# ME/BE/MS 523 Mechanics of Biomaterials Spring 2010

Boston University,PHO 211, 12-2pm *(TENTATIVE SYLLABUS 1/08/10)*

**Instructor:** Prof. Catherine Klapperich; **Office:** 725 ERB **Office Hours:** Mon. 10a-12:30p, catherin@bu.edu
**Grading:** Exams(2): 30%, Homework: 30%, Final Project: 35%, Participation and attendance 5%.
**Textbook:** N. Dowling, Mechanical Behavior of Materials, 3rd edition.
**Prerequisites by topic:** EK 301, EK 305 or BE 420

| Date | Lecture | Topic | Notes (Readings, events) |
|---|---|---|---|
| Th Jan 14 | 1 | Overview of course, Introduction to Materials in Medicine / Logistics | Dowling Chapters 1 and 2 |
| Tu Jan 19 | 2 | **Guest Lecture:** Dr. J. Rosen | |
| Th Jan 21 | 3 | Materials Classes, Metals, Ceramics | Dowling Chapter 3 |
| Tu Jan 26 | 4 | Deformation of an Elastic Solid | Dowling Chapter 4.1-4.6,4.9 |
| Th Jan 28 | 5 | Complex and Principal States of Stress and Strain | Dowling Chapter 5.3, 5.4 |
| Tu Feb 2 | 6 | Review of Beam Theory | **CIMIT Forum 4-6pm** *At MGH* Dowling Appendix A |
| Th Feb 4 | 7 | | No reading |
| Tu Feb 9 | 8 | Materials Classes, Polymers, Materials Selection | **CIMIT Forum 4-6pm** *at MGH* |
| Th Feb 11 | 9 | Introduction to the Mechanics of Soft Materials; Creep, Stress Relaxation, *Exam Review* | Dowling 5.2 Dowling 15.1-15.3 |
| Tu Feb 16 | | **No Class – MONDAY classes.** | **CIMIT Forum 4-6pm** *at BWH* |
| Th Feb 18 | 10 | **Midterm #1** | |
| Tu Feb 23 | 11 | **Guest Lecture:** Dr. J. Rosen | |
| Th Feb 25 | 12 | Linear Viscoelasticity | Handouts |
| Tu March 2 | 13 | Measuring Viscoelastic Behavior | Handouts |
| Th March 4 | 14 | Yielding Failure | Handouts |
| Tu March 9 | | **No Class – Spring Break** | No reading |
| Th March 11 | | **No Class – Spring Break** | No reading |
| T March 16 | 15 | Yielding Failure | TBA in class |
| Th March 18 | 16 | Fracture Failure | TBA in class |
| Tu March 23 | 17 | Fracture Failure | TBA in class |
| Th March 25 | 18 | Fatigue (Total Life) | TBA in class |
| Tu March 30 | 19 | FDA Approval Processes | TBA in class |
| Th April 1 | 20 | **Guest Lecture:** Dr. J. Rosen | TBA in class |
| Tu April 6 | 21 | Sterilization Technology and Shelf Life Considerations: Effects on Device Performance | TBA in class |
| Th April 8 | 22 | Hydrogels – An Introduction | TBA in class |
| Tu April 15 | 23 | Manufacturing Solid Polymers; *Exam Review* | TBA in class |
| Th April 20 | 24 | **Midterm #2** | |
| Tu April 22 | | **NO Class – MONDAY classes.** | |
| Th April 27 | 25 | Prepare for final poster presentation | |
| Tu April 29 | 26 | **Project Presentations Poster Session** | 12- 2pm, PHOTONICS Atrium |

**Notes**

1. Homework is due at the beginning of class and will not be accepted late (ever). Missed/late homework will result in a zero.
2. Plagiarism of any kind will not be tolerated.
3. You are required to attend at least ONE of the CIMIT Forum meetings on the syllabus. The directions to these events are located at http://www.cimit.org/forum-current.html Attendance will count toward your final participation grade.
4. If you miss a midterm you will get a zero, unless you notify the instructor AHEAD of time.
5. Exams can be rescheduled in special cases AHEAD of the listed exam date.
6. Your team members will be given a chance to "grade" your participation level and quality in the final project. This information will be included in your individual final course grade.