https://socfoodeng.org
Email: societyoffoodengineering@gmail.com

Abbreviated Summary of Results

An Educational Needs Survey was conducted in 2019 by the Society of Food Engineering (SoFE) in response to interest from the food industry for educational programming leading to certification of food engineering professionals. This led to the need for a survey of industry and academia to determine the nature of the knowledge needed by engineers employed by the food industry, as well as programs currently being offered in academia.

The survey involved emails to about 300 persons, both in industry and academia. 97 responses were received, for a 33 percent response rate.

The data (response to questions) and the demographics: industry, academia and overall, are presented in the succeeding pages. At this time, the data are being analyzed in more depth, for conclusions to be drawn. It is anticipated that this information will be used to spur course material development in the areas of need.

The question of food engineering certification and who should be responsible for it, is still in discussion and awaiting resolution.

We thank all those whose efforts and participation resulted in this survey and its outcome.

Society of Food Engineering

Important areas of coverage needed for engineers in the food industry were:

- Fundamentals of Food Engineering: physical and engineering properties of foods, fluid mechanics, heat transfer, mass transfer, thermodynamics, reaction kinetics and reactor design, and mass and energy balances.
- Food Manufacturing Unit Operations: liquid & powder mixing, drying, freezing, membrane operations, aseptic processing, thermal processing (retort), evaporation, extrusion, distillation, extraction, sheeting, baking, frying, material handling, size reduction and new technologies.
- Process Design: piping and instrumentation diagrams (P&ID); modeling; simulation; equipment selection; best practices in valves, pumps, instruments, process equipment, and validation; factory acceptance testing (FAT); installation/operational/performance qualification (IQ, OQ, PQ); scale-up; process control; sensors.
- Design of Food Facility and Infrastructure (utility systems).
- Capital Project Management: budget; resources; vendor and schedule management; economics and profitability; process, products and environment sustainability; applications of statistics and design of experiments (DOE) in food engineering.
- Use of mathematical software and data analytics.

Food quality and food safety knowledge gaps:

- Fundamentals of Food Microbiology: hazards (biological, physical, & chemical) and preservation methods (temp, Aw, pH, etc.)
- Hygienic design of food equipment; cleaning; and sterilization; allergen management processes
- Allergen management processes and traceability

Food packaging and food science knowledge gaps

- Food Packaging: principles of packaging, product-package interactions, packaging defects and implications, and innovations.
- Packaging sustainability and financial considerations
- Primary Packaging Equipment: filler design for foods, powders and liquids
- Secondary Packaging and End of Line Equipment: labelers, case packers, palletizers, coders, check-weighers, line controls
- Fundamentals of Food Science, Product Development, Nutrition, and Food Analysis: analytical and sensory methods
- Food quality
- Food Safety Modernization Act (FSMA), Good Manufacturing Practice (GMP), Hazard Analysis Critical Control Points (HACCP), 3A Sanitary Standards

Other relevant knowledge areas with gaps

- Food Laws and Regulations
- Raw Materials (sourcing variations, contamination, and testing) and Finished Foods
- Supply Chain and Distribution Chain Logistics
- Other Topics: Six Sigma, Total Productive Maintenance (TPM), World Class Manufacturing (WCM), Digital Factory 4.0 (Robots & Cobots)