

BIOL 3863	General Ecology. 3 Hours.	3
	Ecological principles and concepts; environmental factors and interactions that determine distribution and abundance of organisms. Prerequisite: 7 hours of biological science. General Ecology Prerequisite: 7 hours of biological science.	
ENSC 4023	Water Quality. 3 Hours.	3
	Physical, chemical, and biological characteristics of natural waters (rain, river, lake, soil, ground, etc.). Discussion of water quality parameters such as pH, alkalinity and acidity, redox, hardness, BOD, TSS, etc. Aquatic processes of pollutants and principles of modeling. Prerequisite: CHEM 1123 and CHEM 1121L and BIOL 1543 and BIOL 1541L .	
CSES 2203	Soil Science. 3 Hours.	3
	Origin, classification, and physical, chemical, and biological properties of soils. Lecture 3 hours, discussion 1 hour per week. Corequisite: Drill component. Prerequisite: MATH 1203 and CHEM 1103 or CHEM 1073 .	
CHE M 3613	Organic Chemistry II. 3 Hours.	3
	Basic chemistry of aromatic and carbonyl compounds: properties and reactions. Lecture 3 hours per week. Corequisite: CHEM 3611L and related course component drill section for CHEM 3613 . Prerequisite: (CHEM 3603 and CHEM 3601L) or (CHEM 3603H and CHEM 3602M) or (CHEM 3703 and CHEM 3702L).	
CHE M 3813	Elements of Biochemistry. 3 Hours.	3
	One semester survey course of the fundamentals of biochemistry. Structures, properties, and reactions of major classes of biomolecules. Basics of enzyme catalysis. Overview of metabolism. Credit for both CHEM 3813 and 4813H may not be counted toward a chemistry degree. Lecture 3 hours per week. Prerequisite: (CHEM 3613 and CHEM 3611L) or (CHEM 3613H and CHEM 3612M) or (CHEM 3713 and CHEM 3712L) or (CHEM 2613 and CHEM 2611L).	

BIOL 2533	Cell Biology. 3 Hours. Introduction to cell structure, cell processes, biological polymers, energetics, and diversity. An introduction to biochemistry and cell chemistry. Pre- or Corequisite: (CHEM 1123 and CHEM 1121L) or (CHEM 1223 and CHEM 1221L) or equivalent. Prerequisite: BIOL 1584 or BIOL 1543 and BIOL 1541L .	3
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Biological Engineering Suggested Engineering Electives

BENG 4123	Biosensors & Bioinstrumentation (Odd years, Sp) (Prerequisite: BIOL 2013 or BIOL 2533 and BENG 3113.)	3
BENG 450V	Special Problems	3
BENG 451VH	Honors Thesis: Prerequisite: Honors candidacy.	3
BENG 4753L	Nanotechnology Laboratory (Fa) (Prerequisite: MATH 2564, PHYS 2074, CHEM 1123 or CHEM 1133.)	3
BENG 4963	Modeling Environmental Biophysics: Prerequisite: MATH 2564 and [BENG 4933 OR CVEG 3223].	3
CVEG 2053	Surveying Systems (Sp, Fa) Corequisite: CVEG 2051L . Prerequisite: MATH 2554 or MATH 2445 .)	3
CVEG 3243	Environmental Engineering (Sp, Fa) (Prerequisite: MATH 2584 with a grade of C or better, and CHEM 1103 or CHEM 1113 with a grade of C or better.)	3
CVEG 4203	Environmental Regulations and Permits: Prerequisite: CVEG 3243 with a grade of C or better and senior standing.	3
CVEG 4243	Environmental Engineering Design (Sp, Fa) (Prerequisite: CVEG 3243 , INEG 2313 and INEG 2413 , each with a grade of C or better.)	3

CVEG 4273	Open Channel Flow Prerequisite: <u>CVEG 3213</u> and <u>CVEG 3223</u> .	3
<u>CVEG 4263</u>	Air Pollution Control (Sp) (Prerequisite: <u>CVEG 3213</u> or <u>MEEG 3503</u> .)	3
<u>INEG 2313</u>	Applied Probability and Statistics for Engineers I (Sp, Fa) (Prerequisite: MATH 2564.)	3
<u>INEG 2413</u>	Engineering Economic Analysis (Sp, Fa) (Prerequisite: MATH 2554.)	3
INEG 4423	Advanced Engineering Economy (Irregular). 3 Hours. Preparation of feasibility studies, including cost estimation, risk and uncertainty, sensitivity analysis and decision making. Effects of taxes, depreciation and financing costs on cash flows. Prerequisite: <u>INEG 2413</u> .	
<u>MEEG 4453</u>	Industrial Waste and Energy Management (Irregular) (Prerequisite: MEEG 4413.)	3
<u>MEEG 4473</u>	Indoor Environmental Control (Irregular) (Prerequisite: MEEG 4413.)	3
Biological Engineering Suggested Technical Electives		
<u>AGEC 3503</u>	Agricultural Law I (Fa) Examination of those areas of law especially applicable to agriculture.	3
<u>AGEC 3523</u>	Environmental and Natural Resources Law (Even years, Sp)	3
<u>AGME 3153</u>	Surveying in Agriculture and Forestry (Fa)	3

<u>AGST 4023</u>	Principles of Experimentation (Fa) Prerequisite: <u>MATH 1203</u> or higher level.	3
<u>BENG 3603</u>	Metrics for Sustainable Agricultural Systems (Fa)	3
or <u>CSES 3603</u>	Metrics for Sustainable Agricultural Systems (Fa)	
BENG 4973	Practice in Water Quality Monitoring and Analysis: Prerequisite: CVEG 3213 or instructor's consent to allow interdisciplinary student teams.	3
BIOL 2323	General Genetics: Prerequisite Prerequisite: (<u>BIOL 1584</u> or <u>BIOL 1543</u> and <u>BIOL 1541L</u>) and (<u>CHEM 1123</u> and <u>CHEM 1121L</u> or <u>CHEM 1223</u> and <u>CHEM 1221L</u>) and (<u>MATH 1203</u> or <u>STAT 2023</u> or equivalent).	3
<u>BIOL 2533</u>	Cell Biology (Sp, Fa) Pre- or Corequisite: (<u>CHEM 1123</u> and <u>CHEM 1121L</u>) or (<u>CHEM 1223</u> and <u>CHEM 1221L</u>) or equivalent. Prerequisite: <u>BIOL 1584</u> or <u>BIOL 1543</u> and <u>BIOL 1541L</u> .	3
BIOL 4333	Biotechnology in Agriculture: This course is cross-listed with <u>PLPA 4333</u>.	3
<u>BIOL 4734</u>	Wildlife Management Techniques (Irregular) (Corequisite: Lab component. Prerequisite: <u>BIOL 3863</u>).	4
<u>BIOL 4814</u>	Limnology (Odd years, Fa) (Prerequisite: (<u>CHEM 1123</u> and <u>CHEM 1121L</u>) or equivalent and <u>BIOL 3863</u> or instructor's permission.	4
<u>CHEM 3613</u>	Organic Chemistry II (Sp, Su) Corequisite: <u>CHEM 3611L</u> and related course component drill section for <u>CHEM 3613</u> . Prerequisite: (<u>CHEM 3603</u> and <u>CHEM 3601L</u>) or (<u>CHEM 3603H</u> and <u>CHEM 3602M</u>) or (<u>CHEM 3703</u> and <u>CHEM 3702L</u>).	3
<u>CHEM 3813</u>	Elements of Biochemistry (Sp, Su, Fa) Prerequisite: (<u>CHEM 3613</u> and <u>CHEM 3611L</u>) or (<u>CHEM 3613H</u> and <u>CHEM 3612M</u>) or	3

([CHEM 3713](#) and [CHEM 3712L](#)) or
([CHEM 2613](#) and [CHEM 2611L](#)).

[CSES 2203](#) Soil Science (Sp, Fa) 3
Prerequisite: [MATH 1203](#) and [CHEM 1103](#) or [CHEM 1073](#).

[CSES 3214](#) Soil Resources and Nutrient Cycles (Odd years, Sp) Pre- or 4
Corequisite: [BIOL 2013](#) and [BIOL 2011L](#). Corequisite: Lab
component. Prerequisite: [CSES 2203](#).

[CSES 4303](#) Bioenergy Feedstock Production (Sp) 3
(Prerequisite: [MATH 1203](#) and [BIOL 1543](#) or [CSES 1203](#). Courses
in introductory chemistry or soil science are preferred.

[ENSC 3103](#) Plants and Environmental Restoration (Fa) 3
Prerequisite: [CSES 1203](#) or [HORT 2003](#) or [BIOL 1613](#).

[ENSC 3223](#) Ecosystems Assessment (Even years, Fa) 4
& [ENSC 32](#) and Ecosystems Assessment Laboratory (Even years,
[21L](#) Fa) Prerequisite: [BIOL 1543](#).

[ENSC 3263](#) Soil and Water Conservation (Fa) Prerequisite: [CSES 2203](#). 3

[ENSC 3413](#) Principles of Environmental Economics (Sp) 3
Prerequisite: [AGEC 1103](#) or [ECON 2023](#).
This course is cross-listed with [AGEC 3413](#).

or [AGEC 34](#) Principles of Environmental Economics (Sp)
[13](#) Prerequisite: [AGEC 1103](#) or [ECON 2023](#).
This course is cross-listed with [ENSC 3413](#).

[ENSC 3603](#) GIS for Environmental Science (Odd Years, Sp) 3
Prerequisite: [CSES 2203](#).

[ENSC 3933](#) Environmental Ethics (Odd years, 3
Sp) Prerequisite: [ENSC 1003](#) or [PHIL 2003](#) or [PHIL 2103](#).
This course is cross-listed with [PHIL 3113](#).

<u>ENSC 4023</u>	Water Quality (Fa) Prerequisite: <u>CHEM 1123</u> and <u>CHEM 1121L</u> and <u>BIOL 1543</u> and <u>BIOL 1541L</u> .	3
<u>ENSC 4034</u>	Analysis of Environmental Contaminants (Even years, Sp) Corequisite: Lab component. Pre- or Corequisite: <u>CHEM 2613</u> and <u>CHEM 2611L</u> or <u>CHEM 3603</u> and <u>CHEM 3601L</u> .	4
<u>ENSC 4263</u>	Environmental Soil Science (Even years, Sp) Pre- or Corequisite: <u>PHYS 2013</u> and <u>PHYS 2011L</u> . Prerequisite: <u>CSES 3214</u> .	3
<u>FDSC 4122</u>	Food Microbiology (Fa) (Pre-req BIOL 2013 & BIOL 2011L or BIOL 2533) (FDSC 4121L Food Microbiology Lab 1 hour Pre- Corequisite: FDSC 4122: A hands-on laboratory course designed to teach students microbiological techniques and certain enumeration and plating techniques of specific food spoilage and pathogenic bacteria.)	2
<u>FDSC 4304</u>	Food Chemistry (Fa): Corequisite: Lab component. Prerequisite: <u>CHEM 1123</u> and <u>CHEM 1121L</u> and <u>CHEM 2613</u> and <u>CHEM 2611L</u> or (<u>CHEM 3603</u> and <u>CHEM 3601L</u>).	4
<u>GEOS 1113</u>	General Geology (ACTS Equivalency = GEOL 1114 Lecture) (Sp, Su, Fa) <u>GEOS 1111L</u> is recommended as a corequisite.	3
<u>GEOS 3052</u>	Geology for Engineers (Fa)	2
<u>GEOS 4033</u>	Hydrogeology (Sp) Prerequisite: <u>MATH 2043</u> or <u>MATH 2554</u> , and <u>GEOS 3514</u> .	3
<u>GEOS 4063</u>	Principles of Geochemistry (Fa) Prerequisite: <u>CHEM 1121L</u> , <u>CHEM 1123</u> and <u>GEOS 2313</u> .	3
<u>GEOS 4413</u>	Principles of Remote Sensing (Fa) Prerequisite: <u>GEOS 3023</u> or <u>GEOS 3543</u> .	3
<u>GEOS 4693</u>	Environmental Justice (Sp) This course is cross-listed with <u>SUST 4693</u> .	3

STAT 4003 Statistical Methods (Sp, Fa) (Corequisite: STAT 4001L.) 3
Prerequisite: **MATH 2554** or **MATH 2554C**.

SUST 4103 Capstone Experience in Sustainability (Sp)
Prerequisite: **SUST 1103** and **SUST 2103**.