ABE 304 Bioprocess Engineering Laboratory
Course Syllabus, Spring 2018

Instructors

A. Engelberth
Professor: POTR 218
aengelbe@purdue.edu

Office hours: *By appointment*

Teaching Assistants:		*Lab Manager:*
Emma Brace	**Samira Fatemi**	**Coleen Riley**
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POTR 336	POTR 336	ABE xx

Class Times:	Lab Prep:	Friday 11:30 -12:20	All students	WTHR 160
	Lab:	Monday 10:30 – 14:20	Section 008	NSLN 1254
		Monday 14:30 – 18:20	Section 009	NSLN 1254
		Wednesday 10:30 – 14:20	Section 010	NSLN 1254

Lab Prep. The instructors for the individual projects will define and discuss the projects with the student groups and monitor their progress. Lab prep will occur on Fridays from 11:30-12:20 PM. Preparation periods will be used for: safety training (biological, process, industrial hygiene), laboratory/process skills, technical communication, and introduction to other bioprocess unit operations.

Lab Sections/Groups. M, W laboratory sections are for the student groups to perform the lab experiments, analyze the data, work on lab reports etc. Each section has ~16 students. Students will conduct the lab modules in their assigned group. The groups will remain constant for the semester.

Course learning objectives:
1. Understand and analyze mixing and heat transfer in biological systems.
2. Understand and analyze the flow behavior in biological systems.
3. Understand and analyze fermentation processes and kinetics.
4. Understand order of separation processes and be able to recover a biological product.
5. Collect and analyze rheological properties.
6. Understand basic principles of bioencapsulation of cells and molecules and analyze impact on production function.
7. Design and safely execute experiments in a process laboratory.
8. Collect and perform statistical analysis on experimental data.
9. Present the results of analysis in the form of a written or oral report.

Program outcomes:
1. An ability to design and/or conduct experiments and analyze and interpret results (CLO 1-7)

2. Effective use of appropriate technique, skills, and state-of-the-art engineering tools necessary for engineering practice (CLO 1-7)
3. Appropriate writing, speaking, and listening skills (CLO 9)
4. The ability to function on, and contribute effectively to, a multi-disciplinary team (CLO 7-9)

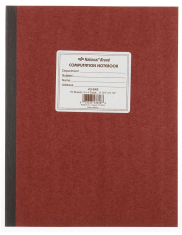
Evaluation of Student Performance. The final grades for the course will be determined by a total accumulation of points from all activities and assignments. Individual progress toward course objectives and final grades will be computed based on the following weights:

Assignments	**Percentage**
Lab Notebooks	10
Pre-labs	10
Executive Summary Report	10
Lab Reports	55
Presentation	10
Peer Evaluations	5
Total	*100*

Grading Scale

Grade	**GPA Value**	**% Range**
A	4.0	93-100
A-	3.7	90.0-92.9
B+	3.3	87.0-89.9
B	3.0	83.0-86.9
B-	2.7	80.0-82.9
C+	2.3	77.0-79.9
C	2.0	73.0-76.9
C-	1.7	70.0-72.9
D+	1.3	67.0-69.9
D	1.0	63.0-66.9
D-	0.7	60.0-62.9
F	0.0	<60.0

Lab Notebooks. Every student will need to purchase a National Brand Lab or Computation Notebook (available in the book store or on-line, http://www.amazon.com/National-Computation-Notebook-Inches-43648/dp/B00007LV4B/ref=pd_sim_op_1). Lab notebooks will be checked mid semester for quality and will follow the lab notebook rubric. Final completed lab notebooks will be collected and evaluated at the end of the semester for a grade.



Required Textbook

Transport Processes & Separation Process Principles, 4th Edition
C. Geankoplis, Prentice Hall (ISBN-13: 978-0131013674)

Recommended Textbook

Bioprocess Engineering Principles, 2nd Edition
P. Doran, Academic Press (ISBN-13: 978-0122208515)

Pre-lab Assignments. Students are expected to submit a pre-lab report that needs to be approved by the TA for the lab. The submissions will be the same as the author type for the lab report. Students will NOT be allowed to perform the lab experiments without approval. Pre-lab expectations will be defined during lab prep. *Due dates are set by the TA and will be posted in Blackboard.*

Lab Reports. Each student is expected to submit a lab report either individually or as a group. The format for the lab report is provided in the report guideline manual. *Due dates are set in the course calendar and will be posted in Blackboard.* The type of report to be handed in for each is experiment is detailed in the table below.

Experiment	Type of Report	Authors
Mixing & Heat Transfer	Formal	Group
Pump & Fluid Flow	Memo	Group
Fermentation	Formal	Group
Rheological Properties	Memo	Individual
Bioseparations	Formal	Individual
Bioencapsulation	Presentation	Group

Attendance. You should attend all classes. We understand that on *rare* occasions you may have legitimate business that conflicts with class. If you need to miss class, you must inform *Professor Engelberth,* copying your TA, *in advance*. Students who are absent are still responsible for knowing course material and getting assignments and announcements regardless of attendance. You are expected to be punctual and to stay for the entire class period.

Academic Integrity. Purdue University prohibits "dishonesty in connection with any University activity." We do not tolerate forms of dishonesty such as cheating, plagiarism, etc. in the class. Please do the right thing. If you are unsure, visit the online brochure from the office of the Dean of Students entitled, "Academic Integrity: A Guide for Students," posted at http://www.purdue.edu/odos/osrr/academic-integrity/index.html which clearly explains the matter. Academic dishonesty may result in a failing grade for the assignment or for the course. Academic dishonesty cases will be referred to the dean of student's office. Please take the student honor code – "*As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue."* – to heart.

Adaptive Services. Academic/classroom accommodations are available for students with disabilities. However, these accommodations must be arranged through the Disability Resource Center (https://www.purdue.edu/disabilityresources/). Students requiring alternate accessibility should first register with the DRC before classroom accommodations can be provided.

Emergency Statement. In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Here are ways to get information about changes in *this* course. Blackboard web page or instructor email address: aengelbe@purdue.edu.