EVSC 125 Fundamentals of Environmental Science Course Syllabus, Spring 2018

MP Bonchonsky, Chemistry and Environmental Science Department

Location: Faculty Memorial Hall 207
Class Lectures: M, W 11:30 AM-12:55 PM
Moodle: http://moodle.njit.edu, for detailed course information

Instructor: Michael P. Bonchonsky
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Office: Tiernan 365
Office Hours: M, W 10:30- 11:30 AM and by appt

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.

II. Required Text

Students in this course should obtain the following text from the NJIT bookstore or through any of the commercial on-line dealers.

Textbook*: Environmental Science as a Living Planet , Botkin and Keller, 9th edition*

ISBN13: 978 1118427323 ISBN 10 1118427327

The assigned readings are designed to provide background knowledge needed to understand the subject matter covered in class. The readings listed for each topic should be read prior to the class in order to better prepare for class discussions.

Readings will be supplemented with handouts and journal articles that will be available on Moodle.

III. Evaluation

The final course grade will be given consistent with the following:

Final Grade	Overall Academic Performance (100%)
A	Above 90
B+	85-89
B	80-84
C+	75-79
C	70-74
D	60-69
F	Below 60

The evaluation of student performance in this course is based on five components:

1. **Midterm examination (25%):** There will be a midterm exam comprised of multiple-choice or short-answer questions and brief essays. This exam will be based on course lectures, discussion sessions, and assigned readings. The midterm is scheduled on October 28.

2. **Final examination (30%):** There will be a final exam conducted during the end-of-semester exam period. The format of the final exam will be the same as the midterm exam; it will be based mainly on course material covered during the second half of the semester.

3. **Class participation (5%):** Students are expected to participate and attend all lectures and attendance will be taken at each session. You will be required to sign a daily attendance sheet and late arrival (more than fifteen minutes) will be treated as an absence. Each student will however be granted two "free absences" during the semester.

4. **Quizes (20%):** Alternate weeks as shown on moodle will be administered to assess your familiarity with the weekly lectures and the required readings. There will be no make-up quizzes or late submission under any circumstances. Be aware: Academic Honor Code is applied.

5. **Project and Class Presentation (20%):** One research paper will be required during the semester which will be presented to class. Schedule for the assignments will be determined at the start of the semester. Instructions for the assignment will be posted on the Moodle prior to deadlines. All completed assignments must be submitted in class at the start of class on the day of the deadline.

6. **Extra Credit – environmental news bonus work (5%):** You need to collect one piece of environmental news pertaining to Issues of Environmental Science. Write down your comments in a paragraph. You are required to submit 3-7 pieces of your work (attaching your news) **spread throughout the semester** – recommend: one piece every other week.

IV. Important Notices

1. Students enrolled in this course are forewarned that the consequences of plagiarism or academic misconduct of any kind are severe. Violations will be handled in accordance with the rules outlined in the NJIT Student Handbook (current edition). If you are unfamiliar with these procedures, you should consult the appropriate section of this governing manual.

2. Please arrive to class with the expectation that you will need to remain in place for the scheduled time period. You are advised not to depart the classroom during a session…for any reason.

3. **All cellular phones must be turned off during class**

4. Final grades are not subject to post-semester adjustment–with the exception of the amendment of a grading error. Under no circumstances will students be given the opportunity to complete other extra-credit papers or other assignments to bolster their final grades.

Lecture topics, dates:

Week 1 W January 17 Introduction to Environmental Science…review of syllabus, assignments, selected readings; introduction to environmental science, the relationship to traditional disciplines of study, and its applications in the real world today.

Week-2 January 22, 24 Energy in the Natural Environment
- Energy and Cycles of Energy

Week-3 January 29, 31 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
  - Solar Energy: Passive Systems, Solar/Electric
  - 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-4 February 5, 7 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-5 February 12, 14 Water Pollution Sources of Pollution
Parameters and Constituents
Related measurements

Week-6 February 19, 21 Basic Water and Wastewater Treatment Systems
Biological Systems
Chemical Physical Systems
Health Impacts and concerns

Week-7 February 26, 28 Presentations, Problems

Week 8 March 5, 7 Review and Midterm

Week- 9 Spring Break March 11-17

Week 10 March 19, 21 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 11 March 26, 28 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 12 April 2, 4 Hazardous Waste
Identification of hazardous waste
Resource Conservation and Recovery Act
Hazardous waste management
Treatment and Remediation

Week-13 April 9, 11 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-14 April 16, 18 Sustainable Development Chap 5
Biological Systems, Major Biomes and Biodiversity
Industry Ecosystems
Global Changes Trends
"Tragedy of the Commons"/Environmental Impact Statements

Week-15 April 23, 25 complete student presentations
Monday April 30, Problems and review …last day of class…
Finals Week begins as scheduled starting Fri May 4