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
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
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
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