The Department of Food Science and Human Nutrition (FSHN) at the University of Illinois at Urbana-Champaign is dedicated to implementing education, research, and outreach programs designed to promote a safe, nutritious, and affordable food supply that enhances human health. To this end, students and faculty work collectively toward learning, discovering, and disseminating new knowledge and in applying novel technologies to achieve the departmental mission. The basic human need for high quality food for optimal health and wellness drives the core of student training within the FSHN Department.

Undergraduate concentrations leading to the B.S. degree include Dietetics, Food Science, Hospitality Management, and Human Nutrition. Career opportunities for graduates of our program are excellent and include position titles including nutritionist, dietitian, food technologist, product developer, food scientist, senior scientist, entrepreneur, restauranteur, and food systems manager. Graduate students may pursue M.S. and Ph.D. degrees, focusing on original research in the general concentrations of Food Science or Human Nutrition. The FSHN Department also offers a non-thesis Professional Science Master’s degree that includes foundational courses within the department along with business and marketing courses. The University of Illinois Online Food Science Master’s Degree Program is a popular option for individuals working full-time and who desire a non-thesis M.S. degree in Food Science. Advanced degrees lead to accelerated careers in industry, government, and academia.

Departmental faculty expertise includes:

* Integrated food, nutrition and health
* Food materials science and engineering
* Biochemical and molecular nutrition
* Food safety and security
* Food service management

The FSHN Department values diversity in people, cultures, learning, and science. Collaboration with experts in engineering, biomedical sciences, cellular and molecular biology, and multiple disciplines within the field of agricultural, consumer, and environmental sciences (ACES) is important and routine for students and faculty to promote health, wellness, and sustainable human and economic development.

For the Degree of Bachelor of Science in Food Science and Human Nutrition

**Prescribed Courses including Campus General Education**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Hours</th>
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<tbody>
<tr>
<td>RHET 105</td>
<td>Writing and Research &amp; CM 101 and Public Speaking (or equivalent) (see college Composition I requirement)</td>
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<tr>
<td>CMN 111</td>
<td>Oral &amp; Written Comm I &amp; CMN 112 and Oral &amp; Written Comm II</td>
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</tbody>
</table>

**Advanced Composition**

Select one course from campus approved list of Advanced Composition courses. 3-4

**Cultural Studies**

Select one course from Western culture, one from non-Western culture, and one from U.S. minority culture from campus approved lists. 9

**Foreign Language**

Coursework at or above the third level is required for graduation.

**Quantitative Reasoning I**

Select one of the following: 1 4-5

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>MATH 220</td>
<td>Calculus</td>
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<tr>
<td>MATH 221</td>
<td>Calculus I</td>
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<tr>
<td>MATH 234</td>
<td>Calculus for Business I</td>
</tr>
</tbody>
</table>

This course does not count for students in the Food Science Concentration; choose from the other two options.

**Quantitative Reasoning II**

Select one of the following: 3-4

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>ACE 261</td>
<td>Applied Statistical Methods</td>
</tr>
<tr>
<td>CPSC 241</td>
<td>Intro to Applied Statistics</td>
</tr>
<tr>
<td>ECON 202</td>
<td>Economic Statistics I</td>
</tr>
<tr>
<td>PSYC 235</td>
<td>Intro to Statistics</td>
</tr>
<tr>
<td>STAT 100</td>
<td>Statistics</td>
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</tbody>
</table>

**Natural Sciences and Technology**

Chemistry 2 3 or 8

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<thead>
<tr>
<th>Code</th>
<th>Title</th>
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<tbody>
<tr>
<td>CHEM 101</td>
<td>Introductory Chemistry</td>
</tr>
<tr>
<td>CHEM 102</td>
<td>General Chemistry I</td>
</tr>
<tr>
<td>CHEM 103 &amp; CHEM 104</td>
<td>General Chemistry Lab I &amp; General Chemistry II Lab I</td>
</tr>
</tbody>
</table>

**Humanities and the Arts**

Select from campus approved list. 6

**Social and Behavioral Sciences**

Select from campus approved list and/or see individual concentration. 9

**ACES Prescribed Course**

ACES 101 Contemporary Issues in ACES 2

**Required Concentration**

Concentration prescribed courses. See specific requirements for each concentration listed below.

| Total Hours | 126 or 130 |

Approved concentrations:
• Food Science Concentration (http://catalog.illinois.edu/undergraduate/aces/departments/food-sci/food-science-concentration)
• Dietetics Concentration (http://catalog.illinois.edu/undergraduate/aces/departments/food-sci/dietetics-concentration)
• Human Nutrition Concentration (http://catalog.illinois.edu/undergraduate/aces/departments/food-sci/human-nutrition-concentration)
• Hospitality Management Concentration (http://catalog.illinois.edu/undergraduate/aces/departments/food-sci/hospitality-management-concentration)

Students in the Food Science Concentration must select from MATH 220 or MATH 221.

Students in the Hospitality Management Concentration must take CHEM 101. All other concentrations take CHEM 102 + 103 & CHEM 104 + 105, which are not required for the Hospitality Management Concentration.

Six hours for Food Science Concentration.
The Food Science Concentration requires a minimum of 130 hours; the Dietetics, Human Nutrition, and Hospitality Management Concentrations each require a minimum of 126 hours.

• Minor in Food Science (http://catalog.illinois.edu/undergraduate/aces/departments/food-sci/minor-food-science)
• Minor in Nutrition (http://catalog.illinois.edu/undergraduate/aces/departments/food-sci/minor-nutrition)

FSHN Class Schedule (https://courses.illinois.edu/schedule/DEFAULT/DEFAULT/FSHN)

Courses

FSHN 101 Intro Food Science & Nutrition credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/101)
Discusses the evolution of the food system to meet the needs and desires of a complex, heterogeneous society. Provides an overview of food in relation to nutrition and health, composition and chemistry, microbiology, safety, processing, preservation, laws and regulations, quality, and the consumer.
This course satisfies the General Education Criteria for: Nat Sci Tech - Phys Sciences

FSHN 120 Contemporary Nutrition credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/120)
Fundamental principles of human nutrition and their application to the selection of an adequate diet for health and wellness; current nutrition topics of importance. Credit is not given for FSHN 120 if credit has been given for FSHN 220. Prerequisite: CHEM 101 or equivalent.
This course satisfies the General Education Criteria for: Nat Sci Tech - Life Sciences

FSHN 125 Intro to Human Nutrition credit: 1 Hour. (https://courses.illinois.edu/schedule/terms/FSHN/125)
Introductory course for students in Human Nutrition. Explore department, college and campus resources. Learn about current issues, opportunities, and careers in the nutrition field. Prerequisite: FSHN major with a concentration in Human Nutrition only.

FSHN 130 Introduction to Food Science credit: 1 Hour. (https://courses.illinois.edu/schedule/terms/FSHN/130)
Introductory course for students in Food Science (FS) focused on student learning and success, current issues, and opportunities and careers in the field of food science. In addition, students will learn about how to enhance their learning strategies. Approved for S/U grading only. Prerequisite: For freshman majoring in FSHN with a concentration in Food Science only.

FSHN 140 Introduction to Hospitality credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/140)
Overview of the hospitality industry with emphasis on organizational and operational structures of the major segments of the industry and career opportunities within each. Field trips required.

FSHN 145 Intro Hospitality Management credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/145)
Explore the foodservice aspect of the hospitality industry by assisting Hospitality Management seniors taking FSHN 443 in the operation of the Spice Box. Course covers the planning, production, and service of meals in specialized settings. Additional fees may apply. See Class Schedule.

FSHN 150 Introduction to Dietetics credit: 1 Hour. (https://courses.illinois.edu/schedule/terms/FSHN/150)
Introductory course for students in dietetics. Addresses current issues, opportunities and careers in the dietetics profession. Freshmen or transfer student into dietetics given priority.

FSHN 195 Intro to Undergrad Research credit: 1 Hour. (https://courses.illinois.edu/schedule/terms/FSHN/195)
Learn about research opportunities available to undergraduate students in the FSHN department, and find a laboratory that fits a student's interests and education goals. Guest faculty members present research opportunities in their laboratory, and then give a laboratory tour for students to learn more about the research activities there. Approved for S/U grading only. Prerequisite: For FSHN majors only.

FSHN 199 Undergraduate Open Seminar credit: 1 to 5 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/199)
Experimental course on a special topic in food science and human nutrition. Topic may not be repeated except in accordance with the Code. Approved for letter and S/U grading. May be repeated in the same or subsequent terms. No more than 12 hours may be counted toward graduation.

FSHN 220 Principles of Nutrition credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/220)
Course focuses on the nutritive value of foods and metabolism of essential nutrients, as well as the application of principles of nutrition to the requirements of normal individuals throughout the life cycle. Prerequisite: CHEM 102; MCB 244 and 246.

FSHN 230 Food Sci Professional Issues credit: 1 Hour. (https://courses.illinois.edu/schedule/terms/FSHN/230)
Discussion of current topics in food science and professional issues, including ethics, undergraduate research, study abroad, graduate school options and internships. Approved for S/U grading only. Prerequisite: Sophomore and Junior transfer students with a Food Science concentration only.

Information listed in this catalog is current as of 06/2018
FSHN 232  Science of Food Preparation  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/232)
Application of food preparation principles and techniques in the preparation of standard food products; principles of food management and their application in the planning and preparation of meals. Additional course fees may apply. See Class Schedule. Prerequisite: FSNH 101 or concurrent registration.

FSHN 260  Raw Materials for Processing  credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/260)
Problems involved with procurement, harvesting, handling, and storage of fruits, vegetables, cereal grains, dairy products, red meat, poultry, fish, and eggs for the food-processing industry. Field trips to specialized operations. Additional fees may apply. See Class Schedule. Prerequisite: One high school course in biological science and FSNH 101.

FSHN 274  NonMajors Food Microbiology  credit: 1 Hour. (https://courses.illinois.edu/schedule/terms/FSHN/274)
Introduction to food microbiology and the role of microorganisms in foodborne illness and food manufacture. Credit is not given for both FSNH 274 and FSNH 101. Prerequisite: Sophomore standing or higher.

FSHN 293  Off Campus Internship  credit: 2 to 4 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/293)
Supervised, off-campus experience in a field directly pertaining to the subject matter. Approved for letter and S/U grading. May be repeated to a maximum of 10 hours.

FSHN 294  On Campus Internship  credit: 1 to 4 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/294)
Supervised, on-campus, learning experience with faculty engaged in research. Approved for both letter and S/U grading. May be repeated in the same or subsequent terms to a maximum of 10 hours. Prerequisite: Sophomore standing, 2.0 GPA, consent of the advisor, and consent of the Department Teaching Coordinator.

FSHN 295  UG Research or Thesis  credit: 1 to 4 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/295)
Individual research, special problems, thesis, development and/or design work under the supervision of an appropriate member of the faculty. Approved for letter and S/U grading. May be repeated in the same or subsequent terms. No more than 12 hours of special problems, research, thesis and/or individual studies may be counted toward degree. Prerequisites: Cumulative GPA of 2.5 or above at the time the activity is arranged and consent of instructor.

FSHN 302  Sensory Evaluation of Foods  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/302)
This course is devoted to learning the 1) physiological and psychological basis of human subjects, 2) chemistry of aroma and taste, 3) basic sensory methodologies in food evaluation, and 4) analysis and interpretation of sensory data. Additional fees may apply. See Class Schedule. Prerequisite: Recommended to students in junior and senior levels. Recommended to have taken foundational statistics course, i.e., STAT 100, STAT 200 or FSNH 440.

FSHN 312  Applied Microbiology Methods  credit: 2 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/312)
Consideration, through experimentation, of properties of bacteria, yeasts, molds, and actinomycetes important to industrial processes; exploration of methods of control of microbial processes in industry and sanitation. Prerequisite: MCB 100 and MCB 101 or consent of instructor.

FSHN 322  Nutrition and the Life Cycle  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/322)
Examines physiological changes that occur during gestation, postnatal growth, and aging and the influence of these changes on nutritional requirements. Prerequisite: FSNH 220 or consent of instructor.

FSHN 329  Communication in Nutrition  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/329)
Application and integration of the principles of nutrition and their transmission to groups and individuals. Students will learn individual counseling techniques as well as how to present nutrition information to groups. Open to Dietetics and Human Nutrition juniors and seniors only. Prerequisite: RHET 105, CMN 101, and FSNH 220 or equivalents.

FSHN 340  Food Production and Service  credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/340)
Introduction to the management of commercial and noncommercial foodservice systems through the operation of Bevier Cafe. Students experience managing the procurement, production and service of food, as well as the sanitation and maintenance of equipment and facilities. Prerequisite: FSNH 332, credit or concurrent registration in FSNH 349 and FSNH 345.

FSHN 343  Foundations in Beverage Management: Introduction to Wine, Beer and Spirits  credit: 2 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/343)
The course will focus on the application of principles and practices related to preparation and service of alcohol and specialty beverages in the hospitality industry. The course includes a study of management principles, study of bar operations, human resources and liability protection. Intrinsic to excellent service is having an understanding of proper tasting skills and knowledge to be able to verbalize nuances within the wine or spirit. Structured tastings will be utilized to discover, identify and describe attributes of the beverage. Successful completion of alcohol handler training required to maintain course enrollment. Additional fees may apply. See Class Schedule. Prerequisite: All registrants must be 21 years of age or older.

FSHN 344  Business Etiquette  credit: 1 Hour. (https://courses.illinois.edu/schedule/terms/FSHN/344)
The fundamentals of business etiquette as they are applied to the modern multicultural and global business environments. Content includes the importance of the first impression, polite conversation, personal appearance, office politics, diplomacy, telephone and cell phone etiquette, high-tech etiquette, proper oral and written communication, and the protocol of meetings both in the United States and abroad. Students will also participate in a formal dining experience. Offered every other year. Prerequisite: Junior standing.

FSHN 345  Strategic Operations Management  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/345)
This course is intended to promote an understanding of the managerial aspects of strategic operations. Strategic operations management examines facilities, capacity, process/work-force planning, organization, people, systems integration, and coordination between operations. An introduction to the principles and procedures for the purchasing, selection and procurement of food and non-food items in the hospitality industry is also included. This course provides students with the management information needed to make operational decisions based on sound criteria. Prerequisite: FSNH 232.
FSHN 349  Food Service Sanitation  credit: 1 Hour. (https://courses.illinois.edu/schedule/terms/FSHN/349)
Examines the dangers, costs and prevention of foodborne illness as well as the training and motivation of food service employees in sanitary food handling and quality assurance practices. Upon completion of this course, student will be eligible to apply for the food service sanitation certificate issued by the State of Illinois. Prerequisite: FSHN 101 and FSHN 232, or consent of instructor; MCB 100 and MCB 101 recommended. Course should be taken concurrently with or prior to FSHN 340.

FSHN 396  UG Honors Research or Thesis  credit: 1 to 4 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/396)
Individual research, special problems, thesis, development and/or design work under the direction of the Honors advisor. May be repeated in the same or subsequent terms. No more than 12 hours of special problems, research, thesis and/or individual studies may be counted toward the degree. Prerequisite: Junior standing, admission to the ACES Honors Program, and consent of instructor.

FSHN 398  Undergraduate Seminar  credit: 1 to 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/398)
Group discussion on a special topic in a field of study directly pertaining to subject matter in food science and human nutrition. Approved for Letter and S/U grading. May be repeated in the same or subsequent terms to a maximum of 12 hours. Prerequisite: Sophomore standing.

FSHN 414  Food Chemistry  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/414)
Examines the chemical aspects of major food components; water, carbohydrates, proteins, and lipids; properties of pigments, salts, and food dispersions. Undergraduate Food Science majors must enroll concurrently in FSHN 416. 3 undergraduate hours. 3 graduate hours. Prerequisite: CHEM 232 and CHEM 233.

FSHN 416  Food Chemistry Laboratory  credit: 2 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/416)
Chemical and physical properties of water, proteins, lipids, carbohydrates, and other food components/additives are discovered in the context of their interactions and functional roles in foods. 2 undergraduate hours. 2 graduate hours. Prerequisite: CHEM 232 and CHEM 233 and concurrent enrollment in FSHN 414.

FSHN 417  Neuroscience of Eating & Drinking  credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/417)
Same as NEUR 417 and PSYC 417. PSYC 417.

FSHN 418  Food Analysis  credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/418)
Principles and application of the chemical, physical, and instrumental methods used to determine the constituents of foods; special considerations applicable to the analysis of certain foods. Lecture and lab. 4 undergraduate hours. 4 graduate hours. Prerequisite: CHEM 232; FSHN 414; FSHN 416 or consent of instructor.

FSHN 419  Food Ingredient Technology  credit: 2 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/419)
Explores the research, science and technology of the production of safe, high quality food ingredients through the application of food chemistry, food microbiology, and food processing principles. 2 undergraduate hours. 2 graduate hours. Prerequisite: FSHN 414 or consent of the instructor. FSHN majors only, junior standing required.

FSHN 420  Nutritional Aspects of Disease  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/420)
Examines nutritional, biochemical, and physiological aspects of disease processes and studies the role of nutrition in prevention, management, and treatment of disease. Same as NUTR 420. 3 undergraduate hours. 3 graduate hours. Prerequisite: FSHN 220 or comparable course with a physiology prerequisite; MCB 450 or equivalent.

FSHN 421  Pediatric Clinical Nutrition  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/421)
Examines physiological, biochemical and nutritional aspects of disease processes relevant to infants, children and adolescents. Topics covered include prematurity, developmental disabilities, inborn errors of metabolism, food allergy, obesity and eating disorders. The role of nutrition in prevention, management and treatment of disease is also covered. Offered every other year. 3 undergraduate hours. 3 graduate hours. Prerequisite: FSHN 420; FSHN 322 is highly recommended.

FSHN 423  Advances in Foods & Nutrition  credit: 2 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/423)
New developments in foods and nutrition; readings, lectures, and discussions. 2 undergraduate hours. 2 graduate hours. Prerequisite: FSHN 220 and FSHN 323, or equivalent.

FSHN 425  Food Marketing  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/425)
Same as ACE 430. See ACE 430.

FSHN 426  Biochemical Nutrition I  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/426)
The dietary and hormonal regulation of carbohydrate, lipid and amino acid metabolism. Emphasizes the regulation of enzyme activity and the different roles the major organs have in whole animal energy balance. Same as NUTR 426. 3 undergraduate hours. 3 graduate hours. Prerequisite: FSHN 220, or FSHN 120 and FSHN 414, and MCB 450 or concurrent enrollment.

FSHN 427  Biochemical Nutrition II  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/427)
Biochemistry and metabolism of the water and fat soluble vitamins and minerals. Emphasizes the digestion, transport, metabolism and intercellular functions of these nutrients and how diet/food intake and physiological states affect these processes. Same as NUTR 427. 3 undergraduate hours. 3 graduate hours. Prerequisite: FSHN 220, or FSHN 120 and FSHN 414, and MCB 450 or concurrent enrollment.

FSHN 428  Community Nutrition  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/428)
Application of nutrition principles to needs assessments, program planning, delivery and evaluation in local, national, and international settings using behavioral theory frameworks. Same as NUTR 428. 3 undergraduate hours. 3 graduate hours. Prerequisite: FSHN 220 or equivalent, one introductory statistics course, and one course in the social or behavioral sciences.

FSHN 429  Nutrition Assessment & Therapy  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/429)
Problem-based learning application (via cases) of the nutrition care process with emphasis on nutrition assessment, diagnosis, intervention, monitoring and evaluation, as related to the management and treatment of disease states. This course is the clinical capstone course for the dietetics curriculum. 3 undergraduate hours. 3 graduate hours. Prerequisite: FSHN 420, or concurrent enrollment required.
FSHN 440 Applied Statistical Methods I credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/440)
Same as ABE 440, ANSC 440, CPSC 440, and NRES 440. See CPSC 440.

FSHN 442 Hospitality Management & Leadership Skills credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/442)
Application of behavioral science and management techniques, methods and strategies to the hospitality industry. Applied management techniques will focus on those managerial behaviors needed to develop and maintain positive and productive relationships with subordinates, peers, supervisors and individuals external to the hospitality organization. 3 undergraduate hours. No graduate credit. Prerequisite: FSHN 340 or consent of instructor.

FSHN 443 Management of Fine Dining credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/443)
Advanced application of food production and management principles to specific food service demands; emphasis on artistry in preparation, serving, and merchandising high quality food in quantity. 4 undergraduate hours. No graduate credit. Prerequisite: FSHN 340 and credit or concurrent registration in FSHN 442.

FSHN 450 Dietetics: Professional Issues credit: 2 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/450)
Discussion of current topics in dietetics, professional issues (ethics, outcomes research, marketing, legislation, registered dietitian exam) and preparing for dietetic internships. Required of all dietetics students. 2 undergraduate hours. 2 graduate hours. Prerequisite: Senior standing in dietetics.

FSHN 453 Nutrition for Performance credit: 3 or 4 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/453)
Same as KIN 453. See KIN 453.

FSHN 460 Food Processing Engineering credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/460)
Examines application of process engineering principles to the conversion of raw agricultural materials into finished food products. Topics include basics of engineering analysis, units and dimensions, materials balances, energy balances, thermodynamics, heat transfer, psychrometry, refrigeration and mechanical separations. 3 undergraduate hours. 3 graduate hours. Prerequisite: PHYS 101 and MATH 220; or consent of instructor.

FSHN 461 Food Processing I credit: 4 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/461)
Principles, unit operations, and applications of food preservation and processing by high temperature, refrigeration, and freezing processes; includes heat transfer, kinetics, chemical and microbial changes in food as a result of processing. Also, principles and applications of food processing unit operations based upon the combination of heat and/or mass transfer, including such unit operations as evaporation, freeze-concentration, membrane separation, dehydration, centrifugation, extrusion, as well as water activity control. Lecture-based course. 4 undergraduate hours. 4 graduate hours. Prerequisite: FSHN 414 or equivalent; FSHN 460 or equivalent, and FSHN 418. FSHN 260 is recommended.

FSHN 462 Food Processing II credit: 2 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/462)
Laboratory course for FSHN 461. Includes labs on blanching, pasteurization, sterilization, freezing, freeze drying, dehydration (tray drying, drum drying and spray drying), evaporation, and extrusion; discussion and labs. Additional fees may apply. See Class Schedule. 2 undergraduate hours. 2 graduate hours. Prerequisite: FSHN 461.

FSHN 464 Beverage Science & Technology credit: 2 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/464)
Explores the research, science and technology of the production of safe, high quality beverages through the application of food chemistry, food microbiology, and food processing principles. 2 undergraduate hours. 2 graduate hours. Prerequisite: FSHN 414 or FSHN 332 or consent of instructor. FSHN majors only, junior or senior standing required.

FSHN 465 Principles of Food Technology credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/465)
Overview of processing techniques in the food industry, including thermal/non-thermal processing, refrigeration, freezing, moisture removal, and separation. Presentations cover basic principles of each technology with examples of processing equipment. The changes of food components and nutrients caused by processing is also discussed. Lecture and field trips. 3 undergraduate hours. 3 graduate hours. Credit is not given for both FSHN 465 and the FSHN 461 - FSHN 462 sequence. Undergraduate food science majors or graduate students specializing in food processing/engineering may not enroll in FSHN 465. Recommended: FSHN 332 or food chemistry equivalent.

FSHN 466 Food Product Development credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/466)
Principles of food product development: target market evaluation, concept development and presentation, formulation, manufacturing, packaging, product costs, pricing, safety, and marketing. May include a product in accordance with Institute of Food Technologists national competition guidelines. Products will be unveiled and presented for faculty evaluation. Additional fees may apply. See Class Schedule. 3 undergraduate hours. 3 graduate hours. May be repeated to a maximum of 6 hours in separate terms if topics vary. Prerequisite: FSHN 332 or FSHN 414; FSHN 471 or FSHN 472; concurrent registration or completion of FSHN 461 and FSHN 462, or FSHN 465. This capstone course is limited to seniors in the Food Science or Foods Industry and Business options in FSHN. Graduate students will be allowed to register pending sufficient space in the class.

FSHN 469 Package Engineering credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/469)
Cross-disciplinary study of the materials, machinery, research, design, techniques, environmental considerations, ethics and economics used in the global packaging industry with emphasis on the implementation of improved technologies for the problems unique to food packaging. An emphasis on the broad, systems-based nature of packaging will be maintained throughout the course. Same as ABE 482. 3 undergraduate hours. 3 graduate hours. Prerequisite: MATH 220; one each of 100-level Chemistry and Physics courses or their equivalent; junior-senior standing or higher, or consent of instructor.

FSHN 471 Food & Industrial Microbiology credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/471)
Relationship of microorganisms to food manufacture and preservation, to food and industrial fermentation and processing, and to food-borne illness. Same as MCB 434. 3 undergraduate hours. 3 graduate hours. Prerequisite: MCB 101 or MCB 301 or equivalent.
FSHN 480  Basic Toxicology  credit: 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/480)
Emphasizes basic toxicology principles and the pharmacokinetics, absorption, distribution, metabolism and excretion of drugs, non-nutrient dietary supplements and other compounds foreign to the body. Toxic effects on major target organ systems are discussed, including an introduction to how foreign compounds can initiate, enhance or prevent the carcinogenic process. Briefly surveys diverse areas of toxicology such as eco-, nano-, forensic, genetic, nutritional, clinical and reproductive toxicology; review the federal regulatory aspects of safety assessment and consumer protection. Same as CB 449, CPSC 433, and ENVS 480. 3 undergraduate hours. 3 graduate hours. Prerequisite: Biochemistry - MCB 450 or equivalent, or consent of instructor.

FSHN 499  Cur Topics in FS & Human Nutr  credit: 1 to 3 Hours. (https://courses.illinois.edu/schedule/terms/FSHN/499)
Group discussion or an experimental course on a special topic in food science and human nutrition. 1 to 3 undergraduate hours. 1 to 3 graduate hours. May be repeated in the same or subsequent terms to a maximum of 12 hours as topics vary.