BME 7220 – Experimental Orthopedic Engineering

Course Description
The course prepares the students to learn design aspects used in orthopedic devices. It introduces the learner the components and designs of total joint replacement implants and fixation methods. Students research FDA application categories for various types of devices.

Graduate level – 3 credit hours.

Course Learning Objectives
Students enrolled in this course will learn to:

- Learn design aspects used in orthopedic devices.
- Introduces the learner the components and designs of total joint replacement implants and fixation methods.
- Students will research FDA application categories for various types of devices.
- Each student also works on an independent project involving experimental orthopedics and prepares 2 presentations (5th and 10th week, mid-terms) and a final report (15th week). This course also uses instructor's research on various topics.

Course Learning Outcomes
Upon successful completion of this course, students can:

- Design aspects used in orthopedic devices.
- Understand components and designs of total joint replacement implants and fixation methods.
- Students can research FDA application categories for various types of devices.
- Student can present an independent project involving experimental orthopedics

Tentative Weekly Schedule
Week 1   General Introduction
Week 2   Statistics as applicable in medicine (BSoM professor, Dr. Markert)
Week 3   Regulatory details (FDA)
Week 4   Regulatory details (FDA)
Week 5   Failure modes (concepts) Midterm presentation I
Week 6   Failure mode (experiments)
Week 7   Case studies in Orthopedics, gait parameters
Week 8   Standards and codes in retrieved implants
Week 9   Trauma instrumentation and procedures (Surgeon and BSoM Professor Dr. Prayson)
Week 10   Orthopedics devices, materials and design issues, applications
Week 11   Orthopedics devices, materials and design issues, applications
Week 12   Wear and fatigue
Week 13   Wear and fatigue
Week 14   Student Presentations