



Course Syllabus Version 2.1

PHY 1038: Physics of Energy, Climate Change, and the Environment Fall 2022

This is a Mixed Mode Course - Instruction is Online and in Class

Professor: Dr. Josh Colwell

Office: Physical Sciences Building (PSB) 430

Contact info: Message within webcourses or e-mail josh@ucf.edu
Telephone: 407-823-1882.

Office hours: Mondays 3:00-4:00 p.m., Tuesdays 10:30-11:30 a.m., and by appointment. All office hours are in person with a zoom option unless announced otherwise.

Office Hour Zoom Location: 971 8958 2432, passcode 346057.

Website: Class notes, grades, and announcements will be made on webcourses.

Classroom: MSB 359 Tuesdays 9:00 - 10:20 a.m.

Enrollment Requirements: This course has no prerequisites.

See Webcourses Syllabus page for complete syllabus information. The course content schedule is listed here.

Schedule

The course schedule shows the assignments and quizzes within each module and the associated student learning outcomes (LOs) listed above, as well as whether the assignment is part of the Integrated-Learning Experience (IE). **Due dates for specific assignments and quizzes are always on the webcourses calendar. The dates for each module are for planning purposes only.**

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Dates	Module	Assignments
Aug. 22 - Aug. 28	1: Introductions, Reading Graphs, Quantitative Reasoning Refresher, and the History of the Universe! EEC Chapter 1.	- Webcourses Quiz: Syllabus and Introductory Video. - Assignment 1: Interpreting visual displays of data and information. (Ungraded) LO: 1, 10, 11 - Assignment 2: Environmental Performance Index. IE. LO: 1, 10, 14
Class August 23	Overview. Logistics. Graphs. Unit Conversions.	Demonstrations: M93, M100
Aug. 29 - Sep. 6	2: Work, Energy, and Power. The physics of energy. EEC Chapters 2-3. SE Chapters 1-3.	- Webcourses Quiz: Energy and Power. - Assignment 0: Begin your Physics in My Life Reflection Discussion. IE. LO: 8, 12, 13, 14. - Assignment 3: Working with units, energy, and power. IE. LO: 2, 13 - Assignment 4: My Carbon Footprint. IE. LO: 1, 2, 8, 12, 14
Class August 30	Energy and Power worksheet (Assignment 3).	Demonstrations: M75, M12
Class Sep. 6	Thermodynamics (Assignment 5).	Demonstrations: T314, T293, T294, T286
Sep. 7 - Sep. 16	3: Thermodynamics and Heat. EEC Chapter 4. SE Chapter 7.	- Webcourses Quiz: Thermodynamics. - Assignment 5: Applications of Thermodynamics to Problems in Energy Use. IE. LO: 2, 3, 4, 8, 20
Class Sep. 13	More Thermodynamics	Demonstrations: T298, T304
Sep. 17 - Sep. 20	4: Fossil Fuels. EEC Chapters 5-6. SE Chapter 23.	- Webcourses Quiz: Fossil Fuels. - Assignment 6: Air Quality Index. IE. LO: 1, 2, 5, 8, 14
Class Sep. 21	Fossil Fuels	Demonstrations: EM412, EM413, EM424, EM426

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Dates	Module	Assignments
Class Sep. 27 Mid-term Exam 1	Modules 1-4	All material covered in modules 1-4.
Sep. 29 - Oct. 6	5: Nuclear Power. EEC Chapter 7. SE Chapter 24.	- Webcourses Quiz: Nuclear Power. - Assignment 7: Researching U.S. Energy Trends. IE. LO: 1, 4, 5, 10, 12, 14
Class Oct. 4	Review, Global Climate sneak peak, and hurricanes. Nuclear Power	Demonstration: radioactive decay.
Oct. 7 - Oct. 16	6: Direct Solar Power and Physics of Light. EEC Chapter 9 and Supplementary Material. SE Chapter 6.	- Webcourses Quiz: Light and Solar Power. - Assignment 8: Assessing the Solar Power Resource. LO: 1, 4, 5, 8, 12, 14
Class Oct. 11	Light	Demonstrations: T309, EM446, 449
Oct. 17 - Oct. 24	7: Indirect Solar Power - Wind and Hydropower. EEC Chapter 10. SE Chapters 4, 8, 10, 12, 14.	- Webcourses Quiz: Indirect Solar Power. - Assignment 9: Assessing the Indirect Solar Power Resources. LO: 1, 2, 3, 4, 5, 8, 12, 14
Class Oct. 18	Wind and Hydropower	Demonstrations: Lava lamp. F217
Class Oct. 25	Review and practice problems for Modules 5-7	Demonstrations: Spectroscopy. IR Camera.
Oct. 25 - Nov. 1	Catch up on modules 5-7.	- Assignment 10: Explain the Promises and Challenges of Direct and Indirect Solar Power. IE. LO: 1, 2, 3, 4, 5, 6, 10, 12, 13
Class Nov. 1 Mid-Term Exam 2	Modules 5-7	Bring calculator, pink scantron, pencil and eraser.

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Dates	Module	Assignments
Nov. 4 - Nov. 15	8: Electricity. EEC Chapter 11. SE Chapters 22, 26.	- Webcourses Quiz: Electricity. - Webcourses Quiz: Earth's Climate. - Assignment 11: Explain the Greenhouse Effect. IE. LO: 1, 2, 3, 6, 7, 12, 13
Class Nov. 8	9: Earth's Climate and the Greenhouse Effect. EEC Chapters 12-13. Energy balance and the Carbon cycle. Greenhouse Effect	Demonstrations: EM440, EM444, EM352, EM353
Nov. 16 - Nov. 28	10: Evidence and Modeling of Climate Change. EEC Chapters 14-16.	- Webcourses Quiz: Climate Change and Scientific Models. - Assignment 12: A Simple Climate Change Model. LO: 2, 7, 8, 9
Class Nov. 15	Climate Change	Greenhouse effect model interactive worksheet (Assignment 12)
Nov. 29 - Dec. 5	11: Summative Reflection and the Future. SE Chapters 18, 29-32.	- Webcourses Quiz: Course Evaluation (ungraded). - Assignment 13: Physics in My Life. IE. LO: 8, 12, 13, 14
No Class Nov. 22	No Class Nov. 22	No Class Nov. 22
Class Nov. 29	Review	
Dec. 6, 2022	Cumulative Final Exam	All Course Materials.

EEC refers to Energy, Environment, and Climate by Richard Wolfson. SE refers to Sustainable Energy: Without Hot Air, the free downloadable book.

We may adjust the schedule according to how long it takes us to cover each chapter, but exam dates will not change unless there is a major disruption such as a hurricane.

Reminder: if you have questions, please ask. If you don't understand the material: see me in office hours; make an appointment if you cannot make office hours; study with your peers.

One Last Item:

This syllabus is subject to change. The latest version will always be available on Webcourses.

[Revision history: v1.0, Aug. 4, 2022.

v2.0, Oct. 3, 2022. Date revised for exam 2 due to disruption caused by hurricane Ian.

v2.1, November 7, 2022. No Class on November 22.]