Department of Food Science & Nutrition
BS Food Science Track A – Updated Fall 2016
This track is IFT approved and meets the requirements for Food Industry hires and Food Science Graduate Programs

Foundation Courses (55 credits) *Denotes preferred course

Biology (8-9 credits)
- BIOL 1009* - General Biology, Bio (4.0 cr – fall, spring, summer)
- FSCN 2021* - Introductory Microbiology, Bio (4.0 cr – fall, spring)
  or VBS 2032 - General Microbiology With Laboratory (4.0 cr – prereq: Biol 1009, Chem 1061/1065 – fall, spring, summer)
  or MICB 3301 - Biology of Microorganisms (5.0 cr – prereq: Biol 1009, Chem 2302 – fall, spring)

Chemistry (19-21 credits)
- CHEM 1061 - Chemical Principles I, Phy (3.0 cr – prereq: Chem 1015 or placement – fall, spring, summer)
- CHEM 1065 - Chemical Principles I Laboratory, Phy (1.0 cr – fall, spring, summer)
- CHEM 1062 - Chemical Principles II, Phy (3.0 cr – prereq: Chem 1061 – fall, spring, summer)
- CHEM 1066 - Chemical Principles II Laboratory, Phy (1.0 cr – fall, spring, summer)
- CHEM 2302 - Organic Chemistry II (3.0 cr – prereq: Chem 2301 - fall, spring, summer)
  or CHEM 2304 – Organic Chemistry II for the Life Sciences (3.0 cr – prereq: 2301 – fall, spring)
- CHEM 2311* - Organic Chemistry Lab (4.0 cr – prereq or concurrent: Chem 2302 or 2304 – fall, spring, summer)
  Note: CHEM 2311 is required for Food Science graduate programs
  or BIOC 4025 - Laboratory in Biochemistry (2.0 cr – prereq: BioC 3021/4331 or Biol 3021 – fall, spring)
  or CHEM 2111 - Introductory Analytical Chemistry Lab (2.0 cr – prereq or concurrent: Chem 2101 – fall, summer)
  or FSCN 4613 - Experimental Nutrition (2.0 cr – prereq: FScN 4612, BioC 3021, Stat 3011 - spring)
- BIOC 3021 - Biochemistry (3.0 cr – prereq: Biol 1009, Chem 2301 – fall, spring, summer)

Communication (11 credits)
- WRIT 1301 - University Writing (4.0 cr – prereq: placement - fall, spring, summer)
  or WRIT 1401 – Writing and Academic Inquiry (4.0 cr – prereq: placement – fall, spring, summer)
- COMM 1101* - Introduction to Public Speaking, Civ (3.0 cr – fall, spring, summer)
  or APEE 2421 – Professional Communication for Agriculture, Food and the Environment (3.0 cr – fall, spring)
- WRIT 3562W - Technical and Professional Writing, 2 WI (4.0 cr – prereq: WRIT 1301 or WRIT 1401 – fall, spring, summer)

Math (8 credits)
- MATH 1142* - Short Calculus, Mth (4.0 cr – prereq: Math 1031/1051 or placement - fall, spring, summer)
  or MATH 1271 & 1272 – Calculus I & II (8.0 cr - prereq: MATH 1151 or placement - fall, spring, summer)
STAT 3011 - Introduction to Statistical Analysis, Mth (4.0 cr – fall, spring, summer)

Physics (4 credits)
- PHYS 1201W – Introductory Physics for Biology and Medicine I, Phy, WI (4.0 cr – prereq or concurrent: Math 1241/1271/1371 – fall, spring)
- Or PHYS 1301W Introductory Physics for Science and Engineering I, Phy, WI (4.0 cr – prereq or concurrent: Math 1271/1371/1571 – fall, spring)

The preferred Physics course, for the BS in Food Science at the University of Minnesota, is PHYS 1201W while PHYS 1301 (or an equivalent calculus based physics) is acceptable. If a student has an algebraically based physics course (including AP) they must still complete one of the above (Physics 1201 or Physics 1301 or its equivalent).

Professional Courses (37 credits)
- BBE 4744 - Engineering Principles for Biological Scientists (4.0 cr – prereq: Math 1142/1271 and Phys 1101/1201/1301/1401 – fall)
- FSCN 1102 - Food: Safety, Risks, and Technology, Civ (3.0 cr – fall, spring) Meets Interdisciplinary Learning requirements.
- FSCN 1112 - Principles of Nutrition (3.0 cr – fall, spring)
- FSCN 3102 - Introduction to Food Science (3.0 cr – prereq: Chem 1062 - fall)
- FSCN 4112 - Food Chemistry and Functional Foods (3.0 cr – prereq: FScN 3102, BioC 3021 - fall)
- FSCN 4121 - Food Microbiology and Fermentations (3.0 cr – prereq: FScN 2021, BioC 3021 - spring)
- FSCN 4122 – Food Fermentations and Biotechnology (2.0 cr – prereq: FScN 2021, FScN 4123 – fall)
- FSCN 4123 – Molecular Biology for Applied Sciences (1.0 cr – prereq: Bioc 3021, FScN 2021 - fall)
- FSCN 4131 – Food Quality (3.0 cr – prereq: junior; FScN 1102 – 3cr – fall)
- FSCN 4311 – Chemical Reactions in Food Systems (2.0 cr – prereq: FSCN 4112, 4312 – spring)
- FSCN 4312W - Food Analysis, WI (4.0 cr – prereq: FScN 4112, Stat 3001 – fall)
- FSCN 4332 – Food Processing Operations (3.0 cr – prereq: BBE 4744 – spring)
- FSCN 4481 – Sensory Evaluation of Foods (1.0 cr – prereq: FScN 3102, Stat 3011 - spring)
- FSCN 4349 – Food Science Capstone (2.0 cr – prereq: senior – fall, spring) Meets Experiential Learning requirements.

Experiential Learning
Note: this course is also a “Professional Course,” this does not mean that it needs to be taken twice.
- FSCN 4349 – Food Science Capstone (2.0 cr – prereq: senior – fall, spring) Meets Experiential Learning requirements.

Interdisciplinary Learning
Note: this course is also a “Professional Course,” this does not mean that it needs to be taken twice.
- FSCN 1102 - Food: Safety, Risks, and Technology, Civ (3.0 cr – fall, spring)

Liberal Education Courses (27 credits)
Food Science Track A

<table>
<thead>
<tr>
<th>Core Requirement</th>
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<td>BIOL 1009</td>
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<td>CHEM 1061 / CHEM 1065 / CHEM 1062 / CHEM 1066 / PHYS 1301W</td>
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<tr>
<td>Historical Perspective (HP)</td>
<td>ELECTIVE</td>
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<tr>
<td>Social Science (SocS) – 2 courses</td>
<td>ELECTIVE</td>
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<tr>
<td>Literature (Lit)</td>
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<td>WRIT 3562W</td>
</tr>
<tr>
<td>Upper Level (WI)</td>
<td></td>
</tr>
<tr>
<td>Any Level (WI)</td>
<td>FScn 4312W</td>
</tr>
<tr>
<td>Any Level (WI)</td>
<td>Phys 1301W</td>
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Food Science B.S. Credit Totals

<table>
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<tr>
<th>Track A</th>
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<tbody>
<tr>
<td>Foundation Credits:</td>
<td>55 credits</td>
</tr>
<tr>
<td>Professional Credits:</td>
<td>35 credits</td>
</tr>
<tr>
<td>Experiential Learning:</td>
<td>2-4 credits</td>
</tr>
<tr>
<td>Liberal Ed &amp; Elective Credits:</td>
<td>27-29 credits</td>
</tr>
<tr>
<td>Total Credits:</td>
<td><strong>120 credits</strong></td>
</tr>
</tbody>
</table>
### Foundation Courses (42 credits) *Denotes preferred course

**Biology (8-9 credits)**
- [ ] **BIOL 1009** - General Biology, *Bio* (4.0 cr – fall, spring, summer)
- [ ] **FSCN 2021** - Introductory Microbiology, *Bio* (4.0 cr – fall, spring)
  - or **VBS 2032** - General Microbiology With Laboratory (4.0 cr – prereq: Biol 1009, Chem 1011 / Chem 1061, Chem 1065 – fall, spring, summer)
  - or **MICB 3301** - Biology of Microorganisms (5.0 cr – prereq: Biol 1009, Chem 2302 – fall, spring)

**Chemistry (14 credits)**
- [ ] **CHEM 1061** - Chemical Principles I, *Phy* (3.0 cr – prereq: Chem 1015 or placement – fall, spring, summer)
- [ ] **CHEM 1065** – Chemical Principles I Laboratory, *Phy* (1.0 cr – fall, spring, summer)
- [ ] **CHEM 1062** - Chemical Principles II, *Phy* (3.0 cr – prereq: Chem 1061 – fall, spring, summer)
- [ ] **CHEM 1066** – Chemical Principles II Laboratory, *Phy* (1.0 cr – fall, spring, summer)
- [ ] **CHEM 2301** - Organic Chemistry I (3.0 cr – prereq: Chem 1062, Chem 1066 – fall, spring, summer)
- [ ] **BIOC 3021** - Biochemistry (3.0 cr – prereq: Biol 1009, Chem 2301 – fall, spring, summer)

**Communication (8 credits)**
- [ ] **WRIT 1301** - University Writing (4.0 cr – prereq: placement - fall, spring, summer)
  - or **WRIT 1401** – Writing and Academic Inquiry (4.0 cr – prereq: placement – fall, spring, summer)
- [ ] **WRIT 3562W** - Technical and Professional Writing, 2 WI (4.0 cr – prereq: WRIT 1301 or WRIT 1401 – fall, spring, summer)

**Math (8 credits)**
- [ ] **MATH 1142** - Short Calculus, *Mth* (4.0 cr – prereq: Math 1031/1051 or placement - fall, spring, summer)
  - or **MATH 1271 & 1272** – Calculus I & II (8.0 cr - prereq: MATH 1151 or placement - fall, spring, summer)
- [ ] **STAT 3011** - Introduction to Statistical Analysis, *Mth* (4.0 cr – fall, spring, summer)

**Physics (4 credits)**
- [ ] **PHYS 1201W** – Introductory Physics for Biology and Medicine I, *Phy, WI* (4.0 cr – prereq or concurrent: Math 1241/1271/1371– fall, spring)
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### Professional Courses (35 credits)
- [ ] **BBE 4744** - Engineering Principles for Biological Scientists (4.0 cr – prereq: Math 1142/1271 and Phys 1101/1201/1301/1401 – fall)
- **FSCN 1112** - Principles of Nutrition (3.0 cr – fall, spring)
- **FSCN 3102** - Introduction to Food Science (3.0 cr – prerequisite: Chem 1062 - fall)
- **FSCN 4112** - Food Chemistry and Functional Foods (3.0 cr – prerequisite: FScN 3102, BioC 3021 - fall)
- **FSCN 4121** - Food Microbiology and Fermentations (3.0 cr – prerequisite: FScN 2021, BioC 3021 - spring)
- **FSCN 4122** - Food Fermentations and Biotechnology (2.0 cr – prerequisite: FScN 2021, FScN 4123 - fall)
- **FSCN 4123** - Molecular Biology for Applied Sciences (1.0 cr – prerequisite: BioC 3021, FScN 2021 - fall)
- **FSCN 4131** - Food Quality (3.0 cr – prerequisite: junior; FScN 1102 – 3 cr - fall)
- **FSCN 4312W** - Food Analysis, *WI* (4.0 cr – prerequisite: FScN 4112, Stat 3001 - fall)
- **FSCN 4332** - Food Processing Operations (3.0 cr – prerequisite: BBE 4744 - spring)
- **FSCN 4481** - Sensory Evaluation of Foods (1.0 cr – prerequisite: FScN 3102, Stat 3011 - spring)
- **FSCN 4349** - Food Science Capstone (2.0 cr – prerequisite: senior – fall, spring) Meets Experiential Learning requirements.

**Experiential Learning**

Note: this course is also a “Professional Course,” this does not mean that it needs to be taken twice.
- **FSCN 4349** - Food Science Capstone (2.0 cr – prerequisite: senior – fall, spring) Meets Experiential Learning requirements.

**Interdisciplinary Learning**

Note: this course is also a “Professional Course,” this does not mean that it needs to be taken twice.
- **FSCN 1102** - Food: Safety, Risks, and Technology, *Civ* (3.0 cr – fall, spring)

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**Areas of Emphasis – Options for students who choose Track B**

1. Advanced Food Technology
2. Nutrition
3. Chemistry
4. Microbiology
5. Biochemistry

**1) Advanced Food Technology (10 cr)**
- **FSCN 4311** Chemical Reactions in Food Systems (2.0 cr)
- **FSCN 5441** Introduction to New Product Development (2.0 cr)
- **FSCN 5521** Flavor Technology (2.0 cr)
- **FSCN 5101** Food Regulation in the United States (2.0 cr)
- **FSCN 5481** Sensory Evaluation of Food Quality (2.0 cr)

**2) Nutrition (12 cr) (sufficient to earn a minor)**
- **FSCN 1112** Principles of Nutrition, ENVT (3.0 cr)
- **FSCN 3612** Life Cycle Nutrition (3.0 cr)
- **FSCN 4612** Human Nutrition (3.0 cr)
□ FSCN 3615 Sociocultural Aspects of Food, Nutrition, and Health, GP (3.0 cr)

3) Chemistry (15 cr)
□ CHEM 2302 Organic Chemistry II (3.0 cr)
□ CHEM 2311 Organic Chemistry Lab (4.0 cr)
□ CHEM 2101 Introductory Analytical Chemistry Lecture (3.0 cr)
□ CHEM 2111 Introductory Analytical Chemistry Lab (2.0 cr)
□ CHEM 3501 Physical Chemistry 1 (3.0 cr)

4) Microbiology (12 cr)
□ MICB 4111 Microbial Physiology and Diversity (3.0 cr)
□ MICB 4161W Eukaryotic Microbiology (3.0 cr)
□ MICB 4121 Microbial Ecology and Applied Microbiology (3.0 cr)
□ MICB 4151 Molecular and Genetic Bases for Microbial Diseases (3.0 cr)

5) Biochemistry (13 cr) (it may also earn a Biochemistry minor)
□ Take the BIOC 4331 and 4332 series instead of BIOC 3021
□ BIOC 4331 Biochemistry I: Structure Catalysis, Metabolism and Bioenergetics of Biological Systems (4.0 cr)
□ BIOC 4332 Biochemistry II: Molecular Mechanisms of Gene Action and Biological Regulation (4.0 cr)
□ BIOC 4025 Laboratory in Biochemistry (2.0 cr)
□ BIOC 4521 Introduction to Physical Biochemistry (3.0 cr)

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