



Certification Examination for Nutrition Specialists Content Outline

1. Domain I: Fundamental Principles of Nutrition (20% of exam)

- a. Epidemiology and biostatistics
 - i. Apply the knowledge of basic epidemiology of nutrition into practice
 - ii. Utilize knowledge from research studies to compare outcomes and translate them into science-based therapies for clients
- b. Life cycle
 - i. Understand the physiologic changes associated with life cycle stages, i.e., pregnancy and lactation, infancy, childhood, adolescence, adulthood, and elderly
 - ii. For each life cycle stage, understand its impact on nutrient requirements, including nutrient absorption, metabolism, and transport
 - iii. Identify appropriate nutritional assessment for each life cycle stage
 - iv. Identify the unique nutritional therapy for each life cycle stage
 - v. Be familiar with the psychological and social factors resulting in negative adolescent health outcomes
 - vi. Be familiar with disease risk and prevalence in relation to socioeconomic status (income, education, occupation), geographical residency, and ethnicity
- c. Energy balance and caloric values of foods
 - i. Identify the impact of physical activity on nutritional requirements, including fluids and electrolytes
 - ii. Estimate caloric values of specific meals
 - iii. Understand the effect of age, weight, body composition, physical activity, and health status on calorie requirements
 - iv. Calculate calorie requirements of a given individual for weight loss or weight gain
- d. Body composition and regulation of metabolism
 - i. Understand the effects of age, sex, and physical activity on body composition and energy expenditure
 - ii. Understand the effect of body composition on metabolism
- e. Nutritional biochemistry
 - i. Understand the chemical composition and classification of carbohydrates, proteins, and fats
 - ii. Understand basic biochemical principles as they relate to nutrition
 - iii. Understand energy production and its regulation
 - iv. Understand normal regulation of fluid and electrolyte balance and the metabolic implications arising from disturbances in fluid/electrolyte balance
 - v. Understand the regulation of acid-base balance and the metabolic implications arising from acid/base disturbances
 - vi. Understand the mechanisms of gluco-regulation, free radical generation and inflammatory pathways and their relation to nutrition
 - vii. Become familiar with the concepts of nutrigenomics and epigenetics and their impact on nutrition and health



- f. General nutrition-related physiology
 - i. Understand the physiology of the digestive tract (mechanisms and regulation of motility, absorption, secretion, and intestinal barrier function)
 - ii. Have knowledge of malabsorption and its effects on macro- and micronutrient absorption
 - iii. Be familiar with the nutrients that are essential to the health of the digestive tract (such as glutamine, short chain fatty acids, fiber)
 - iv. Be familiar with the impact of chronic stress on digestive tract function
 - v. Understand the role of oxidative stress and detoxification pathways on health status

2. Domain II: Nutrients and Human Health (30% of exam)

- a. Metabolism of nutrients
 - i. Be familiar with the normal metabolism of carbohydrates, lipids, proteins, amino acids, nucleic acids, bile pigments, and micro-nutrients
 - ii. Be familiar with major cytokine and eicosanoid pathways and their effect on biological responses
 - iii. Be familiar with common in-borne errors of metabolism
- b. Digestion, absorption, and transport of nutrients
 - i. Be familiar with mechanisms of digestion, absorption and transport of macronutrients and factors that either facilitate or interfere with them
 - ii. Be familiar with the role of the microbiome in nutrient digestion and absorption, including the role of prebiotics and probiotics
- c. Function of nutrients
 - i. Be familiar with the function and effects of macronutrients in the body
 - ii. Be familiar with the function and effects of vitamins and minerals
 - iii. Be familiar with the chemical structure and function of soluble and insoluble fiber in relation to health
- d. Toxicity of nutrients
 - i. Be familiar with tolerable upper intake levels of nutrients and symptoms and treatment of nutrient toxicity
- e. Macronutrient sources and nutrient quality
 - i. Know which foods are rich sources of essential nutrients and fiber
 - ii. Be familiar with common functional foods and their potential impact on health
- f. Micronutrient sources
 - i. Identify dietary and supplemental sources of nutrients
 - ii. Understand the effect of agriculture (including conventional versus organic farming, genetic engineering), irradiation, freeze drying, transportation, processing, storage, and food preparation techniques on nutrient value
 - iii. Be familiar with key nutrients used in fortification and applicable food sources
 - iv. Be aware of the wide range of food supplements available and their broad use by large



numbers of clients

- g. Nutrient requirements
 - i. Understand how to apply current guidelines (Dietary Reference Intakes, and Dietary Guidelines for Americans) for preventive and therapeutic interventions
 - ii. Understand the appropriate use of dietary supplementation to optimize health
- h. Bioactive components in foods
 - i. Identify classifications of key phytochemicals and zoochemicals (of animal origin)
 - ii. Understand the biochemical actions and physiologic effects of these components and their indication for health promotion
- i. Insufficiency/deficiency of nutrients
 - i. Identify the common causes and symptoms of micro- and macro nutrient deficiencies
 - ii. Know the treatment approaches to reverse deficiencies with dietary changes and nutrient supplementation

3. Domain III: Nutrition Assessment (20% of exam)

a. Health history

Know how to elicit a patient-appropriate health history, including data such as:

- i. Current health concerns, past and present health history, and family health history
- ii. Body weight history and recent weight changes
- iii. Psychosocial history, including access to food, occupation, living situation, smoking, drug and alcohol use
- iv. Medication and supplement use
- v. Review of body systems
- vi. Mastication and swallowing difficulty, appetite and bowel function
- vii. Pregnancy history and/or desired pregnancy
- viii. Sleep patterns, stress level

b. Diet and lifestyle history

- i. Obtain a focused nutrition history via multi-day food record, a food frequency record, and a 24-hour recall
- ii. Identify limitations of food records, food frequency questionnaires, and recalls and understand the appropriate use of these tools
- iii. Determine suboptimal dietary intake or status of nutrients
- iv. Evaluate eating patterns, stress eating tendencies, and disordered eating behaviors
- v. Identify dietary avoidance behaviors
- vi. Identify allergies and sensitivities to foods and dietary supplement ingredients based on history and symptoms reports
- vii. Physical activity, identifying frequency, intensity, type, and limitations to exercise
- viii. Identify stages of change for making dietary and other lifestyle modifications

c. Biochemical and laboratory assessment

- i. Evaluate somatic signs of vitamin and mineral deficiencies or toxicities



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- ii. Interpret laboratory data as it applies to nutrition –related conditions and systemic imbalances
 - iii. Monitor growth, weight and BMI
 - iv. Identify hormonal and neurotransmitter imbalances based on laboratory assessment
 - v. Identify optimal laboratory value ranges as compared to normal reference value ranges
- d. Genetic/genomic factors
- i. Understand the basics of gene expression, transcription and translation
 - ii. Understand genetic disorders in nutrient metabolism
 - iii. Evaluate family health history as it relates to current health status and risk factors
- e. Anthropometrics
- i. Be familiar with the following anthropometric measurements: mid-arm circumference, triceps skin-fold, mid-arm muscle circumference
 - ii. Be familiar with bioelectric impedance
 - iii. Be familiar with waist to hip ratio measurements
 - iv. Be familiar with emerging tools of anthropometrics (ultrasound, DEXA, MRI, CT scanning, and air displacement plethysmography)
- f. Assessment of diet impact on health status
- i. Be familiar with computerized analysis of food intake
 - ii. Determine individual micro- and macro-nutrient requirements using guidelines and recommendations but customizing them according to the individual's age, sex, body type, reproductive status, activity level and metabolism
- g. Identification of clinical status
- i. Identify symptoms that require medical referral
 - ii. Correlate constellations of symptoms for the most effective and efficient treatment protocols
- 4. Domain IV: Clinical Intervention and Monitoring (25% of exam)**
- a. Nutrition relationship to disease or system (Medical Nutrition Therapy)
Formulate applicable dietary and nutraceutical interventions for prevention, modulation, and management for the following chronic, systemic disorders:
- i. Obesity
 - ii. Cardiovascular disease, dyslipidemias, and hypertension
 - iii. Insulin resistance and non-insulin dependent diabetes
 - iv. Endocrine disorders
 - v. Autoimmune disorders
 - vi. Gastrointestinal disorders (gastroesophageal reflux disease, peptic ulcer disease, dumping syndrome, irritable bowel syndrome, inflammatory bowel disease, short bowel syndrome, diverticulosis, and colorectal cancer)
 - vii. Hematologic disorders
 - viii. Bone disorders, such as osteopenia and osteoporosis
 - ix. Hepatic disorders



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- x. Pulmonary disorders
- xi. Renal disorders
- xii. Cognitive disorders
- xiii. Food allergies and intolerances

- xiv. Apply nutritional therapy in compromised individuals (those undergoing chemotherapy, radiation, surgical procedures, dialysis, bariatric surgery, or those who cannot masticate, swallow, or absorb nutrients due to medical interventional procedures or treatments)
- xv. Apply specific dietary and nutraceutical modifications as adjuvant therapy in immuno-compromised individuals (those with HIV-AIDS, cancer, tuberculosis)

- b. Drug-nutrient/ drug-herb interactions
 - i. Identify common drug-nutrient and drug-herb-interactions affecting glucoregulation, coagulation, and metabolism
 - ii. Be familiar with the drug/herb action, duration of action, purpose and dose of a patient's current therapeutic regimen
 - iii. Be familiar with the dietary factors that affect the actions of common drugs and the underlying mechanisms of action
 - iv. Be familiar with nutrient depletions which can occur related to commonly used drugs
 - v. Be familiar with interactions between drugs and foods, vitamins, minerals, herbs, phytochemicals, and zoochemicals
 - vi. Be familiar with the interaction of nutrients with alcohol

- c. Interactions between nutrients
 - i. Understand the synergistic effects and antagonistic interactions of nutrients in foods and supplements and how they may impact the health status of an individual

- d. Dietary therapeutics and behavior optimization
 - i. Have knowledge of the positive and negative aspects of popular diets
 - ii. Identify therapeutic usefulness of specific foods
 - iii. Understand how to apply scientific evidence and methods when developing specific dietary recommendations
 - iv. Understand the link between behaviors learned in childhood and their impact on obesity and other chronic health issues in adulthood
 - v. Apply psychological and motivational skills to enhance clinical outcomes
 - vi. Gauge and optimize compliance with recommendations

- e. Nutraceutical and supplement therapeutics
 - i. Have knowledge of evidence-based dose and duration of use of nutraceuticals for common conditions
 - ii. Be familiar with good manufacturing practices and other markers of quality end-products

- f. Eating behaviors and eating disorders
 - i. Be familiar with the effects of disordered eating patterns on nutritional status, body composition and function



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- g. Data comprehension and translation
 - i. Assess individual patient data and compare with other data (national guidelines, policies, consensus statements, expert opinions and previous outcome experience) to develop nutritional therapeutic interventions
- h. Botanical and related therapeutics
 - i. Be familiar with the effects of common botanical supplements and their indication for health promotion
 - ii. Know the safe use and potential toxicity of botanical supplements

5. Domain V: Professional Issues (5% of exam)

- a. Food quality and safety
 - i. Be familiar with the causes and preventive measures for the most common food borne illnesses
 - ii. Monitor current developments and outbreaks of food borne illnesses and translate media information into science-based evidence and patient recommendations
 - iii. Be familiar with populations at risk for food safety issues
 - iv. Be familiar with factors that negatively affect food quality (pesticides, xenobiotics, GMO's, hormones, food additives, PCB, heavy metals)
- b. Cultural issues, ethical standards and boundaries
 - i. Be familiar with and carry out all HIPAA compliance requirements
 - ii. Refer clients to appropriate healthcare providers when their care requires services outside the scope of practice of a CNS
 - iii. Have knowledge of how personal and cultural beliefs affect dietary and lifestyle patterns and be able to address these beliefs when developing nutrition intervention plans