

New Jersey Institute of Technology
Digital Commons @ NJIT

Chemistry and Environmental Science Syllabi

NJIT Syllabi

Spring 2020

EVSC 325-102: Energy and Environment

Michael Hornsby

Follow this and additional works at: <https://digitalcommons.njit.edu/chem-syllabi>

Recommended Citation

Hornsby, Michael, "EVSC 325-102: Energy and Environment" (2020). *Chemistry and Environmental Science Syllabi*. 225.

<https://digitalcommons.njit.edu/chem-syllabi/225>

This Syllabus is brought to you for free and open access by the NJIT Syllabi at Digital Commons @ NJIT. It has been accepted for inclusion in Chemistry and Environmental Science Syllabi by an authorized administrator of Digital Commons @ NJIT. For more information, please contact digitalcommons@njit.edu.

EVSC 325 Energy and Environment Syllabus Spring 2020

- Class Website: <https://njit.instructure.com/courses/9137>
- Class Meeting Time: 6:00 pm - 8:50 pm each Monday evening from Jan 27, 2020 to May 4, 2020 (Except for Spring Break March 16)
- Location: Faculty Memorial Hall, Classroom 305
- Instructor: Michael Hornsby
- E-mail: hornsbym@njit.edu Cell Phone: 609-529-6875
- Profile: <https://www.linkedin.com/in/mikehornsby>
- Office Hours: Mondays, 8:50 P.M., Faculty Memorial Hall 305

COURSE INFORMATION

I. Course Description and Objectives Summary:

The course is a study about energy production and use, and the resulting climate and other environmental impacts. The class will examine:

- Energy fundamentals
- International and national energy production and usage trends
- Primary forms of energy production: coal, oil, natural gas, nuclear and renewable energy (solar, wind and renewable natural gas)
- Electricity generation with fossil fuels and nuclear power
- Transmission, distribution and electric utilities
- New Jersey energy programs
- Microgrids, energy storage and fuel cells
- Energy efficiency
- Building electrification, including geothermal
- Transportation electrification

- Waste to energy
- Climate change science, policy and carbon pricing
- Climate resilience
- Environmental trends
- Sustainability
- Perspectives from industry and environmental groups
- The future of energy

Number of Credits: 3 Credits

Prerequisites: EVSC 125. Fundamentals of Environmental Sciences and CHEM 125: General Chemistry I

Required Textbook:

| | |
|-----------|--|
| Title | Textbook: Energy: Its Use and the Environment, 5th Edition |
| Author | Roger A. Hinrichs, Merlin H. Kleinbach |
| Edition | 5 th edition, 2013 |
| Publisher | Brooks/Cole |
| ISBN # | ISBN-10: 1111990832 |

The textbook has its own website with supplemental materials: https://www.cengage.com/cgi-wadsworth/course_products_wp.pl?fid=M20b&product_isbn_issn=9781111990831&token=C96CBF5FE1B17F4D016FCF75E7EF88699C2692559818209ACA6658502EE6EA201F378713BF544CA4B82C14C91A7EF21CF8A5EC26D5BE3AAD13EA478F92D2730BFBD3F7B14F75E020

University-wide Withdrawal Dates: Withdrawal dates are posted on the NJIT academic calendar: <https://www5.njit.edu/registrar/>

II. Learning Outcomes: Student learners will:

- Understand baseline energy and environmental conditions
- Understand the science and physics of energy
- Understand how energy is produced and used, and its resulting environmental impacts
- Understand the need to electrify everything, and the means to produce clean energy

- Understand transportation electrification
- Understand the several forms of climate resilience
- Understand the gravity of climate change and their ability to address it
- Understand technological and policy solutions
- Understand the institutions, politics and people in the energy field
- Understand that it is possible to build a career around solving the worlds greatest problems
- Learn about the future of energy

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 as follows:

| | |
|---------------|----|
| Assignments | 15 |
| Quizzes | 20 |
| Participation | 5 |
| Midterm Exam | 30 |
| Final Exam | 30 |
| Extra Credit | 0 |

The final course grade will be determined as follows:

| 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 |

Attendance Policy: Attendance at classes will be recorded and is mandatory.

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 two 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:

| | |
|------------------------------|-------------------------------------|
| Midterm Exam | March 9 |
| Quizzes | Quiz 1: Feb. 17 Quiz 2: April 13 |
| University Final Exam Period | May 8-14 |

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. If a make up is allowed, it will be more substantially difficult than the original quiz or exam.

Cellular Phones: All cellular phones must be silenced switched off during class times.

Schedule

- See the Pages section within each weekly online Module for details including: Introduction, Agenda, Learning Objectives, Assignments and Files/References
- The Course Schedule is subject to change, to accommodate the availability of guest speakers.

| Date | Topic & Presenter |
|-------------------|--|
| Week 1 Jan. 27 | <ul style="list-style-type: none"> • Topic: Course Overview. Review of syllabus and website, learning outcomes and expectations Presenter: Mike Hornsby • Topic: Overview of International Energy Generation and Usage Presenter: Mike Hornsby |
| Week 2 Feb. 3 | <ul style="list-style-type: none"> • Topic: Overview of US Energy Information Administration and US Department of Energy Presenter: Mike Hornsby • Topic: Climate Change and Carbon Fee and Dividend Presenter: Mike Aucott, Volunteer, Citizens Climate Lobby |
| Week 3 Feb. 10 | <ul style="list-style-type: none"> • Topic: Waste to Energy Presenter: Jyoti T. Agarwal, PhD, Environmental Manager, Covanta Holding Corporation • Topic: Municipal Climate Action Plans Presenter: Guest Speaker: Christine Symington, Sustainable Princeton |
| Week 4 Feb. 17 | <ul style="list-style-type: none"> • Topic: Offshore Wind Power Presenter: Brandon Burke, Business Network for Offshore Wind • Topic: Solar Power and Energy Storage Presenter: Lyle Rawlings, President, CEO of Advanced Solar Products |

| | |
|---------------------------|---|
| <p>Week 5 Feb. 24</p> | <ul style="list-style-type: none"> • Topic: An Industry Perspective on Energy and the Environment • Presenter: Dennis Hart, Executive Director, Chemistry Council of New Jersey • Topic: Climate Resilience: Swiftwater/Flood Rescue Team • Presenter: Brian Doel, Assistant Chief, Princeton Junction Volunteer Fire Company • QUIZ 1 |
| <p>Week 6 Mar. 2</p> | <ul style="list-style-type: none"> • Topic: Nuclear Fusion • Presenter: Andrew Zwicker, Head, Office of Communications and Public Outreach, Princeton Plasma Physics Laboratory. New Jersey Legislature – Assemblyman, Legislative District 16. • Topic: The Physics of Energy: • Presenter: Mike Hornsby • Topic: Review for Midterm • Presenter: Mike Hornsby |
| <p>Week 7 Mar. 9</p> | <ul style="list-style-type: none"> • Topic: Renewable Natural Gas • Presenter: Brian Blair, Chief Operating Officer, Trenton Biogas, LLC • Midterm Exam |
| <p>Mar. 16</p> | <p>Spring Break - No Class</p> |
| <p>Week 8 Mar. 23</p> | <ul style="list-style-type: none"> • Topic: Climate Change • Presenter: Bernadette Woods Placky, Chief Meteorologist, Climate Matters Director • Topic: The Economics of Energy Presenter: Mike Hornsby |

| | |
|-----------------------------|--|
| <p>Week 9 Mar. 30</p> | <ul style="list-style-type: none"> • Andrew Levitt, Sr. Business Solution Architect, Applied Innovation, PJM Interconnection: Electricity Transmission • Topic: Sustainable Jersey • Presenter: Randall Solomon, Executive Director (invited) |
| <p>Week 10 Apr. 6</p> | <ul style="list-style-type: none"> • Topic: Green Buildings - Energy Efficiency • Presenter: Wayne D. DeFeo, LEED AP USGBC NJ Executive Director • Electricity Generation (Fossil and Nuclear): Mark Scorsolini, PSEG Energy Resources and Trade |
| <p>Week 11 April 13</p> | <ul style="list-style-type: none"> • Topic: The Environmental Assessment of Energy Presenter: Mike Hornsby • Topic: Natural Gas & Electricity Transmission & Distribution Presenter: Paul Drake, Regional Public Affairs Manager, PSE&G |
| <p>Week 12 April 20</p> | <ul style="list-style-type: none"> • Topic: Microgrids: • Presenter: Mike Hornsby • Topic: Wholesale Electricity Markets and Energy Price Forecasting • Presenter: Joshua Danial, Power Analyst, North America, BloombergNEF |
| <p>Week 13 Apr. 27</p> | <ul style="list-style-type: none"> • Topic: Insurance Industry Perspective on Climate Change Presenter: Mark Bove, Natural Catastrophe Solutions Manager, Munich Reinsurance America, Inc. (invited) • Topic: Energy Planning– This session will provide an overview of the energy planning at a community, state or national level and will build on the energy, economic and environmental assessment tools that have been provided in previous sessions. • Presenter: Mike Hornsby |

| | |
|-----------------------------------|---|
| Week 14 Week of May 4, 2020 | <ul style="list-style-type: none">• Topic: Resilience Against Climate Change• Presenter: Mike Hornsby • Review for Final Exam |
| TBD | <p>Topic: Electric Vehicles</p> <ul style="list-style-type: none">• Presenter: Mike Hornsby |

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:

<http://www5.njit.edu/studentsuccess/disability-support-services/>

Statement on Academic Integrity

“Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: <http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu”