

## ENVIRONMENTAL STUDIES

Mount Wachusett offers three programs for students interested in studying the Earth's environment. The Earth/Environmental Science program is a multi-discipline program designed for students intending to transfer to a four-year school to earn a baccalaureate degree in environmental science or geology.

For students more interested in earning a two-year degree that would enable them to have careers in fields such as stewardship, forestry, agriculture, or park ranger the Environmental Conservation degree is the right fit for you. This degree also prepares students who wish to continue in these fields at a four-year institution.

The third option within the field of environmental studies is our Regenerative Agriculture Certificate. This is a one-year degree with a focus on getting your hands dirty in the process of obtaining the skills and knowledge to not only successfully grow plants but to regenerate the soil. Those who choose this option and decide they want to continue their studies could easily continue and pursue our Environmental Conservation degree. The lab and lecture portions of this course frequently take place in one of our many outdoor instructional spaces. Students are to refer to the applicable semester's course syllabus for specifics and expectations.

### EARTH / ENVIRONMENTAL SCIENCE (EAES)

The Earth Systems/Environmental Science Associate of Science Degree is designed for students to transfer to a four-year college or university to pursue a bachelor's degree in earth systems, geology, meteorology, or environmental science. With a bachelor's degree, students may pursue careers as a geologist, seismologist, environmental consultant, environmental safety consultant, meteorologist, soil scientist, atmospheric scientist, or earth science teacher. Embedded within the MWCC Associate Degree is a Geospatial Technologies course (EAS 130), which provides the student with current technology skills crucial to this field of study. The lab and lecture portions of this course frequently take place in one of our many outdoor instructional spaces. Students are to refer to the applicable semester's course syllabus for specifics and expectations.

Year 1		Credits
<b>Fall</b>		
ENG 101	College Writing I	3
EAS 125	Physical Geology of the Earth	4
MAT 162	College Algebra (or higher)	4
CHE 107	General Chemistry I	4
<b>Spring</b>		
ENG 102	College Writing II	3
PSY 105	Introduction To Psychology	3
MAT 163	Pre-Calculus (or higher)	4
Professional Elective (students planning on studying environmental science are encouraged to take EAS 110) (see list below)		3-4
CHE 108	General Chemistry II	4
<b>Year 2</b>		
<b>Fall</b>		
PHY 105	College Physics I (or PHY 120)	4
EAS 130	Fundamentals of Geospatial Technologies	4
Humanities Elective <sup>1</sup>		3
Professional Elective (see list below)		4
<b>Spring</b>		
Social Science Elective <sup>2</sup>		3
Humanities Elective <sup>1</sup>		3
Professional Elective (see list below)		4
Professional Elective (see list below)		4
<b>Total Credits:</b>		<b>61-62</b>

<sup>1</sup> Humanities Electives: PHL 235 recommended. See Elective Courses by Abbreviation (<http://catalog.mwcc.edu/electivecoursesbyabbreviation/>).

<sup>2</sup> Social Science Electives: See Elective Courses by Abbreviation (<http://catalog.mwcc.edu/electivecoursesbyabbreviation/>).

Professional Electives

		<b>Credits</b>
BIO 118	Biology I	4
BIO 119	Biology II	4
BIO 116	Ecology	4
BIO 130	Botany: Plant Science	4
CHE 207	Organic Chemistry I	4
CHE 208	Organic Chemistry II	4
EAS 110	Introduction to Environmental Science	3
EAS 120	Soil Science	4
EAS 126	Weather and Climate	4
MAT 211	Calculus I	4
MAT 212	Calculus II	4
PHY 106	College Physics II	4
PHY 121	Physics for Engineering and Science II	4

See Earth / Environmental Science program student learning outcomes and technical standards.

### **Campus**

This program is offered at the Gardner campus only.

### **Transfer Options**

For transfer options, please click here (<http://catalog.mwcc.edu/academicresources/#transferinformationtext>). It is recommended that you also consult with your academic advisor.

## MASSTRANSFER

Students who plan to transfer to a Massachusetts state university or a University of Massachusetts campus may be eligible to transfer under the MassTransfer agreement, which provides transfer advantages to those who qualify.

Please click here for the MassTransfer information. (<http://www.mass.edu/masstransfer/>)

## CAREER OPTIONS/EARNING POTENTIAL

For career options, please click here (<https://mwcc.lightcastcc.com/programs/earthenvironmental-science-associate-degree/166957/?region=North%20Central%20MA/Southwest%20NH&radius=>).

## ENVIRONMENTAL CONSERVATION (ECS)

Environmental Conservation covers a range of environmental occupations in the horticulture/floriculture, agriculture, forestry, parks and recreation fields. Because of an emerging appreciation and heightened awareness of the nation's natural resources, opportunities in these fields are growing. The Environmental Conservation degree program provides students with a variety of environmentally-oriented subjects. MWCC offers the perfect setting by providing hundreds of acres of undeveloped plant communities and forested areas, two pond ecosystems, and a life studies center consisting of a greenhouse, potting area, and lecture facility. Embedded within the MWCC Environmental Conservation Degree is a Geospatial Technologies course (EAS 130), which provides the student with current technology skills crucial to this field of study. The lab and lecture portions of this program frequently take place in one of our many outdoor instructional spaces. Students are to refer to the applicable semester's course syllabus for specifics and expectations.

		Credits
<b>Year 1</b>		
<b>Fall</b>		
ENG 101	College Writing I	3
BIO 109	Concepts in Biology	4
ECR 120	Regenerative Agriculture	4
Social Science Elective <sup>1</sup>		3
<b>Spring</b>		
ENG 102	College Writing II	3
MAT 126	Topics In Mathematics <sup>2</sup>	3
Humanities Elective <sup>3</sup>		3
BIO 122	Zoology: The Biology Of Animals (Or EAS 115 Paleontology)	4
CHE 120	Environmental Chemistry	4
<b>Year 2</b>		
<b>Fall</b>		
ECR 102	Introduction to Forestry (or ECR 197 Forest Fire Control and Management)	4
BIO 224	Botany: Plant Science	4
LAS Elective <sup>4</sup>		3
ECR 201	Conservation Biology	3
<b>Spring</b>		
ECR 220	Practicum In Environmental Conservation	1
EAS 130	Fundamentals of Geospatial Technologies	4
BIO 216	Ecology	4
Professional Elective (see list below)		3-4
EAS 120	Soil Science	4
<b>Total Credits:</b>		<b>61-62</b>

<sup>1</sup> Social Science Electives: See Elective Courses by Abbreviation (<http://catalog.mwcc.edu/electivecoursesbyabbreviation/>).

<sup>2</sup> MAT 162 College Algebra (or higher) recommended for transfer.

<sup>3</sup> Humanities Electives: See Elective Courses by Abbreviation (<http://catalog.mwcc.edu/electivecoursesbyabbreviation/>).  
SPC 113 Speech recommended.

<sup>4</sup> LAS Elective: See LAS Elective Options (<http://catalog.mwcc.edu/generaleducationcorecurriculum/>).

**ECS Professional Electives**

		<b>Credits</b>
BIO 128	Plants And Society	3
BIO 140	Introduction To Greenhouse Management	4
BIO 142	Entomology: Insect Biology	3
EAS 110	Introduction to Environmental Science	3
EAS 125	Physical Geology of the Earth	4
EAS 126	Weather and Climate	4
ECR 107	Plant Nutrients	2
ECR 108	Plant Pathology	4
ECR 109	Fruit Production	1
ECR 181	Integrated Pest Management	1
ECR 197	Forest Fire Control and Management	4
MAT 143	Statistics	3
MAT 163	Pre-Calculus	4
MAT 211	Calculus I	4

See Environmental Conservation and Regenerative Agriculture program student learning outcomes and technical standards.

**Campus**

This program is offered at the Gardner campus only.

**Transfer Options**

For transfer options, please click here (<http://catalog.mwcc.edu/academicresources/#transferinformationtext>). It is recommended that you also consult with your academic advisor.

## MASSTRANSFER

Students who plan to transfer to a Massachusetts state university or a University of Massachusetts campus may be eligible to transfer under the MassTransfer agreement, which provides transfer advantages to those who qualify.

Please click here for the MassTransfer information. (<http://www.mass.edu/masstransfer/>)

## CAREER OPTIONS/EARNING POTENTIAL

For career options, please click here (<https://mwcc.lightcastcc.com/programs/environmental-conservation-and-regenerative-agriculture-associate-degree/166957/?region=North%20Central%20MA/Southwest%20NH&radius=>).

## REGENERATIVE AGRICULTURE CERTIFICATE (RAC)

The Regenerative Agriculture certificate provides students with the theoretical and practical skills necessary for careers in local food movements and agriculture. Regenerative agriculture is modeled after the cycles of natural systems, relying on nutrient pathways, building and preserving soils and its fertility. You will learn to build food systems that provide healthy food and build local communities. You will study fundamental ecological processes such as nutrient cycling, effective solar capture, efficient use of water, and interactions among plants and animals in their environment. You also will learn to analyze the ecological, economic, and cultural dimensions of complex food systems. The lab and lecture portions of this program frequently take place in one of our many outdoor instructional spaces. Students are to refer to the applicable semester's course syllabus for specifics and expectations.

Year 1		Credits
<b>Fall</b>		
ECR 181	Integrated Pest Management	1
ECR 108	Plant Pathology	4
BIO 142	Entomology: Insect Biology	3
BIO 224	Botany: Plant Science	4
<b>Spring</b>		
ECR 107	Plant Nutrients	2
ECR 120	Regenerative Agriculture	4
ECR 109	Fruit Production	1
ENG 101	College Writing I	3
EAS 120	Soil Science	4
<b>Total Credits:</b>		<b>26</b>

## Special Requirements

Technical standards must be met with or without accommodations.

## Career Options/Earning Potential

For career options, please click here (<https://mwcc.lightcastcc.com/programs/regenerative-agriculture-certificate/166957/?region=North%20Central%20MA/Southwest%20NH&radius=>).

## PROGRAM STUDENT LEARNING OUTCOMES FOR EAES

Upon graduation from this program, students shall have the ability to:

- Develop science literacy in the fields of chemistry, biology, and physics.
- Clearly demonstrate the ability to use tools appropriately to collect scientific data.
- Use mathematics and computer programs such as EXCEL and GIS to visually analyze and display information.
- Use data analysis to describe the chemical, biological, and physical processes that shape our planet.
- Describe the complex interactions between humans and their environment and understand the need for conservation practices.

## PROGRAM STUDENT LEARNING OUTCOMES FOR ECS AND RAC

Upon graduation from this program, students shall have the ability to:

- Clearly demonstrate the ability to use tools appropriately to collect scientific data.
- Use mathematics and computer programs such as EXCEL and GIS to visually analyze and display information.
- Describe the history of agriculture and summarize the impacts it has had on soil and the health of the environment.

- Use indigenous and nonindigenous practices and demonstrate the ability to participate in food production for a sustainable world.
- Successfully identify plants native to New England and their anatomical structures.

### **TECHNICAL STANDARDS FOR EAES, ECS, RAC**

Students entering this program must be able to demonstrate the ability to:

- Comprehend textbook material at a college level.
- Communicate and assimilate information either in spoken, printed, signed, or computer voice format.
- Gather, analyze, and draw conclusions from data.
- Stand for a minimum of two hours.
- Differentiate by touch: hotness/coldness, wetness/dryness, and hardness/softness.
- Use the small muscle dexterity necessary to do such tasks as gloving, gowning, and operating controls on laboratory instrumentation.
- Respond promptly to spoken words, as well as monitor signals and instrument alarms.
- Identify behaviors that would endanger a person's life or safety and intervene quickly in a crisis situation with an appropriate solution.
- Remain calm, rational, decisive, and in control at all times, especially during emergency situations.
- Manipulate small parts, and make fine hand adjustments to machines and test equipment.
- Operate a computer.

#### **EAS 110. Introduction to Environmental Science. 3 Credits.**

This is an introductory course to the interdisciplinary field of environmental studies. Emphasis in this course will focus on the natural world and how it is influenced by human activities. Topics discussed will include: biodiversity, conservation, human populations, resources and sustainability, energy production, toxicology, as well as global change. The lab and lecture portions of this course frequently take place in one of our many outdoor instructional spaces. Students are to refer to the applicable semester's course syllabus for specifics and expectations. Prerequisite: ENG 098, MAT 092 or MAT 096, RDG 098 or placement.

#### **EAS 115. Paleontology: Evolution of Life. 4 Credits.**

In this course, students will be introduced to basic biologic principles of ecology and natural selection that have influenced the evolution of modern species. Examination of fossil and geologic records will illustrate how climate changes and major evolutionary developments over the earth's history have culminated in the domains and kingdoms of life. Students will also study what role humans are playing in the evolution and extinction of species today. Lab work will complement topics discussed during lectures. The lab and lecture portions of this course frequently take place in one of our many outdoor instructional spaces. Students are to refer to the applicable semester's course syllabus for specifics and expectations. Prerequisites: ENG 098, FYE 101, RDG 098, or placement.

#### **EAS 120. Soil Science. 4 Credits.**

Soils are the anchors of biological systems. This is a study of the physical, chemical, and biological nature of the soil. This four-credit laboratory course will study the substrate of the ecosystem. Emphasis will be placed on the role of the soil in plant pathology. Lab sessions will be hands-on experiences revolving around and applying the topics listed in the lab section of the syllabus. The lab and lecture portions of this course frequently take place in one of our many outdoor instructional spaces. Students are to refer to the applicable semester's course syllabus for specifics and expectations. Formerly offered as BIO 220. Prerequisites: ENG 098, FYE 101, MAT 092 or MAT 096, RDG 098 or placement. Fall.

#### **EAS 125. Physical Geology of the Earth. 4 Credits.**

This is an introductory course concerning the geology of both the earth's interior and surface. The geology of the earth's interior deals with its structure, the rock cycle, the formation and characteristic of igneous sedimentary and metamorphic rocks, as well as their mineral composition. The theory of plate tectonics will be used to discuss earthquakes, volcanoes, and mountain building. Surface geology encompasses soil and its formation, rivers, lakes, deserts, glaciers, topographic maps, and oceans. The process of physical and chemical weathering will be discussed in relation to these topics. Laboratory sessions will involve hands on experience with rocks, minerals, and measuring techniques used in geology, as well as online exercises. The lab and lecture portions of this course frequently take place in one of our many outdoor instructional spaces. Students are to refer to the applicable semester's course syllabus for specifics and expectations. Prerequisites: ENG 098, FYE 101, RDG 098, MAT 092 or MAT 096 or placement.

#### **EAS 126. Weather and Climate. 4 Credits.**

This is a 4-credit on-line laboratory science course. This course describes the basic structure of the atmosphere, and atmospheric processes. Students will develop an understanding of meteorological principles and concepts in order to understand the weather

phenomena that affect our daily lives. Climate and the distinction between climate and weather will also be discussed. Prerequisite: ENG 098, MAT 092 or MAT 096, RDG 098 or placement.

**EAS 127. Introduction to Astronomy. 3 Credits.**

This course is a general introduction to the field of astronomy. Students will study topics such as telescopes, the history of astronomy, tides and the moon, the planets of our solar system, properties of stars, our sun, solar formation and evolution, as well as galaxies. Students will be expected to make astronomical observations from their homes, as well as collect relevant data from the internet.

Prerequisite: ENG 098, RDG 098, MAT 092 or MAT 096 or placement.

**EAS 130. Fundamentals of Geospatial Technologies. 4 Credits.**

This course introduces students to relevant aspects of geospatial technologies. Topics to be covered include mapping techniques, the theory and application of Geospatial Data and GPS, Geographic Information Systems, Remote Sensing, and Geospatial Applications. Students will gain hands-on experience with geospatial software such as Google Earth, ArcGIS Online, ArcGIS Pro and other applications to establish a basic understanding and the skills needed in the broad field of Natural Resources as well as other related disciplines. The lab and lecture portions of this course frequently take place in one of our many outdoor instructional spaces.

Students are to refer to the applicable semester's course syllabus for specifics and expectations. Prerequisites: ENG 098, MAT 092 or MAT 096, RDG 098 or placement. Fall.