

# ENVIRONMENTAL SCIENCE: FOOD SYSTEMS AND SUSTAINABLE AGRICULTURE/ ENVIRONMENTAL SCIENCE AND SUSTAINABILITY (BS/ MS)

Our environmental science degree program in food systems and sustainable agriculture answers the growing call to evaluate and redesign our food and farming systems. This program prepares students to develop innovative, sustainable food production and distribution approaches that protect the environment and improve access to healthy food. Students learn in the classroom and through hands-on projects in the community, developing the skills to make a difference for people and the natural world.

## CURRICULUM

Students studying Food Systems & Sustainable Agriculture build upon a solid foundation of environmental science, gain experience in designing and managing agricultural ecosystems, develop quantitative skills in evaluating ecosystem processes and services, and practice making management and policy recommendations based on available data.

| Code                         | Title   | Hours |
|------------------------------|---|-------|
| <b>Core Curriculum</b>       |   |       |
| ENVS 137                     | Foundations of Environmental Science I            | 3     |
| BIOL 101                     | General Biology I                                 | 3     |
| BIOL 111                     | General Biology I Lab                             | 1     |
| CHEM 160                     | Chemical Structure and Properties                 | 3     |
| CHEM 161                     | Chemical Structure and Properties Laboratory      | 1     |
| BIOL 102                     | General Biology II                                | 3     |
| BIOL 112                     | General Biology II Lab                            | 1     |
| CHEM 180                     | Chemical Reactivity I                             | 3     |
| CHEM 181                     | Chemical Reactivity I Lab                         | 1     |
| ENVS 200                     | Environmental Careers and Professional Skills     | 1     |
| ENVS 203                     | Environmental Statistics                          | 3     |
| ENVS 274                     | Chemistry of the Environment                      | 3     |
| ENVS 275                     | Chemistry of the Environment Lab                  | 1     |
| ENVS 280                     | Principles of Ecology                             | 3     |
| ENVS 286S                    | Principles of Ecology Lab                         | 1     |
| PLSC 392                     | Environmental Politics                            | 3     |
| ENVS 207                     | Plants and Civilization                           | 3     |
| ENVS 223                     | Soil Ecology                                      | 3     |
| ENVS 325                     | Sustainable Agriculture                           | 3     |
| Select one of the following: |   | 3     |
| ENVS 320                     | Conservation Biology                              |       |
| ENVS 326                     | Agroecosystems                                    |       |
| ENVS 327                     | Food Systems Analysis                             |       |
| ENVS 350F                    | Solutions to Environmental Problems: Food Systems |       |

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|--|---|--------------|
| <b>Justice and Ethics Choice</b>         |   |              |
| Select one of the following:             |   | 3            |
| ENVS 284                                 | Environmental Justice                                     |              |
| PHIL 287                                 | Environmental Ethics                                      |              |
| THEO 204                                 | Religious Ethics and the Ecological Crisis                |              |
| <b>Economics Choice</b>                  |   |              |
| ENVS 335                                 | Ecological Economics                                      | 3            |
| or ECON 328                              | Environmental Economics                                   |              |
| <b>Engaged Learning Choice</b>           |   |              |
| Select one of the following:             |   | 3            |
| ENVS 226                                 | Science & Conservation of Freshwater Ecosystems           |              |
| ENVS 267                                 | Bird Conservation and Ecology                             |              |
| ENVS 273                                 | Energy and The Environment                                |              |
| ENVS 283                                 | Environmental Sustainability                              |              |
| ENVS 340                                 | Natural History of Belize                                 |              |
| ENVS 345                                 | Conservation and Sustainability of Neotropical Ecosystems |              |
| ENVS 350A                                | Solutions to Environmental Problems: Water                |              |
| ENVS 350B                                | Solutions to Environmental Problems: Biogas               |              |
| ENVS 350C                                | Solutions to Environmental Problems: Climate Action       |              |
| ENVS 350F                                | Solutions to Environmental Problems: Food Systems         |              |
| ENVS 369                                 | Field Ornithology   |              |
| ENVS 391                                 | Environmental Research                                    |              |
| ENVS 395                                 | Environmental Internship                                  |              |
| <b>Capstone Choice</b>                   |   |              |
| Select one of the following:             |   | 3            |
| ENVS 390                                 | Integrative Seminar                                       |              |
| ENVS 391C                                | Independent Environmental Research (Capstone)             |              |
| ENVS 395C                                | Environmental Internship (Capstone)                       |              |
| <b>Electives</b>                         |   | <b>21</b>    |
| See designated elective categories below |   |              |
| <b>Total Hours</b>                       |   | <b>79</b>    |
| <b>BS Electives</b>                      |   |              |
| <b>Code</b>                              | <b>Title</b>  | <b>Hours</b> |
| <b>Society, Ethics, and Justice</b>      |   |              |
| Select one of the following:             |   | 3            |
| COMM 260                                 | Environmental Journalism                                  |              |
| ENVS 204                                 | Gender, Health & Environment                              |              |
| ENVS 279 / HIST 279E                     | Climate and History                                       |              |
| ENVS 284                                 | Environmental Justice                                     |              |
| ENVS 297 / HIST 297E                     | North American Environmental History                      |              |
| ENVS 298                                 | Special Topics (with SES approval)                        |              |
| ENVS 338                                 | Climate Change and Human Health                           |              |
| ENVS 350A                                | Solutions to Environmental Problems: Water                |              |
| ENVS 350B                                | Solutions to Environmental Problems: Biogas               |              |
| ENVS 350C                                | Solutions to Environmental Problems: Climate Action       |              |

|  |   |           |
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| ENVS 350F  | Solutions to Environmental Problems: Food Systems         |           |
| ENVS 383   | Human Dimensions of Conservation                          |           |
| ENVS 391   | Environmental Research (with SES approval)                |           |
| ENVS 395   | Environmental Internship (with SES approval)              |           |
| ENVS 398   | Special Topics (with SES approval)                        |           |
| ENVS 399   | Directed Readings (with SES approval)                     |           |
| COMM 101   | Public Speaking & Critical Thinking                       |           |
| COMM 277   | Organizational Communication                              |           |
| COMM 306   | Environmental Advocacy                                    |           |
| COMM 322   | Guerilla Media  |           |
| ENGL 288   | Nature in Literature                                      |           |
| PHIL 287   | Environmental Ethics                                      |           |
| PSYC 277   | Environmental Psychology                                  |           |
| SOCL 226   | Science, Technology, & Society                            |           |
| SOCL 252   | Global Inequalities                                       |           |
| SOCL 272   | Environmental Sociology                                   |           |
| SOCL 276   | The Sociology and Politics of Food                        |           |
| SOCL 278   | Global Health   |           |
| THEO 204   | Religious Ethics and the Ecological Crisis                |           |
| THEO 344   | Theology and Ecology                                      |           |
| <b>Policy, Economics, and Resource Management</b>      |   |           |
| Select one of the following:                           |   | 3         |
| ENVS 298   | Special Topics (with SES approval)                        |           |
| ENVS 300   | Introduction to Public Health                             |           |
| ENVS 310   | Introduction to Environmental Law & Policy                |           |
| ENVS 311   | Natural Resources and Land Use Law & Policy               |           |
| ENVS 312   | Water Law & Policy  |           |
| ENVS 313   | Energy Law & Policy                                       |           |
| ENVS 327   | Food Systems Analysis                                     |           |
| ENVS 332   | Industrial Ecology  |           |
| ENVS 333   | Introduction to the Circular Economy                      |           |
| ENVS 335   | Ecological Economics                                      |           |
| ENVS 336   | Design for Circular & Sustainable Business                |           |
| ENVS 338   | Climate Change and Human Health                           |           |
| ENVS 351   | Introduction to Sustainability Concepts & Impacts         |           |
| ENVS 363   | Sustainable Business Management                           |           |
| ENVS 364   | Sustainability Management in the Global Context           |           |
| ENVS 383   | Human Dimensions of Conservation                          |           |
| ENVS 384   | Conservation Economics                                    |           |
| ENVS 389   | Ecological Risk Assessment                                |           |
| ENVS 391   | Environmental Research (with SES approval)                |           |
| ENVS 395   | Environmental Internship (with SES approval)              |           |
| ENVS 398   | Special Topics (with SES approval)                        |           |
| ENVS 399   | Directed Readings (with SES approval)                     |           |
| ECON 328   | Environmental Economics                                   |           |
| COMM 379   | Digital Sustainability                                    |           |
| GLST 305   | Globalization and Environmental Sustainability            |           |
| MGMT 201   | Managing People and Organizations                         |           |
| PLSC 354   | Global Environmental Politics                             |           |
| <b>Environmental Electives</b>                         |   |           |
| Select one of the following:                           |   | 3         |
| ENVS 204   | Gender, Health & Environment                              |           |
| ENVS 218   | Biodiversity & Biogeography                               |           |
| ENVS 224   | Climate & Climate Change                                  |           |
| ENVS 226   | Science & Conservation of Freshwater Ecosystems           |           |
| ENVS 267   | Bird Conservation and Ecology                             |           |
| ENVS 273   | Energy and The Environment                                |           |
| ENVS 283   | Environmental Sustainability                              |           |
| ENVS 298   | Special Topics (with SES approval)                        |           |
| ENVS 300   | Introduction to Public Health                             |           |
| ENVS 301   | Environmental Health                                      |           |
| ENVS 303   | Introduction to Epidemiology                              |           |
| ENVS 319   | Winter Ecology  |           |
| ENVS 320   | Conservation Biology (if not used above)                  |           |
| ENVS 322   | Invasive Species  |           |
| ENVS 323   | Environmental Microbiology                                | 3         |
| ENVS 326   | Agroecosystems (if not used above)                        |           |
| ENVS 327   | Food Systems Analysis (if not used above)                 |           |
| ENVS 330   | Restoration Ecology                                       |           |
| ENVS 340   | Natural History of Belize                                 |           |
| ENVS 345   | Conservation and Sustainability of Neotropical Ecosystems |           |
| ENVS 350A  | Solutions to Environmental Problems: Water                |           |
| ENVS 350B  | Solutions to Environmental Problems: Biogas               |           |
| ENVS 350C  | Solutions to Environmental Problems: Climate Action       |           |
| ENVS 350F  | Solutions to Environmental Problems: Food Systems         |           |
| ENVS 369   | Field Ornithology   |           |
| ENVS 380   | Introduction to Geographic Information Systems            |           |
| ENVS 381   | Advanced GIS Applications                                 |           |
| ENVS 382   | Remote Sensing  |           |
| ENVS 383   | Human Dimensions of Conservation                          |           |
| ENVS 384   | Conservation Economics                                    |           |
| ENVS 385   | Introduction to Global Health                             |           |
| ENVS 387   | Principles of Ecotoxicology                               |           |
| ENVS 388   | Applied Environmental Statistics                          |           |
| ENVS 389   | Ecological Risk Assessment                                |           |
| ENVS 391   | Environmental Research (with SES approval)                |           |
| ENVS 395   | Environmental Internship (with SES approval)              |           |
| ENVS 398   | Special Topics (with SES approval)                        |           |
| ENVS 399   | Directed Readings (with SES approval)                     |           |
| ANTH 104   | The Human Ecological Footprint                            |           |
| ANTH 303   | People and Conservation                                   |           |
| BIOL, CHEM, PHYS 300-level courses (with SES approval) |   |           |
| <b>Total Hours</b>                                     |   | <b>12</b> |

## Year 5

The Environmental Science and Sustainability MS has the following requirements:

| Code                    | Title  | Hours |
|-------------------------|--|-------|
| <b>Required Courses</b> |  |       |
| ENVS 401                | Sustainable Systems - Natural Science Perspectives | 6     |

ENVS 402 Sustainable Systems - Social Science Perspectives

**Completion of One of Four Concentrations: 9-12**

**Environmental Law & Policy**

ENVS 410 Introduction to Environmental Law & Policy

ENVS 411 Natural Resources and Land Use Law & Policy

ENVS 412 Water Law & Policy

ENVS 413 Energy Law & Policy

**Geographic Information Systems**

ENVS 480 Introduction to Geographic Information Systems

ENVS 481 Advanced GIS Applications

ENVS 482 Remote Sensing

**Sustainable Assessment and Planning**

ENVS 451 Introduction to Sustainability Concepts & Impacts

ENVS 452 Sustainability Assessment & Reporting I

ENVS 453 Sustainability Assessment & Reporting II

ENVS 454 Sustainability Plan Development & Reporting

**Sustainable Business**

ENVS 433 Introduction to the Circular Economy

ENVS 435 Ecological Economics

ENVS 436 Design for Circular & Sustainable Business

ENVS 463 Sustainable Business Management

**Electives (for a total of 30 credit hours with required courses) 12-15**

**Natural Science and Quantitative Courses 6**

Students will take at least two courses from the following list of electives.

ENVS 420 Conservation Biology

ENVS 422 Invasive Species

ENVS 425 Sustainable Agriculture

ENVS 426 Agroecosystems

ENVS 427 Food Systems Analysis

ENVS 430 Restoration Ecology

ENVS 435 Ecological Economics

ENVS 438 Climate Change and Human Health

ENVS 451 Introduction to Sustainability Concepts & Impacts

ENVS 452 Sustainability Assessment & Reporting I

ENVS 453 Sustainability Assessment & Reporting II

ENVS 480 Introduction to Geographic Information Systems

ENVS 481 Advanced GIS Applications

ENVS 482 Remote Sensing

ENVS 484 Conservation Economics

ENVS 487 Principles of Ecotoxicology

ENVS 488 Applied Environmental Statistics

ENVS 489 Ecological Risk Assessment

ENVS 491 Independent Environmental Research (upon approval)

ENVS 498 Special Topics (upon approval)

ENVS 498L Special Topics with Lab (upon approval)

ENVS 499 Directed Readings (upon approval)

BIOL 495 Special Topics (Topic: Metagenomics)

BIOL 416 Limnology Lec/Lab

BIOL 418 Aquatic Insects Lecture & Laboratory

BIOL 470 Biostats & Exp Design Lec/Lab

MPBH 401 Environmental Health

MPBH 402 Public Health Practice and Management

MPBH 403 Introduction to Epidemiology

MPBH 404 Biostatistics for Health and Biological Science

MPBH 407 Public Health Policy: Concepts and Practice

MPBH 409 Biostatistics I

MPBH 412 Intro to Statistical Computing for Public Health

MPBH 414 Introduction to Global Health

MPBH 421 Biostatistics II

MPBH 423 Intermediate Epidemiology

MPP 401 Analytical Tools in Public Policy

MPP 402 Cost Benefit Analysis

MPP 403 Public Budget and Finance

MPP 405 Statistical Methods & Analysis for Public Policy I

MPP 406 Statistical Methods & Analysis Public Policy II

MPP 408 Political Feasibility Analysis

SOCL 414 Statistical Methods Analysis I

SOCL 415 Statistical Methods of Analysis II

STAT 403 SAS Program & Applied Statistics

STAT 407 Statistical Design

STAT 436 Topics in Biostatistics

**Sustainable Society and Business Courses**

Student may choose from courses focused on society's interaction with the environment: environmental law and policy, sustainable business management, and fostering sustainable societies.

ENVS 410 Introduction to Environmental Law & Policy

ENVS 411 Natural Resources and Land Use Law & Policy

ENVS 412 Water Law & Policy

ENVS 413 Energy Law & Policy

ENVS 432 Industrial Ecology

ENVS 433 Introduction to the Circular Economy

ENVS 436 Design for Circular & Sustainable Business

ENVS 454 Sustainability Plan Development & Reporting

ENVS 463 Sustainable Business Management

ENVS 464 Sustainability Management in the Global Context

ENVS 483 Human Dimensions of Conservation

ENVS 491 Independent Environmental Research (upon approval)

ENVS 498 Special Topics (upon approval)

ENVS 499 Directed Readings (upon approval)

MPBH 407 Public Health Policy: Concepts and Practice

MPP 400 Policy Design and Analysis

MPP 404 Public Policy Process

PSYC 460 Social Psychological Theory

PSYC 461 Attitude and Attitude Change

PSYC 486 Methods of Program Evaluation

SOCL 412 Qualitative Methods in Social Research

SOCL 446 Knowledge, Power & Expertise

SOCL 463 Sociology & Natural Environment

## School of Environmental Sustainability Graduation Requirements

All SES students are required to complete a foreign language requirement and a writing intensive requirement. The SES language requirement can be fulfilled by 1) earning college credit at the 102-level or above; or 2) demonstrating proficiency via the SES foreign language proficiency examination. The SES writing intensive requirement is fulfilled by successfully completing two Loyola WI courses (max of one per semester). Writing intensive courses have a "W" in the section number.

## Additional Undergraduate Graduation Requirements

All Undergraduate students are required to complete the University Core, at least one Engaged Learning course, and UNIV 101. SCPS students are not required to take UNIV 101. Nursing students in the Accelerated BSN program are not required to take core or UNIV 101. You can find more information in the University Requirements (<https://catalog.luc.edu/undergraduate/university-requirements/>) area.

## LEARNING OUTCOMES

- Explain the components of food systems and their complex interactions across spatial and temporal scales.
- Articulate the physical, psychological, cultural, and spiritual significance of food to individual and community wellbeing.
- Using multiple methods of analysis, evaluate the environmental and equity impacts of different food system practices to reveal points of leverage for social-ecological change.
- Engage knowledge, skills, and values through experiences that advance sustainability, resilience, and justice within food systems.

## SES Shared Learning Outcomes

All SES majors share the following Program Learning Objectives, in addition to their unique major-specific Program Learning Objectives:

1. Articulate the foundational principles of natural and social sciences and humanities essential to solving environmental problems.
2. Critically evaluate the accuracy and credibility of information relating to environmental topics.
3. Employ knowledge and skills to design and implement solutions that contribute to a just and sustainable world.
4. Exemplify the values of environmental and social justice through actions to care for our common home and one another.