

# BME 231

## Introduction to Biomechanics

### Winter 2014

Instructor: Prof. Joseph L. Bull  
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Note: email is generally a good way to contact me. **Please include “BME 231” in the subject.**

Lectures: Monday and Wednesday, 1:30-3:30, 1013 Dow

Office Hours: 4:00-5:00pm on Monday and 3:00-5:00pm on Tuesday, 2204 Lurie Biomedical Engineering Building.  
Other times can be arranged by appointment. There will likely be some changes to the regular office hour times for some weeks, which will be announced in class and on CTools.

GSI: Melanie Gupte  
[mgupte@umich.edu](mailto:mgupte@umich.edu)  
Office hours: TBA

IA: Alex Waselewski  
[waselewa@umich.edu](mailto:waselewa@umich.edu)  
Office hours: TBA

Course URL: The course web page is on CTools, <https://ctools.umich.edu/portal>

Please check CTools frequently. The topic coverage schedule, homework assignments, any changes to office hours, and additional reading material will be posted there.

Course Text: *BIOMEDE 231 E-Book*, Wiley (ISBN 9781119925958). It is available here <http://store.vitalsource.com/show/9781119925958>  
It works on computers, iPad, iPhone, etc. through their app. We are using sections of three textbooks and the publisher has combined these sections into a single e-book.

If you want a paper book, there are two options.

1. Wiley BIOMEDE 231 Introduction to Biomechanics custom book (ISBN 9781119925972). It's the print version of the e-book.
2. All three print books: *Engineering Mechanics: Statics, 7<sup>th</sup> Edition* (ISBN 9780470614730) by Meriam and Kraige, *Engineering Mechanics: Dynamics, 7<sup>th</sup> Edition* (ISBN 9780470614815) by Meriam and Kraige, and *Mechanics of*

*Materials: An Integrated Learning System, 3<sup>rd</sup> Edition* (ISBN 9781118083475) by Philpot. (Even used or on Kindle, this appeared more expensive than the other two options)

Topics: This course provides an introduction to topics in biomechanics, including statics, dynamics, and deformable body mechanics, as they apply to biology and medicine.

Prerequisites: Math 116 and Physics 140.

Grading:	Exam 1	25%
	Exam 2	25%
	Exam 3	25%
	Homework	25%
Total		100%

Exams: Tentatively during class time (subject to availability of additional classroom)

**Exam 1—February 12**

**Exam 2—March 26**

**Exam 3—April 30**

**Please let me know during the first week of the semester if you have any conflicts with this schedule**

Homework: Homework will be assigned throughout the semester, approximately weekly. Expect a total of 7-10 assignments. Homework will be due at the beginning of lecture on the due date. **Late assignments will not be accepted.** One homework assignment will be dropped in calculating your overall homework grade. Please present your solutions in a neat and easy to follow format. Twenty-five percent credit will be deducted from solutions that do not follow these guidelines:

1. Use 8.5" x 11" paper with straight edges, *not* paper torn from a spiral notebook.
2. Number all pages, e.g. 1/5, 2/5, ..., 5/5.
3. Box or underline the answer.
4. Staple all pages together.
5. Write and draw neatly and legibly.

Honor Code: The policies of the College of Engineering Honor Code, described at <http://www.engin.umich.edu/students/honorcode/>, apply to this course. While you are encouraged to discuss the homework with others, the assignments you turn in must represent your independent understanding of the material. Thus, you may not simply copy another person's work and submit it as your own. The exams are solely an individual effort and are also subject to the guidelines described on the College of Engineering Honor Code site.

Grade Scale: Performance expectations (based on overall percentage grade) will not be higher than the following scale:

97-100%	A+
93-97%	A
90-93%	A-
87-90%	B+
83-87%	B
80-83%	B-
77-80%	C+
73-77%	C
70-73%	C-
67-70%	D+
63-67%	D
60-63%	D-
0-59%	E

Regrades: Regrade requests must be submitted to your GSI within 1 week receiving a graded homework or exam. A detailed explanation of why you deserve additional points on specific question(s) should be written on a separate paper and attached.

Cell phones: Please turn cell phones to vibrate or silent before class. Ringing or beeping is disturbing to the class.

Schedule: This is a **tentative** schedule of the topics we will cover in this course. This will change as we progress through the semester and **the schedule will be regularly updated on CTools.**

Week	Date	Reading	Topics Covered	HW
1	Jan. 8	Ch. 1	Introduction; Review Vectors, Forces, and Moments	
2	Jan. 13, 14	Ch. 2-3	Systems of Forces, Equilibrium	HW 1 due Wednesday Jan. 15
3	Jan. 22	Ch. 3-4	Equilibrium, Structures	
4	Jan. 27, 29	Ch. 4	Structures	HW 2
5	Feb. 3, 5	Ch. 5	Centroid, Moment of Inertia, Intro. Distributed Loads	HW3
6	Feb. 10, 12		Review	Exam 1
7	Feb. 17, 19	Ch. 6-7	Stress and Strain	
8	Feb. 24, 26	Ch. 8-9	Stress and Strain	HW 4
9	Mar. 3-7	Spring Break		
10	Mar. 10, 12	Ch. 10	Stress and Strain	
11	Mar. 17, 19	Ch. 11-12	Stress and Strain	HW5
12	Mar. 24, 26		Review	Exam 2
13	March 31, April 2	Ch. 13	Kinematics	
14	April 7, 9	Ch. 13-14	Kinematics & Kinetics	HW 6
15	April 14, 16	Ch. 14	Kinetics	HW 7
16	April 21		Review	
17	April 30		Exam 3	Exam 3