

ENGR 1559 / GSVS 2050
Introduction to Sustainable Energy Systems

Course details: Tuesday, Thursday 2 – 3:15 p.m. 3 credits
collab.itc.virginia.edu

Course instructor: James Groves (jgroves@virginia.edu)

COURSE OVERVIEW

Brief Description

This course will provide students with a cross-disciplinary perspective on the complex challenge of human-centered energy use. The course will explore current energy practices and emerging sustainable energy system strategies. It will consider the barriers to deployment of sustainable strategies, from the local to global scale. As our global community grapples with the broad impacts of human development upon our Earth system, this course investigates one major source of such impact – energy consumption to fuel human activity.

Pre- or co-requisite courses or topics

This course is open to all undergraduates at the University of Virginia.

INSTRUCTIONAL MATERIALS

Readings will be assigned and provided on a weekly basis. In addition, students may find the following references helpful.

Sustainable Energy without the Hot Air

David J.C. MacKay, UIT Cambridge England, ISBN 978-0-9544529-3-3

Available free online at: <https://www.withouthotair.com/>

An Introduction to Sustainable Energy Systems web site

John C. Bean, University of Virginia

Available free online at: http://wecanfigurethisout.org/ENERGY/Energy_home.htm

LEARNING OBJECTIVES

1. Students will learn and be able to use the units, magnitudes and terminology of major and emerging energy systems. They will be able to do basic unit conversion, express energy magnitudes in the appropriate units, and be able to use energy terminology appropriately and in context, including such terms as energy, power, and capacity factor.
2. Students will develop a foundational understanding of energy and energy system life cycles and demonstrate an ability to complete a high-level assessment of the sustainability and financial viability of a given energy choice.
3. Students will demonstrate a foundational understanding of the U.S. electrical grid and its management. They will develop a basic appreciation for the opportunities and challenges associated with integrating new and emerging sustainable energy solutions into the grid.

4. Students will demonstrate an understanding of the magnitude of human energy use. They will develop a high-level understanding of energy use across transportation, industrial, commercial, and residential sectors of the economy. They will be able to estimate the ability of different energy sources to meet that demand.
5. Students will demonstrate a deep understanding of a selected sustainable energy system-related challenge space of their choice. They will describe the key elements of their challenge space. They will be able to articulate clearly and concisely how their selected challenge fits into the broader challenge of supplying sustainable energy to society, today and into the foreseeable future.

ASSESSMENT & MEASUREMENT

How course outcomes will be assessed

Personal Energy Audit (10%)

Homework Quizzes (20%)

Concept and Vocabulary Quizzes (15%)

Individualized Learning Paper

Mid-term Paper Prospectus (10%)

Final Paper (20%)

Final Exam (20%)

Class Participation (5%)

Late policy

All graded assignments in ENGR 1559 / GSVS 2050 will have specific due dates and times listed in the weekly handouts provided by your instructor. Untimed assignments may be turned in up to 72 hours after the assigned due date and time. When such assignments are turned in late (by any amount of time), a 15% grade penalty will be assessed. After a student misses the 72 hour “late submission” window, assignments may be turned in at any time before the official end of the semester, receiving a 50% grade penalty.

Course grade scale

A+	> 97%	B+	87 – 90%	C+	77 – 80%	D+	67 – 70%
A	93 – 97%	B	83 – 87%	C	73 – 77%	D	63 – 67%
A-	90 – 93%	B-	80 – 83%	C-	70 – 73%	D-	60 – 63%
F	<60%						

LEARNING COMMUNITY INTERACTION & ENGAGEMENT

Individual student engagement

Your success in this course will depend on *your* individual efforts and on *our* ability to work together to build a cooperative learning environment. Questions and sharing of beliefs, opinions, and feelings are strongly encouraged. In order to maximize our learning, we will need to create a safe community in which we will feel comfortable sharing thoughts and ideas even when those

thoughts and ideas are not in full agreement with the thoughts of others in the course. Achieving a safe learning environment requires practice and effort. It will require each of us to behave professionally and respectfully at all times, and to adhere to our course norms. As you learn in this course and learn about your classmates, you are encouraged to respect and appreciate differences.

Learning community values

Meaningful and courteous dialogue is expected in this course. Healthy dialogue will require a degree of respectful understanding and a willingness to listen to all course participants. You may not agree with another person's point-of-view, or you may already understand a concept and feel frustrated with the pace of class discussion at times. Give others a chance to contribute and learn. Encourage one another politely. Seek to understand and appreciate the ideas of others. Learn from one another. Be patient and encouraging as we *all* seek to advance our knowledge of important sustainable energy system concepts. Since every student is entitled to full participation in this course without interruption, all students are expected to come to class sessions prepared and on time. You are always expected to refrain from undertaking any activities that might be considered disruptive.

Class schedule and time commitment

This course is a 3 credit hour course at the University of Virginia. Students should understand that the U.S. federal government mandates a certain *minimum* student workload for each credit hour earned while in college. By the federal definition, a credit hour is an amount of work that reasonably approximates *not less than* one hour of classroom or direct faculty instruction and a minimum of two hours of out of class student work each week for approximately fifteen weeks for one semester hour of credit, or the equivalent amount of work over a different amount of time. Students who spend less than the minimum should have no expectation of passing the course.

Use of email

Your instructor will seek to minimize the number of course related messages sent to you by email. Still, email messages to the class and to individual students will be necessary from time-to-time. Your instructor expects that you will check your university email account at least one time each day, Monday – Friday during the semester. If an email includes a specific request for a response, it is your instructor's expectation that you will respond in no more than two business days from the time that the email was *sent* to you (not from the time that you read the email). Failure to read and respond to emails from your instructor in a timely manner (as defined above) will have a negative impact upon your class participation grade.

Respect and safety

Your instructor is committed to supporting and encouraging students, staff, and faculty to take responsibility for safety on our campus. If you or someone you know experience stalking, partner violence, or sexual assault, please remember that you (or he or she) is not alone. If for any reason you do not feel safe in class, on grounds, or in your personal life, then please do not hesitate to contact your instructor or the Student Health Center. Counseling and Psychological Services (CAPS) is available for all students. Call 434-243-5150 (or 434-972-7004 after hours

and weekend) to get started and to schedule an appointment. Call Madison House's HELP Line at 434-295-8255, if you prefer to speak anonymously and confidentially. If you or someone you know is struggling with gender, sexual, or domestic violence, there are many community and University of Virginia resources available to help you. The Office of the Dean of Students, Sexual Assault Resource Agency (SARA), Shelter for Help in Emergency (SHE), and the UVA Women's Center are excellent resources for both men and women. Contact the Director of Sexual and Domestic Violence Services at 434-982-2774.

Special Needs

It is the policy of the University of Virginia to accommodate students with disabilities in accordance with federal and state laws. Any student with a disability who needs accommodation (e.g., in arrangements for seating, extended time for examinations, or note-taking, etc.), should contact the Student Disability Access Center (SDAC) and provide them with appropriate medical or psychological documentation of his/her condition. Once accommodations are approved, it is the student's responsibility to follow up with the instructor about logistics and implementation of accommodations. Accommodations for test taking should be arranged at least 14 business days in advance of the date of the test(s). Students with disabilities are encouraged to contact the SDAC: 434-243-5180/Voice, 434-465-6579/Video Phone, 434-243-5188/Fax. Further policies and statements are available at www.virginia.edu/studenthealth/sdac/sdac.html

Honor code

The University of Virginia relies upon and cherishes its community of trust. Your instructor firmly endorses, upholds, and embraces the University of Virginia's Honor principle that students will not lie, cheat, or steal, and we expect all students to take responsibility for the System and the privileges that it provides. I recognize that even one Honor infraction can destroy an exemplary reputation that has taken years to build. Acting in a manner consistent with the principles of Honor will benefit every member of the community both while enrolled in this course and in the future.

If you have questions about the Honor System or would like to report suspicions of an Honor offense, please contact your instructor. For more information on the UVA Honor System, please visit the following web resource: <http://www.virginia.edu/honor/>