TO: The Engineering Faculty
FROM: Department of Biomedical Engineering
RE: Permanent Dual Level Course Number

The Department of Biomedical Engineering has approved the following course change. This action is now submitted to the Engineering Faculty with a recommendation for approval.

From:
BME 583 Biomaterials Sem. 2. Class 3, cr. 3. (Offered in alternate years.) Prerequisites: Permission of the instructor required

Course discusses principles of biomaterial design, synthesis, and evaluation for various tissues/organs of the body including orthopaedic/dental, cardiovascular, kidney, liver, lung, skin, nerve, and brain. Topics include fundamentals of materials science and engineering integrated into biology for the better regeneration of tissue.

To:
BME 583 Biomaterials Sem. 1. Class 3, cr. 3. (Offered in alternate years.) Prerequisites: Permission of the instructor required

Course discusses principles of biomaterial design, synthesis, and evaluation for various tissues/organs of the body including orthopaedic/dental, cardiovascular, kidney, liver, lung, skin, nerve, and brain. Topics include fundamentals of materials science and engineering integrated into biology for the better regeneration of tissue.

Reason: Biomedical Engineering is beginning to offer undergraduate courses and due to the distribution of the teaching load we request a change of semester for the course offering.

George R. Wodicka
Professor and Head

Biomaterials

Supporting Documentation:

Course Instructor: Tom Webster

Offered: fall semester (even years)

Credit: 3

Course Objective:
To integrate materials science and engineering concepts with biology to educate students how to design successful biomaterials.

3. SYLLABUS:

Topics	No. of Lectures
Introduction to course	1
Structure of solids	3
Atomic bonding, crystal structure, imperfections	
Characterization of materials	4
Mechanical properties, stress-strain behavior	
Viscoelasticity, thermal properties, phase diagrams	
Strengthening mechanisms, surface properties	
Metallic implant materials	3
Ceramic implant materials	3
Polymeric implant materials	4
Composites as biomaterials	2
Structure-property relationships in biology	3
Proteins, polysaccharides, mineralized tissue: bone/dentin	
Organ Transplants	3
Tissue response to biomaterials	7
Normal wound healing process, body response to implants	
Cell response to biomaterials	8
Protein mediated cell adhesion	
Student Presentations	3
Total	44

4. SUGGESTED REFERENCE AND/OR TEXTBOOKS:

1. Park JB and Lakes RS: Biomaterials an Introduction. Plenum Press, New York, 1992.
2. Ratner BD, Hoffman AS, Schoen FJ, Lemons JE: Biomaterials Science: An Introduction to Materials in Medicine. Academic Press, New York, 1996.
3. Hudson JB: Surface Science. Butterworth-Heinemann, Boston, 1992.
4. Simon SR: Orthopaedic Basic Science. American Academy of Orthopaedic Surgeons, Rosemont, IL, 1994.
5. Fung YC: Biomechanics: Mechanical Properties of Living Tissues. Springer-Verlag, New York, 1993.
6. Guyton AC and Hall JE: Textbook of Medical Physiology. W.B. Saunders Company, Philadelphia, 1996.

5. DOCUMENTATION ON PREVIOUS COURSE OFFERINGS:

	Fall 1999	Fall 2001	Fall 2003
Total Number of Students Enrolled	10	14	17
Total BME Students Enrolled	4	13	12
Course Evaluation	4.1/5.0	4.5/5.0	4.8/5.0