

FOOD SCIENCE, B.SC.

Overview/Entrance Requirements

The B.Sc. Food Science provides the academic foundation of knowledge and skills for the wide range of opportunities in food science and technology. The degree program is structured in course offerings and content to enhance the competence of graduating students by providing greater emphasis in communications, critical thinking, computer literacy and statistics which are basic requirements of a modern professional environment. The B.Sc. Food Science (Science Option) program is accredited by the Institute of Food Technologists (IFT). (<https://www.ift.org/>)

The B.Sc. Food Science degree program offers two options: a Science Option and a Business Option. Students will select one of the two options of study. Both options require students to complete the Food Science Degree Core courses.

Degree Requirements

Course	Title	Hours
B.Sc. Food Science Degree Core		
ABIZ 1000	Introduction to Agribusiness Management	3
AGRI 1600	Introduction to Agrifood Systems	3
AGRI 2030	Technical Communications	3
AGRI 2400	Experimental Methods in Agricultural and Food Sciences ¹	3
BIOL 1020	Biology 1: Principles and Themes	3
BIOL 1030	Biology 2: Biological Diversity, Function and Interactions	3
CHEM 1100	Introductory Chemistry 1: Atomic and Molecular Structure and Energetics	3
CHEM 1130	Introduction to Organic Chemistry ²	3
or CHEM 1110	Introductory Chemistry 2: Interaction, Reactivity, and Chemical Properties	
CHEM/MBIO 2730	Elements of Biochemistry 1 ³	3
CHEM 2740	Introduction to the Biochemistry Laboratory ³	3
ECON 1010	Introduction to Microeconomic Principles	3
FOOD 2500	Food Chemistry	3
FOOD 3010	Food Process 1	3
FOOD 4100	Current Issues in Food and Human Nutrition	3
FOOD 4150	Food Microbiology 1	3
FOOD 4160	Food Analysis 1	3
FOOD 4200	Quality Control in Foods	3
FOOD 4270	Sensory Evaluation of Food	3
FOOD 4502	HACCP and Food Safety Regulations	3
FOOD 4510	Food Product Development	3
HNSC 1200	Food: Facts and Fallacies	3
HNSC 1210	Nutrition for Health and Changing Lifestyles	3
MATH 1210	Techniques of Classical and Linear Algebra ⁴	3
or MATH 1300	Vector Geometry and Linear Algebra	
One of the following: ⁵		3
MATH 1500	Introduction to Calculus	
MATH 1510	Applied Calculus 1	

MATH 1524	Mathematics for Management and Social Sciences	
Free Electives		
18 - 21 credit hours ^{6,7}		18-21
Options		
One of the following options:		27-30
Business Option Core		
Science Option Core		
Total Hours		117-123

¹ STAT 2000 (Basic Statistical Analysis 2) can be substituted for AGRI 2400 (Experimental Methods in Agricultural and Food Sciences).

² Students can hold CHEM 2100 (Organic Chemistry 1: Foundations of Organic Chemistry) in place of CHEM 1130 (Introduction to Organic Chemistry).

³ Under required courses, students can use either CHEM 2700/MBIO 2700 (Biochemistry 1: Biomolecules and an Introduction to Metabolic Energy) in place of CHEM 2730/MBIO 2730 (Elements of Biochemistry 1) and may use CHEM 2720 (Principles and Practices of the Modern Biochemistry Laboratory) in place of CHEM 2740 (Introduction to the Biochemistry Laboratory).

⁴ Students are recommended to take one of MATH 1210 or MATH 1300 however may also substitute MATH 1220 to meet the requirement.

⁵ Students are recommended to take one of MATH 1500 or MATH 1510 or MATH 1524 however may also substitute MATH 1230 to meet the requirement.

Students may use the former MATH 1520 to meet the MATH course requirement.

⁶ Students can apply for the Cooperative Education Program. Three work terms are required to graduate with Co-op designation. Co-op courses (3 credit hours each) are used towards free electives.

⁷ Students in the Business Option will have 21 credit hours of Free Electives. Students in the Science Option will have 18 credit hours of Free Electives.

Program Progression

Suggested Food Science (Science Option) Program Progression

Course	Title	Hours
Year 1		
AGRI 1600	Introduction to Agrifood Systems	3
BIOL 1020	Biology 1: Principles and Themes	3
BIOL 1030	Biology 2: Biological Diversity, Function and Interactions	3
CHEM 1100	Introductory Chemistry 1: Atomic and Molecular Structure and Energetics	3
CHEM 1110	Introductory Chemistry 2: Interaction, Reactivity, and Chemical Properties	3
or CHEM 1130	or Introduction to Organic Chemistry	
ECON 1010	Introduction to Microeconomic Principles	3
HNSC 1200	Food: Facts and Fallacies	3
HNSC 1210	Nutrition for Health and Changing Lifestyles	3
MATH 1210	Techniques of Classical and Linear Algebra	3
or MATH 1300	or Vector Geometry and Linear Algebra	

One of the following:		3
MATH 1500	Introduction to Calculus	
MATH 1510	Applied Calculus 1	
MATH 1524	Mathematics for Management and Social Sciences	
Hours		30
Year 2		
ABIZ 1000	Introduction to Agribusiness Management	3
AGRI 2030	Technical Communications	3
AGRI 2400	Experimental Methods in Agricultural and Food Sciences	3
CHEM 1110 or CHEM 1130	Introductory Chemistry 2: Interaction, Reactivity, and Chemical Properties or Introduction to Organic Chemistry	3
CHEM/MBIO 2730	Elements of Biochemistry 1	3
CHEM 2740	Introduction to the Biochemistry Laboratory	3
FOOD 2500	Food Chemistry	3
MBIO 1010	Microbiology I	3
Free Electives/Co-op		6
Hours		30
Year 3		
BIOE 3530	Engineering Fundamentals	3
FOOD 3010	Food Process 1	3
FOOD 3210	Food Engineering Fundamentals	3
FOOD 4150	Food Microbiology 1	3
FOOD 4160	Food Analysis 1	3
FOOD 4250	Food Analysis 2	3
FOOD 4270	Sensory Evaluation of Food	3
MKT 2210	Fundamentals of Marketing	3
Restricted Electives		3
Free Electives/Co-op		3
Hours		30
Year 4		
FOOD 4010	Food Process 2	3
FOOD 4100	Current Issues in Food and Human Nutrition	3
FOOD 4200	Quality Control in Foods	3
FOOD 4502	HACCP and Food Safety Regulations	3
FOOD 4510	Food Product Development	3
Restricted Elective		6
Free Electives/Co-op		9
Hours		30
Total Hours		120

While both CHEM 1110 and CHEM 1130 are required for the Food Science-Science Option program, normally only one is taken at a time.

Suggested Food Science (Business Option) Program Progression

Course	Title	Hours
Year 1		
AGRI 1600	Introduction to Agrifood Systems	3
BIOL 1020	Biology 1: Principles and Themes	3

BIOL 1030	Biology 2: Biological Diversity, Function and Interactions	3
CHEM 1100	Introductory Chemistry 1: Atomic and Molecular Structure and Energetics	3
CHEM 1110 or CHEM 1130	Introductory Chemistry 2: Interaction, Reactivity, and Chemical Properties or Introduction to Organic Chemistry	3
ECON 1010	Introduction to Microeconomic Principles	3
ECON 1020	Introduction to Macroeconomic Principles	3
HNSC 1200	Food: Facts and Fallacies	3
MATH 1210 or MATH 1300	Techniques of Classical and Linear Algebra or Vector Geometry and Linear Algebra	3
One of the following:		3
MATH 1500	Introduction to Calculus	
MATH 1510	Applied Calculus 1	
MATH 1524	Mathematics for Management and Social Sciences	
Hours		30
Year 2		
ABIZ 1000	Introduction to Agribusiness Management	3
ACC 1100	Introductory Financial Accounting	3
AGRI 2030	Technical Communications	3
AGRI 2400	Experimental Methods in Agricultural and Food Sciences	3
CHEM/MBIO 2730	Elements of Biochemistry 1	3
CHEM 2740	Introduction to the Biochemistry Laboratory	3
FOOD 2500	Food Chemistry	3
HNSC 1210	Nutrition for Health and Changing Lifestyles	3
ABIZ 2620 or HRIR 2440	Agricultural Human Resource Management or Human Resource Management	3
Free Electives/Co-op		3
Hours		30
Year 3		
ABIZ 2510	Introduction to Agricultural and Food Marketing	3
ECON 2010	Microeconomic Theory 1	3
ECON 2020	Macroeconomic Theory 1	3
FOOD 3010	Food Process 1	3
FOOD 4150	Food Microbiology 1	3
FOOD 4160	Food Analysis 1	3
FOOD 4270	Sensory Evaluation of Food	3
MKT 2210	Fundamentals of Marketing	3
Free Electives/Co-op		6
Hours		30
Year 4		
ABIZ 3510	Economics of Food Policy	3
FOOD 4100	Current Issues in Food and Human Nutrition	3
FOOD 4200	Quality Control in Foods	3
FOOD 4502	HACCP and Food Safety Regulations	3
FOOD 4510	Food Product Development	3

Restricted Elective	3
Free Electives/Co-op	12
Hours	30
Total Hours	120

Concentrations

Science Option

The principal areas covered are food processing, chemistry, analysis and safety.

In addition to the courses required for the Food Science Degree Core the following courses are prescribed for the program leading to a B.Sc. in Food Science – Science Option.

Course	Title	Hours
Science Option Core		
BIOE 3530	Engineering Fundamentals	3
CHEM 1110	Introductory Chemistry 2: Interaction, Reactivity, and Chemical Properties ¹	3
	or CHEM 1130 Introduction to Organic Chemistry	
FOOD 3210	Food Engineering Fundamentals	3
FOOD 4010	Food Process 2	3
FOOD 4250	Food Analysis 2	3
MBIO 1010	Microbiology I ²	3
MKT 2210	Fundamentals of Marketing	3
Restricted Electives		
Group 1 - Food Safety:		
FOOD 1000	Food Safety Today and Tomorrow	3
Group 2 - General:		
Two of the following: 6		
FOOD 3160	Frozen Dairy Products	
FOOD 3170	Cheese and Fermented Milk Products	
FOOD 3220	Grains for Food and Beverage	
FOOD 3330	Ingredient Technology for Food Design	
FOOD 3500	Processing of Animal Food Products	
FOOD 4230	Food Research	
FOOD 4260	Water Management in Food Processing	
FOOD 4540	Functional Foods and Nutraceuticals	
Total Hours		30

¹ Both CHEM 1110 and CHEM 1130 are required for the Food Science – Science Option program. One of these courses will be credited as part of the Degree Core.

² Students who already have credit for MBIO 1220 before entering the program can use it towards MBIO 1010.

Business Option

The Business option provides students specialization in the areas of economics, finance, marketing and management.

In addition to the courses required for the Food Science Degree Core the following courses are prescribed for the program leading to a B.Sc. in Food Science – Business Option.

Course	Title	Hours
Business Option Core		
ABIZ 3510	Economics of Food Policy	3
ACC 1100	Introductory Financial Accounting	3
ECON 1020	Introduction to Macroeconomic Principles	3
ECON 2010	Microeconomic Theory 1	3
ECON 2020	Macroeconomic Theory 1	3
HRIR 2440	Human Resource Management	3
	or ABIZ 2620 Agricultural Human Resource Management	
Restricted Electives		
Group 1 - Marketing:		
ABIZ 2510	Introduction to Agricultural and Food Marketing	3
MKT 2210	Fundamentals of Marketing	3
Group 2 - General:		
One of the following: 3		
FOOD 1000	Food Safety Today and Tomorrow	
FOOD 3160	Frozen Dairy Products	
FOOD 3170	Cheese and Fermented Milk Products	
FOOD 3220	Grains for Food and Beverage	
FOOD 3330	Ingredient Technology for Food Design	
FOOD 3500	Processing of Animal Food Products	
FOOD 4250	Food Analysis 2	
FOOD 4260	Water Management in Food Processing	
FOOD 4540	Functional Foods and Nutraceuticals	
Total Hours		27

Cooperative Education Program

Co-operative Education is a process that alternates periods of academic study with periods of paid work experience relating to the co-op student's area of study. The Co-operative Education Program provide students with practical experience, coaching, workshops and support as well as the opportunity for career exploration, development and exposure to more than a single type of work environment in their discipline.

Students secure full-time, paid co-op work placements with a FAFS-Co-op Office approved employer(s) that are each a minimum of 420 hours, to be completed within 4 months. The FAFS Co-op Office supports students on both a group and individual basis to develop effective job search skills to assist in securing a co-op position. Prior to starting each work term, students will register in AGRI 2002 (1st work term), AGRI 3002 (2nd work term), and AGRI 4002 (3rd work term) within the term that their co-op placement will take place and pay the associated fees. Students must submit a reflective assignment at the end of the work term and are evaluated for both overall participation and the report on a Pass/Fail basis.

Admission

Students who have been admitted to an undergraduate program within the faculty are eligible to apply to the Co-operative Education Program.

Students are advised that satisfying the entrance requirements does not guarantee a place in the Co-operative Education Program.

If a student has been found to have deliberately falsified information in the application for the Co-op Program, the mater will be immediately reported to Associate Dean (Academic) as an allegation of academic misconduct and handled according to the University Student Discipline

Bylaw (<https://catalog.umanitoba.ca/undergraduate-studies/policies-procedures/student-discipline-bylaw/>).

If, prior to acceptance into the Co-op Program, it is found that the student has had an allegation of academic misconduct upheld against them, the student may no longer be eligible for entrance to the FAFS Co-op Education Program.

Degree Program

Co-op applicants should have completed 24 but not more than 90 credit hours towards their degree by the start of their first work term (this will support the completion of 3 work terms). Ideally, the first work term would take place at the end of the second academic year allowing students to pursue professional development activities in year one. However, with approval of the FAFS Co-op Office, the first work term could commence after the first year of a 4-year or Second-Degree program.

Students admitted into the Program must maintain Good Academic Standing (minimum DGPA of 2.0).

Diploma Program

To be considered for admission in the Cooperative Education Program, a first year diploma student must have a minimum Degree GPA of 2.0, and have completed at least 24 credit hours of studies by the end of the academic year of application.

Academic Term Requirements:

Co-operative Education Option students are required to maintain full-time study (minimum 9 credit hours) while registered for an academic term in between work terms.

Students may be required to withdraw from the Co-operative Education Option form any of the following reasons:

- Failure to maintain the minimum academic requirements of the Faculty of Agriculture and Food Sciences.
- Failure to maintain the minimum credit hour requirements of the academic term in the Co-op Option.
- Unsatisfactory performance during a co-op work term.
- Failure to achieve a "Pass" grade in the associated co-op.
- Failure to observe to policies outlined in university governing documents related to Behavioural Policies and Academic Misconduct.
- In opinion of Co-op Coordinators, the student does not possess sufficient ability, skills, aptitude, attitude, diligence or motivation to successfully complete the Co-operative Education Option.

Students are not normally permitted to withdraw from the Co-operative Education Option once they have secured a position for their co-op work term; whether the position was obtained through the FAFS Co-op Office or through students' own self-directed job search. Enrollment in the applicable co-op course (s) will be maintained and students are responsible for all assessed fees for the duration of the co-op work term and for meeting all academic requirements.

Students must end their degree program on an academic term, except by special permission from the FAFS Co-op Office.

Employment Term Requirements:

Prior to starting the work term, students are required to register in the appropriate Agricultural and Food Sciences Co-operative Education Work Term Course within the set deadlines and pay the fee. Successful

completion of a work term includes participating in a mid-work term meeting with Co-op Coordinator and completion of a written work term report at the end of each work term.

The student will receive three credit hours for completing each co-op work term and earning a "Pass" grade in each associated co-op course. Each work term is record on the student's academic record and transcript.

In order to receive a co-op designation on their degree parchment, a degree student complete three full time, paid co-op work terms (minimum of 420 hours each) with a FAFS Co-op Office approved employer(s), although each co-op work term is optional.

Although each co-op work term is optional, a degree student must complete three co-op work terms (minimum 420 hours each) with a faculty FAFS Co-op Office approved employer(s) in order to receive a co-op designation on their degree parchment. Diploma students receive a co-op designation after the successful completion of one co-op work term.

During a work term, a co-op student may take a maximum of one additional course worth up to six credit hours for a total of (9) credit hours. If a student would like to request to take an additional 3 credit hour course while on a co-op work term, they must have written approval from their employer, as well as permission from the FAFS Co-op Office.