LECTURE
MWF 12:00 – 12:50PM    SBDG 103

OFFICE HOURS
MWF 9:30 – 10:30AM    T Th 10:00 – 11:00AM
All other times are subject to my availability. Please see my posted schedule on my office door. I know in PChem it is important to have your questions answered as they arise. I usually have time to help unless I am preparing for a class, lab or meeting. I will also be available at home by phone (not too early or late) or email. Please contact me with your PChem questions or if you will be missing a lecture or lab.

REQUIRED MATERIALS
Routine access to Blackboard through VIP and a scientific calculator with which you are familiar.

ATTENDANCE
Department policy will be in place. More than four (4) unexcused absences will result in a penalty of loss of a letter grade. More than 10 absences total (both excused and unexcused) will result in failing the class. A verifiable excuse must be brought to me immediately after your return to class for an absence to be excused. The work done in the lecture or lab is not excused and you are responsible for the information presented during your absence. Please call or email and let me know if you will miss a class or lab. Thank you. I will be taking attendance in class and lab.

SUGGESTED HOMEWORK PROBLEM SETS
Suggested homework exercises and problems, to practice and apply skills, will be distributed for each exam period. These problem sets are suggested for practice in preparing for the upcoming exam and the key will be posted as we get close to the scheduled date for that section’s exam. The *Student Solutions Manual* that accompanies the textbook (available through Amazon.com or other online location) contains worked out solutions to some of the problems located at the end of each chapter in the text. The purchase or rental of this manual may be helpful. The examples throughout the text will provide a guide for problem solving as will the suggested problems. The suggested homework problem set answer key will be available on Blackboard in time to study for the upcoming exam. Problem solving is an individual process which each of you should develop with practice. The end result is not nearly as important as the thinking that you did to try and solve the problem at hand. Your thinking process can be refined, practiced, modified, and corrected so that your skills improve. That should be your goal. Do you need to puzzle over a sketch to get your creativity started? Perhaps you need to read and re-read the questions multiple times or maybe write down all relevant equations. Whatever it is, you should be developing your own approach. The problems you will be asked to attack have examples and similarities to other questions and so a guide can often be found. We will have problem-solving sessions following every lab for those who want to and can stay.

The text by Francl is an excellent review of the mathematics required for all aspects of chemistry, not just this course. There are also study tips and suggestions for being successful in a physical chemistry course. Please become familiar with this book and use it as needed. I will present several applications of multivariable calculus from this book in lab.

EXAMS
There will be four midterm exams this semester, a fifth exam covering spectroscopy will be given at the Lab Final time, and the ACS full year national exam. My exams will include questions modeled after the suggested homework problems/exercises. I will provide the data tables and figures needed for each exam. There will also be brief discussion questions that cover the lecture and assigned reading. Exams are scheduled during a lab period. The exam length will average three hours. **One 3” x 5” notecard**
containing any equations or information you would like may be brought with you to use during each exam. However the cards cannot contain text passages, examples or problem solutions. I will check each card prior to the exam and collect them with the exam. The answer keys will be available in my office or during lab after each exam and everyone can correct their graded exams. Even though I have decided not to distribute the exam answer keys, I don’t want to restrict their availability either. Any time you want to see the key so you can make notes or make corrections, you may do so. I will include several extra credit multiple-choice questions covering topics from the first semester on each exam. This will hopefully help prepare each of you for the full year ACS standardized exam. For purposes of a schedule, we will have a midterm exam every two or three chapters. Tentatively, Exam I will be 2/4, Exam II will be 3/3, Exam III will be 3/31, and Exam IV will be 4/21. The spectroscopy exam will be given during the lab final period on Thursday, April 28, 2016 at 2:00PM in SBDG 103.

The lecture final exam will be given at the scheduled time of Friday, April 29, 2016 at 2:00PM in our regular class room. The nationally standardized, full-year Examination of Physical Chemistry provided to us by the American Chemical Society is given during the lecture final time and is worth 100 points. This well written multiple-choice exam covers topics from ACHM 541 and 542. An official ACS Study Guide is available through ACS and elsewhere online and is strongly suggested for use as a study aid for this exam. The main difficulty here is that the exam covers material from the entire year and retrieving your knowledge from first semester is time consuming and many students don’t know where to start. The guide will really help. A note card is not allowed for the ACS exam.

LECTURE TOPICS

I plan to finish the kinetics that we began last semester and then proceed on to quantum mechanics, atomic and molecular electronic structure, bonding, molecular symmetry, and statistical mechanics. Molecular spectroscopy will be covered in pre-lab lectures and targeted lab experiments. A suggested problem set for spectroscopy will be distributed in lab. These chapters in the book dealing with the topics for this semester are full of specific information and details that time will not allow me to address completely. Lectures will enhance understanding of the material we cover and not simply follow what is stated in the text. Therefore it is very important that you read the text for understanding and stay ahead of my lectures. For planning purposes, I am targeting an average of 10 – 12 pages of text material per lecture. You must read the text.

GRADING FORMAT

An "A" student in this class is expected to perform well in all test areas from homework exercises/problems to exams. The average student will be able to perform basic physical chemistry calculations and make basic chemical judgments based on their experience and familiarity with the text, lectures, and problems. Past students who have received an "A" have been interested in all of the subject areas, dedicated enough to ask questions, probed the text for more information than is discussed directly in lecture, and attempted to understand physical chemistry as a complete subject. This personal goal of those students drove them to excellent performance in the course.

As juniors in college you should realize by now that one of your major goals in any course, and certainly this course, is to understand the material and not merely to perform tasks. Most students cannot understand a subject such as PChem quickly. Sometimes maintaining a high level of dedication to the course is the only goal a student can accomplish quickly. But understanding must be your ultimate goal and if it is, then good grades follow. You will feel more satisfied about your efforts because they were aimed at the proper target and therefore you will feel better about your classroom efforts in general. That dedication is required in PChem. The subject is too extensive and complex to not require dedication. Understanding a subject requires reading and rereading your textbook and notes, looking at and doing examples and exercises in the text that aren't part of the assignments so that you can gain confidence, and integrating your thoughts about lab into lecture and vice versa. Integrating and applying your acquired knowledge is key to learning physical chemistry.

The point breakdown for each performance area is given below. The course grade will be based on the percentage of total points received. My usual guideline is above 85% is an “A”, 72% - 85% a ”B”, 60% - 72% a “C”, etc.
STUDENT RESPONSIBILITIES

In total, your responsibilities are 1) the assigned homework problems turned in on time, 2) the text material, 3) the lecture material and handouts, and 4) any other suggested exercises and problems assigned for review. Understanding must be your goal. Anything short of that will show up as a lack of confidence, which will translate into lower grades.

Lectures will begin promptly and you are responsible for the material covered in lecture. This text is fairly rigorous but many formula derivations may still appear in class. Many data interpretation ideas covered in lecture are not presented in this or any text. Physical chemistry is a very demanding topic and will require a consistent effort on your part to get the most out of each lecture. Should you need help with problem-solving skills, basic chemistry, etc. please see me at office hours, by appointment, or when I am available.

It is the instructor’s right to remove from the classroom any student who disrupts or disturbs the proceeding of the class. The use of any portable devices, including cell phones, pagers, MP3 players, iPods, etc., during class is not allowed for any reason unless prior approval has been given to a student from the instructor or unless required for the course. If you are planning to have any of these devices in class, they must be turned off and stowed away for the duration of the class period. If you use a portable electronic device during a test, quiz, or other assessment, you are eligible to receive a failing grade on that assignment. I will request that all cell phones, etc. be placed on the front desk when you take an exam so that no one will be tempted to use the internet. In extreme cases of disruption the faculty member can request assistance from University Police. If the student who has been ejected causes similar disturbances in subsequent meetings of the class, he/she may be denied admittance to the class for the remainder of the semester and assigned a grade of F.

HAVE A GOOD SEMESTER!!!!!!!

NOTE: Any student who has a physical, psychological, and/or learning disability that might affect performance in class needs to contact the Office of Disability Services (126A B&E, 803/641-3609) on campus as soon as possible. That office will determine appropriate accommodations based on medical documentation. Thanks.

Contacts---------Office Phone: 803/641-3378
Cell Phone: 803/640-5679
After 7AM and before 10PM
Office Email: montyf@usca.edu
Home Email: cobbletterolf@gforcecable.com
TEXT & REQUIRED MATERIALS

The USCA Physical Chemistry Lab Manual is again required. You again have access to reference materials like old PChem texts, instrument manuals, and lab texts. They can be checked out or read during appropriate times during lab or through the week. Reference handbooks are not available for checkout but may be used in the lab room.

The electronic resources of SBDG 315 & 319 are available to you as they were last semester. You will have access, except between the hours of 11PM and 6AM, to those computers, printers, etc. to prepare for lab work or finish lab reports. (The PacerPrint Program is in place.) The use of these facilities is subject to the guidelines posted in SBDG 315 and you will lose your late access privileges if these guidelines are not followed. **No actual lab bench work is to be done outside of official lab hours without authorization.**

Your lab notebook with copy sheets, long pants, shoes, and your calculator are required.

CONTENT

You must review the specific information for each experiment before coming to lab. All lab reports due during the semester will be generated on computer using word processing, spreadsheets, and graphing programs. The campus supports Microsoft **WORD** and **EXCEL** along with **ChemDraw** and I can provide some assistance with it. Like last semester, your own software is fine but I may not be able to help with it. **Graphical Analysis** is available and is a straightforward graphing package recommended for graphing in lab and on suggested problems.

This semester’s labs will consist of a series of experiments conducted in small groups and centered on one technique or apparatus. These experiments are designed to illustrate fundamental aspects of physical chemistry and to correlate to lecture. **Only the lab data is to be shared. Collaboration on the report is not acceptable.**

This semester, the presentation of practical spectroscopy as a general physical chemistry topic will take place in lab and draw from regular lecture as well. Each lab period will begin with a thirty-five to forty-five minute lecture on topics from Chapters 19, 22, and 25 in our lecture text. Suggested problems will be given and the answers discussed and developed following each Thursday’s lab period. Testing on spectroscopy will occur at the Lab Final time scheduled officially for April 28, 2016 at 2PM. This arrangement of presenting spectroscopy in lab allows me to closely coordinate the lab and lecture materials for maximum benefit. After the spectroscopy lecture, we will go over the particular lab for the day and go into any data analysis needed.

Lab reports are due according to the accompanying schedule. Guidelines for the formal written reports and their grading schemes are distributed as part of the lab manual and are the same as last semester. All reports must have the carbon copy of the lab notebook pages attached as an appendix. A 25% point penalty will be strictly applied to all reports that come in up to one week late. Reports that are more than one week late will acquire a 50% penalty. Lab reports that are more than two weeks late will not be accepted for grading. Students have failed lab by not turning in reports sufficiently on time to get over the “C” line. Please do not let your poor time management skills result in you repeating PChem lab. It is a waste of everyone’s time and money. These guidelines may be modified depending on the particular lab situation.
Proper chemical handling is a very important part of this or any lab. Consult the academic lab safety handbook for specifics. All chemical materials and equipment that are not part of the regular lab room will be brought in on a cart or in a large tub. All materials and equipment must be returned there at the end of the lab period. This includes any labeled waste that is generated. The lab must be cleaned before any student may leave the lab. Please arrange to share the cleaning duties or I will assign the duties for each lab. You may want to review the online safety quiz sponsored by Environmental Health Services at USC Columbia. Visit the website http://ehs.sc.edu/LabSafety/Labtraining.htm for the review.

Formal lab reports must be complete and follow the guidelines. Our guide for written scientific presentation will be the ACS Style Guide, 3rd Edition, edited by Anne Coghill and Lorrin Garson. If you have any questions, please refer to this book. It can be purchased on line from ACS and is a great investment for your later careers, but you can refer to my copy also. Correct grammar is very important and so you should consult the ACS Style Guide often. Routine problems in grammar on a submitted final report indicate a lack of attention to detail. Each report must contain two abstracts from any ACS web journal on a topic related to the experiment. An example formal report can be found in the text Survival Guide for Physical Chemistry by Michelle Francl. The quick lab reports consist of the answers to a list of questions that are at the end of each lab in the manual, a reference page, the notebook pages and two abstracts. Any lab report may be redone after grading for increased partial credit. Please read over comments and look at any grammatical, syntactical, or content errors there may be and decide if you would benefit from redoing your report.

The point distribution for the lab course is shown below. The grade received will be based on the percentage of points received relative to the total points possible. The guideline for grades in the lab is 90% or above is an "A", 80% - 89% is a "B", 70% - 79% is a "C", etc. I grade each report with the idea that there will be a usual number of errors in grammar, writing, comprehension and understanding, etc. A typical conscientious approach will earn between 85 – 89% of the points. Extra care towards the writing and concern about the science and the completeness of thought and logic will earn more points. A casual approach and lack of concern will result in fewer points. Your report will be returned with a grade sheet attached. You may edit, change or reconstruct your paper as mentioned above and have it re-graded for increased points if done so within one week of the return.

Lab Grading

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<thead>
<tr>
<th>Requirement</th>
<th>Points</th>
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<tr>
<td>5 Quick Reports @ 20 pts</td>
<td>100 pts</td>
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<tr>
<td>1 In-Lab Report</td>
<td>10 pts</td>
</tr>
<tr>
<td>2 Formal Reports @ 50 pts</td>
<td>100 pts</td>
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<tr>
<td>Total</td>
<td>210 pts</td>
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Please see the attendance policy spelled out in the lecture syllabus. I will be taking attendance in lab and three (3) labs constitute 25% of the lab course.

NOTE: Any student who has a physical, psychological, and/or learning disability that might affect your performance in the class needs to contact the Office of Disability Services (134 B&E, 803/643-6816) on campus as soon as possible. That office will determine appropriate accommodations based on medical documentation. Thanks.

Contacts--------Office Phone: 803/641-3378          Office Email: montyf@usc.edu
               Cell Phone: 803/640-5679                                    Home Email: cobbetterolf@gforcecable.com
               After 7AM and before 10PM
CHEM 542L – PHYSICAL CHEMISTRY II LAB  
TENTATIVE SCHEDULE  
Spring 2016

January 14  Rate Law for Fe³⁺ and I⁻ Using Method of Initial Rates (Formal Report)  
           Initial Draft Due: 2/11/16

January 21  

January 28  Introduction to Spectroscopy – Lecture Only

February 4  **EXAM I – Mechanistic Kinetics & Gas Dynamics**

February 11 Lasers, Light Sources, Detection and Spectroscopy  Due: 2/25/16

February 18 Solvatochromism of Methylene Violet  Due: 3/4/16

February 25 Particle on a Line Modeling of Electronic Transitions in Cyanine Dyes  
           Due: 3/17/16

March 3     **EXAM II – Quantum Mechanics**

March 10    **SPRING BREAK**

March 17    Ruthenium(II) Trisbipyridine Luminescence Quenching by O₂ (Formal Report)  
           Initial Draft Due: 4/7/16

March 24    IR/Raman Vibrational Spectroscopies of CCl₄  Due: 4/14/16

March 31    **EXAM III – Atomic Structure/Chemical Bonding**

April 7     Introduction to Computational Software  Due: In Lab

April 14    Rotational-Vibrational Spectroscopy of HCl(g)  Due: 4/25/16

April 21    **EXAM IV – Symmetry/Chemical Bonding**

April 28    **EXAM V – Spectroscopy & Statistical Mechanics**  
           (SBDG 103) – 2PM

April 29    **LECTURE FINAL (SBDG 103) – 2PM**  
           ACS National Exam – Full Year (No information card.)

- All regular exams are held in SBDG 103. Our lecture final is in SBDG 103, same as our lecture. Lab recitation and pre-lab meetings will be in SBDG 103 while the actual lab work will be in SBDG 316.