Senior Design, Professionalism, and Ethics I

BME4882   Section 1A49
Class Periods: T – Period 7 – 1:55p-2:45p, R – Period 7-8 – 1:55p-3:50p
Location: Turlington Hall, Rm L011
Academic Term: Fall 2024

Instructors:
Chris Geiger
cgeiger@bme.ufl.edu
Office Phone: (352) 273-9338
Office Hours: M,W 1:30p-3p, T,R 11a-12p or by appointment, BMS J293

Ismael "Tito" Arroyo
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Office: BME Design Space

If you would prefer to meet with me virtually during office hours via Zoom or Microsoft Teams, scheduling is **required, please email me with the date and time you would like to meet so I can ensure that time is available.** In addition to my open office hours, you can schedule a meeting with me through Calendly for times you would like to meet with me outside of my scheduled office hours:

https://calendly.com/rcgeiger/

If none of those times work with your schedule, please email me and we'll try to figure something out.

Outside of class and office hours, I prefer to be contacted via email and will make every effort to respond as quickly as possible (more quickly during the work week than on the weekend). As the instructor, I will do my best to follow the proposed course schedule as closely as possible. However, I also reserve the right to make necessary changes if the need arises.

Teaching Assistant/Peer Mentor/Supervised Teaching Student:
Please contact through the Canvas website
- Troy Kelly, TBD
- Nikolaos Pipis, TBD

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. 3 credits.

Course Pre-Requisites / Co-Requisites
BME 4503, BME 4503L, BME 4409 with a minimum grade of C. Senior standing.

Course Objectives
Upon the completion of this course, students will:
1. Apply the design process methodology to the development of a solution to a biomedical engineering problem.
2. Demonstrate the process of ideating, designing, prototyping, and verifying a biomedical engineering related technology, device, or method.
3. Become effective communicating technical details and rationale for design decisions.
4. Gain experience working on teams, initiating tasks and reporting deliverables.
5. Appreciate the professional and ethical obligations of a professional biomedical engineer.

Professional Component (ABET):
This course will prepare students to apply the design process to solve problems at the interface of engineering and medicine. Specific to the UF BME program educational outcomes, students will gain experience applying a knowledge of the design process to solving open problems and proving the feasibility of a prototype solution. An integral part of this experience will be the professional communication with industry, clinical and faculty experts as well as technical writing and presentations.

Relation to Program Outcomes (ABET):

Outcome	Coverage*	Teaching Level**
1. An ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics	Low	Emphasized
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	Emphasized
3. An ability to communicate effectively with a range of audiences	High	Emphasized
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	High	Emphasized
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	Medium	Emphasized
6. An ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions	High	Emphasized
7. An ability to acquire and apply new knowledge as needed, using appropriate learning strategies	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.

Recommended Textbooks and Software
- Title: Biodesign: The Process of Innovating Medical Technologies
- Authors: Zenios, Makower, Yock, Brinton, Kimar, Denend, and Krummel
- 2nd Edition, 2015
- ISBN number: 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.

- Title: Product Design and Development
- Authors: Ulrich and Eppinger
- 7th Edition, 2019
- ISBN number: 1260043657

Required Computer
UF student computing requirement: *https://news.it.ufl.edu/education/student-computing-requirements-for-uf/*

Course Topics (see Canvas for specific class dates, assignments, and presentations)

- Design Process (including Problem Definition, Brainstorming, Concept Generation and Evaluation, Detailed Design, Fabrication and Validation)
- Experimental Design
- Project Management and Team Dynamics
- Regulations and Standards
- Intellectual Property
- Bioethics
- Technical Communication

Important Dates

Please consult Canvas for the most up to date schedule regarding class assignments, exams, etc.
Important university dates/deadlines: https://catalog.ufl.edu/UGRD/dates-deadlines/2024-2025/#fall24text

Attendance Policy, Class Expectations, and Make-Up Policy

Attendance is expected, required, and noted by the instructors for 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. If you are you experience illness or an event that makes it challenging to keep up with course materials, please let me know ASAP - I am here to help.

Please review your student handbook to ensure that you understand the requirements for a university approved absence. Excused absences are consistent with university policies in the undergraduate catalog (https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx) and require appropriate documentation.

Evaluation of Grades

Assignment	Percentage of Final Grade
Out of Class Deliverables (Team + Individual)	15%
Project Proposal	10%
In Class Participation	10%
Final Semester Project Presentation	30%
Design History File (Technical Documentation)	25%
Peer Evaluation (Individual)	10%
TOTAL	100%

Grading Policy

Letter grade conversion plan:

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	E
≥92	90-91	87-89	83-86	80-82	77-79	73-76	70-72	67-69	63-66	60-62	< 60

This course is an upper division critical tracking course. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. 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/.

In-Class Recording

Students are allowed to record video or audio of class lectures. However, the purposes for which these recordings may be used are strictly controlled. The only allowable purposes are (1) for personal educational use, (2) in connection with a complaint to the university, or (3) as evidence in, or in preparation for, a criminal or civil proceeding. All other purposes are prohibited. Specifically, students may not publish recorded lectures without the written consent of the instructor.

A "class lecture" is an educational presentation intended to inform or teach enrolled students about a particular subject, including any instructor-led discussions that form part of the presentation, and delivered by any instructor hired or appointed by the University, or by a guest instructor, as part of a University of Florida course. A class lecture does not include lab sessions, student presentations, clinical presentations such as patient history, academic exercises involving solely student participation, assessments (quizzes, tests, exams), field trips, private conversations between students in the class or between a student and the faculty or lecturer during a class session.

Publication without permission of the instructor is prohibited. To "publish" means to share, transmit, circulate, distribute, or provide access to a recording, regardless of format or medium, to another person (or persons), including but not limited to another student within the same class section. Additionally, a recording, or transcript of a recording, is considered published if it is posted on or uploaded to, in whole or in part, any media platform, including but not limited to social media, book, magazine, newspaper, leaflet, or third party note/tutoring services. A student who publishes a recording without written consent may be subject to a civil cause of action instituted by a person injured by the publication and/or discipline under UF Regulation 4.040 Student Honor Code and Student Conduct Code.

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/process/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 varied perspectives and lived experiences within our community and is committed to supporting the University's core values, including the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of race, creed, color, religion, age, disability, sex, sexual orientation, gender identity and expression, marital status, national origin, political opinions or affiliations, genetic information, and veteran status.

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 Undergraduate Coordinator
• HWCOE Human Resources, 352-392-0904, student-support-hr@eng.ufl.edu
• Pam Dickrell, Associate Dean of Student Affairs, 352-392-2177, pld@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: https://counseling.ufl.edu, 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://elearning.ufl.edu/.

Career Connections Center, Reitz Union, 392-1601. Career assistance and counseling; https://career.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://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/;https://care.dso.ufl.edu.

On-Line Students Complaints: https://distance.ufl.edu/getting-help/; *https://distance.ufl.edu/state-authorization-status/#student-complaint*.