

### Restricted Electives for a Food Systems and Sustainability

<i>Food Systems and Sustainability</i>		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
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	3	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
FST 298	Food Systems and Sustainability	Upper division standing and consent of instructor	3	S

\*Additional classes may qualify as REs with approval

ARE- Agricultural Resource economics

EBS- Engineering: Biological Systems

ECI- Civil and Environmental Engineering

ESP- Environmental Science & Policy

PLS – Plant Sciences

SOC- Sociology

FST- Food Science and Technology

VEN- Viticulture and Enology

## Restricted Electives for a Sensory and Consumer Science

<i>Sensory and Consumer Science</i>		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	S
FST 159	New Food Product Idea	FST 50; BIS 2A; PHY 7A, 7B, 7C; CHE 2A, 2B, 2C	3	F
FST 160	Food Product Development	FST 50; FST 103; FST 104, FST 110	4	S
FST 213	Flavor Chemistry of Foods and Beverages	CHE 8B; VEN 123; VEN 123L; or consent of instructor	3	S (Offered Irregularly)
CNS 100	Consumer Behavior		3	SS 1, 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
VEN 213	Flavor Chemistry of Foods and Beverages	CHE 8B, FST 123 and FST 123L or FST103 or consent of instructor	3	S (Offered Irregularly)

\*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

### Restricted Electives for a Nutrition

<b>Nutrition</b>		<b>Prerequisites</b>	<b>Units</b>	<b>Quarter</b>
NUT 105	Nutrition and Aging	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	Recs. And STDS. for Human Nutrition	CHE 008B; 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	3	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
NUT 120AN	Nutritional Anthropology	NUT 10 and ANT 2 recommended	4	SSI
NUT 120BN	Nutritional Geography		4	Offered Irregularly

\*Additional classes may qualify as REs with approval

NUT- Nutrition

## Restricted Electives for a Microbiology

<b>Microbiology</b>		<b>Prerequisites</b>	<b>Units</b>	<b>Quarter</b>
FST 102A	Malting and Brewing Science	BIS 102 and BIS 103	4	F
FST 102B	Practical Malting and Brewing	FST 102A; CHE 2A, 2B, and 2C	4	W
FST 109	Principles of Quality Assurance in Food Processing	STA 13 or STA 100	3	S
FST 115	Fermented Foods	BIS 103; MIC 102 or consent of instructor	4	S
FST 119	Chemistry and Technology of Milk and Dairy Products	BIS 002A; BIS 102; Consent of Instructor	4	S
FST 230	Food & Gut Microbiota	Upper division standing and consent of instructor	4	S
MIC 105	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.	4	W
MIC 170	Yeast Molecular Genetics	BIS 101; MIC 102 or MIC 105 strongly recommended.	3	S
MCB 120	Molecular Biology and Biochemistry Laboratory Associated Lecture	BIS 102; or Consent of Instructor	3	All
MCB 120L	Molecular Biology and Biochemistry Lab	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.	5	S
PLP 148	Introductory Mycology	BIS 1A, 1B, 1C	4	F
PLS 174	Mic. And Safety of Fresh Fruits & Veggies.	PLS 002 or BIS 001C or BIS 002C; Or equivalent.	3	F
VEN 128	Wine Microbiology	VEN 123; VEN 124: MIC 102	2	W
VEN 128L	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 Enology

## Restricted Electives for a 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.

<b>Chemistry and Biochemistry</b>		<b>Prerequisites</b>	<b>Units</b>	<b>Quarter</b>
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 required concurrently	2	S
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	S
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
NUT 111AY	Introduction to Nutrition and Metabolism	CHE 8B; NPB 101 (or equivalent)	3	W

VEN 140	Distilled Beverage Technology	CHE 8B; FST 110A	3	S (Even years)
FST 213	Flavor Chemistry of Foods and Beverages	CHE 008B; VEN 123; (VEN 123L or FST 103); or Consent of Instructor	3	S (Even years)

\*Additional classes may qualify as REs with approval

BIS- Biological Sciences

CHE- Chemistry

NUT – Nutrition

VEN- Viticulture and Enology

## Restricted Electives for a Processing and Preservation

<i>Processing and Preservation</i>		Prerequisites	Units	Quarter
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
VEN 140	Distilled Beverage Technology	CHE 8B; FST 110A	3	S (Even years)
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
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

EBS- Engineering: Biological Systems

VEN- Viticulture and Enology



## Restricted Electives for a Brewing Emphasis

<b>Brewing Science</b>		<b>Prerequisites</b>	<b>Units</b>	<b>Quarter</b>
	<b>Specific course requirements:</b>			
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
<b>Choose and Additional 7 units from these courses</b>				
FST 3	Introduction to Brewing and Beer		3	All
FST 109	Principles of Quality Assurance in Food Processing	STA 013 or STA 013Y	3	S
FST 115	Fermented Foods	BIS 103; MIC 102; or consent of instructor	4	S
FST 123L	An Introduction to Enzymology Lab	BIS 103; FST 123 required concurrently	2	S
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