

COURSE SYLLABUS
UMBC ENCH 437L: Chemical Engineering Laboratory (Writing Intensive)
Fall 2008
Tuesday 11:30-12:45 PUP105
Thursday 10:00am-2:30pm ECS 334B

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Office Hours: Monday 11am-12noon and Wednesday 2:30-3:30pm in ECS 334B

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Prerequisites: ENCH 427, ENCH 440

Textbooks: The following references are highly recommended but not required and are on reserve in the UMBC library.

- R.H. Perry and D.W. Green. *Chemical Engineers' Handbook*. (any edition) New York: McGraw Hill.
- Chemical engineering transport texts such as
J.R. Welty, C.E. Wicks, R.E. Wilson. *Fundamentals of Momentum, Heat, and Mass Transfer*. (any edition) New York: John Wiley & Sons.
R.W. Fox, A.T. McDonald. *Introduction to Fluid Mechanics*. (any edition) New York: John Wiley & Sons.
F.P. Incropera, D.P. DeWitt. *Introduction to Heat Transfer*. (any edition) New York: John Wiley & Sons.
- A chemical engineering kinetics text such as
H.S. Fogler. *Elements of Chemical Reaction Engineering*. (any edition) Upper Saddle River, NJ: Prentice Hall.
- Chemical engineering unit operations text such as
W.L. McCabe, J.C. Smith, P. Harriott. *Unit Operations of Chemical Engineering*. (any edition) New York: McGraw-Hill.
C.J. Geankoplis. *Transport Processes and Unit Operations*. (any edition) Englewood Cliffs, NJ: Prentice Hall.

Goals: Based on your work in this course, you should be able to:

- Use the knowledge acquired in previous mathematics, science and chemical engineering courses to analyze and interpret information acquired by operating process equipment.
- Communicate technical information to others through oral and written reports.

In addition, you should:

- Enhance your ability to conduct and design experiments, including consideration of safety and environmental concerns.
- Gain experience with working as part of a team.
- Increase your ability to use the techniques, skills and tools necessary for engineering practice.

Writing in the Discipline: **ENCH 437L is designated as writing intensive (WI)**. Formal laboratory reports constitute the writing component of this course. Laboratory reports will require you to

critically present appropriate technical background material, present your data in a clear and logical way, concisely interpret results and discuss the implications of your data. The format, guidelines and criteria for evaluation of the written assignments will be discussed at the beginning of the semester. Principles for effective communication of laboratory results will be discussed throughout the semester within the context of a specific writing sample. Academic integrity with respect to writing will also be discussed at the beginning of the semester. Topics include plagiarism, how to appropriately cite references, falsification of data and misrepresentation of results.

You will write 4 individual laboratory reports, each of which will be 5-7 pages in length. Each will be used to focus on your writing skills and will therefore be submitted as draft copies, evaluated by the instructor and returned to you for revision based on this feedback. All laboratory reports will be graded for both writing and technical content.

Grading:

Written reports: Reports on experiments will be due one week after the experiment is completed, at the beginning of Thursday's class. The instructor or teaching assistant assigned to that particular laboratory will grade the report's technical information, including raw data, sample calculations, and all graphs/tables provided. The instructor will grade the report's quality of presentation (formatting, clarity, grammar) and quality of analysis (motivation of the study, discussion of the results). The technical and quality grades will be combined to constitute the report grade and will be returned one week after the report was submitted.

Reports receiving a grade of 79% or less must be rewritten by the next laboratory period (Thursday) after they are returned. Reports with a grade of $\geq 80\%$ may be rewritten if you wish. The instructor will indicate what sections of the report must be rewritten or what additions are necessary. The final grade for the report will be the average of the two grades. If you are required to rewrite a report (grade of $\leq 79\%$) and do not do so, a grade of 0% will be averaged with your original report grade.

Sample Schedule:

Week 1:	Complete experiment
Week 2:	Report due
Week 3:	Graded report returned
Week 4:	Revised report due
Week 5:	Graded report returned

Final course grades will be assigned according to the "gap system". In other words, the final grade distribution for all students will be plotted and cut-offs for grades will be determined based on breaks in the distribution. Students with a 90+ course average will receive an A, an 80+ average will receive at least a B, 70+ at least a C, and a 60+ at least a D. For students whose final course scores are borderline between two letter grades, the higher or lower grade will be selected based on visits in office hours, attitude in the laboratory, ability to work with others, and whether graded performance has improved or declined during the semester.

Final course grades will be weighted as follows:		<u>For more information, see:</u>
Quizzes (7 total):	5%	Pre/Post Laboratory Booklet
Post-lab memos (6 total):	5%	Pre/Post Laboratory Booklet
Reports on experiments (6 total):	80%	Report Guidelines Booklet
Report on project:	10%	Project Booklet

Late reports: Reports on experiments will be due one week after the experiment is completed, at the beginning of Thursday's class. Any portion of a report submitted after 10:10am on Thursday's class will be counted as one day late. Late reports will be penalized 5 points per day. A report must be submitted for each experiment by 5:00pm on December 11, 2007 to receive a passing grade in the course.

Any reports turned in to the instructor's mailbox must be signed and dated by one of the chemical engineering professors or office staff.

Sample late penalties:

Report submitted before 10:10am on Thursday: no deduction

Report submitted between Thursday 10:11am and Friday 10:10am: -5 points

Report submitted between Friday 10:11am and Saturday 10:10am: -10 points

Course Policies:

The following course policies must be followed. At the discretion of the instructor or teaching assistants, non-compliance with course policies may negatively impact your final course grade. With the exception of plagiarism, students who do not comply with course policies will be sent one warning notice to the student's umbc.edu email address before final grades will be impacted. First instances of plagiarism may negatively impact your final course grade; in other words, no warnings will be given for plagiarism cases.

Attendance and Team Work: The experimental work is a team effort and all members of the group are expected to be present during each laboratory session. Work may not be started until all members of the group are in the laboratory. If an emergency arises, **YOU MUST INFORM THE INSTRUCTOR OR TEACHING ASSISTANT BEFORE CLASS** and arrangements will be made for the whole group to perform the experimental work at another time.

Laboratory work will be completed by the group. You are encouraged to do the calculations and preparation of the tables and figures together. However, **you are to write your own reports with no sharing of the written work.**

Preparation: During the laboratory period, examine the equipment you will use for the next experiment and ask the instructor or teaching assistants to review the procedure with you. Then, before coming to the laboratory, read the description of the experiment and relevant background material. For each experiment, be prepared to complete a short quiz covering the objective of work, theory, and procedure.

Academic Integrity: By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC's scholarly community in which everyone's academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, course failure, suspension, or dismissal. To read the full Student Academic Conduct Policy, consult <http://www.umbc.edu/integrity>.

You are prohibited from using old reports and files from previous years. Adequate samples may be provided in class if requested.

You are prohibited from copying phrases, sentences and sections from any resources, including handouts, other students' work, text books, and websites. All resources, including figures downloaded from the internet, must be cited. See the Report Guidelines Booklet for more information.

Anyone who violates these policies is in automatic violation of Chemical & Biochemical Engineering's policy and the faculty will treat this as a case of academic misconduct. **Precedent exists for the 1-year delay of graduation for seniors who failed course(s) due to academic misconduct.**

Bottom line: Maintain high standards for your own work. Start work early so that the temptation to cut corners does not arise. Do not risk even the appearance of academic integrity violations. If you have any questions or concerns, do not hesitate to ask the instructor or teaching assistants.

Safety: Safety in the laboratory is tantamount to good laboratory practice. No rule, unless augmented with safety awareness and good sense, will protect you from accidents. The following practices will **ALWAYS** be exercised in the laboratory:

- The group is responsible for checking the experimental equipment before starting the experiment. Hazards must be eliminated before start-up.
- Report all injuries to the instructor or teaching assistant immediately, no matter how minor.
- Safety glasses must be worn in the laboratory at all times.
- No smoking, eating or drinking in the laboratory. Close-toed shoes and shirts must be worn. No open-toed shoes. Long pants are encouraged.
- Operating equipment must not be left unattended. At least one member of the group should always be present.
- Laboratory work will not be permitted outside of regularly scheduled hours unless arrangements are made with the instructor or teaching assistants.

Lockers outside ECS 334B will be assigned during the first class period. Please use the lockers to store your bookbags, coats, and any food or drink. You may also wish to store close-toed shoes and long pants in your locker to wear while working in the laboratory.

Schedule:

	<u>Tuesday Discussion (PUP 105)</u>	<u>Thursday Laboratory (ECS 334B)</u>
<i>August</i>		28 – Orientation
<i>September</i>	2 – Fluid Flow Tutorial (ECS 334B) Groups V and W	4 – Fluid Flow Tutorial Groups X, Y and Z
	9 – Written Report Tutorial	11 – Experiments
	16 – Advanced Excel Tutorial	18 – Experiments
	23 – Data Analysis/Statistics Tutorial	25 – Experiments
	30 – TBD	
<i>October</i>		2 – Experiments
	7 – Trading Experiment assigned	9 – Trading Experiment begins
	14 – Trading Experiment debrief	16 – Trading Experiment instructions due
	21 – Oral Report Tutorial	23 – VT performs Trading Experiment
	28 – Trading Experiments Presentations	30 – Trading Experiment reports due
<i>November</i>	4 – TBD	6 – Experiments
	11 – TBD	13 – Experiments
	18 – TBD	20 – Experiments
	25 – TBD	27 – <i>Thanksgiving Break</i>
<i>December</i>	2 – Oral report debrief	4 – TBD
	9 – Presentations, Last day to submit reports	

List of experiments:

Exp1	Fixed and Fluidized Beds
Exp2	Heat Transfer in a Double Pipe Heat Exchanger
Exp3	Unsteady-State Heat Transfer
Exp4	Kinetics of Dye Oxidation
Exp5	Efflux from a Tank
Exp6	Oxygen Mass Transfer in a Fermenter