**Quantitative Physiology**

BME 4409 Section 27819

***Class Periods:*** MWF, period 3, and 9:35am – 10:25am

***Location:*** Online; internet access with ability to play sound and
a microphone is required; video is strongly encouraged.

***Academic Term:*** Spring 2021

***Instructor:***

Meghan Ferrall-Fairbanks

mferrall.fairbanks@bme.ufl.edu

Office Phone Number: 352-273-9222

Office Hours: By Appointment

Kevin Otto

kevin.otto@bme.ufl.edu

Office Phone Number: 352-294-2227

Mobile Phone Number: 765-543-9449

Office Hours: By Appointment

***Course Communication:***

Communication with the instructor is welcome via email or through Canvas. We will also use a course Slack portal that will enable instructor, direct-student, and intra-group communication. Finally, Discussion boards will be used throughout the course for posting thoughts related to course content. The instructor will strive to provide responses to communication within 1 business day of the initial communication. Grades will be posted promptly following their completion, typically within 1 week of the assessment deadline.

***Teaching Assistant/Peer Mentor/Supervised Teaching Student:***

* N/A

***Course Description***

Quantitative modeling of organ system physiology of the nervous system, the cardiovascular system, the renal system, and others will be discussed, and students will work on quantitative problems.

***Course Pre-Requisites / Co-Requisites***

Pre-requisites:

* PCB 3713C - Cell and system physiology or similar course (with instructor approval)
* MAP 2302 - Elementary Differential Equations
* BME 3060 - BME Fundamentals

***Course Objectives***

* to be able to describe a physiologic system in a quantitative way
* to be able to analyze physiologic measurements and use them for parameter estimation

***Materials and Supply Fees***

Course Fee: $24.99

***Professional Component (ABET):***

This course incorporates mathematics and basic sciences appropriate to Biomedical Engineering. Basic sciences are defined as biological, chemical, and physical sciences. It also incorporates engineering topics, consisting of engineering sciences and engineering design appropriate to Biomedical Engineering.

***Relation to Program Outcomes (ABET):***

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

\*Coverage is given as high, medium, or low. An empty box indicates that this outcome is not covered or assessed in the course.

***Required Textbooks and Software***

* N/A

***Recommended Materials***

* HUMAN PHYSIOLOGY: AN INTEGRATED APPROACH PLUS MASTERING A&P WITH ETEXT -- ACCESS CARD PACKAGE
	+ Author: Dee Unglaub Silverthorn; Publisher: Pearson
	+ Edition: 8th ; ISBN number: 9781323905852
* MATLAB student edition (from the bookstore), OR access to a computer with MATLAB, OR use online at <http://info.apps.ufl.edu>. Full help including FAQ and a Help Request can be found here: <https://info.apps.ufl.edu/>.

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| --- |
| ***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.  |

***Attendance Policy, Class Expectations, and Make-Up Policy***

Class participation is required and part of the final grade. Exceptions are made conforming to university policies, but the instructor must be notified in advance. Lectures and class discussions will be held synchronously during the pre-determined course meeting time.

Flipped Classroom Format: This course will use a partial flipped classroom format. This means students will listen to pre-recording of slide presentations or perform assigned reading prior to class. Scheduled class sessions will then be an opportunity to participate in active discussion and complete activities designed to practice concepts and engage with the course material.

Participation: Students are expected to attend scheduled class sessions. Attending class is critical for understanding the course material. The highest total grades are regularly earned by students who come to class having reviewed all assigned materials and are prepared to actively participate in activities and discussions.

Reading: Reading is an opportunity for students to learn and review course material. Reading also provides a perspective on the course material that is different than that provided by the instructor. Most readings are real-world applications of Quantitative Physiology concepts and show how researchers and scientists apply fundamental concepts in BME to a variety of biomedical problems.

Quizzes: Quizzes allow the students and the instructor to assess understanding of current course material. They also act as a mechanism to widen the course’s grading scheme (i.e., lower the stakes of each exam and the project and include individual, instead of team-based, grades). Quizzes will be released after completion of a module and are due at the start of the next scheduled class time.

Coursework: In-class and homework assignments provide students with an opportunity to apply concepts and affirm their understanding of the course material. All assignments should be turned in electronically via the course website. Assignments turned in late will not be graded, except under extreme circumstances at the discretion of the instructor. Students are encouraged to work cooperatively on assignments. However, each student must individually submit assignments consisting of his or her own work. This means that students are encouraged to discuss the solution process for problems. However, copying another student’s work (or allowing a student to copy your work) will be considered a violation of the University honor code.

Course Project: The design project is an opportunity to learn, practice, and apply quantitative modeling techniques to biomedical applications. There will be three project milestone assignments and a final in-class presentation and 5-page report detailing the results of model. Groups of 3-4 students will be randomly assigned by the instructor. All project milestones will involve written deliverables and/or in-class presentations. Accommodations for missing an in-class presentation will only be made for student who provide appropriate documentation of an excused absence. Excused absences must be consistent with University policies in the undergraduate catalog (<https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx>). Further project details will be discussed in class and distributed on the course website.

***Evaluation of Grades***

* Assignments will be made periodically throughout the semester and will account for 25% of the final grade.
* A semester project will account for 25% of the final grade. The end goal of the project is to work in small groups to develop a simple model of a physiological phenomenon and evaluate the model for a specific system. The projects will be evaluated based on an in-class presentation and a 5-page report detailing the results.
* Module quizzes will be given and must be completed online. These quizzes will account for 20% of the final grade.
* Three exams will be administered throughout the semester accounting for 10% of the final grade each (30% total).

***Grading Policy***

The following grading standards will be used in this class:

|  |  |  |
| --- | --- | --- |
| **Percent**  | **Grade** | **Grade Points** |
| 100 % to 92.0 % | A | 4.00 |
| < 92.0 % to 90.0 %  | A- | 3.67 |
| < 90.0 % to 87.0 %  | B+ | 3.33 |
| < 87.0 % to 83.0 %  | B | 3.00 |
| < 83.0 % to 77.0 %  | B- | 2.67 |
| < 77.0 % to 76.0 % | C+ | 2.33 |
| < 76.0 % to 74.0 %  | C | 2.00 |
| < 74.0 % to 70.0%  | C- | 1.67 |
| < 70.0 % to 67.0 % | D+ | 1.33 |
| < 67.0 % to 64.0 %  | D | 1.00 |
| < 64.0 % to 61.0 %  | D- | 0.67 |
| < 61.0 % to 0.0 %  | F | 0.00 |

Late submissions of student work will receive a 5% deduction per day for a maximum deduction of 50%.

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. In adopting this Honor Code, the students of the University of Florida recognize that academic honesty and integrity are fundamental values of the University community. Students who enroll at the University commit to holding themselves and their peers to the high standard of honor required by the Honor Code. Any individual who becomes aware of a violation of the Honor Code is bound by honor to take corrective action. The quality of a University of Florida education and the value of your degree is dependent upon the community acceptance and enforcement of the Honor Code. 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 in this class.

* **Plagiarism** is a common infraction to the UF Honor Code. If you are confused as to what constitutes plagiarism, see here: <https://guides.uflib.ufl.edu/copyright/plagiarism>. Plagiarism on any of your assignments **will be reported to the Dean of Students as a UF Student Honor Code violation**. Also, note that **copying solutions for any assignment, regardless of the source (e.g. other students, pirated website solutions), will be treated as plagiarism**. If you have any questions or concerns, please consult with the instructor in this class. Note that failure to comply with this commitment will result in disciplinary action compliant with the UF Student Honor Code Procedures.

***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:

• Kristin Theus, Undergraduate Academic Advisor, 352-273-8096, undergrad@bme.ufl.edu

• 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**](https://titleix.ufl.edu/), 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**at392-1111 (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](https://care.dso.ufl.edu/).

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

***COVID Accommodations and Behavior Expectations***

Accommodations: 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.

Student Behavior Expectations: Students and student organizations must adhere to published University of Florida policies and regulations, local and state, and other applicable regulations, guidelines, laws and orders. Students and student organizations must remain informed concerning policies, regulations, guidelines, laws, orders and community health needs which may change in response to COVID-19. The University of Florida’s approach is to educate and engage community members, including students and student organizations, who are expected to take responsibility to be educated and engaged. More information regarding UF’s policy regarding Student Behavior Expectations in Response to COVID-19 is available at: <https://policy.ufl.edu/policy/student-behavioral-expectations-in-response-to-covid-19/>.

Every University student must:

* Wear a mask or cloth face covering in UF and UF Health facilities as required by the university’s [Masking and Physical Distancing policy](https://policy.ufl.edu/policy/masking-and-physical-distancing/).
* Wear a face covering in UF outdoor spaces when the space does not allow for appropriate physical distancing as required by the university’s [Masking and Physical Distancing policy](https://policy.ufl.edu/policy/masking-and-physical-distancing/).
* Follow all university published guidance on events and gatherings, including the [Campus Events and Gatherings in response to COVID-19 policy](https://policy.ufl.edu/policy/campus-events-and-gatherings/).
* Comply immediately with a request from a university official addressing health, safety or welfare such as a request to wear a face covering, maintain physical distancing or comply with other applicable law, policy or order while on university property, inside a university facility or attending a University sponsored event.
* Follow all COVID-19 related published policies, guidelines, laws and orders issued by the county, city, state or other applicable agency while on and off campus. If a county or city ordinance conflicts with a university policy, university policy will control on the university campus.