

CBE 9260 – ADVANCED BIOENGINEERING AND BIOTECHNOLOGY

Description

This course will introduce graduate students to advanced topics in biochemical engineering. Students will be provided with an understanding of the underlying molecular biology of industrially relevant processes and will be introduced to modern techniques and practices in biotechnology and bioengineering. The course will further cover bioreactor design for aerobic and anaerobic processes and bridge new molecular advances and classical reactor engineering. The course is of interdisciplinary nature and intended for graduate students conducting biotechnological research.

Prerequisites

Graduate student status or special permission from the department.

Corequisites

None.

Antirequisites

The former ES 856 or CBE 9261.

Note: It is the **student's responsibility** to ensure that all Prerequisite and Corequisite conditions are met or that special permission to waive these requirements has been granted by the Program. It is also the **student's responsibility** to ensure that they have not taken a course listed as an Antirequisite. The student may be dropped from the course or not given credit for the course towards their degree if they violate the Prerequisite, Corequisite or Antirequisite conditions.

Contact Hours/Location

Thursday 2:30-5:30 (HSB 236)

Instructor

Dr. L. Rehmann (TEB 459) Telephone: 519-661-2111 ext: 89008 email: rehmann@uwo.ca

Graduate Coordinator

(TEB 477) Telephone: 519-661-2111 ext: 88352 email: cbegrad@uwo.ca

Required Text

None.

Reference Texts

W.J. Thieman & M.A. Palladino, "Introduction to Biotechnology, Second Edition." Pearson/Benjamin Cummings, San Francisco, CA, 2009.

N.S. Mosier & M.R. Ladisch, "Modern Biotechnology: Connecting Innovations in Microbiology and Biochemistry to Engineering Fundamentals," Wiley, Hoboken, N.J., 2009.

Blanch, H. W. & Clark, D. S., Biochemical engineering 702, M. Dekker, New York, 1997.

Course Notes

Instructor's lectures will be available through WebCT.

Laboratory Notes

None.

Laboratory

None.

Units

SI units will be used in lectures and for all examinations.

Specific Learning Objectives

It is the core objective of this course to prepare graduate students to be able to successfully conduct novel research in the interdisciplinary and rapidly growing field of Biotechnology and Biochemical Engineering. The skills learned in this course should further prepare students to pursue careers in the Canadian biotechnology industry.

The following topics will be covered:

- Genes and Genome.
- Recombinant DNA Technology.
- Protein Production and Characterization.
- Microbial/Plant/Animal Biotechnology.
- Aquatic Biotechnology.
- Medical Biotechnology.
- Bioremediation.
- Bioreactor Design.
- Scale-Up.
- Regulations and Ethics.
- Business and Job Opportunities.

Evaluation

The final course mark will be determined as follows:

Assignments/Presentations	30 %
Mid-term Examination	30 %
Final Examination	40 %

Both exams will be open book with course notes. Calculators of any kind will be permitted.

Note

Students must pass the final examination to pass this course. Students who fail the final examination will be assigned the aggregate mark, as determined above, or the examination mark, whichever is less.

Repeating All Components of the Course

In accordance with Senate and Faculty Policy, students who have failed an Engineering course (i.e. <50%) must repeat all components of the course. No special permissions will be granted enabling a student to retain laboratory, assignment or test marks from previous years. Previously completed assignments and laboratories cannot be resubmitted for grading by the student in subsequent years.

Use of English

In accordance with Senate and Faculty Policy, students may be penalized up to 10% of the marks on all assignments, tests, and examinations for the improper use of English. Additionally, poorly written work with the exception of the final examination may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

Attendance

Any student who, in the opinion of the instructor, is absent too frequently from class or laboratory periods in any course, will be reported to the Associate Dean (Graduate) (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Associate Dean (Graduate), the student will be debarred from taking the regular examination in the course.

Cheating

University policy states that cheating is a scholastic offence. The commission of a scholastic offence is attended by academic penalties, which might include expulsion from the program. If you are caught cheating, there will be no second warning (see Scholastic Offence Policy in the Western Academic Calendar).

Plagiarism

Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

The University of Western Ontario has software for plagiarism checking. Students may be required to submit their work in electronic form for plagiarism checking.

Conduct

Students are expected to arrive at lectures on time, and to conduct themselves during class in a professional and respectful manner that is not disruptive to others.

Sickness and Other Problems

Students should immediately consult with the instructor or Associate Chair (Graduate) if they have problems that could affect their performance in the course. The student should seek advice from the Instructor or Associate Chair (Graduate) regarding how best to deal with the problem. Failure to notify the Instructor or the Associate Chair (Graduate) immediately (or as soon as possible thereafter) will have a negative effect on any appeal.

Please contact the course instructor if you require material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

Notice

Students are responsible for regularly checking their Western email and notices posted on their Instructor's door. Course cancellation notices will be also be sent out via Twitter.

Consultation

Students are encouraged to discuss problems with their teaching assistant and/or instructor in tutorial sessions. Office hours will be arranged for the students to see the instructor and teaching assistants. Other individual consultation can be arranged by appointment with the appropriate instructor.

Accreditation (AU) Breakdown

Basic Science	=	20%
Engineering Science	=	40%
Engineering Design	=	40%