SYLLABUS

CHE 445/545

Biochemical Engineering

SPRING 2008

110 AIME

MWF 10:00 - 10:50 pm

Instructor: Prof. Chris Brazel
A133 Bevill Building, 8-9738
TA: Mr. Adam Dayan, A103 Bevill

Text: ***Bioprocess Engineering : Basic Concepts.*** Michael Shuler and Fikret Kargi, Prentice-Hall, 2nd ed., 2005
Website: www.bama.ua.edu/~cbrazel (Teaching section)

Additional Reference Texts:

Biochemical Engineering Fundamentals, J.E. Bailey and D.F. Ollis, 2nd ed., New York: McGraw-Hill, Inc., 1986.

Encyclopedia of Bioprocess Technology: Fermentation, Biocatalysis, and Bioseparation Ref. TP 248.3 .F57 1999 Volumes 1-5

COURSE OBJECTIVES

This course is designed to build on the chemical and biological engineering principles taught in the sophomore and junior years, providing insight into the biochemical processes and the biotechnology industry. This course will expand upon undergraduate classes to introduce complex biosystems and bioprocesses and develop an approach to engineering analysis of them. Prior knowledge of calculus and chemical engineering is not required, though some organic chemistry will be needed (CH 231 is a pre-requisite).

GRADING	445 (100 pts)	545/Honors (100 pts)
Individual Assignments/Homework	15 pts	15 pts
Exam I	25 pts	25 pts
Exam II	25 pts	25 pts
Final Exam	25 pts	25 pts
Term Paper and Presentation (topic 3/12; due 4/25)	---	10 pts
Biotech Topic Review Infosheet (topic: 3/26; due 4/23)	10 pts	---

The University of Alabama grading system applies to this course.

DUE DATES

Homework will be assigned throughout the semester, with due dates being *usually* 1 week after assignment. *Late homework will not be accepted, as solutions will be posted on the web.*

EXAMS

The exam format will be closed/open book. The tests will be given in 2 parts, with a closed book portion to test general knowledge and retention of concepts. Calculation problems will be given in an open book/open notes format. Exams I and II will be 50 minutes.

Exam I	February 22 (F)
Exam II	April 2 (W)
Final Exam	May 7 (W) 11:30-2:00 pm

If you know that you will miss an exam for a University-excuse, arrangements can be made to take the exam prior to the scheduled time. Otherwise, for an excused absence, a missed exam will be made-up by doubling the weight of the cumulative final exam.

For 545 and Honors: **TERM PAPERS AND PRESENTATIONS**

Term papers will be completed towards the end of the semester (due April 25). Graduate and honors students must work on an individual paper that will be presented in class during the last 2 weeks of the semester. Topic selections with a brief abstract of the proposed subject matter will be due March 12, including a list of two alternate topics. In the case of repeated topics, the students will be requested to modify subjects or use one of the alternate subjects. Some suggested term paper topics include:

Gene Therapy	Biomaterials and Implants	Targeted Drug Delivery
Bioremediation	Recombinant DNA	Mammalian Tissue Culture
Genetically-Modified Crops & Foods	Plant Tissue Culture	Tissue Engineering
Antibiotic Production (e.g., penicillin)	Wastewater Treatment	Artificial (Human) Organs
Fermented Products (yogurt, beer, wine)	Biodegradable Plastics	Bio-informatics
Treatment of a Specific Disease (pharmaceuticals)		DNA fingerprinting (forensics)
Stem Cells for Human Therapy	Functional Genomics/Proteomics	
Focus on Development of Biotechnology Product (e.g., taxol)		

The length of the papers (double spaced, including figures and cited references) and presentations (including time for discussion) should be approximately 10-12 pages (depending on the use of figures, which is encouraged!). Each student will present their topic in class beginning on April 25, with a 15-20 minute Powerpoint-style presentation.

Presentations will be evaluated both for content as well as oral communication skills. A summary sheet of notes or handouts should be prepared to pass out to all students in the class.

For 445 & non-honors students: **BIOTECHNOLOGY INFOSHEETS**

Each student will prepare a two page infosheet on some product or topic related to biotechnology that gives the basic details of what the material is, how it works, how it's made, how it's used, how it occurs, how it's treated, or answers similar questions appropriate to the topic.

Some topics include:

Detail a particular pharmaceutical product (chemical structure, how it works in vivo, etc.)

Detail a medical diagnostic technique- what is tested for, how are the results analyzed

Detail a biotechnology-related product (e.g., biodiesel, fermented beverages, biologically-modified agricultural products, detergents, stem cells, etc.)

More information will be given on this assignment in March. Topics will be selected by March 26th and assigned so there is no repetition. The infosheets are due on April 23. Although these sheets will not be presented in class, they will be posted on-line for the class to read and download to add to the class notes.

ACADEMIC HONOR CODE

All students in attendance at The University of Alabama are expected to be honorable and observe standards of conduct appropriate to a community of scholars. The University of Alabama expects from its students a higher standard of conduct than the minimum required to avoid discipline. At the beginning of each semester and on tests and projects at the discretion of the professor, each student will be expected to sign an Honor Pledge.

HONOR PLEDGE

I promise or affirm that I will not at any time be involved with cheating, plagiarism, fabrication, or misrepresentation while enrolled as a student at The University of Alabama. I have read the Academic Honor Code, which explains disciplinary procedures that will results from the aforementioned. I understand that violation of this code will result in penalties as severe as indefinite suspension from the University.

PLAGIARISM STATEMENT

The University of Alabama is committed to helping students to uphold the ethical standards of academic integrity in all areas of study. Students agree that their enrollment in this course allows the instructor the right to use electronic devices to help prevent plagiarism. All course materials are subject to submission to Turnitin.com for the purpose of detecting textual similarities. Turnitin.com will be used as a source document to help students avoid plagiarism in written documents.

* The syllabus is accurate as of 01/09/08, but the instructor reserves the right to alter the schedule for sound pedagogical reasons if necessary. Due notice will be given for changes in the syllabus.