



## WTCS Repository

# 10-806-172 Basic Nutritional Science

## Course Outcome Summary

### Course Information

**Description** This course provides an introduction into the science of nutrition. Basics concepts related to digestion and metabolism are presented. The significance of carbohydrates., lipids, proteins and vitamins to the human organism are discussed. The relationship of proper nutrition to selected pathological conditions throughout the human lifecycle is presented. The concept of sustainability and environmentally - conscious food production introduced.

**Total Credits** 3

### Course History

**Last Revision Date** 8/28/2013

### Pre/Corequisites

**Prerequisite** Each Wisconsin Technical College determines the General Education course prerequisites used by their academic institution. If prerequisites for a course are determined to be appropriate, the final Course Outcome Summary must identify the prerequisites approved for use by the individual Technical College.

### Course Competencies

#### 1. Describe the role for carbohydrate in human physiology.

##### Assessment Strategies

1.1. in classroom assessment activities, on a quiz, on a worksheet, on a comprehensive examination

##### Criteria

*Your performance will be successful when:*

- 1.1. you explain the structure of monosaccharides, disaccharides and polysaccharides
- 1.2. you relate structure to function
- 1.3. you explain health benefits of soluble and insoluble fiber
- 1.4. you complete fiber content worksheet

##### Learning Objectives

- 1.a. Explain relationship of chemical structure to function of carbohydrate.
- 1.b. Differentiate between simple and complex carbohydrates.
- 1.c. Identify health benefits of soluble versus insoluble fiber.
- 1.d. Explain function of fiber related to structure.

#### 2. Describe the role for lipids/fats in human physiology.

### **Assessment Strategies**

2.1. in classroom assessment activities, on a quiz, on a worksheet, on a comprehensive examination

#### **Criteria**

*Your performance will be successful when:*

- 2.1. you explain the structure of triglycerides, fatty acids, and cholesterol
- 2.2. you relate structure to function
- 2.3. you define the function of fat in the body
- 2.4. you identify the role of fat and list optimal amounts in the diet
- 2.5. you identify essential fatty acids and food sources for each
- 2.6. you explain "good" and "bad" cholesterol and optimal blood lipid levels for each
- 2.7. you explain hydrogenation and trans fatty acids
- 2.8. you outline physiological consequences of over-consumption of fats

#### **Learning Objectives**

- 2.a. Explain the relationship of chemical structure to function.
- 2.b. Define the function of fat in the body and its role in the diet.
- 2.c. Describe the three basic forms of fatty acids and identify the essential fatty acids.
- 2.d. Identify food sources of three basic forms of fatty acids.
- 2.e. Differentiate between "good" cholesterol and "bad" cholesterol
- 2.f. Explain hydrogenation and trans fatty acids.
- 2.g. Explain health consequences of over-consumption of fats.

### **3. Describe the role for proteins in human physiology.**

#### **Assessment Strategies**

3.1. in classroom assessment activities, on a quiz, on a worksheet, on a comprehensive examination

#### **Criteria**

*Your performance will be successful when:*

- 3.1. you complete worksheet assessing own protein intake
- 3.2. you relate structure to function
- 3.3. you list three complete and three incomplete proteins
- 3.4. you identify the diseases caused by protein deprivation
- 3.5. you identify the health consequences of protein over-consumption
- 3.6. you describe protein metabolism as related to enzymes, hormones, immunity, gluconeogenesis, and fluid balance

#### **Learning Objectives**

- 3.a. Explain relationship of chemical structure to function of protein.
- 3.b. Differentiate between complete and incomplete proteins.
- 3.c. Describe health consequences of over and under consumption of protein.
- 3.d. Identify food sources of high biological value proteins.
- 3.e. Explain functions of protein metabolism related to enzymes, hormones, immunity, gluconeogenesis, and fluid balance.

### **4. Describe the role for vitamins in human physiology.**

#### **Assessment Strategies**

4.1. completing quiz, worksheet, and comprehensive examination

#### **Criteria**

*Your performance will be successful when:*

- 4.1. you contrast the role of vitamins to the other nutrients
- 4.2. you identify the water soluble vitamins, function, and good food sources for each
- 4.3. you identify the fat soluble vitamins, function, and good food sources for each
- 4.4. you define precursor and antagonist as they relate to vitamins
- 4.5. you identify potential causes of vitamin deficiencies
- 4.6. you describe affect of harvesting, processing, preparation and storage of foods to potential vitamin content variability
- 4.7. you state conditions of use for vitamin supplement preparations

- 4.8. you recognize potentially toxic intake levels of vitamins
- 4.9. you complete vitamin use worksheet

#### **Learning Objectives**

- 4.a. Contrast the role of vitamins to other nutrients.
- 4.b. Categorize the vitamins as fat or water soluble and describe general properties of each.
- 4.c. Define precursor and antagonist as they relate to vitamins.
- 4.d. Identify the general causes of vitamin deficiencies.
- 4.e. Recognize the variability in vitamin and content of foods depending on its harvesting, processing, preparation, and storage methods.
- 4.f. Describe appropriate use of vitamin supplement preparations.
- 4.g. Recognize potentially toxic intake levels of vitamins.

### **5. Describe the role for minerals in human physiology.**

#### **Assessment Strategies**

- 5.1. in classroom assessment activities, on a quiz and comprehensive examination

#### **Criteria**

*Your performance will be successful when:*

- 5.1. you utilize dietary intake tables to identify recommended intakes of trace minerals
- 5.2. you state function and good food sources of essential minerals
- 5.3. you describe potential toxicity signs from minerals
- 5.4. you list population groups "at risk" from deficiency states
- 5.5. you utilize dietary intake tables to identify recommended intakes of trace minerals

#### **Learning Objectives**

- 5.a. Classify minerals as trace or major.
- 5.b. State function, deficiency state, potential toxicity, clinical use and food sources of minerals.
- 5.c. List population groups at risk for deficiency states.

### **6. Describe the role for water in human physiology.**

#### **Assessment Strategies**

- 6.1. in classroom assessment activities, on a quiz, worksheet, and comprehensive examination

#### **Criteria**

*Your performance will be successful when:*

- 6.1. you calculate own fluid needs on a worksheet
- 6.2. you explain conditions causing dehydration
- 6.3. you define overhydration
- 6.4. you list physiological consequences of dehydration

#### **Learning Objectives**

- 6.a. Explain fluid balance identifying intake and output parameters.
- 6.b. State physiological impact of dehydration and overhydration.

### **7. Identify the organs of the digestive track.**

#### **Assessment Strategies**

- 7.1. in classroom assessment activities, on quiz, and comprehensive examination

#### **Criteria**

*Your performance will be successful when:*

- 7.1. you identify physiological location of mouth and esophagus
- 7.2. you identify physiological location and importance of the role of the liver and gall bladder in the digestive process
- 7.3. you identify the liver, gall bladder, pancreas and small intestines as organs that produce and secrete digestive substances
- 7.4. you identify physiological location and function of the small and large intestine

#### **Learning Objectives**

- 7.a. List and locate organs involved in digestion

7.b. Identify changes to nutrients in each organ

## 8. Explain chemical and mechanical components of digestion/absorption.

### Assessment Strategies

8.1. in classroom assessment activities, on a quiz, and on a comprehensive examination

### Criteria

*Your performance will be successful when:*

- 8.1. you list three mechanical actions of digestion
- 8.2. you identify digestive juices and function of each
- 8.3. you identify two of the four organs that produce substances needed in digestion
- 8.4. you explain the function of enzymes in chemical breakdown of food

## 9. List diseases that impact digestion/absorption.

### Assessment Strategies

9.1. in classroom assessment activities, on a quiz, and on a comprehensive examination

### Criteria

*Your performance will be successful when:*

- 9.1. you explain the impact of an ulcer, hernia, GERD, constipation, diarrhea, and IBS on digestion/absorption
- 9.2. you explain the impact of GERD on digestion and absorption
- 9.3. you identify dietary factors related to the impact of constipation on digestion and absorption
- 9.4. you explain the impact of diarrhea and IRS on digestion and absorption

### Learning Objectives

- 9.a. Define an ulcer and its impact on digestion.
- 9.b. Define GERD and its impact on digestion.
- 9.c. Define the impact of diarrhea and constipation on digestion.
- 9.d. Define IBS and its impact on digestion.

## 10. Identify substances absorbed upon completion of protien/fat/carbohydrate digestion.

### Assessment Strategies

10.1. in classroom assessment activities, on a quiz, on a comprehensive examination

### Criteria

*Your performance will be successful when:*

- 10.1. you identify three simple sugars absorbed from carbohydrate
- 10.2. you explain absorption as a process which allows digested nutrients to be moved into circulation
- 10.3. you identify free fatty acids as one of the substances broken down from fat during digestion
- 10.4. you identify amino acids as the substances absorbed from the digestion of protein

### Learning Objectives

- 10.a. Summarize the process of carbohydrate digestion including identification of substance absorbed.
- 10.b. Summarize the process of protein digestion including identification of substance absorbed.
- 10.c. Summarize the process of fat/lipid digestion including identification of substance absorbed.

## 11. Analyze intake for ten nutrients utilizing standards.

### Assessment Strategies

11.1. in classroom assessment activities, on a quiz, and on a comprehensive examination.

### Criteria

*Your performance will be successful when:*

- 11.1. you will list amounts of foods from each group you will include each day
- 11.2. you will list amounts of foods from each group you need daily
- 11.3. you will identify serving sizes in both ounces and cup measurements
- 11.4. you will create an individualized Food Guide Pyramid from mypyramid.gov

### Learning Objectives

- 11.a. Create individualized Food Guide Pyramid using website.
- 11.b. Identify food groups, amounts needed and average serving size for Food Guide Pyramid guidelines.

**12. Explain the role of the Food Guide Pyramid in assessing nutritional adequacy.**

**Assessment Strategies**

- 12.1. in classroom assessment activities, on a worksheet, on a quiz, and on comprehensive examination

**Criteria**

*Your performance will be successful when:*

- 12.1. you list the food groups and amounts needed daily
- 12.2. you select and print standardized menu for 2000 kcalories from mypyramid.gov
- 12.3. you demonstrate use of Food Guide Pyramid and menu for assessing adequacy
- 12.4. you identify the recommended serving size for each food group

**13. Describe the role of Dietary Guidelines for Americans for making healthy lifestyle changes.**

**Assessment Strategies**

- 13.1. in classroom assessment activities, on a quiz, and on a comprehensive examination.

**Criteria**

*Your performance will be successful when:*

- 13.1. you list the eight Dietary Guidelines
- 13.2. you identify lifestyle factors indicated for meeting guidelines
- 13.3. you explain which guideline has the most meaning for you as an individual and why
- 13.4. you describe the role of the guidelines for improving the health of Americans

**Learning Objectives**

- 13.a. Describe the Dietary Guidelines for Americans.
- 13.b. Identify lifestyle factors changes necessary to meet the guidelines.
- 13.c. Select one Dietary Guideline and personal lifestyle change necessary to meet the guideline.

**14. Explain use of nutrients listed and Daily Reference Value on nutritional label as tools for making healthy food choices.**

**Assessment Strategies**

- 14.1. in classroom assessment activities, on a quiz, on a worksheet, and on a comprehensive examination

**Criteria**

*Your performance will be successful when:*

- 14.1. you list all components of a nutritional label
- 14.2. you describe the rationale for items included on the label
- 14.3. you identify items listed in Daily Reference Values
- 14.4. you list the health claims permitted
- 14.5. you analyze two food labels on worksheet accurately interpreting requested data

**Learning Objectives**

- 14.a. Describe the components of a nutritional label and rationale for their inclusion
- 14.b. State the use of Daily Reference Values in labeling
- 14.c. Describe the appropriate health claims permitted on a nutritional label.
- 14.d. Interpret food labels

**15. Relate nutritional needs to "at risk" groups within each human life cycle stage.**

**Assessment Strategies**

- 15.1. in classroom assessment activities, on worksheets, on quiz, and on comprehensive examination.

**Criteria**

*Your performance will be successful when:*

- 15.1. you identify lifestyle changes that impact nutritional risk
- 15.2. you list three specific nutrients whose deprivation indicates risk during pregnancy
- 15.3. you identify two nutrients whose deficiency places children at nutritional risk

15.4. you list three nutritional risk factors for the elderly

#### **Learning Objectives**

- 15.a. Identify nutritional and lifestyle factors considered "at risk" during pregnancy.
- 15.b. List nutritional and lifestyle factors considered contraindicated during lactation.
- 15.c. Identify two nutritional concerns that place children at "nutritional risk".
- 15.d. Identify "at nutritional risk" factors for adolescents.
- 15.e. Relate nutritional and lifestyle factors that place middle adults "at risk"
- 15.f. Describe nutritional risk factors for late adulthood.

### **16. Identify nutritional needs during pregnancy, lactation, infancy, toddlerhood, childhood, adolescence, early, middle and late adulthood.**

#### **Assessment Strategies**

16.1. in classroom activities, on a quiz, and on comprehensive examination

#### **Criteria**

*Your performance will be successful when:*

- 16.1. you list unique nutrient needs for pregnancy and lactation
- 16.2. you identify advantages of breast feeding
- 16.3. you define growth pattern of infancy
- 16.4. you identify unique eating patterns of toddlers

#### **Learning Objectives**

- 16.a. Trace nutritional needs of major nutrients through the human life cycle.
- 16.b. Explain unique nutritional needs for each stage of the human life cycle.

### **17. Differentiate between physical changes of growth years and physiological changes in middle to late adulthood.**

#### **Assessment Strategies**

17.1. in classroom assessment activities, on quiz, and on comprehensive examination

#### **Criteria**

*Your performance will be successful when:*

- 17.1. you relate physical and nutritional concerns for older adulthood
- 17.2. you identify nutritional growth parameters for infancy, childhood, adolescence
- 17.3. you compare physiological changes to different stages in human life cycle
- 17.4. you contrast physiological changes of infancy and older adulthood that could relate to nutritional status

#### **Learning Objectives**

- 17.a. Describe nutrient needs for growth.
- 17.b. Explain physiological changes in middle to late adulthood.
- 17.c. Differentiate between growth needs and physiological changes during human life cycle.

### **18. Identify effect of lifestyle choices on longevity.**

#### **Assessment Strategies**

18.1. in classroom assessment activities, on a quiz, and on a comprehensive examination

#### **Criteria**

*Your performance will be successful when:*

- 18.1. you list lifestyle nutritional concerns of middle adulthood
- 18.2. you relate physical and nutritional concerns for older adulthood
- 18.3. you describe three nutritional choices that are related to longevity
- 18.4. you relate nutritional choices from Dietary Guidelines to longevity

#### **Learning Objectives**

- 18.a. Identify lifestyle choices that contribute to longevity.
- 18.b. List potential nutritional choices that influence lifestyle changes.

### **19. Calculate nutritional needs during life cycle utilizing standard tools of assessment.**

### **Assessment Strategies**

19.1. in classroom assessment activities, on a worksheet, on a quiz, and on comprehensive examination

#### **Criteria**

*Your performance will be successful when:*

- 19.1. you determine calorie and protein needs for a four-pound infant using standards
- 19.2. you accurately calculate your own nutritional needs for calories, protein, and grams of fiber, fat, and carbohydrate
- 19.3. you identify calcium needs and appropriate foods containing calcium for pregnant females

#### **Learning Objectives**

- 19.a. Calculate own nutritional needs for five nutrients using standard tools.
- 19.b. Calculate nutritional needs for identified "at risk" individual.

## **20. Describe the role of exercise in health prevention, maintenance, and fitness goals.**

### **Assessment Strategies**

20.1. in classroom assessment activities, on worksheets, on quizzes, and on a comprehensive examination.

#### **Criteria**

*Your performance will be successful when:*

- 20.1. you identify AHA, ADA, ACS risk factors for disease prevention for cardiovascular disease, diabetes, cancer, and obesity
- 20.2. you identify value of exercise in disease prevention
- 20.3. you describe appropriate behavioral interventions for implementing exercise plans
- 20.4. you list nutritional choices according to guidelines and standards that help prevent identified diseases
- 20.5. you list overconsumption of fat, calories and sodium as contributing to nutritional excesses
- 20.6. you identify fruits and vegetables and foods related to nutritional deficiencies
- 20.7. you relate hypertension, lipid abnormalities, obesity, and limited exercise as lifestyle choices contributing to diabetes
- 20.8. you define Type 1 and Type 2 Diabetes using ADA criteria
- 20.9. you interpret BMI calculations relating to obesity
- 20.10. you identify contributing factors of environment and genetics to obesity
- 20.11. you list five health consequences of obesity
- 20.12. you relate use of Dietary Guidelines to identified disease prevention
- 20.13. you write menus for identified diseases using disease-specific guidelines and with > 95% accuracy

#### **Learning Objectives**

- 20.a. Identify fitness goals for the human life cycle.
- 20.b. Explain role of exercise in disease prevention.
- 20.c. Identify optimal approaches for increasing participation in exercise programs.

## **21. Describe the role of nutritional choices on risk for cardiovascular disease, cancer, diabetes, and obesity.**

### **Assessment Strategies**

21.1. in classroom assessment activities, on worksheets, on quizzes, and on a comprehensive examination

#### **Criteria**

*Your performance will be successful when:*

- 21.1. you list two nutritional choices that relate to the risk of cardiovascular disease
- 21.2. you explain the relationship of high fat and low fiber intake to the risk of cancer
- 21.3. you identify sweetened beverages as a potential contributor to obesity
- 21.4. you explain the role of excessive caloric intake to the risk for Type 2 Diabetes

#### **Learning Objectives**

- 21.a. Identify optimal nutritional choices for prevention of identified diseases.

## **22. Identify physiological consequences of nutritional deficiencies/excesses on identified diseases.**

### **Assessment Strategies**

22.1. in classroom assessment activities, on worksheets, on quizzes, and on a comprehensive examination

#### **Criteria**

*Your performance will be successful when:*

- 22.1. you list specific levels of nutritional excess for fat and sodium related to hypertension
- 22.2. you explain the role of substituting nutrient-dense foods for calorie-dense foods in treating obesity and diabetes
- 22.3. you identify the role of complex carbohydrates in treating diabetes
- 22.4. you identify one nutrient excess related to cancer and obesity

#### **Learning Objectives**

- 22.a. List nutritional deficiencies related to development of identified diseases.
- 22.b. List nutritional excesses related to development of identified diseases.

### **23. Identify physiological consequences of nutritional and lifestyle choices on glucose metabolism.**

#### **Assessment Strategies**

23.1. in classroom assessment activities, on worksheets, on quizzes, and on a comprehensive examination

#### **Criteria**

*Your performance will be successful when:*

- 23.1. you explain the physiology of Type 1 Diabetes
- 23.2. you explain the physiology of Type 2 Diabetes
- 23.3. you list three food groups that impact blood glucose excursions
- 23.4. you identify the role of exercise and weight management on diabetes treatment

#### **Learning Objectives**

- 23.a. Explain role of nutritional and lifestyle choices on glucose metabolism.
- 23.b. Describe Type 1 and Type 2 Diabetes.

### **24. Explain health consequences of obesity.**

#### **Assessment Strategies**

24.1. in classroom assessment activities, on quiz, and on comprehensive examination

#### **Criteria**

*Your performance will be successful when:*

- 24.1. you complete nutritional calculations using standards with 95% accuracy
- 24.2. you identify three environmental factors contributing to obesity
- 24.3. you list four health consequences of obesity
- 24.4. you identify the BMI as one standard for assessing weight status

#### **Learning Objectives**

- 24.a. Define obesity using BMI.
- 24.b. Identify risk factors for developing obesity.
- 24.c. List health consequences of obesity.

### **25. Analyze research sources describing lifestyle changes that impact nutritional interventions.**

#### **Assessment Strategies**

25.1. in classroom assessment activities, on worksheets, on quizzes, and on a comprehensive examination

#### **Criteria**

*Your performance will be successful when:*

- 25.1. you identify AHA guidelines for sodium and fat as a component for cardiovascular disease prevention
- 25.2. you list ACS nutritional guidelines for lowering the risk of cancer
- 25.3. you utilize the Food Guide Pyramid as a tool for preventing obesity
- 25.4. you list ADA guidelines for decreasing the risk of Type 2 Diabetes
- 25.5. you identify ADA/AHA/NIC/ACS as credible nutrition information resources

#### **Learning Objectives**



- 25.a. Describe dietary interventions for prevention and treatment of cardiovascular disease.
- 25.b. Describe dietary interventions for prevention and treatment of diabetes.
- 25.c. Explain role of phytochemicals and fat intake on the risk reduction for cancer.
- 25.d. Describe dietary interventions for prevention and treatment of obesity.
- 25.e. Identify credible resources for lifestyle changes for risk reduction of identified diseases.

**26. Describe nutritional interventions appropriate for identified diseases.**

**Assessment Strategies**

- 26.1. in classroom assessment activities, on worksheets, on quizzes, and on a comprehensive examination

**Criteria**

*Your performance will be successful when:*

- 26.1. you prepare a one-day menu meeting DASH diet guidelines
- 26.2. you prepare a one-day menu using carbohydrate counting standards
- 26.3. you prepare a one-day menu for cancer risk reduction identifying three foods containing phytochemicals
- 26.4. you identify three lifestyle choices for obesity management

**Learning Objectives**

- 26.a. Describe American Heart Association and Dietary Guidelines appropriate for cardiovascular diseases.
- 26.b. List components and objectives for the DASH Diet.
- 26.c. Explain Medical Nutrition Therapy and American Diabetes Association nutritional standards for diabetes.
- 26.d. Describe American Cancer Society recommendations for cancer prevention/treatment.
- 26.e. Describe recommended lifestyle choices for obesity management.

**27. Identify how food procurement and production of resources contributes to global environmental problems**

**Assessment Strategies**

- 27.1. in classroom assessment activities, on quiz, and on comprehensive examination

**Criteria**

*Your performance will be successful when:*

- 27.1. you list environmental impact of global food production
- 27.2. you trace production of three food items in the food supply from inception to consumption
- 27.3. you identify global deficiencies in food production
- 27.4. you list populations at nutritional risk due to deficits in food production
- 27.5. you identify energy utilization concerns in food production
- 27.6. you list food production practices that contribute to resource waste
- 27.7. you conduct energy audit and develop action plan meeting criteria
- 27.8. you identify five major hazards in food supply meeting FDA criteria
- 27.9. list outlines acceptable food handling procedures according to Food Code; US or state
- 27.10. you identify three educational tools for food safety meeting criteria

**Learning Objectives**

- 27.a. Describe global environmental issues related to food production.
- 27.b. Identify resources used in production of United States food supply.

**28. Describe global environmental problems in food production.**

**Assessment Strategies**

- 28.1. in classroom assessment activities, on worksheets, on quizzes, and on a comprehensive examination

**Criteria**

*Your performance will be successful when:*

- 28.1. you identify the impact of environmental degradation on the world food supply
- 28.2. you explain the role of poverty and overpopulation to efficient food distribution/production
- 28.3. you identify PEM and Iron deficiency anemia as two nutritional disorders related to ineffective food distribution/production
- 28.4. you identify overweight and obesity as nutritional excesses related to economics in developing countries

### Learning Objectives

- 28.a. List global environmental problems related to feeding the world's population.
- 28.b. Relate production problems to nutritional deficiencies/excesses.

## 29. Identify environmentally-conscious decisions that minimize impact on environment.

### Assessment Strategies

- 29.1. in classroom assessment activities, on worksheets, on quizzes, and on a comprehensive examination

### Criteria

*Your performance will be successful when:*

- 29.1. you identify the role of energy utilization during food production to energy conservation
- 29.2. you list four food production practices that contribute to waste
- 29.3. you conduct a home energy audit using guidelines
- 29.4. you develop an intervention plan utilizing results of an energy audit

### Learning Objectives

- 29.a. Describe energy conservation in food production.
- 29.b. Identify food production practices contributing to waste.
- 29.c. Complete intervention plan as result of energy audit.

## 30. Describe food safety standards.

### Assessment Strategies

- 30.1. in classroom assessment activities, on worksheets, on quizzes, and on a comprehensive examination

### Criteria

*Your performance will be successful when:*

- 30.1. you list four bacteria and one virus as food-borne pathogens
- 30.2. you identify five food handling procedures to prevent food-borne illnesses
- 30.3. you list safe food storage, holding and serving temperatures utilizing the Food Code standards
- 30.4. you list FIGHT BAC as an acceptable educational tool for food safety standards

### Learning Objectives

- 30.a. List five major hazards in food supply as identified by the FDA.
- 30.b. Outline acceptable food handling procedures for professionals and consumers.
- 30.c. Identify two educational tools to use in implementing food safety standards.