Biomedical Engineering Fundamentals  
BME 3060  
3 credit hours  
Spring 2015

Course Description: Focusing on biomedical engineering applications, this course provides the engineering fundamentals of the conservation laws of momentum, mass, and energy.

Prerequisites: CHM2046 or CHM2096, MAC2313, PHY2049 Students with a strong knowledge of vectors and ODEs should find themselves prepared for the information presented in this course.

Class Meeting: Tuesdays and Thursdays, Typically from 3:00 to 4:15pm¹; NEB 202

Instructor: Prof. Cherie Stabler (Anderson)

Office and Contact Information: Office J385, cstabler@bme.ufl.edu

Office Hours: By Appointment

Teaching Assistant: Hamadi McIntosh, Available Wed 1-4pm NEB 350

Required Text:  

Additional Resources:  


Strategies for Creative Problem Solving Website: http://www.umich.edu/~scps/index.htm

Course Goals and/or Objectives: The foundation of many biomedical engineering problems is based on conservation laws. The goals of this course are to develop problem-formulation and problem-solving skills, develop and understand conservation equations, in order to apply them to solve problems in biomedical engineering.

Contribution of the Course to Meeting the Professional Component: This course prepares students to apply advanced mathematics to solve problems at the interface of engineering and biology.

Relationship of Course to Program Outcomes: This course contributes to the following program outcomes: (a) an ability to apply knowledge of mathematics, science, and engineering; (e) an ability to identify, formulate, and solve engineering problems; (f) an understanding of professional and ethical responsibility; (i) a recognition of the need for, and an ability to engage in life-long learning; and (j) a knowledge of contemporary issues.

Meeting Course Objectives: These objectives will be achieved through the four main components of the course: lectures, handouts, assignments, and exams/quizzes.

Lectures: The lectures will reinforce important concepts or areas of information, outline derivations, and provide support for completion of homework assignments. Lectures may be supported by the primary

¹ While Periods 8-9 are blocked out for this course, the average lecture time meet the standards for a 3 credit hr course (i.e. 150 min per week). Typically, lecture periods will run from 3:00 to 4:15pm on Tuesdays and Thursdays; however, adjustments for timing may be made to accommodate special topics, assignments, et al, so all students are expected to be available for Periods 8-9 as needed.
textbook for the class, but other topics will be covered at the discretion of the instructor. Attendance is critical for success in this course.

Handouts: Handouts will be made available in class or via Canvas. Handouts will be used to support and/or summarize material presented in class or to provide supplemental material. Selected handouts may be included on or be used as support for quizzes/exams – these are clearly designed by headings “Permitted In Quizzes/Exam”.

Assignments: Given that a large amount of this class covers mathematics and engineering principles, homework will be a critical component to this course. In general, you will be given 1 week to complete assignments. Independent completion of the homework is critical to success in this course. Homework assignments are due in class. They can be turned in as paper documents in class or as electronic scanned pages via Canvas; however, ensure electronic versions are clearly legible and uploaded properly. Late homework will be accepted up to 24 hrs after the deadline, but with a 15 pt penalty. Homework after this time frame will not be accepted unless a University Approved Absence is documented. Note that homework is a considerable percentage of your grade, so make the completion of this a priority.

Exams/Quizzes: There will be three exams (2 during the semester and 1 during finals week), each of equal weight. One quiz will also be given. Both quizzes and exams will be in-class.

General Topics Covered in Course:
- Approaching Problems from an Engineering Prospective
- Foundations of Engineering Calculations
- Conservation Principles
- Conservation of Momentum
- Conservation of Mass
- Conservation of Energy
- Selective Constitutive relations
- Dimensional analysis and dimensionless groups
- Applying Engineering Principles to Biological Systems

Course Policies:

The syllabus is tentative. Given that there may be a wide range of students at various levels, some topics may take more time to cover than others.

Absences: Please notify me in advance if you will be missing more than 2 consecutive classes. It is your responsibility to keep up to date on the materials/assignments when you have missed class. Make up exams and/or quizzes will only be permitted for University approved absences. Please review your student handbook to ensure that you understand the requirements for a university approved absence.

Website: I will use Canvas extensively to post relevant information on the course, including all assignments. All students are fully responsible for ensuring that they have access to the course website on Canvas and that they check this website or set up reminders to ensure they are fully aware of all postings. Failure to check this website will not be a valid excuse for not completing assignments. Grades will also be posted using Canvas as the course progresses.

Participation: You are highly encouraged to ask questions and initiate discussions during class. Bonus points will be awarded for participation at the discretion of the instructor.

Communication: Class announcements will be posted to Canvas and all students are responsible for ensuring awareness of these postings. Failure to review the course website is not an excuse for missing assignments, class time changes, etc. All students are expected to communicate in a professional manner. I will only communicate with students via their university email address, so please ensure that all email communication comes from this
address and you check this email in a timely manner. For direct email communications, to better facilitate a timely response, please use BME 3060 as the first part of the subject line.

**Conduct:** All students are expected to conduct themselves in a professional manner when participating in this course. A student participating in conduct that is not supportive of the educational experience will be requested to terminate this activity or leave the classroom. Discussions should be conducted in a respectful and courteous manner, to encourage a dynamic interaction from all in attendance.

**Academic Honesty:** 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. A student-run Honor Court and faculty support are crucial to the success of the Honor Code. The quality of a University of Florida education is dependent upon the community acceptance and enforcement of the Honor Code. We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honesty and integrity.

> *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 related to this assignment.”*

Note that failure to comply with this commitment will result in disciplinary action compliant with the UF Student Honor Code Procedures. See [http://www.dso.ufl.edu/sccr/procedures/honorcode.php](http://www.dso.ufl.edu/sccr/procedures/honorcode.php).

**Grading Policy:** Course grade will be a weighted average of exam (**60% of total**), quiz (**5%**) and assignments (**35% of total**).

To maximize your partial credit in grading:
1. Write legibly and do not crowd your work.
2. Write the equations you are using in symbols before substituting in numbers.
3. Label all numerical quantities/values with units.
4. Construct a clear diagram, if appropriate.

**Grading Scale:** The grading scale is: 90-100 = A; 80-89 = B; 70-79 = C; 60-69 = D; and 59 and below = F. Final cumulative numerical grades will be rounded to the nearest tenth of a point. Curving of assignments are exceptionally rare and typically only due to the entire course missing a question. Modifications in credit assigned for questions will be applied to all students. No extra credit is given in this course.

A grade of “C” will not be a qualifying grade for critical tracking courses. 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. For more information on grades and grading policies, please visit: [http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html](http://www.registrar.ufl.edu/catalog/policies/regulationgrades.html)

**University Policy on Accommodating Students with Disabilities:** Students requesting accommodation for disabilities must first register with the Dean of Students Office (http://www.dso.ufl.edu/drc/). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

**UF Counseling Services:** Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
- UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
- Career Resource Center, Reitz Union, 392-1601, career and job search services.