APPL 101

Exploring Engineering

Spring 2024

Introduction	Engineers help to design and build solutions to a variety of problems, ranging from major global issues to local needs in the community. This course will explore some of the fundamental skills and tools in engineering. You will learn how to model and simulate systems, how to look to the natural world for engineering ideas and solutions, and how to explore sustainability issues from an engineering perspective. There will be an emphasis on developing strong professional skills, including work in a group setting and effectively communicating your efforts.
Methods	Each class session will incorporate a small group activity. For example, students may be developing or testing a simulation, discussing an ethical issue in engineering, or exploring engineering designs in the natural world. There will be a variety of assignments, including interviews, programming simulations using Matlab, and several group projects. Some class sessions will be project work time and the faculty and TAs will float between breakout rooms to provide extra help. Students will also be expected to work on their projects outside of class time.
Results	By the end of this course, students should be able to do the following: ● Develop models of different types of systems using the modeling principles and tools that we cover in class ● Write Matlab programs that simulate your models ● Analyze a model and simulation to draw conclusions, based on its results as well as its limitations and assumptions ● Examine and model designs found in the natural world to look for engineering solutions to problems ● Analyze and model the performance of a commercial product from the standpoint of sustainability ● Work effectively in teams ● Communicate solutions to engineering problems in written and oral form
Discussion	This class will provide students with a foundation in engineering skills and tools. It will be based on real world examples and will demonstrate the strong connection between engineering and the liberal arts. We encourage you to take the complementary class, APPL 110 Introduction to Design and Making: Developing Your Personal Design Potential. This class is appropriate for you if you are thinking about a minor in Applied Sciences and Engineering, anticipate that you could be working with engineering in your own career, or want to get some engineering experience to expand your own career or graduate school possibilities.

Engineering Student Outcomes	• Demonstrate constant curiosity about our changing world
	• Integrate information from many sources to gain insight.
	• Identify unexpected opportunities to create extraordinary value
	• Discern and pursue ethical practices
	• An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
	• An ability to communicate effectively with a range of audiences
	• An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
	• An ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
	• An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

Class Essentials

CONTACT INFORMATION

Dr. Daphne Klotsa	
Office Location: 1114 Murray Hall Email: dklotsa@email.unc.edu Office Hours: Tuesdays, Thursdays 12:30-1:30pm	

LOGISTICS

 Class meeting times
Tu Thu 11:00 am-12:15 pm

 Class meeting location
GSB G010

Course audience
- Students in any class year and any major who would like an introduction to engineering topics and mindset

This class is a gateway to the minor in Applied Sciences and Engineering

 Required Texts & Software
- Matlab, download from here

 Pre-requisites
- Prior programming experience is helpful. You can take this class with no programming experience, but you are expected to learn the basics of programming in Matlab throughout the course. **You will be programming and submitting codes in Matlab for your group projects and individual assignments.**

Course content

COURSE TOPICS
- Engineering skills overview
- Introduction to programming in Matlab

- Modeling and simulation
- Ethics in engineering
- Biomimicry – engineering in the natural world
- Sustainability engineering project

COURSE SCHEDULE

See calendar link on Canvas for detailed schedule

To help you succeed

Health

Your mental and physical health are very important to me! Let me know how I can support you and your health this semester. If you need accommodations from ARS, please let me know ASAP.

Course Expectations on Attendance

Class attendance is required. Let me know ahead of time if you are missing class for any reason and it will be an excused absence.

University Policy:

As stated in the University's Class Attendance Policy, no right or privilege exists that permits a student to be absent from any class meetings, except for these University Approved Absences:

1. Authorized University activities: University Approved Absence Office (UAAO) website provides information and FAQs for students and FAQs for faculty related to University Approved Absences
2. Disability/religious observance/pregnancy, as required by law and approved by Accessibility Resources and Service and/or the Equal Opportunity and Compliance Office (EOC)
3. Significant health condition and/or personal/family emergency as approved by the Office of the Dean of Students, Gender Violence Service Coordinators, and/or the Equal Opportunity and Compliance Office (EOC).

COURSE EXPECTATIONS AND POLICIES
- When assigned, watch all online lectures and do all reading assignments before coming to class (in-class quizzes will help to encourage you to do this).
- Participate in class discussions and activities.
- We will be using laptops frequently during class and you do not have easy access to power in the classroom. Please make sure that it is adequately charged before coming to class.
- During class time, **do not use your phone or computer for something unrelated to class. If you repeatedly do that, I may ask you to leave.**
- Come to every scheduled class and let us know ahead of time if you cannot attend.
- **For any assignment, 5% will be deducted for every day past the deadline. After 1 week, the assignment disappears from Canvas and you get a zero.**

Assignments & Evaluation

⬚ Your Course Grade	
Homework and in class activities, such as worksheets, and attendance	20%
Matlab quizzes	15%
Simulations	30%
Biomimicry report	10%
Final Project (sustainable engineering)	25%
Total	100%

⬚ Grade Interpretation & Honor Code

Your final course grade will be determined from a standard scale:	ACADEMIC HONESTY
A 93+ A- 90.0 - 92.9 B+ 87.0 - 89.9 B 83.0 - 86.9 B- 80.0 - 82.9 C+ 77 - 79.9 C 73 - 76.9 C- 70 - 72.9 D+ 67 - 69.9 D 60 - 66.9 F <60	There will be clear communication if assignments are individual or group. For individual assignments, while I encourage collaboration, it is a violation of the honor code if a student duplicates work or obtains solutions from another student and submits it on their own. Please reference the honor code: http://honor.unc.edu.

⬚ Class recording policies

The University may record meetings of this class for educational purposes. These recordings will be shared only with students enrolled in the course for purposes of academic instruction only. Your instructor will communicate to you how you may access any available recordings.

Unauthorized student recording of classes on personal devices or on any other format is prohibited.

Students requesting the use of assistive technology as an accommodation should contact Accessibility Resources & Service. Other students must obtain express permission from the department to record the class, and the University will only grant such permission in extraordinary circumstances in which the student otherwise lacks access to a recording made by the University or instructor. Students shall not copy, reproduce, or distribute any recordings of their classes, and students shall delete any recordings at the conclusion of the course.

Any violation of these prohibitions or restrictions on the making, use, copying, or distribution of recording of classes shall constitute an honor code violation.

HONOR CODE

All students are expected to follow the guidelines of the UNC honor code. In particular, students are expected to refrain from "lying, cheating, or stealing" in the academic context. If you are unsure about which actions violate that honor code, please consult honor.unc.edu.

ARTIFICIAL INTELLIGENCE AI USE POLICY

Not following these guidelines may be a reportable violation to the UNC Honor Court. (Check out honor.unc.edu)

-Writing, Reports, and Presentations: In principle, you may submit material that contains AI-generated content, or is based on or derived from it, if this use is properly documented. This may include drafting an outline, preparing individual sections, combining elements, removing redundant parts, and compiling and annotating references. Therefore, AI can be the starting point **but not the end point**, and you should not be copying sentences and paragraphs word-for-word and submitting it as your own without making some significant changes first. **Your use of AI must be transparent and documented. The submission itself must meet the relevant standards of attribution and validation.**

-Research: If you use AI to support your research, you must account for and document your use. Possibilities include topic brainstorming, search assistance, source evaluation, and summaries and source documentation. **Track your use of AI throughout these stages, and then document this assistance as you submit the project. Any material generated through AI in your projects should also be documented in your citations.**

-Simulations: In principle, you may use AI tools for generating code. However, you should be able to understand the generated code at the same level as if you had written it from scratch by yourself. You should know exactly what the code does, be able to use and edit it and interpret the data produced. **You must make the use of AI transparent; you must comment at the bottom of your code how you used AI to generate the code.**

SYLLABUS CHANGES

The instructor reserves the right to make changes to the syllabus including project due dates and test dates. These changes will be announced as early as possible.

ACCESSIBILITY RESOURCES AND SERVICE

Accessibility Resources and Service (ARS – ars@unc.edu) receives requests for accommodations, and through the Student and Applicant Accommodations Policy determines eligibility and identifies reasonable accommodations for students with disabilities and/or chronic medical conditions to mitigate or remove the barriers experienced in accessing University courses, programs and activities.

ARS also offers its Testing Center resources to students and instructors to facilitate the implementation of testing accommodations.

COUNSELING AND PSYCHOLOGICAL SERVICES

UNC-Chapel Hill is strongly committed to addressing the mental health needs of a diverse student body. The Heels Care Network website is a place to access the many mental health resources at Carolina. CAPS is the primary mental health provider for students, offering timely access to consultation and connection to clinically appropriate services. Go to their website https://caps.unc.edu/ or visit their facilities on the third floor of the Campus Health building for an initial evaluation to learn more. Students can also call CAPS 24/7 at 919-966-3658 for immediate assistance.

TITLE IX AND RELATED RESOURCES

Any student who is impacted by discrimination, harassment, interpersonal (relationship) violence, sexual violence, sexual exploitation, or stalking is encouraged to seek resources on campus or in the community. Reports can be made online to the EOC at https://eoc.unc.edu/report-an-incident/ or by contacting the University's Title IX Coordinator (Elizabeth Hall, titleixcoordinator@unc.edu) or the Report and Response Coordinators in the Equal Opportunity and Compliance Office (reportandresponse@unc.edu). Confidential resources include Counseling and Psychological Services and the Gender Violence Services Coordinators (gvsc@unc.edu). Additional resources are available at safe.unc.edu.