

ABE/BME 486/586 Biomaterial–Tissue Interactions
Spring 2006
TR 2–3:15 Shantz 440
Dr. Jeong-Yeol Yoon

Description: Biomaterials and their applications; protein-surface and blood-biomaterial interactions, inflammation, wound healing, biocompatibility, implants, and tissue engineering.

Grading: Regular grades are awarded for this course: A B C D E.

Prerequisite(s): CHEM 103A and 103B or equivalent.

Usually offered: Spring.

Contact Information

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Course Objectives

1. To explore and become familiar with biomaterials and their applications including protein-surface and blood-biomaterial interactions, inflammation, wound healing, biocompatibility, implants, and tissue engineering.
2. To apply engineering and biological fundamentals to the design of industrial products towards creating a profitable business model (for 486) or a new research activity (for 586).

<u>Grading Criteria</u>	<u>486</u>	<u>586</u>	<u>Grading Scale</u>	
Mid-term exam	30%	25%	90.0 – 100.0	A
Final exam	40%	35%	80.0 – 89.9	B
Homework (4 total)	10%		70.0 – 79.9	C
Journal club (3 total)		15%	60.0 – 69.9	D
Term paper (team effort)	20%	25%	< 60.0	E

Class Policies

1. Attendance in each lecture session is required.
2. A valid excuse from taking a scheduled exam can only be obtained by calling or e-mailing the instructor no later than 48 hours before the exam is given.
3. A valid excuse from making a scheduled presentation (journal club and term paper) can only be obtained through switching the presentation with somebody else(s).
4. Each homework and term paper that is submitted late will be penalized by reducing its score by 50% for each day that it is late.
5. Homework is to be turned in individually, except where explicitly noted.
6. Adherence to official university rules and regulations pertaining to the classroom is mandatory.
7. The office hour of the instructor will be announced in class.

Text

Kay C. Dee, David A. Puleo and Rea Bizios, “An Introduction to Tissue-Biomaterial Interactions,” Wiley-Liss, Hoboken, NJ, 2002.

Journal Club and Term Paper

1. Students enrolled in 586 should make a 5-min journal club presentation approximately 3 times a semester. About 3 presentations will be made per week, typically at the end of Thursday lectures. Grading (15%) will be made from the peer (586 students only) evaluations. At the first day of class, peer evaluation criteria will be announced and detail presentation schedule will be arranged. Students enrolled in 486 are not required to make journal club presentation, but the attendance is required.
2. Term paper is a team effort, comprised of 2-3 students. 4-student team is not allowed without the instructor's consent. 486 students cannot be teamed with 586 students, or vice versa. Each team will make a single presentation and submit a single term paper, although all team members should participate in both presentation and term paper writing.
3. The format of term paper will be different for 486 and 586 students. 486 students will make a professional presentation of soliciting new investment in starting a new biotech venture company; extensive theoretical background is not required, but the feasibility as a profitable business model should be addressed. 586 students will write a grant proposal to the external funding agencies, such as NSF or NIH.

Schedule

<u>Tuesdays</u>	<u>Thursdays</u>	<u>Topic</u>
	Jan 12	Introduction to the course. Scheduling journal club presentations.
Jan 17	Jan 19	Introduction to biomaterials.
Jan 24	Jan 26	Proteins.
Jan 31	Feb 2	Protein – surface interactions: fundamentals.
Feb 7	Feb 9	Protein – surface interactions: applications.
Feb 14	Feb 16	Blood – biomaterial interactions and coagulation.
Feb 21	Feb 23	Inflammation, infection and immune system.
Feb 28	Mar 2	Wound healing.
Mar 7	Mar 9	Review for mid-term exam. Mid-term exam.
Mar 14	Mar 16	<i>No classes; spring break.</i>
Mar 21	Mar 23	Physiological environment and biocompatibility.
Mar 28	Mar 30	Natural biomaterials from animals.
Apr 4	Apr 6	Natural biomaterials from plants.
Apr 11	Apr 13	Implants. Applications in medicine and dentistry.
Apr 18	Apr 20	Tissue engineering.
Apr 25	Apr 27	Term paper presentations.
May 2		Review for final exam.

Journal club presentations are scheduled at every Thursday, 3-3:15, except Jan 12 (first day of class), Mar 9 (mid-term exam) and Apr 27 (term paper presentation).