



CFS Certified
Food Scientist.

Make an Impact on Your Career!

CFS Examination Content Outline

This content outline reflects the general responsibilities performed by food scientists and the knowledge required to perform these responsibilities. It was prepared in the course of a systematic job-task analysis (practice analysis) and validated through a survey of a demographically representative cross-section of food scientists.

I. Product Development (34%)

This area includes application of knowledge for development of new products or reformulations from concept to commercialization, utilizing knowledge of raw materials, quality, safety, processing and sensory.

I.A. Concept Development (4%)

- I.A.01. Provide technical perspective for development of product concepts.
- I.A.02. Conduct technical feasibility assessment of product concepts.

I.B. Prototype Design and Testing (12%)

- I.B.01. Develop prototypes or protocepts that meet business and technical targets.
- I.B.02. Formulate products by preparing laboratory samples and sourcing raw materials that meet business and technical targets.

I.B.03. Create product formulations which deliver desired sensory qualities.

- I.B.04. Determine ingredients which deliver desired functional properties.
- I.B.05. Perform benchtop review of product samples to compare to control products.
- I.B.06. Develop products with characteristics suitable for specific consumer needs.

I.C. Product Optimization (12%)

- I.C.01. Create product formulations that withstand food processing and distribution.
- I.C.02. Conduct scale up trial activities from benchtop to pilot plant and commercialization of products to match intended design.
- I.C.03. Develop formulations to meet cost targets, ingredient statement, nutrition profile and sensory attributes of desired product.
- I.C.04. Evaluate opportunities to improve shelf life of products or ingredients.
- I.C.05. Recommend suitable ingredient substitutions.
- I.C.06. Determine impact of manufacturing, distribution and storage on product performance.
- I.C.07. Select optimal packaging system and materials that align packaging requirements with product quality attributes, product compatibility, line processing, sustainability and costs.

I.D. Implementation and Commercialization (6%)

- I.D.01. Identify process parameters and associated performance indicators.
- I.D.02. Provide technical input to help resolve problems in manufacturing.
- I.D.03. Establish specifications for raw materials, ingredients and finished product.

II. Quality Assurance & Control (17%)

This area includes application of knowledge to develop and maintain quality assurance and quality control systems, methods and practices that ensure food products meet requirements.

- II.01. Develop quality systems programs.
- II.02. Develop approved supplier programs.
- II.03. Develop programs to ensure compliance with product, process or ingredient specifications.
- II.04. Verify compliance with product, process or ingredient specifications.
- II.05. Develop testing procedures for ingredients, finished product, and in-process tests.
- II.06. Develop sampling methods and plans.

- II.07. Conduct sampling and testing of products and ingredients.
- II.08. Develop recordkeeping systems for food safety and quality.
- II.09. Maintain records for food safety and quality.
- II.10. Monitor compliance to quality systems programs.
- II.11. Conduct root cause analysis to resolve quality issues.
- II.12. Develop product recall programs.
- II.13. Develop product or ingredient traceability systems.
- II.14. Conduct ongoing sensory testing to verify product quality and consistency.
- II.15. Develop master sanitation program (SSOP).

III. Food Chemistry and Food Analysis (10%)

This area includes application of knowledge related to analyzing and interpreting chemical components, structural and functional properties of molecules, and chemical processes and transformations they undergo during postharvest handling, processing, and storage.

- III.01. Interpret assays of chemical composition of products or ingredients to determine implications on product design.
- III.02. Interpret assays to identify chemical residues or contaminants in products or ingredients.
- III.03. Interpret analysis of products and ingredients for nutrient content.
- III.04. Control chemical changes in products and ingredients that affect quality, stability and performance.
- III.05. Control physical changes in products and ingredients that affect quality, stability and performance.
- III.06. Evaluate physical and chemical properties of ingredients that affect functionality.
- III.07. Evaluate products or ingredients for chemical residues or other contaminants.

IV. Regulatory (10%)

This area includes application of knowledge that enables the food scientist to develop or maintain foods in compliance with national and international regulations.

- IV.01. Evaluate products, process and ingredients for legal standards and identity claims.
- IV.02. Comply with regulatory requirements for food composition.
- IV.03. Comply with required regulatory testing of food.
- IV.04. Determine label specifications according to regulations for nutrition, product naming, and claims.
- IV.05. Comply with regulatory requirements for food allergens.
- IV.06. Determine implications of standards and regulations for products and ingredients.

V. Food Microbiology (9%)

This area includes application of knowledge related to the impact of microflora on food systems. This includes assessing microbial risk from raw materials through to the finished product, and determining methods and technology to control the risk. It also includes an understanding of beneficial effects of microbial organisms in preservation and health.

- V.01. Establish microbiological sampling plans.
- V.02. Interpret microbiological test results.
- V.03. Establish microbiological specifications.
- V.04. Determine food preservation technologies to address microflora in products or ingredients.
- V.05. Assess microbiological risks from raw ingredients to finished product.
- V.06. Perform validation studies to determine the level of reduction of microbial load.
- V.07. Recommend appropriate microorganism(s) to deliver desired fermented product attributes.
- V.08. Identify optimal growth conditions for desirable microorganisms.
- V.09. Specify environmental monitoring programs for food processing and packaging.

VI. Food Safety (9%)

This area includes development and application of programs to minimize the risk of chemical, physical and microbiological contamination of food products, and providing adequate documentation of the programs.

- VI.01. Design effective food safety plans (HACCP).
- VI.02. Validate food safety plans.
- VI.03. Verify ingredients and raw materials are safe for food use.
- VI.04. Identify hazards and risks in food or food components.
- VI.05. Develop program to reduce risk of allergens and food components to which some people are sensitive.
- VI.06. Design effective prerequisite food safety programs, e.g., traceability, GMPs, SSOPs, SOPs, training.
- VI.07. Evaluate food safety risk of emergency deviations from standard conditions.

VII. Food Engineering (6%)

This area includes application of knowledge of engineering principles of physical and chemical conversions to produce finished food products from raw materials and ingredients. It also includes use of modeling and pilot scale equipment to develop, validate and improve food processes.

- VII.01. Recommend process configuration for production of products or ingredients.
- VII.02. Specify process controls in processing of products or ingredients.
- VII.03. Calculate yields, efficiencies and material variances in food production processes.
- VII.04. Conduct pilot plant trials and product start-ups.
- VII.05. Determine requirements for material handling and process integration.

VIII. Sensory Evaluation & Consumer Testing (5%)

This area includes application of knowledge of principles and methods of sensory and consumer testing. It also includes statistical analysis and interpretation to ensure food products or ingredients meet specifications and consumer preferences.

- VIII.01. Identify sensory attributes that affect product acceptance of target product.
- VIII.02. Identify test protocols for sensory and consumer testing.
- VIII.03. Perform sensory and consumer tests.
- VIII.04. Interpret sensory and consumer test results to guide product development