Chemistry 463 (Physical Chemistry Lab II) Spring 2015

Instructor
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TA
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Text
None! Students will use literature references, library resources, web-based resources, and handouts from TA.

Course Times
Tuesdays 8:00-10:50 AM, Neckers 409 (and other locations)

Course Description
Chem 463 is the 2nd semester (advanced) physical chemistry laboratory course

Course Objectives and Philosophy
This lab course will almost certainly be different from any lab course you have taken previously. In a typical p-chem lab course, students perform a number of pre-defined “stock” lab experiments that are generally focused on a single learning objective—usually, the master of a given experimental (or computational) technique. Step-by-step protocols are usually provided, and the chemical system of interest is often “cherry-picked” in support of learning the methodology. While this approach is useful
for reinforcing fundamental p-chem concepts, training students to use key instrumentation, and exposing students to modern methods – it seldom resembles real scientific research or inquiry.

Correspondingly, we have designed a novel physical chemistry lab course comprising several “system-oriented modules”. For each “module” students will spend several weeks bringing to bear multiple experimental (and computational) methodologies to explore a single prototypical system (or class of systems). Overarching objectives of this course include:

1) Students will obtain a greater, more thorough understanding of each system of interest through the application of multiple experimental and computational methodologies (reinforcing fundamental principles in physical chemistry);

2) Students will gain an appreciation for different methodologies – and a greater understanding of a) what kinds of information they can provide and (b) their respective appropriateness for a given situation;

3) Students will gain a greater understanding of the complete research process in physical chemistry, including: literature search; experimental design; team-work and collaboration; using modern data analysis to answer questions (and to help ask new ones); and the communication of their results through preparation of professional manuscripts and presentations.

**Grading**

Students will complete three modules below. The final grade will be based on the total points accumulated from the following sources

| Written Lab report for Module 1 | 25% |
| Written Lab report for Module 2 | 25% |
| Written Lab Report for Module 3 | 25% |
| Weekly Prelab reports | 8% |
| TA Grade | 2% |
| Final Oral Presentation | 15% |

Students may complete the experimental/computational portions of each module in groups of 2-3 students, but each student must complete their own reports and presentations. Students using the same datasets need to reach the same conclusions.

[Note: TA discretionary points will be allotted based on class participation, as manifested by: on-time attendance, lab technique, collaborative involvement in experiments with lab mates, innovation, etc.]

**Modules**

Three modules are implemented in the physical chemistry lab. Each module uses advance physical chemistry in solving different complex problems. These three modules are summarized below
Module 1: Proteins and their Prosthetic Groups: Structure, Stability and Spectroscopy

Module 2: Liquid Crystals: Phase Transitions and Order

Module 3: Solar Cells: Thermodynamics and Electrochemistry

The experimental and computational methods available to students for a given module may vary but may include variable-temperature (VT) NMR spectroscopy, IR spectroscopy, UV-vis spectroscopy, differential scanning calorimetry, thermal gravimetric analyzer and others. Furthermore, students will also be able to use modern quantum computational methods via Gaussian 09 software and will be able to utilize a variety of other software packages including MestreNova (for processing and analyzing NMR data), and Gaussview (for drawing and visualizing molecular structure). All of these software packages are available in Neckers 118 for your use. For some modules web-based resources may be important (e.g., the Protein Data Bank)

With some guidance from the TA (and/or Instructor), as well as consultation with the relevant literature, students will choose different methods to answer a series of provided questions. Students are encouraged to consider their own experiments to answer these (on their own!) questions – just get permission first! The answers to these questions will provide much of the narrative of their reports.

Reports

Details regarding the expectations of the written reports are available in the lab manual. Details of the oral report will be provided later (stay tuned!)

Emergency procedures

Southern Illinois University Carbondale is committed to providing a safe and healthy environment for study and work. Because some health and safety circumstances are beyond our control, we ask that you become familiar with the SIUC Emergency Response Plan and Building Emergency Response Team (BERT) program. Emergency response information is available on posters in buildings on campus, on BERT’s website www.bert.siu.edu, Department of Safety website www.dps.siu.edu (disaster drop down) and in Emergency response Guideline pamphlet. Know how to respond to each type of emergency.

Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. It is important that you follow these instructions and stay with your instructor/TA during an evacuation or sheltering emergency. The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or sheltering within the facility.
IMPORTANT DATES *

Semester Class Begins: ..............................................................01/20/2015
Last day to add a class (without instructor permission): ........01/25/2015
Last day to withdraw completely and receive a 100% refund: ....02/01/2015
Last day to drop a course using SalukiNet: ..........................04/05/2015
Last day to file diploma application (for name to appear in Commencement program):.................................03/13/2015
Final examinations: ................................................................05/11–5/15/2015

Note: For outreach, internet, and short course drop/add dates, visit Registrar’s Academic webpage http://registrar.siu.edu/

SPRING SEMESTER HOLIDAYS
Martin Luther King, Jr.’s Birthday 01/19/2015
Spring Vacation 03/07—03/15/2015

WITHDRAWAL POLICY ~ Undergraduate only
Students who officially register for a session may not withdraw merely by the stopping of attendance. An official withdrawal form needs to be initiated by the student and processed by the University. For the proper procedures to follow when dropping courses and when withdrawing from the University, please visit http://registrar.siu.edu/pdf/ugradcatalog1314.pdf

INCOMPLETE POLICY ~ Undergraduate only
An INC is assigned when, for reasons beyond their control, students engaged in passing work are unable to complete all class assignments. An INC must be changed to a completed grade within one semester following the term in which the course was taken, or graduation, whichever occurs first. Should the student fail to complete the course within the time period designated, that is, by no later than the end of the semester following the term in which the course was taken, or graduation, whichever occurs first, the incomplete will be converted to a grade of F and the grade will be computed in the student's grade point average. For more information please visit: http://registrar.siu.edu/grades/incomplete.html

REPEAT POLICY
An undergraduate student may, for the purpose of raising a grade, enroll in a course for credit no more than two times (two total enrollments) unless otherwise noted in the course description. For students receiving a letter grade of A,B,C,D, or F, the course repetition must occur at Southern Illinois University Carbondale. Only the most recent (last) grade will be calculated in the overall GPA and count toward hours earned. See full policy at http://registrar.siu.edu/pdf/ugradcatalog1314.pdf

GRADUATE POLICIES
Graduate policies often vary from Undergraduate policies. To view the applicable policies for graduate students, please visit http://gradschool.siu.edu/about-us/grad-catalog/index.html

DISABILITY POLICY
Disability Support Services provides the required academic and programmatic support services to students with permanent and temporary disabilities. DSS provides centralized coordination and referral services. To utilize DSS services, students must come to the DSS to open cases. The process involves interviews, reviews of student-supplied documentation, and completion of Disability Accommodation Agreements. http://disabilityservices.siu.edu/

PLAGIARISM CODE

MORRIS LIBRARY HOURS
http://www.lib.siu.edu/about

SAFETY AWARENESS FACTS AND EDUCATION
Title IX makes it clear that violence and harassment based on sex and gender is a Civil Rights offense subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories such as race, national origin, etc. If you or someone you know has been harassed or assaulted, you can find the appropriate resources here: http://safe.siu.edu

SALUKI CARES
The purpose of Saluki Cares is to develop, facilitate and coordinate a university-wide program of care and support for students in any type of distress—physical, emotional, financial, or personal. By working closely with faculty, staff, students and their families, SIU will continue to display a culture of care and demonstrate to our students and their families that they are an important part of the community. For Information on Saluki Cares: (618) 453-5714, or siucares@siu.edu, http://siukicares.siu.edu/index.html

EMERGENCY PROCEDURES
Southern Illinois University Carbondale is committed to providing a safe and healthy environment for study and work. We ask that you become familiar with the SIU Emergency Response Plan and Building Emergency Response Team (BERT) programs. Please reference the Building Emergency Response Protocols for Syllabus attachments on the following pages. It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency.

INCLUSIVE EXCELLENCE
SIU contains people from all walks of life, from many different cultures and sub-cultures, and representing all strata of society, nationalities, ethnicities, lifestyles, and affiliations. Learning from and working with people who differ is an important part of education as well as an essential preparation for any career. For more information please visit: http://www.inclusiveexcellence.siu.edu/

LEARNING AND SUPPORT SERVICES
Help is within reach. Learning support services offers free tutoring on campus and math labs. To find more information please visit the Center for Learning and Support Services website:
Tutoring: http://tutoring.siu.edu/
Math Labs: http://tutoring.siu.edu/math_tutoring/index.html

WRITING CENTER
The Writing Center offers free tutoring services to all SIU students and faculty. To find a Center or Schedule an appointment please visit http://write.siu.edu/

AFFIRMATIVE ACTION & EQUAL OPPORTUNITY
Our office’s main focus is to ensure that the university complies with federal and state equity policies and handles reporting and investigating of discrimination cases. For more information visit: http://diversity.siu.edu/

Additional Resources Available:

SALUKINET: https://salukinet.siu.edu/cp/home/displaylogin
ADVISEMENT: http://advisement.siu.edu/
SIU ONLINE: http://online.siu.edu/
Building Emergency Response Protocols for Syllabus:

University’s Emergency Procedure Clause:

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Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. **It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency.** The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or sheltering within the facility.

**Students With a Disability:**

Instructors and students in the class will work together as a team to assist students with a disability safely out of the building. Students with a disability will stay with the instructor and communicate with the instructor what is the safest way to assist them.

**Tornado:**

During the spring semester we have a **Storm Drill.**

Pick up your belongings and your instructor will lead you to a safe area of the basement. No one will be allowed to stay upstairs. Stay away from windows. The drill should not last more than 10 minutes. You must stay with your instructor so he/she can take roll. Students need to be quiet in the basement as the BERT members are listening to emergency instructions on handheld radios and cannot hear well in the basement.

**Fire:**

During the fall semester we have a **Fire Drill.**

Pick up your belongings and your instructor will lead you to either the North or South parking lot depending on what part of the building your class is in. You must stay with your instructor so he/she can take roll. As soon as the building is all clear, you will be allowed to return to class.

**These drills are to train instructors and the Building Emergency Response Team to get everyone to a safe place during an emergency.**

**Bomb Threat:**

If someone calls in a bomb threat, class will be suspended and students will be asked to pick up their belongings, evacuate the building and leave the premises. Do not leave anything that is yours behind. We will not allow anyone back into the building until the police and bomb squad give us an all clear. **DO NOT USE YOUR CELL PHONES.** Some bombs are triggered by a cell phone signal.
Shooter in the Building:

If it is safe to leave, move to a safe area far from the building away from where the shooter is located. If anyone has any information about the shooter, please contact the police after they have gone someplace safe.

If it is not safe to leave, go into a room, lock the door and turn out the lights. Everyone should spread out and not huddle together as a group. Don't stand in front of the door or in line of fire with the door. Students' chair and desks should be piled in front of the glass and door as a barricade and the teacher's desk, podium and anything movable can be pushed against the door. This is intended to slow down any attempts to enter the classroom. If it looks like the shooter is persistent and able to enter, make a lot of noise and have the students use everything in their backpacks to throw at the shooter to distract him.

Silence all cell phones after one person in the room calls the police and informs them of their location and how many people are in the room. Be quiet and wait for the police to arrive. The police are looking for one or more shooters, and they have no way of knowing if the shooter is in the room people are hiding in. For this reason, when the police enter the room, no one should have anything in his/her hands and each person MUST raise his/her hands above his/her head.

Earthquake:

In the event of an earthquake, you are advised to take cover quickly under heavy furniture or crouch near an interior wall or corner and cover your head to avoid falling debris. Outside the building are trees and power lines and debris from the building itself that you will need to stay away from. In the building, large open areas like auditoriums are the most dangerous. Do not try to escape on a stairway or elevator. Do not hide under a stairway. We do not recommend that you stand in a doorway because the door could shut from the vibrations and crush your fingers trapping you there.

Rave Mobile Safety Alert System:

We recommend that you sign up for the Rave Mobile Safety Alert System. It is a new system that replaces the WENS system to alert you through emergency text messages on your cell phone and emails for emergencies on campus, weather reports and emergency school closures. You have to sign up. If you were signed up for WENS it does not roll over. You have to sign up for Rave Mobile Safety Alert System. Go to hrss.siu.edu (Human Resources Self-Services System), login with your regular SIU login username and password, click on Personal Information, fill out the information or update the information and save it. For more information, visit dps.siu.edu, contact SalukiTech at 453-5155 or salukitech@siu.edu.

CPR/First Aid Classes:

If you would be interested in getting your name on a list for a free four hr. CPR or First Aid class contact LaVon Donley-Cornett at lavong@siu.edu.

Women's Self Defense Classes are offered to female students faculty and staff by the Department of SIU Public Safety. For more information, contact Officer Russell Thomas russellt@dps.siu.edu.