Spring 2021

EVSC 125-002: Fundamentals of Environmental Science

Michael Bonchonsky

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EVSC 125-002 Fundamentals of Environmental Science

Michael Bonchonsky
EVSC 125-002 Fundamentals of Environmental Science: Spring 2021 Course Syllabus

E-mail: michael.p.bonchonsky@njit.edu; also at mickbon@aol.com
Class to be held on Webex for the start of semester M and Thurs 9-10:20 AM, later as announced converged learning
FIRST CLASS starts on WEBEX Thurs Jan 21  go to https://njit.webex.com/meet/bonchons
Office Hours:  M and Thurs after class 10:30-12:00 and by Webex appt

NJIT Academic Integrity Code: All Students should be aware that the Department of Chemistry & Environmental Science takes the University Code on Academic Integrity at NJIT very seriously and enforces it strictly. This means that there must not be any forms of plagiarism, i.e., copying of homework, class projects, or lab assignments, or any form of cheating in quizzes and exams. Under the University Code on Academic Integrity, students are obligated to report any such activities to the Instructor.

COURSE INFORMATION

I. Course Description and Objectives Summary:

An introductory course to the interdisciplinary study of the complex interactions that occur among and within environmental systems: air, water, and terrestrial environs. The course includes an emphasis on anthropocentric effects on these environmental systems. It is provided as a part of a curriculum in applied environmental science and as such emphasizes problem identification and engineered solutions. The course serves as an introduction to further advanced study specializing in environmental science and engineering.

Number of Credits: 3 Cr

Prerequisites: None

Course-Section and Instructors

<table>
<thead>
<tr>
<th>Course-Section</th>
<th>Instructor</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVSC 125 M,Thr 9-10:20; on webex at the start possible later at Cull. L-1</td>
<td>MP Bonchonsky</td>
</tr>
</tbody>
</table>

Office Hours for All Chemistry & Environmental Science Instructors: Spring 2021 Office Hours and Emails

Required Textbook:

<table>
<thead>
<tr>
<th>Title</th>
<th>Environmental Science as a Living Planet , Botkin and Keller, 9th edition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Author</td>
<td>Botkin and Keller</td>
</tr>
<tr>
<td>Edition</td>
<td>9th</td>
</tr>
<tr>
<td>Publisher</td>
<td>Wiley</td>
</tr>
</tbody>
</table>

University-wide Withdrawal Date: The last day to withdraw is as shown on the NJIT academic calendar currently listed as Monday, April 5, 2020. It will be strictly enforced.
Learning Outcomes:

Student learners will:

- Learn core concepts and methods from natural and physical sciences and their application in environmental problem solving.
- Understand the transboundary character of environmental problems and ways of addressing them, including interactions across local to global systems.
- Analyze basic public works and private systems that provide potable water, treat wastewater and manage air quality.
- Demonstrate an ability to communicate effectively in written and oral form, demonstrating the ability to create an appropriate annotated bibliography and the ability to use effective presentation skills.
- Develop a sense of community responsibility by becoming aware of scientific issues in the larger social context.
- Demonstrate interpretative skills including the ability to analyze data, assess reliability, interpret results and draw reasonable conclusions.
- Become well-grounded in laws and theories of basic scientific disciplines by demonstrating and applying the scientific method.
- Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world.
- Develop and incorporate standards of professional behavior that include rules of ethics and etiquette.

The course EVSC 125 covers these overarching topics:

The natural environment and population
Energy and the Environment
The aqueous environment
The terrestrial environment
The air environment
Industrial impacts and Sustainability

POLICIES
All EVSC students must familiarize themselves with, and adhere to, all official university-wide student policies. EVSC takes these policies very seriously and enforces them strictly.

Grading Policy: The final score in this course will be determined as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Essays</td>
<td>20%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>20</td>
</tr>
<tr>
<td>Participation</td>
<td>5</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>25</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30</td>
</tr>
</tbody>
</table>

The final course grade will be determined as follows:

<table>
<thead>
<tr>
<th>Final Grade</th>
<th>Overall Academic Performance (100%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Above 90</td>
</tr>
<tr>
<td>B+</td>
<td>85-89</td>
</tr>
<tr>
<td>B</td>
<td>80-84</td>
</tr>
<tr>
<td>C+</td>
<td>75-79</td>
</tr>
<tr>
<td>C</td>
<td>70-74</td>
</tr>
</tbody>
</table>
**Attendance Policy:** Attendance at classes will be recorded and is mandatory. Each class is a learning experience that cannot be replicated through simply “getting the notes.”

**Homework Policy:** Homework is an expectation of the course. The homework assignments set by the instructor are used in class discussions which comprise in part the determination of the score for “participation.”

**Exams:** There will be quizzes, a midterm exam held in class during the semester and one final exam. The following exam periods are tentative and therefore possibly subject to change (see moodle for any updates):

<table>
<thead>
<tr>
<th>Exam Type</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm Exam</td>
<td>March 4</td>
</tr>
<tr>
<td>Quizzes</td>
<td>TBD dates as shown on Canvas</td>
</tr>
<tr>
<td>Final Exam Period</td>
<td>May 7-13, see Registrar exam schedule</td>
</tr>
</tbody>
</table>

**Makeup Exam Policy:** There will normally be NO MAKE-UP QUIZZES OR EXAMS during the semester. In the event that a student has a legitimate reason for missing a quiz or exam, the student should contact the Dean of Students office and present written verifiable proof of the reason for missing the exam, e.g., a doctor’s note, police report, court notice, etc. clearly stating the date AND time of the mitigating problem. The student must also notify the CES Department Office/Instructor that the exam will be missed so that appropriate steps can be taken to make up the grade.

**Cellular Phones:** All cellular phones and other electronic devices must be switched off during all class times. Such devices must be stowed in bags during exams or quizzes.

**ADDITIONAL RESOURCES**

**Accommodation of Disabilities:** Office of Accessibility Resources and Services (formerly known as Disability Support Services) offers long term and temporary accommodations for undergraduate, graduate and visiting students at NJIT.

If you are in need of accommodations due to a disability please contact Chantonette Lyles, Associate Director at the Office of Accessibility Resources and Services at 973-596-5417 or via email at lyles@njit.edu. The office is located in Fenster Hall Room 260. A Letter of Accommodation Eligibility from the Office of Accessibility Resources Services office authorizing your accommodations will be required.

For further information regarding self-identification, the submission of medical documentation and additional support services provided please visit the Accessibility Resources and Services (OARS) website at:

**Important Dates** (See: always check Spring 2020 Academic Calendar, Registrar)

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 21, 2020</td>
<td>First Day of Class for this course</td>
</tr>
<tr>
<td>January 31</td>
<td>Last Day to Add/Drop Classes</td>
</tr>
</tbody>
</table>
Course Outline

(please see Canvas course website for any changes and updates during the semester)

Lecture topics, dates shown on Canvas website:

Week 1 (Class starts Th Jan 21) Introduction to Environmental Science…review of syllabus, assignments, selected readings; introduction to environmental science, relationship to traditional disciplines of study, and its applications in the real world today.

Week 2 (Jan 25, 28) Biomes: major ecological systems of the world; review of interrelationships of organisms and habitats; adaptation and evolution principles.

Week 3 (Feb 1, 4) Energy in the Natural Environment

   Energy and Cycles of Energy in Nature

Week 4 (Feb 8, 11) Energy in the Anthro- Environment

   Principles of energy
   First and Second Laws of Thermodynamics
   (Conservation of Energy and examples of Entropy, as found in environmental systems)
   Sources and Forms of Energy Development
      Fossil Fuels
      Nuclear Fuels
   Alternative Energy Development Patterns
      Advantages and Disadvantages of alternatives
   Existing Energy Infrastructure
   Energy for the future, renewable energy sources
   Energy Use in Industrial Societies
   Energy Consumption in the United States
   Comparative Energy Use Internationally
   Nonrenewable Energy Sources
   Renewable Energy Sources

Week 5 (Feb 15, 18) Population

   Age structure diagrams
   Total Fertility rate, Birth rates
   Human Population Dynamics
   Demographic transition

Week 6 (Feb 22, 25) Water Quality
The water molecule
The hydrologic cycle
Quantity and Quality of Water Resources
Surface water, groundwater characteristics
Algal Nutrients and Eutrophication
Basic Examination of Water and Wastewater  Problem set

7 Midterm  week review Mon Mar 1 test March 4

8 Spring Break March 14-21

Week 9 (March15, 18) February Water Pollution
Sources of Pollution
Parameters and Constituents
Related measurements

Week 10 (March 22, 25) Basic Water and Wastewater Treatment Systems

Biological Systems
Chemical Physical Systems
Health Impacts and concerns

Week 11 (March 29, Apr 1) Terrestrial and Groundwater Environment

Groundwater Hydrology  Contaminants, Transport
Land Resources and Conservation
Soils and their preservation
Minerals: reserves and consumption
Chemical and physical properties of soil
Soil Matrix Systems
Land Disposal of Solid Waste
Fate of Pollutants in Soil Matrix
Wetlands Impacts

Week 12 (April 5, 8) Atmospheric Environment  Problem set

Atmospheric Strata and Quality of Atmosphere
Fate of Chemicals in the Atmosphere
Indoor Air Pollution
Global Warming, Greenhouse Effect
Hydrocarbons and Photochemical Smog
Industrial Air Pollution Control Systems

Week 13 (April 12, 15) Hazardous Waste

Identification of hazardous waste
Resource Conservation and Recovery Act
Hazardous waste management
Treatment and Remediation

Week-14 April 19, 22 Industrial Ecology

The Law of Conservation of Mass, the continuity equation
Properties of matter
Advantages of Circular Systems over Linear Systems
Conducting a Mass Balance, non-reacting and reacting systems
Applications to Polluting Circumstances

Week-15 April 26, 29 Sustainable Development
Week-15  May 3 Review..last day of this class

Finals Week begins as scheduled starting by registrar exam schedule beginning May 7

*Updated by MPB - 2021*

*Department of Chemistry & Environmental Sciences*

*Course Syllabus, Spring 2021*

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**Spring 2021 Academic Calendar**

<table>
<thead>
<tr>
<th>January</th>
<th>18</th>
<th>Monday</th>
<th>Martin Luther King, Jr. Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>19</td>
<td>Tuesday</td>
<td>First Day of Classes</td>
</tr>
<tr>
<td>January</td>
<td>23</td>
<td>Saturday</td>
<td>Saturday Classes Begin</td>
</tr>
<tr>
<td>January</td>
<td>25</td>
<td>Monday</td>
<td>Last Day to Add/Drop a Class</td>
</tr>
<tr>
<td>January</td>
<td>25</td>
<td>Monday</td>
<td>Last Day for 100% Refund, Full or Partial Withdrawal</td>
</tr>
<tr>
<td>January</td>
<td>26</td>
<td>Tuesday</td>
<td>W Grades Posted for Course Withdrawals</td>
</tr>
<tr>
<td>February</td>
<td>2</td>
<td>Tuesday</td>
<td>Last Day for 90% Refund, Full or Partial Withdrawal - No Refund for Partial Withdrawal after this date</td>
</tr>
<tr>
<td>February</td>
<td>15</td>
<td>Monday</td>
<td>Last Day for 50% Refund, Full Withdrawal</td>
</tr>
<tr>
<td>March</td>
<td>8</td>
<td>Monday</td>
<td>Last Day for 25% Refund, Full Withdrawal</td>
</tr>
<tr>
<td>March</td>
<td>14</td>
<td>Sunday</td>
<td>Spring Recess Begins - No Classes Scheduled - University Open</td>
</tr>
<tr>
<td>March</td>
<td>21</td>
<td>Sunday</td>
<td>Spring Recess Ends</td>
</tr>
<tr>
<td>April</td>
<td>2</td>
<td>Friday</td>
<td>Good Friday - No Classes Scheduled - University Closed</td>
</tr>
<tr>
<td>April</td>
<td>5</td>
<td>Monday</td>
<td>Last Day to Withdraw</td>
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<tr>
<td>May</td>
<td>4</td>
<td>Tuesday</td>
<td>Friday Classes Meet</td>
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<tr>
<td>May</td>
<td>4</td>
<td>Tuesday</td>
<td>Last Day of Classes</td>
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<td>Date</td>
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<tr>
<td>May 5</td>
<td>Wednesday</td>
<td>Reading Day 1</td>
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<td>May 6</td>
<td>Thursday</td>
<td>Reading Day 2</td>
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<tr>
<td>May 7</td>
<td>Friday</td>
<td>Final Exams Begin</td>
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<tr>
<td>May 13</td>
<td>Thursday</td>
<td>Final Exams End</td>
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</tr>
<tr>
<td>May 15</td>
<td>Saturday</td>
<td>Final Grades Due</td>
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