



IUFoST

Strengthening Global Food Science
and Technology for Humanity

**IUFoST Education Committee
Undergraduate Curriculum
Guidelines and Approvals for
University Programmes in Food
Science/Food Technology/Food
Engineering**



Curriculum Content

- Food Science and Technology programs around the world are broad and diverse, catering to both local needs and education practices. While guidelines from IUFoST therefore cannot be too prescriptive, undergraduate programmes seeking approval must meet basic criteria. Programs should include: **fundamental science; food chemistry and analysis; food microbiology and safety; and, food engineering and technology**. These are the hallmark disciplines of food science and technology. The distribution of weighting can vary, depending on the definition of the programme, but breadth of knowledge should not come at the expense of depth of knowledge. Other important discipline areas that may be included are nutritional sciences, and food management and business.

Aims

- The aims of these undergraduate studies are to prepare professionals for industry (management of production, quality control, research and development, process design) and/or candidates for higher education and ultimately research and/or academic careers.

Duration

- The duration of studies of approved programmes generally are 4 years or 5 years post-secondary schooling, where the first two years are mainly devoted to fundamental sciences. Five-year programmes are more advanced than the four year programmes and therefore roughly equivalent to a Master of Science. The change to five years will include more specialized or expanded courses, more projects and/or research periods or industry training periods. After the 4 year programme, students can be accepted for a Master programme and either the five-year programme or the Master of Science programme is generally required to lead to Doctoral programmes.

Delivery

- The delivery of courses must be associated with active teaching methods that contribute to the development of personal skills, through scientific teaching. Communication is a critical personal skill to be developed in all students. Courses must combine classroom study with experimental/practical/laboratory experience. Capstone experiences or other projects at the end of the program should integrate different aspects of food science and technology through independent learning opportunities. Assessment should be on the basis of outcomes, both course-specific and program-specific, with means of assessment of both. Thus prescribed schedules of study are not presented, rather it is the outcomes of such programmes that are important.

Fundamental Sciences

- Fundamental sciences of importance to Food Science and Technology include: mathematics (algebra, calculus, probability, statistics, experimental design and data processing); computer science; physics; chemistry (general and inorganic, organic, biochemistry, physical chemistry, analytical chemistry); and, biology (plants and animal anatomy and physiology, cell biology, microbiology).

Food Chemistry

- Food chemistry and biochemistry must address structure and function of water, proteins, carbohydrates, lipids, and minor constituents; biochemical reactions and their control; food colour, flavour and texture; and functional additives. Food physics, which may be combined with food chemistry, should address physical properties of foods (rheology, gels, sols) and dispersed systems (emulsions, suspensions, powders). Food analysis should include sampling methods; benchtop (wet chemistry) and instrumental methods; enzymatic and immunological methods; chemical indicators of food spoilage and adulteration; and, sensory analysis (methods, tests, consumer preference studies, statistics).

Food Microbiology

- Food microbiology and safety studies must include: microbiology of food spoilage, plant sanitation and hygiene, and laboratory and rapid methods for microbial quantification; quality assurance (HACCP and Good Manufacturing Practices); industrial food fermentations and production of food ingredients by biotechnology; and food safety and pathogenic contaminations, including food toxicology

Food Engineering and Technology

- Food engineering and technology studies must include food manufacturing technology (transformation processes, preservation processes, food packaging and storage); food process engineering (transport processes: fluid flow, heat transfer and mass transfer, thermodynamics, equilibrium and transient problems; separation processes; reaction engineering; modeling and simulation); and, food plant design (food process control; industrial computer applications; measurement and control) and, utilities (refrigeration, steam generation, water and waste, electricity).

Others

- Nutritional sciences include nutrients and human nutritional requirements, the effect of processing on nutritional value, and food and health.
- Food management and business includes economics, operations management, accounting, and marketing.

Approvals

- University programmes in food science, technology or engineering seeking recognition and approval from IUFoST must submit the following material to the IUFoST Education Committee for review. Programmes will be evaluated against internationally-accepted best practices. Approval will be based on programme content (curriculum content and course content) and programme quality (as assessed by incoming and outgoing student assessment, faculty, facilities and graduates).

Requirements

- Brief description of University, College, and Department (or similar administrative structures), to develop a context in which the Food Science/Technology programme exists. Include total approximate numbers of students at the University and number of students by year in the program under review.
- Description of the interaction of the programme with the local food industry, government and NGO's (e.g., contributions of alumni to the program, work experience opportunities for students, success rate of placements of students in full-time employment post graduation, examples of the types of positions held by recent and 5- and 10-year graduates from the program, etc.).



Requirements

- Description of the incoming students: education level (high school or post-secondary school University preparatory programs) and quality of applicants, assessment process and acceptance rate of applicants
- Description of the desired outcomes of the programme in terms of holistic student knowledge development, and assessment of that knowledge development
- Name of degree granted, duration (3, 4 or 5 year) and schedule of studies (curriculum; course listing by semester of year) for the food science/technology program for which approval is being sought. Include required courses and optional courses according to streams, if any.

Requirements

- List of faculty members who are teaching in the academic unit that offers the food science/technology programme for which approval is being sought (Name, highest University degree earned, full-time or part-time appointment, specialization, courses taught)
- List of faculty members who are teaching in the food science/technology programme for which approval is being sought, but who are not members of the academic unit that offers the program (Name, highest University degree earned, full-time or part-time appointment, specialization, courses taught)

Requirements

- Description of facilities: teaching laboratories, pilot plant/processing capabilities, libraries, computer/internet access for students
- As an appendix, brief course outlines for all required courses within the programme and course outlines for optional courses that are specific to food science/technology and offered as part of an optional stream, as above, showing course content and assessment methods.