety.
- List the drawbacks of the Food Guide Pyramid.
- Describe how the Exchange System facilitates calorie control.
- Discuss the importance of serving sizes in nutrition.
- Describe the mechanical and chemical digestive processes in order of their occurrence in the body.
- Discuss the processes of absorption, transportation, and storage of nutrients.
- Distinguish among the various carbohydrates found in foods and in the human body.
- Describe the body's use of glucose to provide energy or to make glycogen and fat.
- Discuss diabetes, hypoglycemia, and lactose intolerance and their relationships to carbohydrate intake.
- Discuss the roles of fiber-rich foods in the maintenance of the body's health and identify foods rich in fiber.
- List the chief functions and food sources of carbohydrate rich vitamins and describe any major deficiency and toxicity symptoms associated with each.
- Describe the best method of planning a diet that is both rich in vitamins and consistent with the Dietary Guidelines.

### Unit 2 Objectives

- List the classification of lipids and give an example of each.
- Define in writing the difference between saturated and unsaturated fatty acids.
- Describe the major roles of fats in the body and in the diet.
- Identify an essential fatty acid.
- Describe three ways to avoid the spoilage problem with unsaturated oils.
- Describe the body's use of triglycerides.
- Define the role of lipoproteins in the absorption of fats.
- Discuss the function of cholesterol in the diet.
- Differentiate between HDL and LDL.
- Give examples of foods in each food group, which are low/high in fat.
- Discuss the evidence, which indicates that dietary fats may be related to heart disease.
- Applying your knowledge of chemistry, state the chemical components of proteins.

Unit 2 continued

- Define essential amino acid, complete protein, non-essential amino acid, complementary protein, and incomplete protein.
- Explain what is meant by “protein-sparing action”.
- Identify and discuss the roles of protein.
- Describe the body’s handling of protein to obtain maximum efficiency.
- Identify the RDA for protein.
- List examples of protein foods, including those containing complete proteins.
- List the precautions a vegetarian must take in order to meet their protein needs.
- Describe the signs and symptoms of the deficiency diseases related to inadequate protein in the diet.
- Identify the general characteristics of fat-soluble vitamins.
- Explain the major body functions of Vitamin A.
- Explain the deficiency signs and symptoms associated with insufficient Vitamin A in the diet.
- List the oral signs of Vitamin A deficiency.
- Identify the toxicity symptoms associated with excess intakes of Vitamin A.
- Explain how the Vitamin A in plants differs from the sources of Vitamin A in plant foods.
- Identify food sources of Vitamin A in its active form and food sources of provitamin A.
- Explain the major body functions of Vitamin D.
- Describe the symptoms and signs of rickets and Osteomalacia.
- Identify both early and later symptoms and signs of Vitamin D toxicity.
- List the oral symptoms of Vitamin D deficiency.
- Identify sources of Vitamin D.
- Explain the major body function of Vitamin E.
- Identify some functions exploited by the media, which are not directly controlled by Vitamin E.
- Identify the probable sign of Vitamin E deficiency.
- Describe those symptoms and signs that are currently thought to be associated with Vitamin E toxicity.
- Explain the major body function of Vitamin K.
- List the whole body and oral symptoms associated with Vitamin K deficiency.
- Explain why Vitamin K deficiency is more prone to infants and adults on certain medications.
- Identify sources of Vitamin K.
- Identify the general characteristics of water-soluble vitamins.
- Define co-enzyme.
- Explain the role of the B vitamins in the catabolism of glucose.
- Explain the major body functions of each of the B vitamins.
- Describe the deficiency symptoms associated with each of the B vitamins.

- List the oral signs of deficiencies associated with each of the B vitamins.
- List the best food sources of all the B vitamins.
- Explain why anemia is associated with a folacin deficiency, a B12 deficiency, or lack of the intrinsic factor.
- List the ways to prevent losses of vitamin B in food handling.
- Describe how the body handles excess intakes of the B vitamins.
- Name the two active forms of Vitamin C.
- Describe the metabolic roles of Vitamin C.
- List the symptoms of scurvy.
- State the oral signs of Vitamin C deficiency.
- Identify foods that are good sources of Vitamin C.
- List the ways to protect Vitamin C in food handling.
- Explain why megadoses of Vitamin C may be dangerous.
- Give examples of situations, which may require therapeutic doses of Vitamin C.

### Unit 3 Objectives

- Identify the seven major minerals in the body.
- Identify the major roles of each of the seven major minerals.
- Identify and describe the deficiency diseases associated with the major minerals.
- List the food sources of calcium, phosphorus, potassium, sodium, chloride, sulfur, and magnesium.
- Describe the roles of iron in the body.
- Identify the best food sources of iron.
- Explain why iron deficiencies are seen more often in females and children.
- Describe the symptoms of iron-deficiency.
- Describe the symptoms of excess iron, iodine, and fluoride intakes.
- Identify the major body functions of iodine and zinc.
- Describe the deficiency symptoms of iodine and zinc.
- Identify the best food sources of iodine, zinc and fluoride.
- Briefly describe the roles of copper, selenium, and chromium in the body.
- Identify and discuss the functions of water in the body.
- Identify four variables that affect the quality of water.
- Discuss the effect of these variables in the body.
- Identify the general characteristics of fat-soluble vitamins.
- List and define the three components of the body's energy budget.
- Identify and explain the factors that affect the basal metabolic rate.

- Estimate your individual total energy expenditure.
- Discuss the problems of too much or too little body fat.
- Discuss the role of standard weight tables and BMI in defining obesity.
- Evaluate the methods used to estimating body fatness.
- Summarize the theories that attempt to explain the mystery of obesity.
- Explain what happens during moderate weight loss versus rapid weight loss.
- Summarize the recommended strategies to promote weight control and explain the roles surgery and pills play in this attempt.
- Explain the benefits of and guidelines for regular physical activity.
- Summarize how the body adjusts its fuel mix to respond to physical activity of varying intensity levels and duration.
- Discuss the effects, if any, of a high-protein diet on athletic performance.
- Describe the roles vitamins and minerals play in physical performance and indicate whether supplements are necessary to support the needs of active people.
- List the risks of taking ergogenic aids and steroids.
- Describe the best way to stay hydrated before and during exercise.

#### Unit 4 Objectives

- Describe the role of nutrition in maintaining a healthy immune system.
- Define atherosclerosis and identify the risk factors for cardiovascular disease.
- Describe how hypertension develops and identify the risk factors associated with the disease.
- Discuss strategies that can be used to reduce the risks of cardiovascular disease and hypertension.
- Describe the process by which a cancer develops and explain what is known about the effects of food constituents on cancer development.
- Describe how maternal nutrition before and during pregnancy affects both the development of the fetus and growth of the infant after birth.
- Discuss maternal physiological adjustments that occur during pregnancy and explain how they influence energy and other nutrient requirements.
- Explain why abstinence from smoking and drugs, avoiding dieting, and moderation in the use of caffeine are recommended during pregnancy.
- Explain the effects of alcohol on the development of the fetus and describe fetal alcohol syndrome.
- List the benefits of breastfeeding and indicate the changes a lactating woman needs to make in her diet to promote breastfeeding success.
- Describe the circumstances when breastfeeding is not appropriate and explain healthy alternatives.



- Describe the nutrient needs of young children and appropriate feeding practices including issues of choking, portion sizes, and snacking.
- Discuss nutrition-related concerns of children including the link between diet and behavior, the problem of lead, and the impact of television on nutrition.
- Distinguish between food allergies, intolerances, and aversions.
- Discuss the special nutrient needs and concerns of teenagers including the effect of diet on PMS and acne.
- Describe special nutritional needs of older adults and the suspected connections between diet and disease.
- Understand the multifaceted interactions between diet, nutrition and the synergistic bidirectional relationship between the two.
- Relate dental caries and periodontal disease to nutritional factors.
- Explain nutritional concerns with the following medically compromising conditions: diabetes, HIV, overweight and obesity, oral and pharyngeal cancer, and osteoporosis.

### **Note to Instructors**