

GLY 3039
Energy, Resources, and Environment
Spring 2022
Revised for the COVID-19 Crisis

Syllabus (modified Feb 21, 2022)

GLY 3039-0001

Credit hours: 3

Lectures: in-person (HCB 0209) and online with ZOOM in Canvas.

Time: Tuesday and Thursday 11:35 a.m. - 12:50 p.m.

Instructor: Ahmed S. Elshall

Office: EOAS Building 3013

Email: aelshall@fsu.edu

Course Description

This course is designed for undergraduates with varied levels of scientific preparation, interested in a comprehensive survey of the scientific issues of the origin, extraction, and environmental impact, of Earth's energy resources. The course is open to both Geology and Environmental Science majors, and to majors in the areas of Environmental Studies, Environmental Law, Public Administration and Policy, Business Administration, Public Administration, and Economics. The energy demands of a modern society will be examined, and the supply of energy resources presented. The carbon cycle is developed to understand the storage of organic and inorganic carbon in the Earth, and the geology of fossil fuels (coal, oil and natural gas) will be presented. The course will examine the environmental impacts of extracting fossil fuel resources and their use in the on-going Industrial Revolution, the historic and continued availability of these resources, and other issues confronting a growing human population seeking to attain or maintain a 21st century standard of living. The scientific basis of global climate change, CO₂ sequestration, fracking, and other environmental consequences of Human-Earth interactions will be explored. The shift to a zero-carbon source and "green" energy future will be presented. Renewable energy sources (e.g., solar, wind and biofuels) will be explored to see how these resources could supply the growing demand for energy. The rate at which renewable resources are being brought into play will be examined to see if they are on track to reduce greenhouse emissions rapidly enough to forestall the worst impacts of climate change. This course is centered around your participation. In a politically charged environment on climate and energy, this course is not an endorsement of a set of ideals. This course is place where all perspectives and ideas are respected, but you need to support your arguments with evidence. The course emphasizes the importance of **critical thinking** skills over **content knowledge**, which is changing rapidly in the energy transition that we are currently experiencing.

Prerequisites: Chem I and II (CHM 1045, CHM 1046, or equivalent), or consent of the instructor.

Course Mechanics

The course material will consist of lectures involving both Powerpoint™ and whiteboard presentations, and video (DVD or YouTube) footage. Discussion of the subject matter in class is strongly encouraged. The subject matter can be provocative at times. The opinions expressed in the DVDs and videos are those of the producers or their guests, and in books are those of the authors, not those of the instructor. Exposure to these ideas is intended to generate discussion and critical examination of the ideas we all hold on our energy future. The exams are designed to test for content knowledge, problem-solving skills and critical analysis of information.

For Spring 2022, lectures will be delivered in **hybrid mode**. Each student is offered the opportunity to attend classes in person. Any student not interested in the in-person experience, will be taking the class synchronously by ZOOM. Course content will be delivered online using ZOOM for teleconferencing. Powerpoints will be posted on Canvas. The online lectures will be recorded in ZOOM and available for asynchronous learning.

ZOOM: you will see ZOOM showing up in the left hand menu bar on your Canvas home page for this course. You may have to activate your account. Once you sign in you will note that I have set up the session so that you can join even before I do, just as you can sit in class before I arrive. ZOOM has a chat function with which you can send questions, and I will pause to answer these questions from time-to-time.

Top Hat: We will be using **Top Hat Pro** (www.tophat.com) for class participation. You will be able to submit answers to quizzes, etc., using Apple or Android smartphones and tablets, laptops, or through text messages. **If you signed up for GLY 3039 by the end of last semester, you should have gotten an email invitation asking to sign up with Top Hat.** The service is free for the first week so if you decide not to use it there should be no cost to you. For instructions on how to create a Top Hat account and enroll in this Top Hat Pro course, please refer to the invitation sent to your school email address or consult Top Hat's Getting Started Guide (<https://bit.ly/3ITGMlw>).

If you already have a Top Hat account, go to <https://app.tophat.com/e/578675> to be taken directly to our course. If you are new to Top Hat, follow the link in the email invitation you received or...

- Go to <https://app.tophat.com/register/student>
- Click "Search by school" and input Florida State University,
- Search for this course with the following join code: **578675**

If a paid subscription is required, it will be listed at checkout.

Should you require assistance with Top Hat at any time please contact their Support Team directly by email (support@tophat.com), the in-app support button, or by calling 1-888-663-5491. Specific user information may be required by their technical support team when troubleshooting issues.

Class schedule: classes meet twice weekly (11:35 am – 12:50 pm), in hybrid mode (online and in-person).

Date	Lecture topic
Week 1: Jan. 6 (hybrid)	Introduction
Week 2: Jan. 11, 13 (hybrid)	The Carbon Cycle
Week 3: Jan. 18, 20 (hybrid)	Formation of petroleum
Week 4: Jan. 25, 27 (hybrid)	Petroleum extraction
Week 5: Feb. 1, 3 (hybrid)	Oil supply
Week 6: Feb. 8, 10 (hybrid)	Exam 1* (and optional review session) Unconventional oil
Week 7: Feb. 15, 17 (hybrid)	Natural gas and fracking
Week 8: Feb. 22, 24 (hybrid)	Natural gas and fracking
Week 9: Mar. 1, 3 (hybrid)	Coal and clean coal
Week 10: Mar. 8, 10 (hybrid)	Climate effects of fossil fuels
Week 11: Mar. 15, 17	Spring Break. No classes
Week 12: Mar. 22, 24 (hybrid)	Exam 2* (and optional review session) Greenhouse gases;
Week 13: Mar. 29, 31 (hybrid)	Greenhouse warming; Global temperatures and ice melting;
Week 14: Apr. 5, 7 (hybrid)	Sea level rise, droughts, hurricanes, wildfires; Carbon footprints
Week 15: Apr. 12, 14 (hybrid)	Solar Energy; Wind Energy
Week 16: Apr. 19, 21 (hybrid)	Emission Controls and stabilization concepts Exam 3* (and optional review session)
Week 17: Apr. 25 (online)	Final Exam: 10:00-12:00 pm

* This is a take-home exam that will be assigned after the class, which would be an optional review session (i.e., no attendance will be taken).

Course texts:

Edmond A. Mathez and Jason E. Smerdon (2018), *Climate Change The Science of Global Warming and Our Energy Future*, 2nd Edition, Columbia University Press, New York, 503 pp.

In the interest of making textbooks affordable and accessible to all students, FSU Libraries has acquired an e-book license to the contents of this text with unlimited users (UU). The text should be accessible from the Canvas course site.

Interesting popular reading:

- Daniel Yergin (2009) *The Prize: The Epic Quest for Oil, Money and Power*, Free Press, New York, pp. 908.
- Tom Wilbur (2012) *Under the Surface: Fracking, Fortunes, and the Fate of the Marcellus Shale*, Cornell University Press, Ithaca NY, pp. 272. An excellent investigative account of the opening of the gas boom in Pennsylvania that explores the issue from the perspectives of locals, drillers, farmers, environmental enforcers and other vested groups.

- Kenneth S. Deffeyes (2001) *Hubbert's Peak: The Impending World Oil Shortage*, Princeton University Press, Princeton NJ, 208 pp.
- Jeff Goodell (2006) *Big Coal: The Dirty Secret Behind America's Energy Future*, Mariner Books, New York, pp. 324.
- Jeff Goodell (2010) *How To Cool The Planet: Geoengineering and the Audacious Quest To Fix Earth's Climate*, Houghton Mifflin Harcourt, New York, pp. 248.
- Jeff Goodell (2017) *The Water Will Come: Rising Seas, Sinking Cities, and the Remaking of the Civilized World*, Little, Brown and Co., New York, pp. 340.
- Tom Zoellner (2009) *Uranium: War, Energy, and the Rock that Shaped the World*, Viking (Penguin), New York, 337 pp.

Footage from the following DVDs may be shown in the class:

- Switch: Discover the future of Energy (2013) 98 mins., Arcos Films LLC.
- Crude (2008), The History Channel: a history of oil with vignettes from discovery and exploration to its geological origins and modern usage.
- Gasland I and II (2010; 2013): An exploration of the fracking industry and the serious environmental consequences involved
- Coal Country (2009), Evening Star Productions: on the practice of mountain-top removal and its impact in the Appalachians. 85 minutes.
- Fuel (2010), 112 mins., Josh Tickell Films, <http://www.cinematlibrestudio.com>: about petroleum and biofuels with strong advocacy of biofuels renewable energy.
- Renewable Energy (2006), 50 mins., The History Channel: how to harness energy from solar, wind, geothermal, tidal and biomass sources.
- The Burden: Fossil Fuel, The Military and National Security (2015) 40 mins., a Roger Sorkin film on the military cost of fossil fuels and the Pentagon's efforts in renewables. http://www.theburdenfilm.com/get_the_film
- Inside Japan's Nuclear Meltdown: Frontline, story on the Fukushima-Daiichi nuclear reactor accident in the aftermath of the Tohoku earthquake in Japan. <http://www.pbs.org/wgbh/pages/frontline/japans-nuclear-meltdown/>, 54 mins.

Attendance: Attendance will be taken in Top Hat. The material presented in lectures, not the text, is the ultimate source of material on which students will be examined.

Homeworks: There will be four homework problem sets assigned, each worth 4 points (total 16 points). The homework is designed to teach you how to handle some important calculations in the Energy class. I will go over the calculations in class before the homework is due.

Quizzes: Quizzes will be taken using Top Hat (24 points) for lecture-based material. You will receive points for participation, and points for correct answers.

Exams: There will be three exams to test comprehension of subject material, each worth **18 points**. The course material is divided into three parts consisting of 8-9 lectures, each followed by an exam. There will be no make-up exams for this course. **Due to the Covid pandemic, the exams will be take-home exams, posted on Canvas and due 48 hours after being assigned on the due date.** The exam dates for this semester are:

Exam 1: Feb. 08, take-home
Exam 2: Mar. 22, take-home
Exam 3: Apr. 21, take-home

The Final Exam (**6 points**) will follow the Registrar's Calendar for Final Examinations (https://registrar.fsu.edu/registration_guide/spring/exam_schedule/), and for this course is scheduled for **Monday, April 25, 2022, at 10:00 a.m.**

Final Exam*: April 18, 10:00 a.m. - 12:00 p.m., only offered online on Top Hat

Grading: The relation between grade and cumulative score (Exams + **Final** + lecture quizzes + **homework**: $54+6+24+16=100$) is shown below:

Grade	Cumulative Score
A	92 and above
A-	89-91
B+	86-88
B	79-85
B-	76-78
C+	73-75
C	67-72
C-	64-66
D+	61-63
D	55-60
D-	51-54
F	<51

There is no +/- for F.

Canvas™: We will use Canvas to post Powerpoint™ presentations, supplemental material, and grades, make announcements, etc. To learn about the features of Canvas see instructions at <https://fsu.instructure.com/courses/15>.

Recording of lectures: Lectures will be recorded online and posted on Canvas.

Office Hours:

Ahmed S. Elshall: Thursday 9:00 – 11:00 a.m. Please feel free to stop by my office at any time. To schedule an **online** appointment, please email aelshall@fsu.edu. Please make sure to put “GLY 3039” in the email subject heading to receive attention.

TA:

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For more information, see the [FSU Copyright Guidelines](#).

University Attendance Policy

Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

Academic Honor Policy

The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to "...be honest and truthful and...[to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at <http://fda.fsu.edu/Academics/Academic-Honor-Policy>)

Americans With Disabilities Act

Florida State University (FSU) values diversity and inclusion; we are committed to a climate of mutual respect and full participation. Our goal is to create learning environments that are usable, equitable, inclusive, and welcoming. FSU is committed to providing reasonable accommodations for all persons with disabilities in a manner that is consistent with academic standards of the course while empowering the student to meet integral requirements of the course.

To receive academic accommodations, a student:

- (1) must register with and provide documentation to the Office of Accessibility Services (OAS);
- (2) must provide a letter from OAS to the instructor indicating the need for accommodation and what type; and,

(3) should communicate with the instructor, as needed, to discuss recommended accommodations. A request for a meeting may be initiated by the student or the instructor.

Please note that instructors are not allowed to provide classroom accommodations to a student until appropriate verification from the Office of Accessibility Services has been provided.

This syllabus and other class materials are available in alternative format upon request.

For more information about services available to FSU students with disabilities, contact:

Office of Accessibility Services
874 Traditions Way
108 Student Services Building
Florida State University
Tallahassee, FL 32306-4167
(850) 644-9566 (voice)
(850) 644-8504 (TDD)
oas@fsu.edu

<https://dsst.fsu.edu/oas>

Syllabus Change Policy

Except for changes that substantially affect implementation of the evaluation (grading) statement, this syllabus is a guide for the course and is subject to change with advance notice.