The **Institute of Food Technologists** has developed "Core Competencies in Food Science" (see table below) as part of their Education Standards, which highlight the desired competencies of student learning in this area.

http://www.ift.org/cms/?pid=1000427

Core Competencies in Food Science

CORE COMPETENCY	CONTENT	BY THE COMPLETION OF FOOD SCIENCE PROGRAM, THE STUDENT SHOULD:
FOOD CHEMISTRY AND ANALYSIS	• Structure and properties of food components, including water, carbohydrates, protein, lipids, other nutrients and food additives	• Understand the chemistry underlying the properties and reactions of various food components
	• Chemistry of changes occurring during processing, storage and utilization	• Have sufficient knowledge of food chemistry to control reactions in foods. • Understand the major chemical reactions that limit shelf life of foods. • Be able to use the laboratory techniques common to basic and applied food chemistry.
	• Principles, methods, and techniques of qualitative and quantitative physical, chemical, and biological analyses of food and food ingredients.	• Understand the principles behind analytical techniques associated with food. • Be able to select the appropriate analytical technique when presented with a practical problem. • Demonstrate practical proficiency in a food analysis laboratory.
FOOD SAFETY AND MICROBIOLOGY	• Pathogenic and spoilage microorganisms in foods	• Identify the important pathogens and spoilage microorganisms in foods and the conditions under which they will grow. • Identify the conditions under which the important pathogens are commonly inactivated, killed or made harmless in foods. • Utilize laboratory techniques to identify microorganisms in foods.

	• Beneficial microorganisms in food systems	• Understand the principles involving food preservation via fermentation processes.
	• Influence of the food system on the growth and survival of microorganisms	• Understand the role and significance of microbial inactivation, adaptation and environmental factors (i.e., aW, pH, temperature) on growth and response of microorganisms in various environments.
	• Control of microorganisms	• Be able to identify the conditions, including sanitation practices, under which the important pathogens and spoilage microorganisms are commonly inactivated, killed or made harmless in foods.
FOOD PROCESSING AND ENGINEERING	• Characteristics of raw food material	• Understand the source and variability of raw food material and their impact on food processing operations.
	• Principles of food preservation including low and high temperatures, water activity, etc.	• Know the spoilage and deterioration mechanisms in foods and methods to control deterioration and spoilage. • Understand the principles that make a food product safe for consumption.
	• Engineering principles including mass and energy balances, thermodynamics, fluid flow, and heat and mass transfer	• Understand the transport processes and unit operations in food processing as demonstrated both conceptually and in practical laboratory settings. • Be able to use the mass and energy balances for a given food process. • Understand the unit operations required to produce a given food product.
	• Principles of food processing techniques, such as freeze drying, high pressure, aseptic processing, extrusion, etc.	• Understand the principles and current practices of processing techniques and the effects of processing parameters on product quality.

	• Packaging materials and methods	• Understand the properties and uses of various packaging materials.
	• Cleaning and sanitation	• Understand the basic principles and practices of cleaning and sanitation in food processing operations.
	• Water and waste management	• Understand the requirements for water utilization and waste management in food and food processing.
APPLIED FOOD SCIENCE	• Integration and application of food science principles (food chemistry, microbiology, engineering/processing, etc.)	• Be able to apply and incorporate the principles of food science in practical, real-world situations and problems.
	• Computer skills	• Know how to use computers to solve food science problems.
	• Statistical skills	• Be able to apply statistical principles to food science applications.
	• Quality assurance	• Be able to apply the principles of food science to control and assure the quality of food products.
	• Analytical and affective methods of assessing sensory properties of food utilizing statistical methods	• Understand the basic principles of sensory analysis.
	• Current issues in food science	• Be aware of current topics of importance to the food industry.
	• Food laws and regulations	• Understand government regulations required for the manufacture and sale of food products.
SUCCESS SKILLS	• Communication skills (i.e., oral and written	• Demonstrate the use of oral and written communication skills. This includes such skills as writing technical reports, letters and

	communication, listening, interviewing, etc.)	memos; communicating technical information to a nontechnical audience; and making formal and informal presentations.
	• Critical thinking/problem solving skills (i.e., creativity, common sense, resourcefulness, scientific reasoning, analytical thinking, etc.)	• Define a problem, identify potential causes and possible solutions, and make thoughtful recommendations. • Apply critical thinking skills to new situations.
	• Professionalism skills (i.e., ethics, integrity, respect for diversity)	• Commit to the highest standards of professional integrity and ethical values. • Work and/or interact with individuals from diverse cultures.
	• Life-long learning skills	• Explain the skills necessary to continually educate oneself.
	• Interaction skills (i.e., teamwork, mentoring, leadership, networking, interpersonal skills, etc.)	• Work effectively with others. • Provide leadership in a variety of situations. • Deal with individual and/or group conflict.
	• Information acquisition skills (i.e., written and electronic searches, databases, Internet, etc.)	• Independently research scientific and nonscientific information. • Competently use library resources.
	• Organizational skills (i.e., time management, project management, etc.)	• Manage time effectively. • Facilitate group projects. • Handle multiple tasks and pressures.