Spring 2022

EVSC 125-002: Fundamentals of Environmental Science

Michael Bonchonsky

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Spring 2022

EVSC 125-002 Fundamentals of Environmental Science

Michael Bonchonsky  TF 8:30-9:50 AM Live FMH 407 (until Jan 30 on line or as notified)

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EVSC 125-002 Fundamentals of
Environmental Science:
Spring 2022 Course Syllabus

E-mail: michael.p.bonchonsky@njit.edu; also at mickbon@aol.com
Class to be held live (or other as may be announced) at the start of semester Tues and Fri 8:30-9:50 (yes, AM!)
The course materials are posted on webex go to https://njit.webex.com
Office Hours: right after class Tues and Fri right after class 10:00-11:00 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 TF 8:30-9:50; live (or as notified) FMH 407, materials posted</td>
<td>MP Bonchonsky</td>
</tr>
</tbody>
</table>

Office Hours for All Chemistry & Environmental Science Instructors: Spring 2022 Office Hours as above
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 4, 2022. 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:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></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>90 and above</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>
<tr>
<td>D</td>
<td>60-69</td>
</tr>
<tr>
<td>F</td>
<td>Below 60</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 periods are tentative and therefore possibly subject to change (see moodle for any updates):

<table>
<thead>
<tr>
<th>Midterm Exam</th>
<th>See Canvas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes</td>
<td>Dates as shown on Canvas</td>
</tr>
<tr>
<td>Final Exam Period</td>
<td>May 6-12, 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 2022 Academic Calendar, Registrar)

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 18, 2022</td>
<td>First Day of Class for this course</td>
</tr>
<tr>
<td>January 24</td>
<td>Last Day to Add/Drop Classes</td>
</tr>
<tr>
<td>April 4</td>
<td>Last Day to Withdraw</td>
</tr>
<tr>
<td>March 14-19</td>
<td>Spring Break - University Closed</td>
</tr>
<tr>
<td>May 3</td>
<td>Last Day of Classes</td>
</tr>
<tr>
<td>May 6-12</td>
<td>Final Exam Period</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 Tu Jan 18, Th 20) 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 Quiz

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

Week 6 (Feb 22-24) 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

Week 7 (March 1, 3) February Water Pollution

   Sources of Pollution
   Parameters and Constituents
   Related measurements
Week 8 (March 8-10) Midterm Review and Exam week

Week 9 Spring Break March 14-19

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

- Biological Systems
- Chemical Physical Systems
- Health Impacts and concerns

Week 11 (March 28, 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 4, 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… Quiz

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

Week 14 (April 19, 15) Recycling, Solid Waste

- Status of community practices
- Global developments in waste handling

Week-14 April 19, 22 Sustainable Development

- Consumerism
- Biological Systems and Biodiversity
- Global Changes Trends
- “Tragedy of the Commons”/Environmental Impact Statements

Week-15 Tues May 3 last day of classes and Review

- Finals Week begins as scheduled by registrar exam schedule beginning May 6 to May 12

Updated by MPB - 2022

Department of Chemistry & Environmental Sciences
Course Syllabus, Spring 2022
<table>
<thead>
<tr>
<th>Month</th>
<th>Date</th>
<th>Day</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>17</td>
<td>Monday</td>
<td>Martin Luther King, Jr. Day</td>
</tr>
<tr>
<td>January</td>
<td>18</td>
<td>Tuesday</td>
<td>First Day of Classes</td>
</tr>
<tr>
<td>January</td>
<td>22</td>
<td>Saturday</td>
<td>Saturday Classes Begin</td>
</tr>
<tr>
<td>January</td>
<td>24</td>
<td>Monday</td>
<td>Last Day to Add/Drop a Class</td>
</tr>
<tr>
<td>January</td>
<td>24</td>
<td>Monday</td>
<td>Last Day for 100% Refund, Full or Partial Withdrawal</td>
</tr>
<tr>
<td>January</td>
<td>25</td>
<td>Tuesday</td>
<td>W Grades Posted for Course Withdrawals</td>
</tr>
<tr>
<td>January</td>
<td>31</td>
<td>Monday</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>14</td>
<td>Monday</td>
<td>Last Day for 50% Refund, Full Withdrawal</td>
</tr>
<tr>
<td>March</td>
<td>7</td>
<td>Monday</td>
<td>Last Day for 25% Refund, Full Withdrawal</td>
</tr>
<tr>
<td>March</td>
<td>14</td>
<td>Monday</td>
<td>Spring Recess Begins - No Classes Scheduled - University Open</td>
</tr>
<tr>
<td>March</td>
<td>19</td>
<td>Saturday</td>
<td>Spring Recess Ends</td>
</tr>
<tr>
<td>April</td>
<td>4</td>
<td>Monday</td>
<td>Last Day to Withdraw</td>
</tr>
<tr>
<td>April</td>
<td>15</td>
<td>Friday</td>
<td>Good Friday - No Classes Scheduled - University Closed</td>
</tr>
<tr>
<td>April</td>
<td>17</td>
<td>Sunday</td>
<td>Easter Sunday - No Classes Scheduled - University Closed</td>
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<tr>
<td>May</td>
<td>3</td>
<td>Tuesday</td>
<td>Friday Classes Meet</td>
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<tr>
<td>May</td>
<td>3</td>
<td>Tuesday</td>
<td>Last Day of Classes</td>
</tr>
<tr>
<td>May</td>
<td>4</td>
<td>Wednesday</td>
<td>Reading Day 1</td>
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<tr>
<td>May</td>
<td>5</td>
<td>Thursday</td>
<td>Reading Day 2</td>
</tr>
<tr>
<td>May</td>
<td>6-12</td>
<td>Friday-Thursday</td>
<td>Final Exams</td>
</tr>
</tbody>
</table>