UC Davis Food Science and Technology
Guide to Restricted Electives

What is a Restricted Elective?

Restricted Electives (REs) are a group of upper-division courses (except for FST 3 and FST 55, see below) totaling a minimum of 18 units, which Food Science students select to tailor their degree. These courses must be completed with a letter grade. REs allow students to customize their Food Science education by exploring specific areas of interest in greater depth. These areas include Food Chemistry and Biochemistry, Food Safety and Microbiology, Brewing, Food Processing and Preservation, Sensory and Consumer Science, and Food Sustainability., Brewing, Food Processing & Preservation, Sensory and Consumer Science, and Food Sustainability.

How to pick your Restricted Electives?

Restricted Elective are chosen to best fit your interests in Food Science. Anticipate what courses will prepare you for the career that you want after you graduate from UC Davis. What courses or combination of courses would you like to highlight in your application to your future employer, professional or graduate school? Thinking about these questions will help you articulate and rationalize your choice of Restricted Electives. A carefully-chosen, well-balanced set of Restricted Electives can enhance the appeal of your career portfolio.

When to start picking your Restricted Electives?

Begin planning your Restricted Electives (REs) as soon as you declare the Food Science major. Explore the UC Davis General Catalog or Course Supplement (http://catalog.ucdavis.edu/index.html) to identify courses that interest you. Seek guidance from Food Science Undergraduate Advisors, Peer Advisors, and fellow students to learn about the range of available courses. You can also reach out to course instructors and request syllabi to gain a deeper understanding of the course content.
Discuss your RE options with your Food Science Faculty Advisor. Based on your career goals, they might recommend courses in areas such as advanced statistics, microbiology, or chemistry. While faculty advisors may not have detailed knowledge of every course, they can help steer you in the right direction.
Create a preliminary list of REs and revise it as you discover new courses. During your sophomore year, you will meet with the Undergraduate Staff Advisor to review your academic progress, finalize your REs, and integrate them into your personalized academic plan.

Rules and decisions on FST Restricted Electives

Students must meet with their Undergraduate Staff Advisor annually to develop and update their academic plan. As part of this process, Restricted Electives (REs) will be reviewed and approved. Approval is contingent on the coherence and relevance of the REs to the student's overall academic and career goals. REs may not be approved if, for example, there is no clear justification or if the selected courses lack a cohesive connection.

Since the approval of REs is evaluated based on the complete list rather than individual courses, advising staff typically do not provide feedback on the eligibility of single courses. Any non-approved REs will be further reviewed by the Food Science Master Advisor and/or the Teaching Committee.

Pre-Approved Eligible Courses

Appendix A provides a list of pre-approved upper-division courses (100–189) from the UC Davis General Catalog or Course Supplement (http://catalog.ucdavis.edu/index.html) that are eligible as Restricted Electives for the Food Science major. These courses can be included in your academic plan without requiring additional approval from the FS&T Advising Office. However, any course from Appendix A taken with a Pass/No Pass (P/NP) grading option will not qualify as a Restricted Elective. To include these courses as part of your Restricted Electives, you must complete them with a letter grade.

Please note that Appendix A is subject to change, and courses may be added or removed. The most current version of Appendix A is available through the FS&T Advising Office or online at: https://foodscience.ucdavis.edu/academic-programs/undergraduate/bs-major-requirements. There are several reasons why courses are not listed in Appendix A. Such courses may still be eligible as a Food Science Restricted Elective, but by exception only, as explained below.

1. It is a lower-division course (0-99)

There are 2 exception to this rule. FST 3 may be taken as a Restricted Elective for the Brewing option. It may be taken as a GE for the FST major. FST55 is a Restrictive Elective for the FST major and may be taken as an optional GE.

These courses must be taken for a letter grade.

2. Study Abroad

Any food related course that will be taken as part of a study abroad program will be considered on a case by case basis. Contact the Food Science Major Advisor for more information.

3. It is a variable-unit upper-division course (i.e. 192 and 199).

The FST degree allows a total of 6 units of 192 (internship) and 199 (research) courses as part of Restrictive Electives. These courses are graded on a P/NP basis only. Students must complete a research or internship contract in order to obtain FST 192/199 units. Contact the Food Science Major Advisor for more information.

UC Davis Food Science and Technology
Approved Course List for Restricted Electives

The Food Science Major requires 18 units of restricted electives (upper division units); letter grading only. The Department will allow up to 6 units for FST 192 (Internship) and FST 199 (Research) toward the RE requirement for juniors and seniors. Students are highly encouraged to plan RE courses early to ensure prerequisite requirements are satisfied.

Category: Food Science				
Course Number	**Course Title**	**Prerequisites**	**Units**	**Quarter**
FST 55	Food in American Culture		4	S, SS
FST 109	Principles of Quality Assurance in Food Processing	STA 13 or 100	3	F
FST 102A	Malting and Brewing Science	BIS 102 and BIS 103	4	F
FST 102B	Practice Malting and Brewing	FST 102A; CHE 2A, 2B, and 2C	4	W
FST 113	Food Law		3	W
FST 114/ VEN 114	Fermented Foods	BIS 103; MIC 102; or consent of instructor	4	W
FST 123	An Introduction to Enzymology	BIS 102 and 103; FST 123L (can be concurrent)	3	S
FST 123L	An Introduction to Enzymology Lab	BIS 103; FST 123	2	S
FST/ETX 128	Food Toxicology	BIS 102 and 103	3	S
FST 159	New Food Product Idea	FST 50; BIS 2A; PHY 7A, 7B, 7C; CHE 2A, 2B, 2C	3	S
FST 160	Food Product Development	FST 50; FST 103; FST 104, FST 110	4	S

Category: Sensory and Consumer Science				
Course Number	**Course Title**	**Prerequisites**	**Units**	**Quarter**
FST 55	Food in American Culture		4	S, SS
FST 109	Principles of Quality Assurance in Food Processing	STA 13 or 100	3	F
FST 159	New Food Product Idea	FST 50; BIS 2A; PHY 7A, 7B, 7C; CHE 2A, 2B, 2C	3	S
FST 160	Food Product Development	FST 50; FST 103; FST 104, FST 110	4	S
CNS 100	Consumer Behavior		3	SS1,2
STA 106	Analysis of Variance	(STA 13 or STA 13Y or STA 32 or STA100)	4	All
VEN 125	Wine Types and Sensory Evaluation	PLS 120 or STA 106	2	S
STA 141A	Fundamentals of Statistical Data Science	(STA 108 or STA 106); (STA 032 or STA 100 or STA 013 or STA 013Y)	4	F, S
ECS 124	Theory and Practice of Bioinformatics	(ECS 10 or ECS 32A or ECS 30 or ECS 36A or ENG 06);)(STA 12 or STA 13 or STA 13Y or STA 32 or STA 100 or STA 131A or MAT 135A or BIM 105); (BIS 2A or MCB 10)	4	F
*Additional classes may qualify as REs with approval				
FST - Food Science and Technology				
CNS - Consumer Science				
STA - Statistics				
VEN - Viticulture and Enology				
ECS - Engineering: Computer Science				

Category: Food System and Sustainability				
Course Number	**Course Title**	**Prerequisites**	**Units**	**Quarter**
ARE 121	Economics of Agricultural Sustainability	ECN 1A (C- or better)	4	F
ARE 120	Agricultural Policy	ARE 100A (C- or better)	4	S
ARE 147	Resource and Environmental Policy Analysis	ECN 1A (C- or better)	3	Offered Irregularly
EBS 135	Bioenvironmental Engineering	EBS 125, 130	4	S
EBS 144	Groundwater Hydrology	MAT 16B or 21A; HYD 103 or ENG 103 recommended	4	F
EBS 145	Irrigation and Drainage Systems	EBS 103 or HYD 103N	4	
ECI 123	Urban Systems and Sustainability	Upper division standing	4	S
ECI 143	Green Engineering Design and Sustainability	Upper Division Standing	4	W
ECH 171	Chemical Engineering Principles in Food Processing	**ECH 142**	**4**	
ESP 110	Principles of Environmental Science	[PHY 1A or PHY 7A], [MAT 16B or MAT 17B or MAT 21B], [BIS 2A or BIS 10 recommended]; Upper Division Standing	4	W
ESP 162	Environmental Policy	ECN 1A or ECN 1AV	4	W
ESP 165N	Climate Policy	[ESP 1 or ECN 1A or ECN 1AV] or Consent of Instructor	3	S
ESP 167	Energy Policy	[ECN 1A or ECN 1AV]; [MAT 16B or MAT 17B or MAT 21B]; or Consent of Instructor	4	S (Even Years)
ESP 169	Water Policy and Politics	ECN 1A or POL 1 recommended	3	S (Even Years)
ESP 175	Natural Resource Economics	ARE 100B or ECON 100 or the equivalent	4	S
PLS 101	Agriculture and Environment	PLS 2 or consent of instructor	3	W
PLS 150	Sustainability and Agroecosystem Management	SSC 10, CHE 2A, and PLS 2, BIO 1C or 2C	4	S
PLS 190	Seminar on Alternatives in Agriculture	Upper division standing or consent of instructor	2	W
SOC 160	Sociology of the Environment	SOC 1,2,or 3 recommended	4	All
*Additional classes may qualify as REs with approval				
ARE - Agricultural Resource Economics				
ESB - Engineering: Biological Systems				
ECI - Civil and Environmental Engineering				
ECH – Chemical Engineering				
ESP - Environmental Science & Policy				
PLS - Plant Sciences				
SOC - Sociology				
FST - Food Science and Technology				
VEN - Viticulture and Enology				

Category: Nutrition				
Course Number	**Course Title**	**Prerequisites**	**Units**	**Quarter**
NUT 105	Nutrition through the Life Cycle	NUT 111AV or 111AY; ABI 103 (or equivalent)	3	S
NUT 111AY	Intro to Nutrition and Metabolism	CHE 8B, NPB 101 (or equivalent)	3	W
NUT 111B	Recommendations and Standards for Human Nutrition	CHE 8B; NPB 101; (NUT 111AV or NUT 111AY); Or the equivalent of NPB 101	2	S
NUT 112	Nutritional Assessment	((ABI 102, ABI 103) or (BIS 102, BIS 103)); NUT 111AY; (STA 013 or STA 013Y or PLS 120)	4	S
NUT 114	Developmental Nutrition	ABI 102; ABI 103; (NUT 111AV or NUT 111AY); NUT 111B	4	W
NUT 116A	Clinical Nutrition	(NUT 111AV or NUT 111AY); NUT 111B; NUT 112; NPB 101; Or the equivalent to NPB 101	3	F
NUT 116B	Clinical Nutrition	(NUT 111AV or NUT 111AY); NUT 111B; NUT 112; NPB 101; Or the equivalent to NPB 101	3	W
NUT 117	Experimental Nutrition	(NUT 111AV or NUT 111AY); NUT 111B; NUT 112; BIS 102; BIS 103; (MCB 120L)	6	F
NUT 118	Community Nutrition	NUT 116A; (NUT 111AV or NUT 111AY); NUT 111B	4	W
*Additional classes may qualify as REs with approval				
NUT - Nutrition				

Category: Microbiology				
Course Number	**Course Title**	**Prerequisites**	**Units**	**Quarter**
FST 159	Principles of Quality Assurance in Food Processing	STA 13 or STA 100	3	S
FST 114	Fermented Foods	BIS 103; MIC 102 or consent of instructor	4	W
MIC 105	Microbial Diversity	MIC 102 or 104, Biological Sciences 101; BIS 103 or 105 (recommended)	3	W
MIC 120	Microbial Ecology	MIC 105; (BIS 102 or BIS 105)	3	S
MIC 140	Bacterial Physiology	(BIS 101, BIS 102, BIS 103 (can be concurrent)) or (BIS 101, BIS 105); MIC 102 recommended.	3	offered Irregularly
MIC 150	Genomes of Pathogenic Bacteria	MIC 102; BIS 101	3	Offered Irregularly
MIC 155L	Bacterial Physiology Lab	(MIC 140 or MIC 150); MIC 120L; and Consent of Instructor	4	Offered Irregularly
MIC 162	General Virology	BIS 101; BIS 102 or BIS 105 recommended.	3	W
MIC170	Yeast Molecular Genetics	BIS 101; MIC 102 or MIC 105 strongly recommended.	3	SSI
MCB 120	Molecular Biology and Biochemistry Laboratory Associated Lecture	BIS 102; or Consent of Instructor	3	All
MCB 120L	Molecular Biology and Biochemistry Laboratory	BIS 102; or Consent of Instructor. Must be taken concurrently with MCB 120	3	All
MCB 121	Advanced Molecular Biology	BIS 101; (BIS 102 (can be concurrent) or BIS 105 (can be concurrent) or ABI 102 (can be concurrent)); BIS 102 or BIS 105 or ABI 102 can be concurrent although prior completion is recommended.	3	All
PMI 127	Medical Bacteria and Fungi	Any Microbiology course with lab; Immunology strongly recommended.	3	S
PLP 148	Introductory Mycology	BIS 1A, 1B, 1C	4	F
PLS 174	Microbiology and Safety of Fresh Fruits & Vegetables	PLS 002 or BIS 001C or BIS 002C; Or equivalent.	3	F
VEN 128	Wine Microbiology	VEN 123; VEN 124: MIC 102	2	W
VEN128L	Wine Microbiology Lab	VEN 123; VEN 124: MIC 102	2	W
*Additional classes may qualify as REs with approval				
FST - Food Science and Technology				
MIC - Microbiology				
MCB - Molecular and Cellular Biology				
PMI - Pathology, Microbiology and Immunology				
PLP - Plant Pathology				
PLS - Plant Sciences				
VEN - Viticulture and Ecology				

Category: Chemistry and Biochemistry				
Although the organic chemistry series CHE 8A-8B is acceptable for the Food Science B.S. degree, we recommend that students interested in emphasizing chemistry and biochemistry take the 118A, 118B, 118C or 128A, 128B, 128C series for organic chemistry. Students interested in minoring in chemistry should check with the chemistry department regarding course selection.				
Course Number	**Course Title**	**Prerequisites**	**Units**	**Quarter**
CHE 107A	Physical Chemistry for the Life Sciences	CHE 002C or CHE 002CH; (MAT 016C or MAT 017C or MAT 021C); (PHY 007C or PHY 009C or PHY 009HC)	3	F, W
CHE 107B	Physical Chemistry for the Life Sciences	CHE 107A	3	W, S
CHE 108	Molecular Biochemistry	CHE 128C or CHE 118C	3	SSI
CHE 110A	Physical Chemistry : Introduction to Quantum Mechanics	(PHY 007C or PHY 009C or PHY 009HC); (CHE 002C or CHE 002CH); (MAT 016C or MAT 017C or MAT 021C); Completion of Mathematics 21D, 22A, and 22AL, and Physics 9C or 9HC, strongly recommended	4	F, S
CHE 110B	Physical Chemistry: Properties of Atoms and Molecules	CHE 110A	4	F, W
CHE 110C	Physical Chemistry: Thermodynamics, Equilibria and Kinetics	CHE 110B	4	W, S
CHE 124A	Inorganic Chemistry: Fundamentals	CHE 2C or 2CH	3	All
CHE 124B	Inorganic Chemistry: Main Group Block	CHE 124A	3	W
CHE 124C	Inorganic Chemistry: d & f Block Elements	CHE 124A	3	S
CHE 129B	Organic Chemistry Laboratory	CHE 129A; CHE 128B (can be concurrent)	2	W, S
CHE 129C	Organic Chemistry Laboratory	CHE 128C (can be concurrent) and CHE 129B	2	F, S
CHE 131	Modern Methods of Organic Synthesis	CHE 118C or CHE 128C	3	F
CHE 150	Chemistry of Natural Products	CHE 118C or CHE 128C	3	All
FST 123	An Introduction to Enzymology	BIS 102 and 103; FST 123L (can be concurrent)	3	S
FST 123L	An Introduction to Enzymology Lab	BIS 103; FST 123	2	S
FST 128	Food Toxicology	BIS 102; BIS 103	3	S
*Additional classes may qualify as REs with approval lll				
BIS - Biological Sciences				
CHE - Chemistry				
NUT -Nutrition				
VEN - Viticulture and Enology				

Category: Processing and Preservation				
Course Number	**Course Title**	**Prerequisites**	**Units**	**Quarter**
ECH 160	Fundamentals of Biomanufacturing	MIC 102 or BIS 102 or ABI 102	3	Offered irregularly
ECH 140	Mathematical Methods in Biochemical and Chemical Engineering	MAT 022B; (ECH 060 or ENG 006); or equivalents of ECH 060 or ENG 006	4	F
ECH 141	Fluid Mechanics for Biochemical and Chemical Engineers	ECH 051 C- or better; ECH 140	4	W, S
ECH 142	Heat Transfer for Biochemical and Chemical Engineers	ECH 141	4	S
EBS 125	Heat Transfer in Biological Systems	EBS 075; ENG 105; BIS 002A; BIS 002B; BIS 002C	4	S
EBS 127	Mass Transfer and Kinetics in Biological Systems	EBS 125	4	F
EBS 130	Modeling of Dynamic Processes in Biological Systems	EBS 075; (ENG 006 or ECS 030); MAT 022B C- or better	4	W
EBS 161	Kinetics and Bioreactor Design	EBS 127	4	W
VEN 135	Wine Technology and Winery Systems	PLS 021; MAT 016A; MAT 016B; ((PHY 001A, PHY 001B) or PHY 007A)	4	S
VEN 140	Distilled Beverage Technology	CHE 8B; FST 110A	3	S (Even years)
* Additional classes may qualify as REs with approval				
ECH – Chemical Engineering				
EBS - Engineering Biological Systems				
VEN - Viticulture and Enology				

Brewing Science Option/Restricted Electives				
Course Number	**Course Title**	**Prerequisites**	**Units**	**Quarter**
FST 102A	Malting and Brewing Science	(BIS 102, BIS 103) or BIS 105; Senior standing recommended	4	F
FST 102B	Practical Malting and Brewing	FST 102A; CHE 2C	4	W
FST 123	An Introduction to Enzymology	BIS 102 and 103; FST 123L (can be concurrent)	3	S
Choose an Additional 7 units from these courses:				
FST 003	Introduction to Brewing and Beer		3	All
FST 109	Principles of Quality Assurance in Food Processing	STA 013 or STA 013Y	3	S
FST 114	Fermented Foods	BIS 103; MIC 102; or consent of instructor	4	W
FST 123L	An Introduction to Enzymology Lab	BIS 103; FST 123	2	S - not offered in Spring 2022
FST 159	New Food Product Ideas	FST 050; BIS 002A; PHY 007A; PHY 007B; PHY 007C; CHE 002A; CHE 002B; CHE 002C	3	F
FST 160	Food Product Development	FST 050; FST 103; FST 104; FST 110	4	S
VEN 140	Distilled Beverage Technology	CHE 8B	3	S (Even years)
* Additional classes may qualify as REs with approval				
FST - Food Science and Technology				
VEN - Viticulture and Enology				