EGN2020C Engineering Design & Society

EGN 2020C   Credits: 2

Class Periods: W 4th-5th periods; 10:40am-12:35pm

Section: 3E38 **Location:** NSC 0225

Academic Term: Spring 2019

Instructor: Dr. Pamela Dickrell pld@ufl.edu

Dr. Dickrell Office Hours: TBA

Peer Mentors:

TBA

Peer Mentor Open Help Hours: TBA

Course Description

(Credits: 2) An introductory engineering course emphasizing the human-centered design process to address a societal challenge. Exploration of solid modeling, introductory programming, sensors, data acquisition, and 3D printing as maker tools for engineering prototyping. Teams will utilize multidisciplinary approaches, project management, written and oral communication skills in creating a societal-based design.

Course Pre-Requisites / Co-Requisites None

Course Goals

- Understand and practice the human-centered engineering design process for a societal based project.
- Learn techniques to solve open-ended engineering challenges.
- Promote a culture of making by introducing solid modeling, programming, sensors, data acquisition, 3D printing, and other maker tools.
- Build teamwork and cooperative learning skills through participation in multidisciplinary teams and active engineering project management.
- Build professional skills in background research & written, pictorial, and oral communication methods.
- Raise awareness of ethics and contemporary issues in engineering design related to a global society.
- Introduce engineering students to the various engineering majors and their roles within society.
- Inform students of opportunities for experiential learning related to their majors throughout the college of engineering and UF community.

Materials and Supply Fees

$12.00

Required Textbooks and Software

Arduino Starter Kit - English Official Kit With 170 Page Book: Each student should purchase their own Arduino Starter Kit. The kit is not sold in the UF Bookstore; you need to obtain online from either Arduino.cc or Amazon here:

From Arduino.cc: https://store.arduino.cc/usa/arduino-starter-kit

OR

From Amazon (fast shipping if you have Amazon Prime): https://www.amazon.com/Arduino-Starter-Kit-English-Official/dp/B009UKZV0A/ref=sr_1_3/141-4678897-3293920?ie=UTF8&qid=1545066950&sr=8-3&keywords=arduino+starter+kit

You only need one kit, so order from one place or the other, just remember you need it in hand by the end of the first week of class!

This kit is awesome by the way, if you ever wanted to get into Arduino or tinkering/inventing, it is very easy to use and once you get started, you can build and create all kinds of small electronic items!

Relation to Program Outcomes (ABET):

Outcome	Coverage*
(1) an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	Low
(2) an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors	High
(3) an ability to communicate effectively with a range of audiences	Low
(4) an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts	Medium
(5) 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	High
(6) an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	Low
(7) an ability to acquire and apply new knowledge as needed, using appropriate learning strategies	Low

*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not part of the course.

Course Schedule Two credit hours will consist of:

1. One weekly in-person required two period block of laboratory (~1 credit).
2. Weekly online lecture videos/activities averaging 3 hours per week (~1 credit)

This course is an introductory engineering course emphasizing the human-centered design process in which students learn hands-on maker space tools and use them to build functional prototypes of their designs. Students will learn about the various engineering majors offered at UF in a hands-on way to see applications of the different majors, minors, and student organizations within engineering.

Course Schedule (modules for 1st half of semester)

Module	Week Of	Online Materials (Students: things you need to do ahead of live class)	Laboratory Classroom Activities	Complete After Live Class Before 11:59pm Next Monday
0	7-Jan	Order Arduino Kit!!!	Makerspace classroom intro, safety, tools, laboratory notebook use, mockups activity ice-breaker, name-cards/questions	a) Watch all videos in Module 01 b) Obtain Arduinio Kit
1	14-Jan	Watch/Review all items posted under Module 01	Build activity with non-traditional materials using design process: little-bits team design mini-challenge	a) Complete **Quiz 01** individually, 5% of total grade b) Complete **Educational Survey 01** individually, 2.5% of grade c) Create Onshape account d) Watch all items in Module 02
2	21-Jan	Create Onshape Account Watch/Review all items posted under Module 02	Team reveals, ice breaker activity or/and teamwork activity. Discuss Engineering Memos. Discuss Team Charter and Peer Evaluations. Work on Team Charter Draft. Discuss Homework 01 and Onshpae Tutorial	a) Complete **Homework 01** individually, 5% of total grade b) Complete Onshape Tutorial, takes about 3 hours c) Review/Watch all items in Module 03
3	28-Jan	Watch/Review all items posted under Module 03	Onshape Individual Design Practice (keychain) Homework 02 Work Time: Team Mini-design Project	a) Complete **Homework 02** as a team, 5% of total grade b) Bring Arduino Kits to Class c) Review/Watch all items in Module 04
4	4-Feb	Watch/Review all items posted under Module 04 Bring Arduino Kits to Class	Individual 3D printer training using small items (keychains) Getting Started with Arduino (software installation check, Build 01, Build 02)	a) Complete **Homework 03** individually, 5% of total grade b) Review/Watch all items in Module 05
5	11-Feb	Watch/Review all items posted under Module 05 Bring Arduino Kits to Class	Microcontroller kits, breadboards, sensors, 2 more individual mini-builds from book during class. Discuss Homework 04.	a) Complete **Homework 04** as a team, 5% of total grade b) Study for **Quiz 02** (first 5 minutes of next class) c) Review/Watch all items in Module 06
6	18-Feb	Watch/Review all item posted under Module 06 Bring Arduino Kits to Class	**Quiz 02** First 5 Minutes Microcontroller programming and flow diagram practice with students to help start Homework 05. Mini-design project team build program document with Arduino Kits (Homework 06)	a) Complete **Homework 05** individually, 5% of total grade b) Complete **Homework 06** as a team, 5% of total grade c) Review/Watch all items in Module 07

Course Schedule Continued (modules for 2nd half of semester)

Module	Week Of	Online Materials (Students: things you need to do ahead of live class)	Laboratory Classroom Activities	Complete After Live Class Before 11:59pm Next Monday
7	25-Feb	Watch/Review all items posted under Module 07	Final project reveal, team brainstorming activity on human-centered users	a) Complete **Homework 07** as a team, 5% of total grade b) Review/Watch all items in Module 08
8	11-Mar	Watch/Review all items posted under Module 08	Handouts and discussion on design constraints for creating functional prototypes. Team brainstorming, creation of multiple sketches/ideas for decision matrix.	a) Complete **Homework 08** as a team, 5% of total grade b) Review/Watch all items in Module 09
9	18-Mar	Watch/Review all items posted under Module 09	Final Project Timeline, Approaches, and Constraints. Decision matrix for picking final project from ideas. Work early on functional electronic 'guts' Working in teams and Team Member Evaluations	a) Work on Final Design Projects b) Order any Arduino compatible parts or hardware you need early! c) Review/Watch all items in Module 10
10	25-Mar	Watch/Review all items posted under Module 10	Discuss structure of final design reports and presentations, provide template for report and grading rubric for presentation. Active project build with faculty and peer mentors	a) Work on Final Design Projects b)) Review/Watch all items in Module 11
11	1-Apr	Watch/Review all items posted under Module 11	Active project build with faculty and peer mentors	a) Review/Watch all items in Module 12
12	8-Apr	Watch/Review all items posted under Module 12	Active project build, report help, and presentation help with faculty and peer mentors	a) Finish and submit **Final Design Report** as a team, 25% of final grade
13	15-Apr	Watch: :Experiential Learning Opportunities in Herbert Wertheim College of Engineering"	Any last minute project build help in preparation for live presentations. Faculty and peer mentor help with presentations.	a) Finish and submit slides for **Final Design Presentation** as a team (presentation 15% of final grade) b) Complete **Homework 09** individually, 5% of final grade
14	23-Apr	Finalize PowerPoint presentations and upload into Canvas for submission	Presentations In-Class	a) Complete **Educational Survey 02** individually, 2.5% of final grade

Attendance Policy, Class Expectations, and Make-Up Policy

Attendance for laboratory meetings is expected. Failure in regular attendance may result in deductions to Peer Evaluation & Participation portion of grade. **A half letter grade deduction will occur for missing more than one live class without a valid UF excuse**. Contact your instructor if you have an excused absence to work out a plan to make up the work. Excused absences must be consistent with university policies in the undergraduate catalog

(https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx (Links to an external site.)Links to an external site.) and require appropriate documentation.

Evaluation of Grades

Assignment	Total Points	Percentage of Final Grade
Quizzes & Surveys	15	15%
Homework	45	45%
Final Presentation	15	15%
Final Design Report	25	25%
		100%

Grading Policy

Percent	Grade	Grade Points
93.4 - 100	A	4.00
90.0 - 93.3	A-	3.67
86.7 - 89.9	B+	3.33
83.4 - 86.6	B	3.00
80.0 - 83.3	B-	2.67
76.7 - 79.9	C+	2.33
73.4 - 76.6	C	2.00
70.0 - 73.3	C-	1.67
66.7 - 69.9	D+	1.33
63.4 - 66.6	D	1.00
60.0 - 63.3	D-	0.67
0 - 59.9	E	0.00

More information on UF grading policy may be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

Students Requiring Accommodations

Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, https://www.dso.ufl.edu/drc) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation.

Students with disabilities should follow this procedure as early as possible in the semester.

Course Evaluation

Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu/evals Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/

University Honesty Policy

UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (https://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Software Use

All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy

There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html

Campus Resources: Health and Wellness

U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at

352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc , and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)

Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/

Academic Resources

E-learning technical suppor*t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. https://www.crc.ufl.edu/

Library Support, http://cms.uflib.ufl.edu/ask Various ways to receive assistance with respect to using the libraries or finding resources.
Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/
Writing Studio, 302 Tigert Hall*,* 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/
Student Complaints
Campus*:* https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf
On-Line Students Complaints*:* http://www.distance.ufl.edu/student-complaint-process