

BME1008: Introduction to Biomedical Engineering

1. Catalog Description (1 Credit Hour): Introduction to and overview of biomedical engineering. Lectures will be given by faculty expert in an area of biomedical engineering. The goal is to give beginning students an appreciation for the breadth of the field and to guide them in making curriculum, major and career choices.
2. Pre-requisites and Co-requisites: None
3. Course Objectives:
 - a. **Provide students with a broad overview of the biomedical engineering field**
 - b. **Guide students in making early curriculum, major, and education choices concerning biomedical engineering**
 - c. **Provide an overview of common careers available to BME graduates**
4. Contribution of course to meeting the professional component: Not Applicable
5. Relationship of course to program outcomes: Not applicable
6. Instructor

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*** Preferred contact -- Email**

Class Website: See Sakai – BME1008, Fall 2012
Office Hours: By appointment preferred, or, Monday, 10:00-11:00
7. Teaching Assistant: Not Applicable
8. Meeting Times: **Wednesdays, Period 9, 4:05-4:55**
9. Class/laboratory schedule: **Every Wednesday, See Course Outline**
10. Meeting Location: **New Engineering Building, RM 202**
11. Material and Supply Fees: Not Applicable
12. Textbooks and Software Required: Not Applicable
13. Recommended Reading:

The following websites provide a nice overview of the BME field and current events

 - bme.ufl.edu
(Information on our faculty, research, and laboratories)
 - undergraduate.bme.ufl.edu
(Information on the undergraduate BME curriculum at UF)
 - www.bmes.org
(Check out undergraduate research section, career connections, news and press, among other resources)
 - www.whitaker.org
(Check out undergraduate research programs and summer programs)
 - www.nibib.nih.gov
(Information on recent advances in Biomedical Engineering and government funding in BME)
 - www.embs.org
(Information on the IEEE Engineering in Medicine and Biology Society)

14. Course Outline – ****LECTURE SCHEDULE SUBJECT TO CHANGE**

8/22/12: Introduction to the Course and Overview of the Biomedical Engineering Field
(Kyle Allen)

8/29/12: Introduction to Brain Computer Interfaces
(Aysegul Gunduz)

9/5/12: The hip bone is connected to the knee bone... most of the time
(Scott Banks)

9/12/12: Graduate Student Panel on Medical Physics
(Daniel Long, Justin Cantley, Matthew Maynard)
5-8 QUESTION QUIZ

9/19/12: Experiences at Kimberly-Clark and Introduction to BME Design
(James Schumaker)

9/26/12: Molecular Imaging and the Field of Medical Physics
(Dave Gilland)

10/3/12: Image Guidance Tools
(Frank Bova)
5-8 QUESTION QUIZ

10/10/12: NanoBioMagnetics
(Jon Dobson)

10/17/12: Graduate Student Panel on Tissue Engineering
(Joe Uzarski, TBD)

10/24/12: Introduction to Biomechanics in Sports Medicine
(Bryan Conrad)
5-8 QUESTION QUIZ

10/31/12: Simulating Human Physiology and Overview of the BME Curriculum
(Hans van Oostrom)

11/7/12: Graduate Student Panel on Neuroengineering
(Rachel Speisman, Paul Carney Lab, Eric Franca)
PAPER #1 DUE

11/14/12: Modeling Orthopaedic Injuries
(Kyle Allen)
PAPER #2 DUE

11/21/12: THANKSGIVING VACATION

11/28/12: Graduate Student Panel on Drug Delivery
(Matt Carstens, Bettina Kozissnik)
5-8 QUESTION QUIZ

12/5/12: **12-20 QUESTION FINAL QUIZ**

15. Attendance and Expectations

Attendance is required and will be a substantial part of your final grade. Every lecture will have a sign-in sheet. It is your responsibility to sign the sheet with your initials. Don't forget to sign the sheet. If you forget, you may not receive credit.

I also reserve the right to take attendance credits away if you are disruptive to the class, fall asleep, break out your computer to send emails, bring other distractions such as crossword puzzle, are playing games or sending text messages on your phone or other evidence that you are not putting forth any effort to pay attention.

Common Errors:

- Do not have your friends sign you in. If you think I won't check for common handwriting, you'll be sorely mistaken.
- Excused absences may be granted on a case-by-case basis. Excused absences will not be granted for cases that could have been anticipated by the student. Advanced notice will markedly increase your chances. Timeliness in the request will also increase your chances. Helpful hint - most sick people can still use email.

16. Grading

Quizzes: 10% per quiz (40% total)

Final Quiz: 20%

Attendance: 20%

Term Papers: 20% [10% each]

17. Grading Scale

| | | | | | |
|-----------|-----------|-----------|-----------|-----------|-----------|
| A | A- | B+ | B | B- | C+ |
| 92.5-100 | 90.0-92.4 | 87.5-89.9 | 82.5-87.5 | 80.0-82.4 | 77.5-79.9 |
| C | C- | D+ | D | D- | F |
| 72.5-77.5 | 70.0-72.4 | 67.5-69.9 | 62.5-67.5 | 60.0-62.4 | 0-59.9 |

* I will round your grade to the nearest tenth of a point; then, your letter grade will be assigned based on the above table.

“A 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:

<https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx>

18. Make-up Exam Policy:

Make-up exams will be handled on a case-by-case basis, and like excused absence, advanced notice and timeliness in handling a missed quiz or assignment will increase the student's chances of receiving a make-up exam

19. Honesty Policy:

All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

20. Accommodation for Students with Disabilities

Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

21. 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.

22. Software Use

All faculty, staff and student 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.

Paper #1

Due: 11/7/12, 11:55 PM (5 minutes before midnight)

How: Use Turn-it-in via Sakai Website

Assignment: Pick 1 lecture from the class. Describe the medical, biological, and engineering components of the research presented in that lecture.

Logistics: 1 Page, 1 inch margins, 12 point font

Suggested format:

- 3 paragraphs
 - Paragraph 1: The work presented by Dr. X addressed this medical issue
 - Paragraph 2: The work presented by Dr. X used these biological techniques
 - Paragraph 3: The work presented by Dr. X used these engineering techniques

Short Example:

In the lecture presented by Dr. Allen, he described his work on models of osteoarthritis. Osteoarthritis is a degenerative disease that affects joints, limiting the joint's ability to move and causing pain. Osteoarthritis can result from many different things, including ACL or cartilage injury, or the origins may be completely unknown.

Dr. Allen uses animal models to understand how osteoarthritis develops. With a model, he is able to closely examine the joint to see how the cartilage wears away during osteoarthritis. His lab is able to stain for different proteins as the disease progresses. Using these techniques, he is developing new diagnostics and therapeutics for osteoarthritis.

Dr. Allen also uses biomechanical measures to better understand how osteoarthritis affects joint function. His lab is able to measure how the joint moves and how an animal changes its walking pattern in response to injury. Using these techniques, he is able to investigate disease symptoms in addition to the biological processes that cause joint degeneration.

Paper #2

Due: 11/14/12, 11:55 PM (5 minutes before midnight)

How: Use Turn-it-in via Sakai Website

Assignment: Pick 1 of the following options and write a 1 page essay on the topic

Option #1 – BME Application Essay: The BME online application consists of basic information submitted online and a one page essay. The essay should contain the reasons you want to study BME, which BME subjects interest you, what do you want to do with your BME BS degree, and which BME Program Track are you interested in and why.

Option #2 - Imagine you've pursued a career in biomedical engineering. You are now 5 years into your career (post-graduation). Describe the challenges in human health that you have worked on during your 5 year career. Describe the engineering and biology techniques you are using or have used to solve these challenges.

Logistics: The essay should be one 8.5 in x 11in page with 1 inch margins, 11 point Times New Roman font, with no graphics. Line spacing is at the student's digression, but the suggestions spacing is 1.5.