CHE 6905L Advanced Chemical and Bio Processing Laboratories

1. Catalog Description – This is a 3-credit, 4-hour lab course specifically offering to master graduate students who want to have a basic training in the chemical and bioprocessing engineering discipline. The course aims to expand the students' ability in hands-on experiments. The overall goal is to teach students to gain advanced polymer, chemical and bio-based processing techniques. After accomplishing the requirement work, students are expected to have basic concepts of several fundamental technical skills and have an overall understanding in this field.
2. Pre-requisites and Co-requisites – None.
3. Course Objectives –
    a. Students will gain hands-on experience by learning proper and basic chemical process experiments and cultivate problem solving abilities to solve realistic engineering problems.
    b. Students will be able to analyze experimental data from available resources and techniques, such as technical manuals, databases, handbooks, literature, and statistical methods.
    c. Students will be able to rationalize units, make order of magnitude estimates, interpret graphic data, assess reasonableness of solutions, and select appropriate levels of solution sophistication.
    d. Students will exhibit critical and creative thinking skills for analysis and evaluation of problems and cause-effect relationships.
    e. Students will understand and practice correct chemical-handling and laboratory safety principles.
    f. Students will practice good teamwork principles.
    g. Students will be able to give fluent and organized oral presentation, including the handling of questions and the use of appropriate visual aids.
    h. Students will be able to write comprehensive and detailed technical reports in formal engineering and short letter formats.
4. Coordinator – Kirk Ziegler
    a. Office location: CHE 319A
    b. Telephone: (352) 392-3412
    c. E-mail address: kziegler@che.ufl.edu
5. Instructors/Teaching Assistants for each Module

Module	Module Location	Instructor	Teaching Assistant
1	CHE 237	Mark Orazem Tel: (352) 392-6207 Email: meo@che.ufl.edu Oscar Crisalle Tel: (352) 392-5120 Email: crisalle@che.ufl.edu	

2 - 4	CHE 220	Tanmay Lele Tel: (352) 392-0317 Email: tlele@che.ufl.edu Yiider Tseng Tel: (352) 392-0862 Email: ytseng@che.ufl.edu	Shenhsiu Hung Email: shenhsiu@gmail.com Yuan Li Email: liyuan8856@ufl.edu
5	CHE 300A	Chang-Won Park Tel: (352) 392-6205 Email: park@che.ufl.edu	Akshay Vargantiwar Email: akshay.vn343@gmail.com
6, 7	CHE 220	Anuj Chauhan Tel: (352) 392-2592 Email: chauhan@che.ufl.edu	Lokendrakumar Chainroop Bengani Email: lokendrabengani@ufl.edu Vincent Hsu Email: vansin@ufl.edu
8	CHE 220	Peng Jiang Tel: (352) 392-2189 Email: pjiang@che.ufl.edu Jason Butler Tel: (352) 392-2591 Email: butler@che.ufl.edu	Yin Fang Email: fangyin205209@gmail.com
9	CHE 300A	Kirk Ziegler Tel: (352) 392-3412 Email: kziegler@che.ufl.edu	Lingzhi Liao Email: lingzhi@ufl.edu
10	CHE 300A	Oscar Crisalle Tel: (352) 392-5120 Email: crisalle@che.ufl.edu Lewis Johns Tel: (352) 392-0881 Email: johns@che.ufl.edu	Shyam Prasad Mudiraj Email: shyam.stiffy1@ufl.edu
11	CHE 300	Dmitry Kopelevich Tel: (352) 392-4422 Email: dkopelevich@che.ufl.edu	Jai Kant Email: jkant@ufl.edu
12	CHE 300A		Tarun Narra Email: tnarra09@ufl.edu

6. Meeting Times – Once a week.
7. Class/laboratory schedule – This course contains two sections. One section is on Tuesday, Period 6 to 9 and the other section is on Wednesday, Period 6 to 9. Students will be assigned to one of the two sections.
8. Meeting Location – The class is on Chemical Engineering Building, either Room 220, 300 or 300A, depending on the experimental modules. See the table above.

9. Material and Supply Fees – The material and supply fees are already included in the tuition. Students do not need to pay any additional fees.

10. Textbooks and Software Required – None. The lab manuals and protocols of the experimental modules that were developed by individual instructors will be available through Sakai. It is the student's responsibility to let the instructor or teaching assistant know if they have problems accessing the material.

11. Recommended Reading – The students are encouraged to check all the resources from libraries and Internet. Note that most journal articles can be downloaded from a University computer. You can establish a VPN connection to establish your own computer as a hub of the University network.

12. Tentative Course Outline – Students will be divided into groups. Each group contains 3 to 4 students. Each group will rotate among the modules every week. However, Module 1 and 13 are the common modules in which all the groups will attend together.

Lab Regulation –
Module 1. Lab Safety, Orientation and Ethics
Biochemical Kinetics and Diffusion –
Module 2. Michaelis-Menten kinetics
Module 3. Diffusion of DNA under applied electrical fields and particle diffusion
Module 4. Restriction enzyme digests and polymerase chain reaction
Plastic Film and Rod Extrusions –
Module 5. Effects of screw rotating speeds, different take-off speeds and different pressure differences on the properties of tube and extrusion
Drug Transport through Contact Lens –
Module 6. Hydrogel preparation and ion permeability
Module 7. Measuring drug transport and modeling
Fluid Dynamics of Particulate Systems –
Module 8. Viscosity measurement of colloidal suspensions and its application for understanding shear thinning and order-disorder transition of colloidal nanoparticles
Module 9. Effects of particle properties on the pressure drop/fluid velocity behavior of fluidized beds
Advanced Chemical Engineering Systems
Module 10. Fixed bed based ammonium gas absorption
Module 11. Investigation of efficiency of heat exchangers
Module 12. Pump system
Poster Presentation
Module 13. Presentation

13. Attendance and expectations in keeping with the goal of simulating the professional environment, you must be in attendance ("at work") for the entire lab period on each day of the lab. For emergencies or other pressing circumstances, please contact your instructors like you would as an employee. There is a 5-minute quiz at the beginning of each lab.

14. Grading –

Pre-experimental quiz	5 %
Pre-lab questions	15 %
Lab reports	55 %
Poster presentation	20 %
Lab survey	5 %

TOTAL 100 %

Report Submission: The deadline for the pre-lab submission is due at the beginning of the lab. The deadline for the final report submission is one week after the completion of the experiments. Please work ahead to ensure that your report is finished on time.

- 80 % if turn in within 12 hours after deadline
- 60 % if turn in between 12 and 24 hours after deadline
- 50 % if turn in between 24 and 48 hours after deadline
- 0 % if fail to turn in before 48 hours after deadline.

Rules for the poster: New teams will be formed and only 2 people are allowed in each team for poster presentation. The poster needs to be professionally printed, which can be done in the location found in the link: http://print.at.ufl.edu/labmap.shtml. The current cost for a standard size of poster is ~15 dollars (http://print.at.ufl.edu/printingquestions.shtml) + tax. Here are the deadlines for the poster

- Two possible subjects or titles of the poster need to be emailed to the course coordinator by the end of February 8th (1 point).
- The course coordinator will select one of the submitted subjects for your team by the end of February 15th.
- Submit a draft of the abstract with 300 to 350 words by the end of March 1st (2 points).
- Submit 5 papers related to the topic of your poster by the end of March 8th (2 points).
- Submit a revised abstract as well as the plots and tables (they present the main topics of the poster), which will be used in your poster by the end of March 22nd (3 points).
- Submit a draft of your poster (format by Microsoft PowerPoint or compatible software) by the end of April 5th (2 points).
- Poster presentation will be determined at the end of the semester (10 points).

15. Grading Scale – the final grades will be normalized based on the class performance.

    "Graduate students need an overall GPA of 3.00 truncated and a 3.00 truncated GPA in their major (and in the minor, if a minor is declared) at graduation." For more information on grades and grading policies, please visit:

    http://gradcatalog.ufl.edu/content.php?catoid=4&navoid=907#grades

16. Requirements for class attendance and make-up exams, assignments, and other work are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx

17. Honesty Policy – All students admitted to the University of Florida have signed a statement of academic honesty committing themselves to be honest in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

    See http://www.dso.ufl.edu/sccr/procedures/honorcode.php

    Students are expected to exhibit ethical conduct for the course on all exams and homework assignments. All work submitted individually in the form of exams, homework, computer projects, etc., is subject to the following required or *implied* pledge:

On my honor, I have neither given nor received unauthorized aid in doing this assignment.

A non-passing letter grade will be assigned to students who violate academic honesty standards, regardless of the violator's performance on exams, quizzes, and homework assignments. Official sanctions issued by the Office of Student Judicial Affairs will become permanently noted in the student's official transcript.

18. Accommodation for Students with Disabilities – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.
19. UF Counseling Services –Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
    - UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
    - Career Resource Center, Reitz Union, 392-1601, career and job search services.
20. Software Use – All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.