

ABE 486/586 Biomaterial-Tissue Interactions (Spring 2009)

Designation:	ABE Elective																					
2008-2009 catalog description:	(3) Biomaterials and their applications; protein-surface and blood-biomaterial interactions, inflammation, wound healing, biocompatibility, implants, and tissue engineering.																					
Prerequisite(s):	CHEM 103A and CHEM 103B or MSE 110.																					
Textbook(s) and/or other materials:	An Introduction to Tissue-Biomaterial Interactions - Dee, Puleo & Bizios (Wiley-Liss) Course website: http://ag.arizona.edu/~jyyoon/abe486.htm																					
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).																					
Topics covered:	See page 2.																					
Class schedule:	Lecture: TR 2:00-3:15 Shantz 440																					
Grading criteria:	<table><thead><tr><th></th><th><u>486</u></th><th><u>586</u></th></tr></thead><tbody><tr><td>Homeworks (4 total)</td><td>10%</td><td>8%</td></tr><tr><td>Journal club presentations (3 total)</td><td></td><td>10%</td></tr><tr><td>Exam I (1-hr, first-half, closed)</td><td>20%</td><td>18%</td></tr><tr><td>Exam II (1-hr, second-half, closed)</td><td>20%</td><td>18%</td></tr><tr><td>Exam III (2-hr, cumulative, open)</td><td>30%</td><td>28%</td></tr><tr><td>Term paper (team effort)</td><td>20%</td><td>18%</td></tr></tbody></table>		<u>486</u>	<u>586</u>	Homeworks (4 total)	10%	8%	Journal club presentations (3 total)		10%	Exam I (1-hr, first-half, closed)	20%	18%	Exam II (1-hr, second-half, closed)	20%	18%	Exam III (2-hr, cumulative, open)	30%	28%	Term paper (team effort)	20%	18%
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Contribution to professional component:	Math and basic science: 50% Engineering topics: 30% Design experience: 20%																					
Relationship to program outcomes:	(a) apply knowledge of math, science & engineering: moderate; (b) design & conduct experiments: none (c) design a system, component, or process within realistic constraints: moderate; (d) multidisciplinary teams: moderate; (e) identify, formulate & solve engineering problems: moderate; (f) professional & ethical responsibility: limited; (g) communicate effectively: moderate; (h) broad education in global, economic, environmental & societal context: limited; (i) life-long learning: none; (j) contemporary issues: saturation; (k) techniques, skills & modern engineering tools: moderate; (l) agricultural and biological sciences, chemistry & natural resource sciences: moderate; (m) soil & water resource systems: none; (n) biological processes and systems: saturation.																					
Person preparing syllabus and date:	Jeong-Yeol Yoon, Spring 2009																					

Class policies:

1. Attendance in each lecture session is required.
2. A make-up exam or term paper presentation can be scheduled only when a student has a valid excuse and submits a written note made by a responsible person.
3. Late homework will be accepted with penalty (25% for each day that it is late). Late written term paper will not be accepted.
4. Students shall not represent the work of others as their own. The minimum penalty for cheating on exams is an E grade.
5. Adherence to official university rules and regulations pertaining to the classroom is mandatory.

Journal club presentations (586 only):

Students enrolled in 586 should make a 5-min journal club presentation approximately 3 times a semester. About 2 presentations will be made per week, typically at the beginning of Thursday lectures. Grading (10%) 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.

Term paper (team presentations & proposals):

A professional team presentation and a written proposal of soliciting new investment in starting a new biotech venture company (486) or a research grant from federal funding agency (586).

Special needs and accommodations:

SALT Center www.salt.arizona.edu
(520) 621-1242; (520) 621-9448 FAX
Disability Resource Center drc.arizona.edu
(520) 621-3268; (520) 621-9423 FAX

Confidentiality of student record:

<http://www.registrar.arizona.edu/ferpa/default.htm>

Schedule:

<u>Tuesdays</u>	<u>Thursdays</u>	<u>Topic</u>
	Jan 15	Introduction to the course. Scheduling journal club presentations.
Jan 20	Jan 22	Introduction to biomaterials.
Jan 27	Jan 29	Proteins.
Feb 3	Feb 5	Protein – surface interactions: fundamentals.
Feb 10	Feb 12	Protein – surface interactions: applications.
Feb 17	Feb 19	Blood coagulation cascade.
Feb 24	Feb 26	Inflammation, infection and immune system.
Mar 3	Mar 5	Wound healing around implants.
Mar 10	Mar 12	Exam I (closed book). Evaluation of biocompatibility.
Mar 17	Mar 19	<i>No classes; spring break.</i>
Mar 24	Mar 26	Surface characterization.
Mar 31	Apr 2	Surface modification and material responses.
Apr 7	Apr 9	Orthopedic and dental implantations.
Apr 14	Apr 16	Cardiovascular devices.
Apr 21	Apr 23	Drug delivery systems. Exam II (closed book).
Apr 28	Apr 30	Term paper presentations.
May 5		Biomaterial design considerations.
	May 14	Exam III (open book, cumulative) 2:00-4:00 pm.

Office hour: Thu 3:30 pm, Forbes 132A

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<http://biosensors.abe.arizona.edu>