BME 4883 Senior Design, Professionalism, and Ethics II

Class Periods: Lecture: T (9:35-10:25am), Period 3; Lab: T, W, or R (1:55-3:50pm), Periods 7-8
Location: Tuesday lecture via Zoom, lab either in-person or on Zoom
Zoom Link: https://ufl.zoom.us/j/235165355
Academic Term: Spring 2021

Instructors:
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Office Hours: Available upon request

Teaching Assistant/Peer Mentor/Supervised Teaching Student:
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- Adrienne Widener, adriennejan25@ufl.edu

Course Description
Design of custom strategies to address real-life issues in the development of biocompatible and biomimetic devices for biotechnology or biomedical applications. Teams work with a client in the development of projects that incorporate various aspects of biomedical engineering including instrumentation, biomechanics, biotransport, tissue engineering and others. Emphasizes formal engineering design principles; overview of intellectual properties, engineering ethics, risk analysis, safety in design and FDA regulations are reviewed. Designs and prototypes are developed in BME 4882. BME 4883 focuses on implementation, testing, and iteration.

Course Pre-Requisites / Co-Requisites
BME 4503, BME 4503L, BME 4409, BME 4882 and senior standing.

Course Objectives
1. Students will apply the design process methodology to the development of a solution to a biomedical engineering problem.
2. Students will demonstrate the process of ideating, designing, prototyping, and verifying a biomedical engineering related technology, device, or method.
3. Students will become effective communicating technical details and rationale for design decisions.
4. Students will gain experience working on teams, initiating tasks and reporting deliverables.
5. Students will appreciate the professional and ethical obligations of a professional biomedical engineer.

Materials and Supply Fees
A semester fee of $ 92.29 is allocated for project supply material and equipment costs.

Required Textbooks
None

Recommended Materials
Biodesign: The Process of Innovating Medical Technologies. Stefanos Zenios, Josh Makower, Paul Yock, Todd J. Brinton, Uday N. Kumar, Lyn Denend, and Thomas M. Krummel. 2nd Edition. 2015. Cambridge Press. (ISBN-13: 978-1107087354) Web: http://ebiodesign.org.
*Note – this book is free online via UF library. The website above also has videos, case studies and more.

Product Design and Development, 3rd Edition. Ulrich, Eppinger Boston : McGraw-Hill/Irwin, c2004. ISBN number: 0072471468 Web: http://www.ulrich-eppinger.net

Technical Requirement for participation via Zoom
If you are unfamiliar with Zoom, please see the system requirements at https://support.zoom.us/hc/en-us/articles/204003179-System-Requirements-for-Zoom-Rooms and reach out to the UF Computing Help Desk if needed at https://helpdesk.ufl.edu/about/services/. If you still need help to participate via Zoom for any reason, please contact the instructor immediately.

Course Topics (see course schedule for specific class dates, assignments, presentations, and exams)
Design Process
Problem Definition
Concept Generation and Evaluation
Detailed Design
Fabrication and Validation
Experimental Design
Intellectual Property
Bioethics
Project Management and Team Dynamics
Technical Communication

Relation to Program Outcomes (ABET)

Outcome	Coverage*	**Teaching Level
1. An ability to identify, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics.	Low	Emphasized
2. An ability to apply both analysis and synthesis in the engineering design process, resulting in designs that meet desired needs.	High	Emphasized
3. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.	High	Emphasized
4. An ability to communicate effectively with a range of audiences	High	Emphasized
5. 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.	High	Emphasized
6. An ability to recognize the ongoing need for additional knowledge and locate, evaluate, integrate, and apply this knowledge appropriately.	Med	Emphasized
7. An ability to function effectively on teams that establish goals, plan tasks, meet deadlines, and analyze risk and uncertainty	Medium	Emphasized

*Coverage is given as high, medium, or low. **Teaching Level corresponds to the sequential fit in the curriculum and is given as introduced, reinforced, or emphasized.

Online Course Recording
Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

F2F Course Policy in Response to COVID-19
We will have face-to-face instructional sessions to accomplish the student learning objectives of this course. In response to COVID-19, the following policies and requirements are in place to maintain your learning environment and to enhance the safety of our in-classroom interactions.

- You are required to wear approved face coverings at all times during class and within buildings. Following and enforcing these policies and requirements are all of our responsibility. Failure to do so will lead to a report to the Office of Student Conduct and Conflict Resolution.

- This course has been assigned a physical classroom with enough capacity to maintain physical distancing (6 feet between individuals) requirements. Please utilize designated seats and maintain appropriate spacing between students. Please do not move desks or stations.

- Sanitizing supplies are available in the classroom if you wish to wipe down your desks prior to sitting down and at the end of the class.

- Follow your instructor's guidance on how to enter and exit the classroom. Practice physical distancing to the extent possible when entering and exiting the classroom.

- If you are experiencing COVID-19 symptoms (Click here for guidance from the CDC on symptoms of coronavirus), please use the UF Health screening system and follow the instructions on whether you are able to attend class. Click here for UF Health guidance on what to do if you have been exposed to or are experiencing Covid-19 symptoms.
- Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work. Find more information in the university attendance policies.

Attendance Policy, Class Expectations, and Make-Up Policy
Attendance is expected, required, and noted by the instructors each class. Excess absences, class disruption, and lack of engagement will influence the class participation grade. All assignments are due at the beginning of class. Late work will not be accepted. The exam can only be may be made up if extenuating circumstances are discussed beforehand or due to medical/family emergency.

Evaluation of Grades

Assignment	Percentage of Final Grade
Deliverable Presentations	40%
Technical Blitz Presentation	5%
Design Showcase Demonstration	20%
Final Project Report	15%
Peer Evaluation	10%
In-class Participation	8%

Course Evaluation	2%
TOTAL	100%

Grading Policy

Percent	Grade	Grade Points
93.0 - 100.0	A	4.00
90.0 - 92.9	A-	3.67
87.0 – 89.9	B+	3.33
84.0 - 86.9	B	3.00
81.0 – 83.9	B-	2.67
78.0 - 80.9	C+	2.33
75.0 - 79.9	C	2.00
72.0 – 74.9	C-	1.67
69.0 - 71.9	D+	1.33
66.0 - 68.9	D	1.00
60.0 - 65.9	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 who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-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://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-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.

Commitment to a Safe and Inclusive Learning Environment
The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:
• Your academic advisor or Graduate Program Coordinator
• Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
• Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
• Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

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: https://registrar.ufl.edu/ferpa.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 Discrimination, Harassment, Assault, or Violence
If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

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://care.dso.ufl.edu.

On-Line Students Complaints*:* http://www.distance.ufl.edu/student-complaint-process.