



RSCI300 – Environmental Science

Master Course Syllabus

Course Overview (QM Standards 1.2)

Course description: *Environmental Science* is an eight-week online, three credit hour course. This interdisciplinary natural science course is addressed to non-majors. The course bridges understanding of biology, chemistry, geography, human health and nutrition, and other aspects of natural sciences. An emphasis is on modern natural ecosystems as impacted by human activity on atmosphere, water and soil. Students learn about the fundamentals of energy and matter, cycles in nature, structure and functioning of ecosystems. Examples and case studies reinforce understanding of basics of environmental science and its practical applications. We use case studies of real human impact on soil, water, and atmosphere; industrial pollution, including oil spills, mutagens, pesticides, radioactive contamination.

Course Goals:

- Identify and describe the fundamental structure and function of Earth's ecosystems
- Examine and discuss ecological factors, nutrient and energy cycles in nature
- Explain how various human industrial activities impact natural ecosystems.
- Evaluate information available to the public in case studies dealing with various industrial contamination such as oil spills and cleanup
- Predict outcomes of environmental modification.
- Apply quantitative skills to environmental issues
- Interpret data in figures and graphs as related to environmental issues

Pre-Requisites (QM Standard 1.6)

There are no course prerequisites for this course other than being an RBA (Regents Bachelor of Arts) student.

Minimum Technical Requirements and Online Resources (QM Standards 1.5 & 1.7)

In addition to a web browser (preferable Firefox) that is Blackboard compatible, you will need the other WVROCKS supported technologies outlined in the student policies section.

Online Resources: This course makes use of many online resources. I have made every effort to make sure the links I have are up-to-date. However, due to the changing nature of the web, you may find that a resource is temporarily unavailable or has been removed. If this should happen, please send me an email and I will find an alternative resource or modify the assignment accordingly.

Instructor Information (QM Standards 1.8 & 5.3)

Individual instructors complete this information.

Virtual Office Hours

I am available in my virtual office by appointment only. Send me an email to set up an appointment.

Personal Commitment

My personal commitments to you as a participant include:

- I will reply to course mail messages within 24 hours;
- I will read all discussion postings and will reply where appropriate within 3 days
- I will acknowledge my receipt of every course mail message immediately upon reading it. If I am unable to respond to the request or concern at the time of initial reply, I will give you an estimated time for my next reply.
- If I am going to be away from the course space for more than a day or two, I will send a message to you indicating the length of my absence.
- I will regularly update information regarding due dates in the course announcements.

Optional/Required Course Materials (QM Standard 4.6)

- Zehnder et al. "Introduction to Environmental Science" (2015), available online from Georgia College & State University, under Creative Commons license, <http://oer.galileo.usg.edu/cgi/viewcontent.cgi?article=1001&context=biology-collections>
- All other materials are included in the class

Grading Policy (QM Standard 3.2)

List of Course Assignments with Point Values

Assignment/Assessment	Point Value
M1S1: Self-assessment (Do not submit.)	ungraded
M1A1: Discussion, Ecosystems	20
M1A2: Quiz, Ecosystems	20
M2S1: Self-assessment (Do not submit.)	ungraded
M1A1: Discussion, Population Ecology and Human Demography	20
M2A2: Quiz, Population Ecology and Human Demography	20
M2A3: Exam, Ecosystems, Population Ecology and Human Demography	100
M3S1: Self-assessment (Do not submit.)	ungraded
M3A1: Discussion, Non-renewable Energy	20
M3A2: Quiz, Non-renewable Energy	20
M4S1: Self-assessment (Do not submit.)	ungraded
M4A1: Discussion, Alternative Energy	20
M4A2: Quiz, Alternative Energy	20

M4A3: Exam, Non-renewable Energy and Alternative Energy	100
M5S1: Self-assessment (Do not submit.)	ungraded
M5A1: Discussion, Air Pollution	20
M5A2: Quiz, Air Pollution	20
M6S1: Self-assessment (Do not submit.)	ungraded
M6A1: Discussion, Climate	20
M6A2: Quiz, Climate	20
M6A3: Exam, Air Pollution and Climate	100
M7S1: Self-assessment (Do not submit.)	ungraded
M7A1: Discussion, Water Issues	20
M7A2: Quiz, Water Issues	20
Self-assessment (Do not submit.)	ungraded
M8A1: Discussion, Case Studies	20
M8A2: Final Exam, A Comprehensive Demonstration of the Facts, Processes, and Implications Related to Environmental Science	100
Total Points	700

Grading Scale:

- 630-700 pts = A
- 560-629 pts = B
- 490-559 pts = C
- 420-489 pts = D
- < 420 pts = F

Module Objectives and Assessments (QM Standard 2.2, 2.3, 2.4, 2.5, 3.4, 3.5, 5.1)

Module 1

After you have completed the readings and content for this module you will be able to:

- Identify and examine, at an introductory level, the basic chemical and biological foundations of life on Earth (**M1S1: Self-assessment, M1A2: Quiz, Ecosystems**)
- Identify environment, ecosystems, and environmental sciences (**M1S1: Self-assessment, M1A2: Quiz, Ecosystems**)
- Identify and examine the complex relationship between natural and human systems pertaining to environmental impact (**M1S1: Self-assessment, M1A1: Discussion, Ecosystems; M1A2: Quiz, Ecosystems**)
- Define carrying capacity and survivorship curves (**M1A1: Discussion, Ecosystems; M1A2: Quiz, Ecosystems**)
- Identify limiting factors in ecosystems (**M1S1: Self-assessment, M1A2: Quiz, Ecosystems**)

Module 2

After you have completed the readings and content for this module you will be able to:

- Identify and examine the variables in the exponential and logistic growth equations (**M2S1: Self-assessment; M2A1: Quiz, Population Ecology and Human Demography; M2A2: Discussion, Population Ecology and Human Demography; M2A3: Exam, Ecosystems, Population Ecology and Human Demography**)
- Identify the environmental conditions represented by the exponential growth model vs. the logistic growth model (**M2S1: Self-assessment; M2A1: Quiz, Population Ecology and Human Demography; M2A2: Discussion, Population Ecology and Human Demography; M2A3: Exam, Ecosystems, Population Ecology and Human Demography**)
- State the current size of the human population (**M2S1: Self-assessment; M2A1: Quiz, Population Ecology and Human Demography; M2A3: Exam, Ecosystems, Population Ecology and Human Demography**)
- Identify what happens to birth rates, death rates, population growth rate, fertility, and population size as a country moves through the stages of the demographic transition model (**M2S1: Self-assessment; M2A1: Quiz, Population Ecology and Human Demography; M2A2: Discussion, Population Ecology and Human Demography; M2A3: Exam, Ecosystems, Population Ecology and Human Demography**)

Module 3

After you have completed the readings and content for this module you will be able to:

- List specific examples of non-renewable energy sources. Explain what makes an energy source non-renewable (**M3S1: Self-assessment, M3A1: Discussion, Non-renewable Energy; M3A2: Quiz, Non-renewable Energy**)
- Identify the main types of fossil fuels and how they formed (**M3S1: Self-assessment, M3A1: Discussion, Non-renewable Energy; M3A2: Quiz, Non-renewable Energy**)
- Identify and examine the environmental impacts associated with exploration, extraction and use of the different types of fossil fuels (**M3S1: Self-assessment, M3A1: Discussion, Non-renewable Energy; M3A2: Quiz, Non-renewable Energy**)
- Identify and examine nuclear energy, how it works, and its benefits and risks (**M3S1: Self-assessment, M3A1: Discussion, Non-renewable Energy; M3A2: Quiz, Non-renewable Energy**)

Module 4

After you have completed the readings and content for this module you will be able to:

- Identify and examine the aspects of solar energy (**M4S1: Self-assessment, M4A1: Discussion, Alternative Energy; M4A2: Quiz, Alternative Energy; M4A3: Exam, Non-renewable Energy and Alternative Energy**)
- Identify and examine the aspects of biofuels / biomass energy (**M4S1: Self-assessment, M4A1: Discussion, Alternative Energy; M4A2: Quiz, Alternative Energy; M4A3: Exam, Non-renewable Energy and Alternative Energy**)
- Identify wind energy and explain the advantages and disadvantages (**M4S1: Self-assessment, M4A1: Discussion, Alternative Energy; M4A2: Quiz, Alternative Energy; M4A3: Exam, Non-renewable Energy and Alternative Energy**)
- Identify geothermal energy and explain the advantages and disadvantages (**M4S1: Self-assessment, M4A1: Discussion, Alternative Energy; M4A2: Quiz, Alternative Energy; M4A3: Exam, Non-renewable Energy and Alternative Energy**)
- Identify hydroelectric energy and explain the advantages and disadvantages (**M4S1: Self-assessment, M4A1: Discussion, Alternative Energy; M4A2: Quiz, Alternative Energy; M4A3: Exam, Non-renewable Energy and Alternative Energy**)

Module 5

After you have completed the readings and content for this module you will be able to:

- Identify the composition and structure of the atmosphere (**M5S1: Self-assessment, M5A1: Discussion, Air Pollution; M5A2: Quiz, Air Pollution**)
- Identify and examine the importance of the ozone layer (**M5S1: Self-assessment, M5A1: Discussion, Air Pollution; M5A2: Quiz, Air Pollution**)
- Identify and examine natural and anthropogenic sources of air pollution (**M5S1: Self-assessment, M5A1: Discussion, Air Pollution; M5A2: Quiz, Air Pollution**)
- Identify and examine the effects of air pollution on human and ecosystem health (**M5S1: Self-assessment, M5A1: Discussion, Air Pollution; M5A2: Quiz, Air Pollution**)

Module 6

After you have completed the readings and content for this module you will be able to:

- List the major carbon reservoirs on Earth, and identify how carbon flows from one reservoir to another (**M6S1: Self-assessment, M6A1: Discussion, Climate; M6A2: Quiz, Climate; M6A3: Exam, Air Pollution and Climate**)
- Identify ways in which humans are impacting multiple portions of the carbon cycle (**M6S1: Self-assessment, M6A1: Discussion, Climate; M6A2: Quiz, Climate; M6A3: Exam, Air Pollution and Climate**)
- Identify and examine the suggested causes and consequences of global climate change (**M6S1: Self-assessment, M6A1: Discussion, Climate; M6A2: Quiz, Climate; M6A3: Exam, Air Pollution and Climate**)
- Identify methods of climate remediation, including carbon sequestration (**M6S1: Self-assessment, M6A1: Discussion, Climate; M6A2: Quiz, Climate; M6A3: Exam, Air Pollution and Climate**)

Module 7

After you have completed the readings and content for this module you will be able to:

- Identify and examine the molecular structure of the water molecule that contributes to the unique properties of water (**M7S1: Self-assessment, M7A1: Discussion, Water Issues; M7A2: Quiz, Water Issues**)
- Identify how much water is available on Earth and how it is distributed (**M7S1: Self-assessment, M7A1: Discussion, Water Issues; M7A2: Quiz, Water Issues**)
- Identify water-related problems (for example water scarcity, water-borne diseases, water pollution, flooding) from different regions of the world and in the USA (**M7S1: Self-assessment, M7A1: Discussion, Water Issues; M7A2: Quiz, Water Issues**)
- Identify and examine how human modifications of natural water systems can be both beneficial and destructive (**M7S1: Self-assessment, M7A1: Discussion, Water Issues; M7A2: Quiz, Water Issues**)

Module 8

After you have completed the readings and content for this module you will be able to:

- Combine facts, knowledge of processes and issues to demonstrate understanding of Environmental Science (**M8S1: Self-assessment; M8A1: Discussion, Case Studies; M8A2: Final Exam, A Comprehensive Demonstration of the Facts, Processes, and Implications Related to Environmental Science**)
- Locate and discuss case studies and give examples of: environmental destruction and mitigation measures; role of technology in finding solutions by using the knowledge of ecology; regulatory issues and policy changes (**M8S1: Self-assessment; M8A1: Discussion, Case Studies; M8A2: Final Exam, A Comprehensive Demonstration of the Facts, Processes, and Implications Related to Environmental Science**)