



A. JAMES CLARK SCHOOL OF ENGINEERING

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

ENGINEERING FOR SUSTAINABILITY ENCE215 COURSE SYLLABUS, FALL 2020

Instructor: Natasha Andrade, Ph.D.
Email: nandrade@umd.edu
Office: 0160 Glenn L. Martin Hall
Office Hours: Tu/Th 11:00am–12:00pm

Sections:
Section 0101 – Tu/Th 9:30am–10:45am
Section 0201 – Tu/Th 2:00pm–3:15pm
Section 0301 – Tu/Th 8:00am–9:15am

Classes will be a mixture of asynchronous and synchronous, fully online with no in-person component.

COURSE RELATED POLICIES

It is the student's responsibility to understand their rights and responsibilities as expressed in the policies. Policies relevant to Undergraduate Courses are found here: <http://ugst.umd.edu/courserelatedpolicies.html>. Topics that are addressed include academic integrity, student and instructor conduct, accessibility and accommodations, attendance and excused absences, grades and appeals, copyright and intellectual property. Students will also find valuable resources to support academic success, as well as overall health and well-being.

COURSE DESCRIPTION

This course provides a review of physical, chemical, and ecological principles used to examine interactions between humans and the environment, as they relate to the field of civil engineering. The fundamental concepts are taught using analytical and computational methods, which are necessary for designing and analyzing the sustainability of various engineering processes and technologies. The course also provides background needed to think critically about environmental sustainability and its relation to: energy, material choice, infrastructure design, water and atmospheric resources, human population growth, and resource consumption.

Prerequisites: CHEM135 Chemistry for Engineers and permission of department.

COURSE GOALS

- Act as an academic bridge to progress from fundamental math and science courses to upper level engineering and design courses.
- Apply knowledge of basic science principles related to chemistry, physics, and biology to engineering problems related to sustainability.
- Develop the ability to identify and solve engineering problems related to sustainable development.



A. JAMES CLARK SCHOOL OF ENGINEERING

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

- Increase student understanding of the interdisciplinary nature of sustainable development and to inform engineering decision making related to societal issues (e.g. energy and water resources, environmental quality).

COURSE LEARNING OUTCOMES

- Students will identify and interpret basic mathematics, chemistry, and physics principles and apply them to engineering problems related to sustainable development.
 - ✓ Assessments: Homework, quizzes, and exams.
- Students will recognize and discuss the interdisciplinary, global, and social nature of sustainable development.
 - ✓ Assessments: Classroom activities, quizzes, projects, and exams.
- Students will calculate and compare the environmental and economic impacts of sustainable infrastructure.
 - ✓ Assessments: Homework, quizzes, and exams.
- Functioning as a group, students will evaluate information and critically argue about controversial issues related to sustainable development.
 - ✓ Assessments: Group projects.

READING MATERIAL

No required textbook. All reading assignments will be available via ELMS/canvas.

Recommended books:

- Saeed Moaveni, Energy, Environment, and Sustainability (2017). Cengage Learning, Boston, MA. ISBN: 978-1-133-10509-1
- Scott Grinnel, Renewable Energy & Sustainable Design (2014). Cengage Learning, Boston, MA. ISBN: 978-1-1115-4270-2

COPYRIGHT NOTICE

All course materials are copyrighted. Course materials that exist in a tangible medium, such as written or recorded lectures, PowerPoint presentations, handouts and tests, are copyright protected. Students may not copy and distribute such materials except for personal use and with the instructor's permission.

COMMUNICATION AND RESPONSE TIME POLICY

If a student is not able to attend office hours, meetings by appointment can be scheduled. I will answer ELMS communication within 24 hours on weekdays or within 48 hours during the weekend.



A. JAMES CLARK SCHOOL OF ENGINEERING

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

COURSE STRUCTURE

This course will be delivered entirely online through ELMS. To access this course on ELMS you will need access to the Internet and a supported Web browser (Internet Explorer, Firefox, Safari). In ELMS, you will access online video lectures, course materials, and resources. At designated times throughout the semester, we will participate in a blend of asynchronous self-paced and synchronous group-paced activities using ELMS and alternative internet-based technologies.

ONLINE REQUIREMENTS

Since this is an entirely online course, you must have a reliable computer where you will be able to access course materials and interact with the instructor and other students. You must have a camera, a microphone, and a reliable internet connection. The midterm and final exams will be held during live online sessions and all students are required to have their cameras on at all times during the exams. The instructor will be present, and students will be able to ask questions during the exam using the “chat” feature of the online meeting software. **Participation in LIVE virtual sessions is required. Accommodations can be made on a case-by-case basis. Some synchronous online sessions will be recorded and shared via ELMS. Only students enrolled in this course will have access to these recordings in order to maintain students' and instructor's privacy.**

TECHNICAL ASSISTANCE

If you need technical assistance during the course or to report a problem with ELMS you can:

- Visit the ELMS Student Resources link: <http://www.elms.umd.edu/page/student-landing-page>
- Call the ELMS student help desk (301-405-1400).
- Send an email to elms@umd.edu for assistance.

POLICY ON ELECTRONIC DEVICES

No smartphones are permitted during our class meetings. I understand and have considered arguments for permitting smartphone use in the classroom. Researchers have found that distractions such as smartphones do, in fact, interfere with learning and active participation. For more information about the science behind the policy watch: <http://youtu.be/WwPaw3Fx5Hk>

GRADING

IMPORTANT NOTE: Students are responsible for submitting assignments on time in class or online according to the assignments' requirements. Late assignments will receive a grade penalty of 20%. Late assignments will not be accepted, under any circumstance, after grades have been released.



A. JAMES CLARK SCHOOL OF ENGINEERING

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

Quizzes, the group projects, midterm exam, and the final exam are all considered MAJOR assessments. Please refer to the Course Related Policies if you miss a major assessment.

Homework	10%
Quizzes	15%
Project 1	15%
Project 2	10%
Midterm Exam	25%
Final Exam	25%
Total	100%

A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
100-97	96.99-94	93.99-90	89.99-87	86.99-84	83.99-80	79.99-77	76.99-74	73.99-70	69.99-67	66.99-64	63.99-60	59.99-0

IMPORTANT NOTE: This syllabus, along with course assignments and due dates, are subject to change. ELMS announcements will be sent out to the students in case a change is made. It is the student’s responsibility to check ELMS for corrections or updates to the syllabus.

HOMEWORK

A scan (pdf format) of your homework should be submitted on ELMS by the deadline. **Homework will not be graded for correctness.** A student will get full points for submitting **complete** homework **by the deadline**. I recommend the use of a free app to take a picture and convert your file to a pdf for upload. **Scanners are available at our library.**

QUIZZES

Quizzes will be given to test concepts covered during previous class sessions. Quizzes may be in-class, online, or take-home. **No exceptions (unless specified in the Course Related Policies)** will be made for students arriving late or not attending class. One of the quizzes will be the combination of all classroom activities that will be given throughout the semester. These activities are given in class during the semester and are worth one point each. They serve three purposes: allow the students to identify their own misconceptions, allow the instructor to identify and correct major and minor misconceptions, allow the instructor to identify if students prepare for class ahead of time.

PROJECTS

More information about projects is available in documents posted on ELMS.

EXAMS

One mid-term exam (75 min) will be given during scheduled class period and will be closed-book/notes. The final exam (120 min) will be cumulative (all material for the semester will be covered in the final exam) and closed-book/notes. The midterm and final exams will be held during live online sessions and all students are required to have their cameras on at all times during the exams. The instructor will be present, and students will be able to ask questions during the exam using the “chat” feature of the online meeting software.



A. JAMES CLARK SCHOOL OF ENGINEERING

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING

TENTATIVE COURSE SCHEDULE

Date	Event	Assignment Due
26-Jan	Day 1: Introductions and Syllabus Overview	
28-Jan	Day 2: Content Introduction	
02-Feb	Day 3: Population Growth	
04-Feb	Day 4: Carbon Cycle and Non-Renewable Energy	
09-Feb	Day 5: Energy Transfer	
11-Feb	Day 6: Energy Transfer	<i>Population Quiz</i>
16-Feb	Day 7: Energy Transfer	
18-Feb	Day 8: Nuclear Energy	
23-Feb	Day 9: Nuclear Problem Solving	
25-Feb	Day 10: Solar Energy	<i>En. Transfer Quiz</i>
02-Mar	Day 11: Solar Energy	
04-Mar	Day 12: Project Meeting	<i>Nuclear Quiz Course Eval</i>
09-Mar	Day 13: Biomass and Waste-to-Energy	
11-Mar	Day 15: Biomass and Waste-to-Energy	<i>Solar Quiz</i>
16-Mar	Day 14: Spring Break! NO CLASS!	
18-Mar	Day 16: Spring Break! NO CLASS!	
23-Mar	Day 17: Midterm Exam	
25-Mar	Day 18: Project Meeting	
30-Mar	Day 19: Hydroelectric Energy	
01-Apr	Day 20: Wind Energy	
06-Apr	Day 21: Socio-technical Activity	
08-Apr	Day 22: Socio-technical Activity	<i>Hydro Quiz</i>
13-Apr	Day 23: Group Project Workday	
15-Apr	Day 24: Water-Energy Nexus	<i>Wind Quiz</i>
20-Apr	Day 25: Stormwater Management	
22-Apr	Day 26: Stormwater Management	
27-Apr	Day 27: LCA and Rating Systems	<i>SW Quiz</i>
29-Apr	Day 28: Debate (LIVE)	
04-May	Day 29: Debate (LIVE)	
06-May	Day 30: Debate (LIVE)	
11-May	Day 31: Last Class – Debate Results and Goodbyes! (LIVE)	
14-May	Final Exam (sec. 0101) – 8:00am-10:00am (Friday) (LIVE)	
17-May	Final Exam (sec. 0201) – 10:30am-12:30pm (Monday) (LIVE)	
18-May	Final Exam (sec. 0301) – 10:30am-12:30pm (Tuesday) (LIVE)	