

San José State University
Environmental Studies Department
Energy & the Environment / **119**

Course and Contact Information

Instructor:	Benoit Delaveau, M.S, CEM, BEAP
Office Location:	WSQ115A (Not opened - COVID-19 campus policy)
Email:	benoit.delaveau@sjsu.edu (Use Canvas messaging)
Office Hours:	Office Hours: ALWAYS book me on: https://calendly.com/benoit-delaveau
Class Days/Time:	See your section on Canvas
Classroom:	See your section on Canvas
Prerequisites:	Passing the WST http://testing.sjsu.edu/wst/
GE/SJSU Studies Category:	Area R: Earth & Environment http://info.sjsu.edu/static/catalog/sjstudies.html

Faculty Web Page and MYSJSU Messaging

You are responsible for **daily** checking with the messaging system through MySJSU and Canvas. All course materials such as the syllabus, calendar, assignments, readings, and handouts are posted to canvas: <https://sjsu.instructure.com>. Log in with your SJSU One account info. For assistance see: <http://www.sjsu.edu/at/ec/support/>

Course Description

In this course you will be introduced to the nexus of social, technical, and environmental challenges to providing sustainable energy supplies and patterns of use. You will learn physical principles underlying power generation, conventional forms of energy and their social and environmental impacts, sources of renewable energy, and means to transition to more sustainable energy sources. The political, economic, cultural, historical, and policy dimensions of energy procurement, generation, and consumption will show how energy issues are entangled in deeper social and environmental contexts. Human civilization cannot continue using fossil fueled based energy at our present rate of consumption; we must look for ways to decrease and decarbonize our energy use.

This course is divided into five parts. Part I reviews energy generation and consumption patterns and the scientific principles related to energy, heat, and work. Part II of this course explores various sources of energy from conventional forms of energy generation and their social and environmental impacts. Part III focuses on renewables including solar, wind, biomass, wave, tidal, hydroelectric, and geothermal. Part IV centers on questions about making infrastructure more sustainable: food systems, transportation, and buildings. In part V, we will synthesize planning efforts and proposals for making sustainable energy transitions.

Course Goals

At the end of this course, students should be able to:

- Understand the nexus of energy challenges and relevant economic, social, and environmental issues.
- Describe the physical principles related to the energy, heat, power, and work
- Complete basic calculations / conversions in energy, heat, power, and work

Academic integrity: As part of the GE program, strict enforcement of SJSU Academic integrity rules will be enforced. See the University Policy at https://ischool.sjsu.edu/sites/main/files/file-attachments/academic_integrity_policy_f15-7_0.pdf?1539701808

Online tools and conduct

Technology Requirements: Students are required to have an electronic device other than a smartphone like a laptop,

University Policies

Academic integrity

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy F15-7 requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. Visit the Student Conduct and Ethical Development website for more information.

See here for other campus wide policies <http://www.sjsu.edu/gup/syllabusinfo/>

Grading – Exams

10% weekly Quizzes (about 12 mini-exams, in class, Canvas based and proctored) Quizzes are based on key concepts from either (1) the lecture slides (2) the assigned chapter of the text book (3) the assigned readings. Quizzes takes a maximum of 10 minutes of class time, and are always proctored using a Lockdown browser, with the student camera ON during class time.

10% online participation. The class will meet 28 times over the semester on Zoom. Each session, students are eligible to earn 2 participation points by asking a question once a week, bringing a comment to the class discussion, or being the “voice” of their working group. The recording of the lecture will be the proof material regarding the fairness of these point distribution. Follow you class participation grade after each lecture and make sure you are rewarded for doing your part. If you choose to not participate live during the Zoom lecture, you can also get a 2pt discussion grade per week by writing your entry on the week Canvas discussion board (or replying to another student entry).

20% Assignments: As part of the activities in this class, you will complete 3 graded assignments. Late assignments are ALWAYS accepted following these penalty rules: 1 week after due date of unexcused delay -25%, 2 weeks after due date -50%.

Assignment 1 – Unit conversions, power energy, energy/GHGs (SLO 1)

Assignment 2 – Energy and GHG problem sets (SLO 1 & 2)

Assignment 3 – Carbon footprint calculator (SLO 1, 2, & 3)

20% Midterm: Both the midterm and the final exams will be open notebook (your personal typed or handwritten notes). The exams will include short answers and essay questions. Your notebook could contain lecture notes and short annotations on the readings, but all will have to be & 2)

Determination of Grades

The course grade will be determined based on a total 100 possible points. Accumulated points that fall within the grade scale below determine your semester grade.

A+ 97–100

A 92–96

A- 89–91

B+ 86–88

B 81–85

B- 79–80

C+ 76–78

C 72–75

C- 69–71

D+ 67–68

D 64–66

D- 60–64

F < 60

- NO Extra Credit available (given the workload to deal with in this class).

Grading Information for upper division GE courses (R, S, V)

“Passage of the Writing Skills Test (WST) or ENGL/LLD 100A with a C or better (C- not accepted), and completion of Core General Education are prerequisite to all SJSU Studies courses. Completion of, or co-registration in, 100W is strongly recommended. A minimum aggregate GPA of 2.0 in GE Areas R, S, & V shall be required of all students.”

Primary sources for your Final Paper

(choose one book to read over the semester - most can be checked at SJSU library)

“Big Coal, The Dirty Secret Behind America’s Energy Future” by Jeff Goodwell

“Dark Money, The Hidden History of the Billionaires Behind the Rise of the Radical Right” by Jane Mayer

“Energy, The Making of the Atomic Bomb, a Human History” by Richard Rhodes

“The Water Will Come, Rising Sea, Sinking Cities and the Remaining of the Civilized World” by Jeff Goodwell

“Cadillac desert: The American West and it’s Disappearing Water” by M. Reisner

"Colossus. Hoover Dam and the Making of the American Century" by Michael Hiltzik

“Green Illusions, the Dirty Secret of Clean Energy and the Future of Environmentalism” by Ozzie Zehmer

“Autonomy, The Quest to Build the Driverless Car and How it Will Reshape our World” by Lawrence D. Burns

"Faster, Higher, Farther. The (Clean Diesel) Volkswagen Scandal" by Jack Ewing

"High Voltage. The Fast Track to Plug-in the Auto Industry" by Jim Motavalli

"Bottled Lightning. Superbatteries, Electric cars and the New Lithium Economy" by Seth Fletcher

“The Great Transition, Shifting from Fossil Fuels to Solar and Wind Energy” by Lester R. Brown

"Reinventing Fire. Bold Business Solutions for the New Energy Era" by Amory B. Lovins

“Solar Power. Innovation, Sustainability and Environmental Justice” by Mulvaney

"A fierce Green Fire" by Philip Shabecoff

"Toward a Zero Energy Home. A complete Guide to Energy Self-Sufficiency at Home" by David Johnston & Scott Gibson

"Let it Shine, The 6,000-year Story of Solar Energy" by John Perlin

Course Schedule

Due to the possibility of changes, always refer to the electronic schedule on Canvas

/2 Coal Energy (Q/A) + Quiz 3

Keywords & concepts: Coal: regions, uses, sources, formation, Carboniferous period, labor hazards, noxious gases, mountain top removal, coal surface mining. China, export terminals, coal-to-liquids, syngas, clean coal, CCS

9/9 Group Workshop on assignment #1 - **Assignment 1 due + Final Paper List explained**

9/14 Natural gas Energy (Lecture)

Read (at home): Vaclav Smil. 2012. Placing American gas boom in perspective. May 3, 2012.

Q.

Keywords & concepts: politics of reserve estimates, Marcellus Shale, impacts to water, natural gas and energy security.

9/16 Natural gas Energy + Quiz #4

Read (in Class): Chris Mooney. 2011. The Truth About Fracking. November: 80–5

Q.

Keywords & concepts: natural gas production, horizontal slant drilling, hydraulic fracturing, shale, water impacts, risks to drinking water, heating value, chemical energy, heat of combustion

9/21 Petroleum Energy (Lecture) - **Assignment 2 due**

Read (at home): John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 13, Transportation Energy and efficient vehicles. p. 491-519

Read (in class): Vaclav Smil. 2011. America's oil imports: A self-inflicted burden. 101:1-4.

Q.

Keywords & concepts: Oil & petroleum consumption & production trends, oil impacts, unit: tons of oil equivalent, air pollution & photochemical smog from combustion

Additional, optional information

Global Air Pollution Down to the Neighborhood Level: <http://www.citylab.com/weather/2015/08/mapping-global-air-pollution-down-to-the-neighborhood-level/400337/>

9/23 Petroleum Energy + Quiz #5 + **Final Paper Student presentation (4 students)**

Read (in class): Jeremy Miller. 2011. The Colonization of Kern County: A story of oil and water. Orion Magazine. January/February.

Q.

9/28 Clean Vehicles: EVs & Hydrogen (Lecture)

Read (at home): John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 13, Transportation Energy and efficient vehicles. p.519-538

Keywords: BEV, Hybrid cars, CAFÉ

9/30 Clean Vehicles: EVs & Hydrogen + Quiz 6 + Final Paper Student presentation (4 students)

Read (in class): tbd

10/5 Carbon Footprint (Lecture)

Read: Jessica Grady-Bensona and Brinda Sarathyb. 2015. Fossil fuel divestment in US higher education: student-led organising for climate justice.

Q.

Keywords & concepts: Carbon Emissions Factor, divestment movement

10/7 Carbon Footprint + Workshop on Assignment #3 + Quiz 7

10/12 Nuclear Power (Lecture) + Assignment 3 Due

Read (at home): John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 9, Nuclear Power. p.374-376

Read (in class): Charles Perrow. 2013. Nuclear Denial: From Hiroshima to Fukushima. Bulletin of the Atomic Scientists. 65(5).

Q. What is being denied with nuclear denial?

Keywords & concepts: Sources of nuclear power, nuclear waste, low level radiation, yellow cake, Uranium 235/U238.

10/14 Nuclear Power + Quiz 8 + Final Paper Student presentation (4 students)

Read (in-class): Philippe Boudes. “Nuclear Power” In Mulvaney 2011.

SAGE

Q. Is Nuclear a Green, Sustainable, or Renewable Energy?

Read: Alexander Cockburn. 2011. In Fukushima's Wake: How the Greens Learned to Love Nuclear Power. 68: 75–79.

Q. Why do the greens love nuclear power? What are the consequences of their support for nuclear?

Keywords & concepts: Yucca Mountain, passive design, Chernobyl, Three Mile Island, sources of nuclear fear.

10/19 Hydro-Power (Lecture)

Read (at home): John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 4, Section 4.3.3. p., 125–127.

Q.

Read: Paul Robbins 2012. "Hydro-Electric Power." In Mulvaney 2012. Publications.

SAGE

Q.

Keywords & concepts: Hydro-electric power, challenges building dams, different kinds of dams.

10/21 **Hydro-Power + Quiz 9 + Final Paper Student presentation (4 students)**

Read: Marc Reisner. 1993. Chapter 4. An American Nile. Cadillac Desert: The American West and its Disappearing Water. Penguin, New York.

Q. What were some of the challenges encountered at Boulder Canyon?

10/26 **Midterm Review Session Workshop**

10/28 **Midterm Exam (proctored on Canvas, live)**

11/2 **Part III. Renewable energy, Wind Energy (Lecture)**

Read (at home): John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 12. Pp. 461-482

Q.

Keywords & concepts: Wind Power Basics, Power potential

11/4 **Wind + Quiz 10**

Read (in class): Roopali Phadke. 2013. Public Deliberation and the Geographies of Wind Justice. 22(2): 247–255.

Q.

Keywords & concepts: Wind Power, siting challenges, ecological compatibility, the social gap in renewable energy

11/9 **Solar Energy Passive design (Lecture) + Assignment 4 due**

Read (at home): John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 7. Hydro-el

11/23 Life Cycle Assessment (Lecture)

Read (at home): John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 5. Energy Analysis and Lifecycle Assessment.

Q.

Keywords & concepts: Life Cycle Analysis, EROI, EPBT for PV and Wind

11/30 Biofuels, low carbon and carbon negative fuels (Lecture)

Read (at home) : John Randolph and Gilbert Masters. 2011. Energy for Sustainability. Chapter 14. Biofuels Biomass and other alternative fuels.

Keywords & concepts: Second, Third Generation biofuels, water use, water quality.

12/2 Biofuels, low carbon and carbon negative fuels + Quiz 12 + **Final Paper Student presentation (4 students)**

Read (in class): M. Fatih Demirbas. 2011. Biofuels from algae for sustainable development. 88: 3473–3480.

Q.

Keywords & concepts: Second, Third Generation biofuels, water use, water quality.

12/7 Energy Efficiency and Conservation **Final paper due**

Read (at home): John Randolph and Gilbert Masters. 2011. Market transformation to sustainable energy. Ch. 16

Read (in class) : Tom Dietz. 2015. Altruism, self-interest, and energy consumption. Proceeding of the National Academies of Sciences. 112(6): 1654–1655.

Q.

Keywords & concepts: Energy use & conservation

Review session final exam (?)

Final exam:

<https://www.sjsu.edu/classes/final-exam-schedule/fall-2020.php>

ENVS/ENGR 119-01 (MW 10:30-11:45am), Monday December 14, 9:45am-Noon

ENVS/ENGR 119-02 (MW Noon-1:15pm), Wednesday December 9, 9:45am-Noon