Environmental Studies

Environmental scientists work toward defining and solving environmental problems caused by the actions of human beings. Their interdisciplinary training is broad-based and encompasses the natural sciences, mathematics, economics, and the social sciences. Their primary ethical concern is human stewardship of the earth.

Students in the Environmental Studies program are concerned with both the technological problems and social aspects of environmental issues. Working in cooperation with the Center for Environmental, Earth and Space Studies, Economics, and Sociology, they may participate in applied research. Their interdisciplinary course work includes the study of scientific principles used in environmental problem solving, and the study of the impact of economics, politics, and other social systems on environmental policies and practices.

Because of the breadth of study necessary to prepare for upper division Environmental Studies courses, students are urged to declare in the major during their freshman or sophomore year.

At least 50 percent of credits in the major should be at 3000/4000 levels.

Programs

- Environmental Studies, B.S. (Industrial Ecology Emphasis) *major*
- Environmental Studies, B.S. (Geohydrology Emphasis) *major*
- Environmental Studies, B.S. (Environmental Policy and Planning Emphasis) *major*
- Environmental Studies, B.S. (Environmental Health and Toxicology Emphasis) *major*
- Environmental Studies, B.S. (Ecosystem Emphasis) *major*
- Environmental Studies *minor*
- Sustainability *minor*

Career Directions

Chemist
Ecologist
Engineering Technician
Environmental Chemist
Environmental Consultant
Environmental Economist
Environmental Engineer
Environmental Engineering Scientist
Environmental Manager
Environmental Outdoor Educator
Environmental Policy Maker and Planner
Environmental Scientist
Environmental Sociologist
Environmental Specialist
Environmental Technologist
Environmental Toxicologist
Geohydrologist
Hydrogeologist
Natural Resources Specialist
Pollution Control Specialist
Research Lab Technician
Researcher
Teacher
Wastewater Monitor
Wastewater Treatment Operator
Water Quality Specialist
Water Treatment Operator
Also: Graduate Study

Preparation

Recommended High School Courses

Biology
Chemistry
Government
Math
Physics
Political Science
Social Science

Environmental Studies, B.S. *major*
Industrial Ecology Emphasis

Required Credits: 75
Required GPA: 2.25

I REQUIRED CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- ECON 2000 Markets and Resource Allocation (3 credits)
- ENVR 2000 Introduction to Environmental Science (3 credits)
- ENVR 3300 Environmental Management and Safety (3 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)
- GEOL 1110 Physical Geology (4 credits)
- GEOL 3211 Environmental Hydrology (3 credits)

COMPLETE THE FOLLOWING COURSE:

- ENVR 3880 Environmental Controversies (2 credits)

COMPLETE THE FOLLOWING COURSE:

- ENVR 4880 Senior Seminar I (1 credit)

SELECT 1 OF THE FOLLOWING COURSES:

- CHEM 1111 General Chemistry I (4 credits)
- CHEM 2211 Principles of Chemistry I (4 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- ECON 3040 Environmental Economics (3 credits)
- ENVR 3040 Environmental Economics (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- ENVR 3600 Environmental Justice and Sustainability (3 credits)

- ENVR 4210 Environmental Law and Policy (3 credits)

COMPLETE 1 OF THE FOLLOWING COURSES (3 CREDITS):

- ENVR 4970 Internship (3 credits)
- ENVR 4990 Thesis (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- SOC 3001 Social Statistics (3 credits)
- STAT 2610 Applied Statistics (4 credits)

INDUSTRIAL ECOLOGY EMPHASIS

COMPLETE THE FOLLOWING COURSES:

- ENVR 4200 Wastewater Treatment (3 credits)
- ENVR 4220 Sampling and Analysis (4 credits)
- ENVR 4240 Waste Management (4 credits)
- ENVR 4260 Risk Assessment and Auditing (3 credits)
- GEOL 3212 Hydrogeology (3 credits)
- GEOL 3700 Environmental Geophysics (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- CHEM 1112 General Chemistry II (4 credits)
- CHEM 2212 Principles of Chemistry II (4 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- BIOL 1120 General Biology: Evolution And Ecology (3 credits)
- BIOL 1211 Introductory Biology I (4 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- ENVR 4050 Geochemistry (3 credits)
- ENVR 4110 Environmental Chemistry (3 credits)
- CHEM 4110 Environmental Chemistry (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- ENVR 4230 Air Pollution Technology (4 credits)
- ENVR 4500 Environmental Toxicology (4 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- MATH 1470 Precalculus (5 credits)
- MATH 2471 Calculus I (5 credits)

SELECT 3 OR MORE SEMESTER CREDITS OF ELECTIVES APPROVED IN ADVANCE BY A CEEESS ADVISOR.

SUGGESTED SEMESTER SCHEDULE FOR ENVIRONMENTAL STUDIES MAJOR, B.S. INDUSTRIAL ECOLOGY EMPHASIS

The following is a list of Environmental Studies Major Courses arranged by year. This schedule is intended to help students plan their courses in an orderly fashion; however, these are only suggestions and this schedule is flexible.

Freshman

- BIOL 1120 General Biology: Evolution And Ecology (3 credits)
  or BIOL 1211 Introductory Biology I (4 credits)
- CHEM 1111 General Chemistry I (4 credits)
  or CHEM 2211 Principles of Chemistry I (4 credits)
- CHEM 1112 General Chemistry II (4 credits)
  or CHEM 2212 Principles of Chemistry II (4 credits)
- MATH 1470 Precalculus (5 credits)
  or MATH 2471 Calculus I (5 credits)
- Liberal Education Requirements

Sophomore

- ECON 2000 Markets and Resource Allocation (3 credits)
- ENVR 2000 Introduction to Environmental Science (3 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)
- GEOL 1110 Physical Geology (4 credits)
- Liberal Education Requirements

Junior

- ECON 3040 Environmental Economics (3 credits)
  or ENVR 3040 Environmental Economics (3 credits)
- ENVR 3300 Environmental Management and Safety (3 credits)
- ENVR 3880 Environmental Controversies (2 credits)
- ENVR 4050 Geochemistry (3 credits)
  or ENVR 4110 Environmental Chemistry (3 credits)
  or CHEM 4110 Environmental Chemistry (3 credits)
- ENVR 4200 Wastewater Treatment (3 credits)
- ENVR 4220 Sampling and Analysis (4 credits)
- ENVR 4970 Internship (3 credits)
  or ENVR 4990 Thesis (3 credits)
- GEOL 3211 Environmental Hydrology (3 credits)
- STAT 2610 Applied Statistics (4 credits)
  or SOC 3001 Social Statistics (3 credits)

Senior

- ENVR 4880 Senior Seminar I (1 credit)
- ENVR 4210 Environmental Law and Policy (3 credits)
  or ENVR 3600 Environmental Justice and Sustainability (3 credits)
- ENVR 4230 Air Pollution Technology (4 credits)
  or ENVR 4500 Environmental Toxicology (4 credits)
- ENVR 4240 Waste Management (4 credits)
- ENVR 4260 Risk Assessment and Auditing (3 credits)
- GEOL 3212 Hydrogeology (3 credits)
- GEOL 3700 Environmental Geophysics (3 credits)

Environmental Studies, B.S. *major* Geohydrology Emphasis

Required Credits: 75
Required GPA: 2.25

I REQUIRED CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- ECON 2000 Markets and Resource Allocation (3 credits)
- ENVR 2000 Introduction to Environmental Science (3 credits)
- ENVR 3300 Environmental Management and Safety (3 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)
- GEOL 1110 Physical Geology (4 credits)
- GEOL 3211 Environmental Hydrology (3 credits)

COMPLETE THE FOLLOWING COURSE:

- ENVR 3880 Environmental Controversies (2 credits)

COMPLETE THE FOLLOWING COURSE:

- ENVR 4880 Senior Seminar I (1 credit)

SELECT 1 OF THE FOLLOWING COURSES:

- CHEM 1111 General Chemistry I (4 credits)
- CHEM 2211 Principles of Chemistry I (4 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- ECON 3040 Environmental Economics (3 credits)
- ENVR 3040 Environmental Economics (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- ENVR 3600 Environmental Justice and Sustainability (3 credits)
- ENVR 4210 Environmental Law and Policy (3 credits)

COMPLETE 1 OF THE FOLLOWING COURSES (3 CREDITS):

- ENVR 4970 Internship (3 credits)
- ENVR 4990 Thesis (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- SOC 3001 Social Statistics (3 credits)
- STAT 2610 Applied Statistics (4 credits)

GEOHYDROLOGY EMPHASIS

COMPLETE THE FOLLOWING COURSES:

- ENVR 4050 Geochemistry (3 credits)
- GEOL 2110 Mineralogy and Petrology (4 credits)
- GEOL 3212 Hydrogeology (3 credits)
- GEOL 3700 Environmental Geophysics (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- ENVR 4220 Sampling and Analysis (4 credits)
- GEOG 3232 Intermediate Geographic Information Systems (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- BIOL 1120 General Biology: Evolution And Ecology (3 credits)
- BIOL 1211 Introductory Biology I (4 credits)

SELECT 2 OF THE FOLLOWING COURSES:

- GEOL 3120 Soils (4 credits)
- GEOL 3400 Glacial and Pleistocene Geology (3 credits)
- GEOL 3600 Stratigraphy and Sedimentation (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- MATH 1470 Precalculus (5 credits)
- MATH 2471 Calculus I (5 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- PHYS 1101 General Physics I (4 credits)
- PHYS 2101 Physics I (5 credits)

SELECT 3 SEMESTER CREDITS OF UPPER DIVISION (3000/4000) ELECTIVES APPROVED IN ADVANCE BY A CEEESS ADVISOR.

SUGGESTED SEMESTER SCHEDULE FOR ENVIRONMENTAL STUDIES MAJOR, B.S. GEOHYDROLOGY EMPHASIS

The following is a list of Environmental Studies Major Courses arranged by year. This schedule is intended to help students plan their courses in an orderly fashion; however, these are only suggestions and this schedule is flexible.

Freshman

- BIOL 1211 Introductory Biology I (4 credits)
- CHEM 1111 General Chemistry I (4 credits)
  or CHEM 2211 Principles of Chemistry I (4 credits)
- ECON 2000 Markets and Resource Allocation (3 credits)
- ENVR 2000 Introduction to Environmental Science (3 credits)
- GEOL 1110 Physical Geology (4 credits)
- MATH 1470 Precalculus (5 credits)
  or MATH 2471 Calculus I (5 credits)
- Liberal Education Requirements

Sophomore

- ECON 3040 Environmental Economics (3 credits)
  or ENVR 3040 Environmental Economics (3 credits)
- ENVR 3300 Environmental Management and Safety (3 credits)
- ENVR 3880 Environmental Controversies (2 credits)
- GEOL 2110 Mineralogy and Petrology (4 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)
- PHYS 1101 General Physics I (4 credits)
  or PHYS 2101 Physics I (5 credits)
- SOC 3001 Social Statistics (3 credits)
  or STAT 2610 Applied Statistics (4 credits)
- Liberal Education Requirements

Junior

- ENVR 4050 Geochemistry (3 credits)
- ENVR 4220 Sampling and Analysis (4 credits)
  or GEOG 3232 Intermediate Geographic Information Systems (3 credits)
- ENVR 4880 Senior Seminar I (1 credit)
- GEOL 3211 Environmental Hydrology (3 credits)
- GEOL 3212 Hydrogeology (3 credits)
- BIOL 1120 General Biology: Evolution And Ecology (3 credits)
  or BIOL 1211 Introductory Biology I (4 credits)
- Liberal Education Requirements

Senior

- ENVR 4210 Environmental Law and Policy (3 credits)
  or ENVR 3600 Environmental Justice and Sustainability (3 credits)
- ENVR 4970 Internship (3 credits)
  or ENVR 4990 Thesis (3 credits)
- GEOL 3700 Environmental Geophysics (3 credits)
- Select 2 of the following:
  GEOL 3120 Soils (4 credits)
  GEOL 3400 Glacial and Pleistocene Geology (3 credits)
  GEOL 3600 Stratigraphy and Sedimentation (3 credits)
- Liberal Education Requirements

Environmental Studies, B.S. *major*
Environmental Policy and Planning Emphasis

Required Credits: 74

Required GPA: 2.25

I REQUIRED CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- ECON 2000 Markets and Resource Allocation (3 credits)
- ENVR 2000 Introduction to Environmental Science (3 credits)
- ENVR 3300 Environmental Management and Safety (3 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)
- GEOL 1110 Physical Geology (4 credits)
- GEOL 3211 Environmental Hydrology (3 credits)

COMPLETE THE FOLLOWING COURSE:

- ENVR 3880 Environmental Controversies (2 credits)

COMPLETE THE FOLLOWING COURSE:

- ENVR 4880 Senior Seminar I (1 credit)

SELECT 1 OF THE FOLLOWING COURSES:

- CHEM 1111 General Chemistry I (4 credits)
- CHEM 2211 Principles of Chemistry I (4 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- ECON 3040 Environmental Economics (3 credits)
- ENVR 3040 Environmental Economics (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- ENVR 3600 Environmental Justice and Sustainability (3 credits)
- ENVR 4210 Environmental Law and Policy (3 credits)

COMPLETE 1 OF THE FOLLOWING COURSES (3 CREDITS):

- ENVR 4970 Internship (3 credits)
- ENVR 4990 Thesis (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- SOC 3001 Social Statistics (3 credits)
- STAT 2610 Applied Statistics (4 credits)

ENVIRONMENTAL POLICY AND PLANNING EMPHASIS

COMPLETE THE FOLLOWING COURSES:

- ECON 2100 Macroeconomics and the Business Cycle (3 credits)
- ECON 3010 Public Economics (3 credits)
- ECON 3230 Benefit/Cost Analysis (3 credits)
- GEOG 2400 Introduction to Planning (3 credits)
- GEOG 3560 Metropolitan Land Use Planning (3 credits)
- POL 1200 Introduction to American Politics (3 credits)
- POL 3210 Public Administration (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- BIOL 1120 General Biology: Evolution And Ecology (3 credits)
- BIOL 1211 Introductory Biology I (4 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- POL 3230 Environmental Politics (3 credits)
- SOC 3050 Environmental Sociology (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- POL 3200 Minnesota Politics (3 credits)
- GEOG 3232 Intermediate Geographic Information Systems (3 credits)

SELECT COURSE NOT COMPLETED PREVIOUSLY IN REQUIRED CORE

- ENVR 3600 Environmental Justice and Sustainability (3 credits)
- ENVR 4210 Environmental Law and Policy (3 credits)

SELECT 3 SEMESTER CREDITS OF UPPER DIVISION (3000/4000) ELECTIVES APPROVED IN ADVANCE BY A CEEESS ADVISOR.

SUGGESTED SEMESTER SCHEDULE FOR ENVIRONMENTAL STUDIES MAJOR, B.S. ENVIRONMENTAL POLICY AND PLANNING EMPHASIS

The following is a list of Environmental Studies Major Courses arranged by year. This schedule is intended to help students plan their courses in an orderly fashion; however, these are only suggestions and this schedule is flexible.

Freshman

- CHEM 1111 General Chemistry I (4 credits)
  or CHEM 2211 Principles of Chemistry I (4 credits)
- ECON 2000 Markets and Resource Allocation (3 credits)
- ECON 2100 Macroeconomics and the Business Cycle (3 credits)
- ENVR 2000 Introduction to Environmental Science (3 credits)
- GEOL 1110 Physical Geology (4 credits)
- POL 1200 Introduction to American Politics (3 credits)
- Liberal Education Requirements

Sophomore

- BIOL 1120 General Biology: Evolution And Ecology (3 credits)
  or BIOL 1211 Introductory Biology I (4 credits)
- ECON 3040 Environmental Economics (3 credits)
  or ENVR 3040 Environmental Economics (3 credits)
- GEOG 2400 Introduction to Planning (3 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)
- POL 3200 Minnesota Politics (3 credits)
  or GEOG 3232 Intermediate Geographic Information Systems (3 credits)
- SOC 3001 Social Statistics (3 credits)
  or STAT 2610 Applied Statistics (4 credits)
- Liberal Education Requirements

Junior

- ECON 3230 Benefit/Cost Analysis (3 credits)
- ENVR 3300 Environmental Management and Safety (3 credits)
- ENVR 3880 Environmental Controversies (2 credits)
- ENVR 4210 Environmental Law and Policy (3 credits)
- GEOG 3560 Metropolitan Land Use Planning (3 credits)
- GEOL 3211 Environmental Hydrology (3 credits)
- POL 3210 Public Administration (3 credits)
- POL 3230 Environmental Politics (3 credits)
  or SOC 3050 Environmental Sociology (3 credits)
- Liberal Education Requirements

Senior

- ECON 3010 Public Economics (3 credits)
- ENVR 3600 Environmental Justice and Sustainability (3 credits)
- ENVR 4880 Senior Seminar I (1 credit)

- ENVR 4970 Internship (3 credits)
  or ENVR 4990 Thesis (3 credits)

Environmental Studies, B.S. *major*
Environmental Health and Toxicology Emphasis

Required Credits: 76
Required GPA: 2.25

I REQUIRED CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- ECON 2000 Markets and Resource Allocation (3 credits)
- ENVR 2000 Introduction to Environmental Science (3 credits)
- ENVR 3300 Environmental Management and Safety (3 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)
- GEOL 1110 Physical Geology (4 credits)
- GEOL 3211 Environmental Hydrology (3 credits)

COMPLETE THE FOLLOWING COURSE:

- ENVR 3880 Environmental Controversies (2 credits)

COMPLETE THE FOLLOWING COURSE:

- ENVR 4880 Senior Seminar I (1 credit)

SELECT 1 OF THE FOLLOWING COURSES:

- CHEM 1111 General Chemistry I (4 credits)
- CHEM 2211 Principles of Chemistry I (4 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- ECON 3040 Environmental Economics (3 credits)
- ENVR 3040 Environmental Economics (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- ENVR 3600 Environmental Justice and Sustainability (3 credits)
- ENVR 4210 Environmental Law and Policy (3 credits)

COMPLETE 1 OF THE FOLLOWING COURSES (3 CREDITS):

- ENVR 4970 Internship (3 credits)
- ENVR 4990 Thesis (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- SOC 3001 Social Statistics (3 credits)
- STAT 2610 Applied Statistics (4 credits)

ENVIRONMENTAL HEALTH AND TOXICOLOGY EMPHASIS

COMPLETE THE FOLLOWING COURSES:

- BIOL 1211 Introductory Biology I (4 credits)
- BIOL 1212 Introductory Biology II (4 credits)
- ENVR 4220 Sampling and Analysis (4 credits)
- ENVR 4400 Environmental Microbiology (3 credits)
- ENVR 4500 Environmental Toxicology (4 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- CHEM 1112 General Chemistry II (4 credits)
- CHEM 2212 Principles of Chemistry II (4 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- CHEM 3507 Analytical Chemistry (3 credits)
- CHEM 4411 Biochemistry I (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- CHEM 3570 Analytical Chemistry Laboratory (1 credit)
- CHEM 4471 Biochemistry Laboratory I (1 credit)

SELECT 1 OF THE FOLLOWING COURSES:

- ENVR 4050 Geochemistry (3 credits)
- ENVR 4110 Environmental Chemistry (3 credits)
- CHEM 4110 Environmental Chemistry (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- MATH 1470 Precalculus (5 credits)
- MATH 2471 Calculus I (5 credits)

SELECT 3 SEMESTER CREDITS OF UPPER DIVISION (3000/4000) ELECTIVES APPROVED IN ADVANCE BY A CEEESS ADVISOR.

SUGGESTED SEMESTER SCHEDULE FOR ENVIRONMENTAL STUDIES MAJOR, B.S. ENVIRONMENTAL HEALTH AND TOXICOLOGY EMPHASIS

The following is a list of Environmental Studies Major Courses arranged by year. This schedule is intended to help students plan their courses in an orderly fashion; however, these are only suggestions and this schedule is flexible.

Freshman

- ENVR 2000 Introduction to Environmental Science (3 credits)
- BIOL 1211 Introductory Biology I (4 credits)
- BIOL 1212 Introductory Biology II (4 credits)
- ECON 2000 Markets and Resource Allocation (3 credits)
- GEOL 1110 Physical Geology (4 credits)
- MATH 1470 Precalculus (5 credits)
  or MATH 2471 Calculus I (5 credits)
- Liberal Education Requirements

Sophomore

- CHEM 1111 General Chemistry I (4 credits)
  or CHEM 2211 Principles of Chemistry I (4 credits)
- CHEM 1112 General Chemistry II (4 credits)
  or CHEM 2212 Principles of Chemistry II (4 credits)
- ECON 3040 Environmental Economics (3 credits)
  or ENVR 3040 Environmental Economics (3 credits)
- ENVR 3880 Environmental Controversies (2 credits)
- ENVR 4210 Environmental Law and Policy (3 credits)
  or ENVR 3600 Environmental Justice and Sustainability (3 credits)
- SOC 3001 Social Statistics (3 credits)
  or STAT 2610 Applied Statistics (4 credits)
- Liberal Education Requirements

Junior

- CHEM 3507 Analytical Chemistry (3 credits)

or CHEM 4411 Biochemistry I (3 credits)
- CHEM 3570 Analytical Chemistry Laboratory (1 credit)
  or CHEM 4471 Biochemistry Laboratory I (1 credit)
- ENVR 3300 Environmental Management and Safety (3 credits)
- ENVR 4220 Sampling and Analysis (4 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)
- GEOL 3211 Environmental Hydrology (3 credits)
- Liberal Education Requirements

Senior

- ENVR 4050 Geochemistry (3 credits)
  or ENVR 4110 Environmental Chemistry (3 credits)
  or CHEM 4110 Environmental Chemistry (3 credits)
- ENVR 4400 Environmental Microbiology (3 credits)
- ENVR 4500 Environmental Toxicology (4 credits)
- ENVR 4880 Senior Seminar I (1 credit)
- ENVR 4970 Internship (3 credits)
  or ENVR 4990 Thesis (3 credits)
- Elective Courses
- Liberal Education Requirements

Environmental Studies, B.S. *major*
Ecosystem Emphasis

Required Credits: 76
Required GPA: 2.25

I REQUIRED CORE COURSES

COMPLETE THE FOLLOWING COURSES:

- ECON 2000 Markets and Resource Allocation (3 credits)
- ENVR 2000 Introduction to Environmental Science (3 credits)
- ENVR 3300 Environmental Management and Safety (3 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)
- GEOL 1110 Physical Geology (4 credits)
- GEOL 3211 Environmental Hydrology (3 credits)

COMPLETE THE FOLLOWING COURSE:

- ENVR 3880 Environmental Controversies (2 credits)

COMPLETE THE FOLLOWING COURSE:

- ENVR 4880 Senior Seminar I (1 credit)

SELECT 1 OF THE FOLLOWING COURSES:

- CHEM 1111 General Chemistry I (4 credits)
- CHEM 2211 Principles of Chemistry I (4 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- ECON 3040 Environmental Economics (3 credits)
- ENVR 3040 Environmental Economics (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- ENVR 3600 Environmental Justice and Sustainability (3 credits)
- ENVR 4210 Environmental Law and Policy (3 credits)

COMPLETE 1 OF THE FOLLOWING COURSES (3 CREDITS):

- ENVR 4970 Internship (3 credits)
- ENVR 4990 Thesis (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- SOC 3001 Social Statistics (3 credits)
- STAT 2610 Applied Statistics (4 credits)

ECOSYSTEM STUDIES EMPHASIS

COMPLETE THE FOLLOWING COURSES:

- BIOL 1211 Introductory Biology I (4 credits)
- BIOL 1212 Introductory Biology II (4 credits)
- BIOL 2610 General Ecology (3 credits)
- ENVR 4200 Wastewater Treatment (3 credits)
- ENVR 4400 Environmental Microbiology (3 credits)
- ENVR 4500 Environmental Toxicology (4 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- MATH 1170 College Algebra (4 credits)
- MATH 1470 Precalculus (5 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- CHEM 1112 General Chemistry II (4 credits)
- CHEM 2212 Principles of Chemistry II (4 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- BIOL 3630 Conservation Biology (3 credits)
- GEOG 3630 Conservation Biology (3 credits)

SELECT 1 OF THE FOLLOWING COURSES:

- BIOL 3361 Limnology (4 credits)
- BIOL 3840 Wetlands Ecology (3 credits)
- ENVR 3840 Wetlands Ecology (3 credits)

SELECT 3 SEMESTER CREDITS OF UPPER DIVISION (3000/4000) ELECTIVES APPROVED IN ADVANCE BY A CEEESS ADVISOR.

SUGGESTED SEMESTER SCHEDULE FOR ENVIRONMENTAL STUDIES MAJOR, B.S. ECOSYSTEMS EMPHASIS

The following is a list of Environmental Studies Major Courses arranged by year. This schedule is intended to help students plan their courses in an orderly fashion; however, these are only suggestions and this schedule is flexible.

Freshman

- BIOL 1211 Introductory Biology I (4 credits)
- BIOL 1212 Introductory Biology II (4 credits)
- CHEM 1111 General Chemistry I (4 credits)
  or CHEM 2211 Principles of Chemistry I (4 credits)
- ECON 2000 Markets and Resource Allocation (3 credits)
- ENVR 2000 Introduction to Environmental Science (3 credits)
- GEOL 1110 Physical Geology (4 credits)
- MATH 1470 Precalculus (5 credits)
  or MATH 1170 College Algebra (4 credits)
  or MATH 2471 Calculus I (5 credits)
- Liberal Education Requirements

Sophomore (with the emphasis already selected)

- BIOL 2610 General Ecology (3 credits)
- CHEM 1112 General Chemistry II (4 credits)
  or CHEM 2212 Principles of Chemistry II (4 credits)
- ECON 3040 Environmental Economics (3 credits)
- ENVR 3880 Environmental Controversies (2 credits)
- SOC 3001 Social Statistics (3 credits)
  or STAT 2610 Applied Statistics (4 credits)
- Liberal Education Requirements

Junior

- ENVR 3600 Environmental Justice and Sustainability (3 credits)
- ENVR 4200 Wastewater Treatment (3 credits)
- ENVR 4210 Environmental Law and Policy (3 credits)
- GEOG 3231 Introduction to Geographic Information Systems (3 credits)
- GEOL 3211 Environmental Hydrology (3 credits)
- Liberal Education Requirements

Senior

- BIOL 3630 Conservation Biology (3 credits)
- BIOL 3840 Wetlands Ecology (3 credits)
  or BIOL 3361 Limnology (4 credits)
- ENVR 3300 Environmental Management and Safety (3 credits)
- ENVR 4400 Environmental Microbiology (3 credits)
- ENVR 4880 Senior Seminar I (1 credit)
- ENVR 4970 Internship (3 credits)
  or ENVR 4990 Thesis (3 credits)
- ELECTIVE
  - GEOL 3120 Soils (4 credits)
  - BIOL 3723 Ecosystem Ecology (3 credits)
  - BIOL 4623 Forest Ecology (4 credits)
- Liberal Education Requirements

Environmental Studies *minor*

Required Credits: 22
Required GPA: 2.00

I REQUIRED COURSES

COMPLETE THE FOLLOWING COURSES:

- BIOL 1211 Introductory Biology I (4 credits)
- BIOL 1212 Introductory Biology II (4 credits)
- BIOL 2610 General Ecology (3 credits)
- ENVR 2000 Introduction to Environmental Science (3 credits)

COMPLETE THE FOLLOWING COURSE:

- ENVR 3880 Environmental Controversies (2 credits)

COMPLETE THE FOLLOWING COURSE:
Enroll for 1 credit - two different terms

- ENVR 4880 Senior Seminar I (1 credit)

II REQUIRED ELECTIVES

SELECT 4 SEMESTER CREDITS IN UPPER DIVISION COURSES IN ENVIRONMENTAL STUDIES

Sustainability *minor*

Required Credits: 22
Required GPA: 2.00

I REQUIRED COURSES

COMPLETE THE FOLLOWING COURSES:

- ENVR 2000 Introduction to Environmental Science (3 credits)
- ENVR 3600 Environmental Justice and Sustainability (3 credits)

COMPLETE ONE OF THE FOLLOWING COURSES FOR 1 OR 2 CREDITS:

- UNIV 3910 Directed Independent Study (1-2 credits)
- UNIV 4910 Independent Study (1-2 credits)

COMPLETE ONE OF THE FOLLOWING COURSES FOR 3 CREDITS:

- UNIV 3970 Internship (3 credits)
- UNIV 4970 Internship (3 credits)

II REQUIRED ELECTIVES

SELECT 12 CREDITS FROM THE FOLLOWING COURSES:

- ECON 3040 Environmental Economics (3 credits)
  or ENVR 3040 Environmental Economics (3 credits)
- ENVR 4210 Environmental Law and Policy (3 credits)
- ENVR 4220 Sampling and Analysis (4 credits)
- ENVR 4230 Air Pollution Technology (4 credits)
- ENVR 4240 Waste Management (4 credits)
- ENVR 4260 Risk Assessment and Auditing (3 credits)
- GEOG 2400 Introduction to Planning (3 credits)
- GEOL 3211 Environmental Hydrology (3 credits)
- SOC 3050 Environmental Sociology (3 credits)
- TADT 1315 Energy and Power Technology (3 credits)
- TADT 4385 Sustainability and Emerging Technologies (3 credits)
  A course approved by the Director of Center for Environmental, Economics, Earth and Space Studies

Environmental Studies Courses

ENVR 2000 Introduction to Environmental Science (3 credits)
An introduction to environmental science emphasizing biological, physical-chemical and cross-cultural environmental social principles underlying major world environmental, political and economic issues; examination of the impacts of human activities and technology on global environmental and socio-economic stability; application of critical thinking and working with graphic skills and lab-like data analysis related to global environmental, biological, physical-chemical, cultural, and socio-economic topics. Liberal Education Goal Areas 3 & 10.

ENVR 2150 Wilderness Ethics: Projects for Environmental Field Programs (1-3 credits)
Major schools of thought on the meaning of wilderness, its importance to modern society, and implications for responsible citizenship. Notions of wilderness and wilderness ethics advanced by major authors, past and present. Wilderness policy in the United States and recommendations for revisions to the Wilderness Act. Relation of sustainability to wilderness protection and the benefits provided to society. Experiential learning by visiting key areas that meet certain criteria for wilderness and relation of these experiences to personal values, including ethical behavior in "wilderness" settings. Liberal Education Goal Area 9.

ENVR 2925 People of the Environment: Global Pollution Perspective (3 credits)
This course is a section of the interdisciplinary environmental issues course, People of the Environment. The focus of this course is to explore the scientific aspects of global pollution, including causes, effects, and solutions. Liberal Education Goal Area 10.

ENVR 3040 Environmental Economics (3 credits)
Examines environmental problems as consequence of market's failure to accurately value environmental resources. Alternative private and public policies are examined in terms of their effectiveness in improving the efficiency and equity with which water, air, and other resources are allocated. Prerequisite: ECON 2000 or consent of instructor. (Also offered under ECON 3040.)

ENVR 3300 Environmental Management and Safety (3 credits)
Helps students pursuing environmental studies to develop environmental management skills required in both manufacturing and non-manufacturing businesses. Safe handling, transport, and storage of hazardous materials with respect to their physical and chemical nature, and application of regulatory requirements relevant to specific business and hazardous materials involved. Prerequisites: CHEM 1112 or CHEM 2212 or ENVR 2000 or GEOL 1110 or consent of instructor. May not be offered every year.

ENVR 3600 Environmental Justice and Sustainability (3 credits)
The ethical and moral dimensions of environmental choices. The legal, philosophical, political, and economic underpinnings of various theories of justice. A major focus is the inequitable distribution of environmental risks and the implications of policies that attempt to combat these risks. Prerequisite: ENVR 2000 or consent of instructor.

ENVR 3840 Wetlands Ecology (3 credits)
Survey course develops a basic understanding of the terminology, classification, ecology, values, and conservation of wetlands. Covers wetland systems from around the world, with emphasis on wetlands in North America. Prerequisites: BIOL 1211 and BIOL 1212.

ENVR 3880 Environmental Controversies (2 credits)
Faculty and student presentations followed by group discussion of classic and current problems, and governmental policies/regulations. Prerequisite: ENVR 2000 or consent of instructor.

ENVR 4050 Geochemistry (3 credits)
Study of processes in the lithosphere, hydrosphere, and atmosphere; cycling of the elements; weathering; microbe-mineral interactions; nanoparticles; microscopic imaging. Prerequisites: CHEM 1112 or CHEM 2212 or ENVR 2000 or GEOL 1110 or consent of instructor.

ENVR 4110 Environmental Chemistry (3 credits)
Intensive study of biogeochemical cycles of natural and man-made pollutants including transformations, transport, fate and persistence mechanisms. Environmental effects, long-term impacts, and methods of treatment/prevention are discussed. Prerequisites: CHEM 1112 or CHEM 2212 or consent of instructor.

ENVR 4200 Wastewater Treatment (3 credits)
Introduction to the operation of the principal methods and treatment processes of municipal and industrial wastewaters, and for the disposal of treated effluent and sludges, and other solid materials. Integration of fundamental principles of science with different aspects of sanitary technology. Prerequisites: BIOL 1212, CHEM 1112 or CHEM 2212, MATH 1170, or consent of instructor. BIOL 1212 is not required for Chemistry majors.

ENVR 4210 Environmental Law and Policy (3 credits)
Overview of environmental laws, regulations, and policies. Prerequisite: Consent of instructor.

ENVR 4220 Sampling and Analysis (4 credits)
Methods of sampling and analysis of air, water, soil and other environmental compartments will be described in lecture and experienced in laboratory session. The focus is on regulations and prescribed protocols for environmental field and lab work. Lecture and laboratory. Prerequisites: CHEM 1112 or CHEM 2212 or ENVR 2000 or GEOL 1110 or consent of instructor.

ENVR 4230 Air Pollution Technology (4 credits)
In depth overview of sources and types of air pollution, major environmental impacts, regulations, and technologies for control and clean up. Prerequisites: CHEM 1112 or CHEM 2212 or ENVR 2000 or GEOL 1110 or consent of instructor.

ENVR 4240 Waste Management (4 credits)
An overview of the solid and hazardous waste situation at the local, state, national and international levels. The focus on management will include a systems approach to prevention, and remediation of wastes. Prerequisites: CHEM 1112 or CHEM 2212 or ENVR 2000 or GEOL 1110 or consent of instructor.

ENVR 4260 Risk Assessment and Auditing (3 credits)
Overview of human/environmental risk assessment methods and environmental auditing techniques, with a focus on regulatory compliance and case studies. Prerequisites: CHEM 1112 or CHEM 2212 or ENVR 2000 or GEOL 1110 or consent of instructor.

ENVR 4400 Environmental Microbiology (3 credits)
Fundamental aspects of microbiology as related to land production, environmental pollution and water quality control processes. The role of major groups of microbes as pollutants, as purifying agents, and as agents of biochemical changes, and ecological functions and importance of each group in the environment. Prerequisites: BIOL 1110 or BIOL 1120 or CHEM 1112 or CHEM 2212 or consent of instructor.

ENVR 4500 Environmental Toxicology (4 credits)
An overview of major environmental pollutants, their transport, fate and toxicology. Pollutant effects studied from practical and theoretical focus on stress at various levels of biological organization. Prerequisites: BIOL 1212, BIOL 2610, and CHEM 1112 or CHEM 2212, or consent of instructor.

ENVR 4880 Senior Seminar I (1 credit)
Senior level seminar in which students explore the environmental job market and graduate school opportunities. Prerequisites: Senior status; Environmental Studies major, and ENVR 3880.

ENVR 4970 Internship (3 credits)
Graded Satisfactory/Unsatisfactory only. Student internships may be either full-time or part-time in a public or private agency appropriate to the degree objective. Internships consist of closely supervised periods of service that are arranged in advance of the course registration. Students should consult their advisor concerning prerequisites.

ENVR 4990 Thesis (3 credits)
A thesis written by the student that reports extensive original research carried out by the student and demonstrates appropriate methodology and scholarship.

All-University Courses

The course numbers listed below, not always included in the semester class

schedule, may be registered for by consent of the advisor, instructor, or department chair, or may be assigned by the department when warranted. Individual registration requires previous arrangement by the student and the completion of any required form or planning outline as well as any prerequisites.

1910, 2910, 3910, 4910 DIRECTED INDEPENDENT STUDY
1920, 2920, 3920, 4920 DIRECTED GROUP STUDY
1930, 2930, 3930, 4930 EXPERIMENTAL COURSE
1940, 2940, 3940, 4940 IN-SERVICE COURSE
1950, 2950, 3950, 4950 WORKSHOP, INSTITUTE, TOUR
1960, 2960, 3960, 4960 SPECIAL PURPOSE INSTRUCTION
1970, 2970, 3970, 4970 INTERNSHIP
1980, 2980, 3980, 4980 RESEARCH
1990, 2990, 3990, 4990 THESIS