Course: ENGR 1020 - Engineering Foundations 2

Course Description:

What does it mean to be an engineer? What does it mean to work with other engineers and clients? What skills do you need to be a successful engineer? In this course, we will continue to explore and build your skills in the fundamentals of engineering and sociotechnical thinking and provide you with tools to succeed. You will be expected to meaningfully participate in collaboratively solving authentic engineering problems. This is the second in a two-semester course sequence for first-year SEAS undergraduates. You will continue to employ engineering practices, mindsets, the design process, the concept of engineering as an endeavor that shapes and is shaped by society, the fundamentals of engineering ethics, and oral, written, and visual communication. You will also continue your journey developing your career path and exploring possible majors to help you get there.

Course Objectives:

By the end of this course sequence, you will be able to:

1. engage in the engineering design process, which includes working with clients, defining problems, generating solutions, testing and evaluating solutions, and iterating.
2. safely use foundational software and fabrication tools and skills in engineering design.
3. assess human, societal, global, and technical factors and ethical principles while balancing tradeoffs, constraints, and requirements in the design process.
4. effectively collaborate with teammates via navigating conflict and valuing their teammates through listening, asking questions, and sharing space, power, ideas, contributions, and responsibilities equitably.
5. effectively communicate about foundational technical and sociotechnical content with team members, other engineers, clients, and diverse audiences via written, oral, and visual mediums.
6. develop their engineering career paths and begin to establish a professional identity through design thinking and self-reflection.

Advising

Until March 1, your ENGR 1010 professor is still your academic advisor. (Note for Professor Anne McAlister's ENGR 1010 students: Your ENGR 1020 professor is your advisor until March 1.) After that, you will be transferred to a discipline-specific advisor based on which major you choose to declare. This means that I may or may not be your advisor. Questions about this class can and should still be referred to me, but any questions about your broader course schedule this semester (e.g., add/drop, course withdrawal, etc.) should go to your new advisor. As your professor and as a person, know that I care about you and your well-being and stand ready to provide support and resources as I can. As a faculty member, I am a responsible employee, which means that I am required by University policy and by federal law to report certain kinds of conduct that you report to me to the University's Title IX Coordinator. The Title IX Coordinator's job is to ensure that the reporting student receives the resources and support that they need, while also determining whether further action is necessary to ensure survivor safety and the safety of the University community. More information about this is available later in the syllabus.

Challenges and Grading:

Each of the following challenges will focus on either a piece of the engineering design process or require you and your design team to go through the engineering design process. We will make it clear during each unit where you are in the process.

Modules	**Percentage**
Unit 0: Intro and Skills Building You will work individually and with teams to further build your technical skills including electrical wiring, soldering, programming, and basic applications of Arduinos. A major focus will be creating a culture of physical and psychological safety within your design teams to set the foundation for more productive teamwork skills. This unit will also emphasize oral communication and interview skills. More details will be provided on Canvas.	10
Note: For Units 1 – 4, you will be keeping a Team Engineering Notebook and be responsible for working on parts of your final report through each unit. You will also be communicating with your client throughout each unit. In the last unit, you will compile all parts of your report, edit, and finalize your solutions and present in a poster session.	
Unit 1: *Problem Definition, Research, and Client Interviews* You will choose the problem you are going to solve with your design team for the semester from a list of client problem descriptions. You will conduct research, practice sound citation management skills, and develop thoughtful and helpful questions to learn more about the problem you are trying to solve. You will also meet with your client to help your team further develop your problem definition. More details will be provided on Canvas.	10
Unit 2: Ideation, Prototyping, and Proposal With your team, you will develop possible solutions to the problem. Teams will develop an initial solution with work plan including work breakdown structure, linear responsibility chart, and team calendar. In the process teams will develop alternative solutions and a prototype, carry out materials selection, and ultimately write a proposal supporting the decisions for your proposed solution. More details will be provided on Canvas.	20

Unit 3: Fabrication, Testing and Design Modification Student teams will fabricate and test their preliminary designs. This will require testing the solution and analyzing data to make informed design changes based on testing results. Students will be expected to complete multiple rounds of iteration and design change during fabrication and testing while clearly communicating testing procedures, results, and analysis. More details will be provided on Canvas.	20
Unit 4: Final Project Report, Poster, and Presentation The main focus of this part of the semester is clearly communicating the process your design team went through to engineer a solution for your client. More details will be provided on Canvas.	20
Other:	
Career Assignments/STS	10
CAD/MATLAB/Surveys You will complete individual, asynchronous work to learn the fundamentals of CAD and Matlab for design and data analysis. *Safety, Attendance, and Professionalism* You will lose points on your final grade when we see students not being safe, not attending class, and not being professional in your every-day endeavors	10

Final Presentations: Final presentations will be held on Saturday, April 27th to allow for all groups to present their posters and solutions at the same time in the same space while clients can also attend. Location and time TBD, and we will let you know details as soon as possible. Please note that this will be in place of the final exam time; we will not have an exam or presentation during the final exam time. ***If you are not able to attend on this day, please let your professor know as soon as possible and the make-up time will be during your scheduled exam time.***

Grading Scale:

Grade Ranges:	
A	93-100%
A-	90-92.99%
B+	87-89.99%
B	83-86.99%
B-	80-82.99%
C+	77-79.99%
C	73-76.99%
C-	70-72.99%
D+	67-69.99%
D	63-66.99%
D-	60-62.99%
F	<60%

Course Materials:
Students are expected to bring a charged laptop to lecture each day.
There is no textbook required for the course. Required reading and other course materials will be provided on Canvas.

Policies:
Safety:
This course is conducted in an active laboratory space. Students are expected to adhere to daily safety debriefings and policies. Drinks must have closing lids and there may be restrictions on in-class food consumption based on daily laboratory use.

Participation and Professionalism:
We expect you to attend, participate, and be professional in the classroom, which includes (but is not limited to) the following behaviors:

- Phones stored away- they should not be in sight or in use during class
- Ask questions during discussions- be curious
- Clean up after yourself
- Expect (and complete) homework (this may be individual or group work)
- Arrive to class on time
- Communicate with your professor if you will be late or will miss class

We expect continuous and open communication with you about this; this is a learning opportunity. We will adjust your grade based on your participation and professionalism.

Illness/ Absence/ Attendance:
Attendance and timeliness are expected. However, if you are sick, please do not come to class.

- Anticipated Absences: Notify instructor if you have to be late or miss class.
- Unexpected Absences: If you are sick, will miss a class, or will be late to class, please contact your instructor as soon as possible.

Late Work:
On-time work submissions are expected.

- Individual Assignments: If you need an extension, you must communicate with the instructor before the due date.
- Team Assignments: All team assignments must be submitted on the due date; turn in what you have.

Accessibility and Accommodations:
The University of Virginia strives to provide accessibility to all students. If you require an accommodation to fully access this course, please contact the Student Disability Access Center (SDAC) at 434-243-5180 or sdac@virginia.edu. We are fortunate to have an SDAC advisor, Courtney MacMasters, physically located in Engineering. You may email her at cmacmasters@virginia.edu to schedule an appointment. If you are unsure if you require an accommodation, or if you want to learn more about their services, you may contact SDAC at the number above or by visiting their website at: https://www.studenthealth.virginia.edu/SDAC.

If you have already been approved for accommodations through SDAC, please make sure to send me your Faculty Notification Letter as soon as possible and meet with me so we can develop an implementation plan together.

Honor Policy:
We trust every student in this course to fully comply with all of the provisions of the University's Honor Code. By enrolling in this course, you have agreed to abide by and uphold the Honor System of the University of Virginia (for example, a prohibition on plagiarism), as well as the following policies specific to this course:

- All graded assignments must be pledged.
- While collaboration is necessary in team assignments, individual assignments must be completed individually. The level of collaboration you are allowed depends on the assignment:
    - You may ask for input or advice from others in the class on the skill-based assignments (for example, CAD assignments), but the work must be that of your own hands.
    - You are not permitted to collaborate in any way on quizzes.

- Citations are expected for your written and graphical work.
- Suspected violations may be forwarded to the Honor Committee. In addition you will receive an immediate zero on that assignment regardless of any action taken by the Honor Committee.

Please let your instructors know if you have any questions regarding the course Honor policy. If you believe you may have committed an Honor Offense, you may wish to file a Conscientious Retraction by calling the Honor Offices at (434) 924-7602. For your retraction to be considered valid, it must, among other things, be filed with the Honor Committee before you are aware that the act in question has come under suspicion by anyone. More information can be found at http://honor.virginia.edu. Your Honor representatives can be found at: http://honor.virginia.edu/representatives.

Independent vs Collaborative Learning

- *Independent Learning:* Independent learning gives you the opportunity to grapple with new material, practice skills at your own pace, and further develop problem solving skills.
- *Collaborative Learning:* Engineering is a collaborative endeavor. Collaborating with others helps your overall understanding, develops your problem-solving skills, and improves your communication skills. Much of the work we will do in class will be in small groups as we work to develop conceptual understanding, analyze data, and propose solutions. You will often be asked to present results and conclusions to the class as a group.
    - REMEMBER: if you are assigned a "group assignment", and your name is on it, then you are saying you not only contributed to the assignment, but you also know what is in the *entire* assignment

Regrading:

If you believe that a mistake has been made in grading your work, you may request regrading up to 7 days after the graded work has been returned. After 7 days, your score is final. The 7-day clock begins when the graded work is returned, even if you do not access it. All regrade requests must be directed to your professor. The TA is not able to review them.

Statements on Harassment, Discrimination, and Interpersonal Violence:
UVA is committed to providing a safe learning environment where all students, faculty, and staff members feel welcomed and valued. Discrimination, harassment, and sexual misconduct is antithetical to our values and is therefore prohibited on our Grounds and in this class. UVA strongly encourages all members of the community to take action, seek support, and report these incidents to either the Title IX office or Office for Equal Opportunity and Civil Rights ("EOCR").

Title IX/Sexual Misconduct:
Title IX of the Education Amendments Act of 1972 and UVA policy prohibit sexual and gender-based harassment, sexual assault, intimate partner violence (dating/domestic violence), stalking, sexual exploitation, and retaliation. If you (or someone you know) has experienced or is experiencing these types of behaviors, know that you are not alone, and you deserve support.

At UVA, all faculty members and TAs are "responsible employees," which means that if you tell me about a situation involving these forms of sexual misconduct (for example, during my office hours or in an email), I must share that information with the Title IX Office. This is to be sure you are connected with all the support the university can offer and learn about your options and rights. When you receive outreach from the University asking if you would like to meet, you choose if you want to respond and what resources you may need; you are under no obligation to respond.

Please know that I am not required to report disclosures students may make in academic coursework, including classroom discussions, papers, or other assignments, unless it is shared for the purpose of obtaining help, such as academic accommodations, extensions, etc.

If you prefer to make a report directly to the University, you can do that through the online reporting system, Just Report It ("JRI"). Or if you would rather speak about it with a confidential resource (where what you share is not reported to the University), you can turn to Counseling & Psychological Services ("CAPS") and the Women's Center Counseling Staff and Confidential Advocates (for students of all genders). To learn more about the available resources and response options, visit cavcare, UVA's comprehensive website regarding Title IX and sexual misconduct, or contact the Title IX office at titleixoffice@virginia.edu.

Discrimination/Harassment/Retaliation:
UVA also prohibits discrimination and harassment based on age, color, disability, family medical or genetic information, gender identity or expression, marital status, military status (which includes active duty service members, reserve service members, and dependents), national or ethnic origin, political affiliation, pregnancy (including childbirth and related conditions), race, religion, sex, sexual orientation, veteran status. UVA policy also prohibits retaliation.

All faculty and TAs are also responsible employees for disclosures or reports of potential discrimination, harassment, and retaliation. But as explained in the prior section, I am not required to report disclosures you make in academic coursework, including classroom discussions, papers, or other assignments, unless

you share for the purpose of obtaining help, such as academic accommodations, extensions, etc. Also, the same resources and options for individuals who experience sexual misconduct are available for you as well, which you can find at eocr.virginia.edu/resources. If you are aware of someone who has experienced prohibited conduct, you are encouraged to submit a report to JRI or contact EOCR.

Religious Accommodations:
UVA provides reasonable accommodations when a student's sincerely held religious beliefs or observances conflict with academic requirements. Students who wish to request an academic accommodation for a religious observance should submit their request to me by email as far in advance as possible.

If you have questions or concerns about your request, you may contact EOCR at UVAEOCR@virginia.edu or 434-924-3200 or visit their Religious Accommodations webpage for additional information. Please note that receiving any accommodation does not relieve you of your responsibility to complete any coursework you miss as the result of the accommodation.

Food Pantry and Basic Needs Resources:
Community Food Pantry & basic needs resources – Located on the first floor of Newcomb Hall (room 144). The pantry is stocked with fresh produce, canned goods, pasta, deli meats, snacks, and hygiene products. All students and staff with an active UVA ID are encouraged to stop by and pick up groceries as needed. More information: https://pantryatuva.org

Engineering School Food Pantry – Located on the first floor of Thornton Hall A-Wing (Thornton A121). No judgment, no sign-in, 8:30 am to 4:30 pm, Monday through Friday.

Community and Identity:
The Center for Diversity in Engineering (CDE) is a student space dedicated to advocating for underrepresented groups in STEM. It exists to connect students with the academic, financial, health, and community resources they need to thrive both at UVA and in the world. The CDE includes an open study area, event space, and staff members on site. Through this space, we affirm and empower equitable participation toward intercultural fluency and provide the resources necessary for students to be successful during their academic journey and future careers.

Use of Generative AI Policy:
Generative artificial intelligence tools—software that creates new text, images, computer code, audio, video, and other content—have become widely available. The best-known example of generative AI is ChatGPT. This policy governs all generative AI tools for this class, including ChatGPT.

You may use generative AI tools for work in ENGR 1010 however you see fit. If you do use generative AI tools on assignments in this class, you must properly document and credit the tools themselves. Cite the tool you used, following the pattern for computer software given in the specified style guide. Additionally, you must include a brief description of how you used the tool.

If you choose to use generative AI tools, remember that they are trained on pre-existing material, including copyrighted material; therefore, relying on a generative AI tool may result in plagiarism - an honor violation. Finally, keep in mind that the goal of generative AI tools is to produce content that seems to have been produced by a human, not to produce accurate or reliable content; therefore, relying on a generative AI tool may result in inaccurate content. The citations and bibliographies that it generates are fake; if you submit them and they are fraudulent, you are responsible for false citation - another honor violation. It is your responsibility—not that of the tool—to assure the quality, integrity, and accuracy of work you submit in any college course. Citing your work to a generative AI tool does not absolve you of your responsibilities under the Honor Code.