

Appendix

BME 321

Advanced Mechanics for Biomedical Engineers



The Department of
Biomedical Engineering

Instructor: Maxine Kwan [mmkwan@njit.edu]	Class Times: TBD
Office Hours (Or by Appointment) Maxine Kwan – FENS 680 W: 2 PM - 4 PM	TA Office Hours

Required Text:

Statics and Mechanics of Materials, 4th Edition, Hibbeler, R.C., ISBN-13: 978-0133451603

Course Description:

Prerequisites: Grade of C or higher in BME 302.

This course provides an understanding of engineering mechanics, especially as applied to biomechanical systems. Students should be familiar with static equilibrium analysis and concepts of stress and strain. Course topics include method of sections, area moment of inertia, mechanical properties of materials, torsion, bending, stress transformation, Mohr's circle, and deflection of beams.

Course Requirements & Policies

❖ **Grade Weights**

Participation	5%
Homework	15%
Quizzes	20%
Projects	20%
Midterm	20%
Final Exam	20%

❖ **Attendance Policy**

Attendance is mandatory, and participation is required. All absences must be pre-approved – Inform the instructor in advance. In case of extenuating circumstances, justification for any lates or absences must be validated by the Office of the Dean of Students with documentation (e.g. doctor's note).

❖ Projects

Students will work in groups of 3-4 on two course projects. These projects will allow students to gain hands-on experience with mechanical testing of different materials, including biomaterials. Students will summarize their findings in a project report.

❖ Makeup Policy

Homeworks, Quizzes, & Projects

Only documents approved by the Office of the Dean of the students will be accepted for any makeups. If any of the above items are missed, and no validated excuse is provided, a zero will be given for that item. If a validated excuse is provided, the student may be allowed to makeup the item if it has not yet been graded and returned, or if the item has been graded and returned, the missed item will be dropped from that category.

Exams

No makeup examinations will be administered unless the reason for the absence is approved by the Office of the Dean of Students, along with any necessary documentation. If the absence is approved by the Office of the Dean of Students, the student will have the option, depending on availability, of either having a makeup exam, or having the weight of the missed exam transferred to the weight of the Final Exam. Failure to provide an approved reason for the absence will result in a zero on the exam.

Course Outline

The course outline may be modified at the discretion of the instructor or in the event of extenuating circumstances. Students will be notified in class of any changes.

Week	Topic	References
1	Review: Equilibrium of Rigid Bodies (in 3D)	Ch 4
2	Method of Sections	Ch 5
3	Frames and Machines (Multi-body systems)	Ch 5
4	Centroids, Center of Gravity	Ch 6
5	Area Moment of Inertia	Ch 6
6	MIDTERM EXAM	Ch 4-6
7	Review: Axial Loading, Torsion, and Bending	Ch 10-11
8	Combined Loadings	Ch 13
9	Stress Transformation	Ch 14
10	Mohr's Circle	Ch 14
11	Design of Beams and Shafts	Ch 15
12	Beam Deflection: Integration Method	Ch 16
13	Beam Deflection: Superposition Method	Ch 16
14	Columns	Ch 17
15	FINAL EXAM	Ch 4-17