GENERAL INFORMATION

Class Meetings: Lecture - MWF 11-11:50am in SGM 124; Quiz Section - T 3:30-4:50pm in SGM 124

COURSE PERSONNEL

Instructor: Dr. Jasmine Bryant
  Office Hours: See Blackboard site for times / meeting information
  Contact Info: bryantja@usc.edu (preferred contact method)

Lab Instructor: Dr. Catherine Skibo
  Office Hours: See laboratory Blackboard site for times / meeting information
  Contact Info: (213) 740-8265, skibo@usc.edu

Course Coordinator: Paperwork may emailed as a PDF
  Electronic Office Hours: MW 1:30-3pm, emailed questions answered at this time
  Contact Info: coord105@usc.edu

Teaching assistant contact information and office hours times/location can be found on the course Blackboard site.

COURSE DESCRIPTION

The purpose of CHEM 105b is to introduce the basic chemical principles that underlie all of the molecular sciences (from materials and nanoscience to medicine and the machinery of biology). It will introduce good lab practice and how to make decisions based on sound data. Topics covered include reaction kinetics, equilibrium (including applications), acids and bases, entropy and thermodynamics, electrochemistry, and selected topics in inorganic and organic chemistry. After this course students will be both better prepared for continuing studies and have an understanding of molecular principles relevant to everyday life.
LEARNING OBJECTIVES

Students who successfully complete CHEM 105b will be able to:

- Compare experimental conditions that influence reaction rates using rate laws, reaction mechanism, and collision theory.
- Connect forward and reverse reaction rates to describe a system at equilibrium.
- Determine the equilibrium constant for a chemical system and use it to qualitatively describe the relationship between amounts of reactants and products.
- Predict the equilibrium state of a chemical system in partial pressures or concentrations of reactants and products based on initial conditions.
- Predict the behavior of a chemical system at equilibrium when that system is perturbed by a change in conditions.
- Apply the First, Second, and Third Laws of Thermodynamics in relation to chemical systems by predicting the spontaneity of various processes.
- Describe the energetics of a chemical system using the state functions enthalpy, entropy, and free energy.
- Explain the equilibrium state of a chemical system using thermodynamic principles.
- Combine the kinetic and thermodynamic properties of a chemical system to explain whether a reaction will occur on an observable time scale.
- Explain electrochemical systems and the work produced in terms of thermodynamic principles.
- Use isomerism (structural, geometric, and stereo) to explain variation in chemical and physical properties.
- Apply bonding models to the structural study of organic molecules and transition metal coordination complexes.
- Use structural properties to classify the chemical nature of ions and molecules.
- Illustrate the concepts of kinetics, thermodynamics, and equilibria using reaction coordinate diagrams.
- Illustrate examples of the particulate level as related to the concepts above.
- Assess experimental data for accuracy and precision. Evaluate sources of error in laboratory measurements.

COURSE MATERIALS

Required

Textbook: Chemistry: A Molecular Approach (5th edition) by Tro (package available in USC Bookstore includes for free the eText and Mastering Chemistry (MC not required); also available on Amazon).

Lab Manual: Chem 105b Laboratory Manual (available in USC Bookstore)

Scientific calculator (may NOT have internet access)

Optional

General Chemistry Study Guide, Volume 2 by Bryant, J. (available in bookstore or on Amazon.com)

Solutions Manual for textbook
DESCRIPTION AND ASSESSMENT OF ASSIGNMENTS

Assignments in the course include quizzes, in-class work, laboratory reports, homework, and a final project.

Quizzes

**Video Quizzes and Surveys:** Prior to each class you will be asked to watch a few short videos and complete a related quiz (or quizzes) on Blackboard. These videos and their quizzes will help you assess your understanding of the material. There are approximately 50 videos throughout the semester. You will earn 1 point for answering the questions in the quiz completely and accurately, with multiple attempts allowed. Your top 40 scores will count toward your final grade. You will not earn points for submitting answers after the deadline. Please carefully note all due dates and times (found in Blackboard). There are no make-ups and no late submissions.

**Quizzes:** There will be four quizzes during the semester (approximately every three weeks) and a final quiz worth two quizzes (during our Final Exam slot on Wednesday, December 7, 11am-1pm). These will test your understanding of the material covered in the class to that point. Quizzes will be held during the first 30-45 minutes of the weekly quiz section (Tuesdays at 3:30pm in SGM 124, see schedule for dates). No make-up quizzes will be given. If you have an unavoidable absence due to illness or emergency, please contact Prof. Bryant as soon as possible (ideally BEFORE the quiz) to see if you can be excused. A missed quiz without an excused absence will be counted as a zero towards your final grade. If your quiz absence is excused, we will use your final quiz score to generate a replacement quiz score for you. An absence from the Final Quiz will result in a grade of Incomplete for the course.

In-Class Work

Class sessions will be used to reinforce the pre-lecture video content and give students practice solving problems. In-class work will be assigned and collected that day. Some in-class poll questions will be answered via PollEverywhere. Points will be earned for answering in-class questions using the PollEverywhere system. If you are not present in class you may not earn these points and no make-ups are allowed. A small portion of poll questions will be dropped at the end of the semester to account for occasional unavoidable absences and technical issues. In addition to poll questions there will be four in-class group activities throughout the semester, worth 10 points each. You must be present and participate to earn these points.

Laboratory Reports

Lab meets approximately ten times during the course. See the lab Blackboard site for information about lab requirements. All questions regarding lab should be directed to your TA or Dr. Skibo.

Homework

There are ten homework assignments throughout the semester. You may work with other members of the class on the homework, but your submitted work must be your own. Homework assignments are due almost every Wednesday at 11:59pm, and submissions will be

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via Gradescope. Homework is graded on completion and answer keys are posted on Thursday mornings after the assignment due date. No late homework will be accepted after the deadline.

**Final Project**

At the end of the semester you will be asked to construct a poster related to an important chemical reaction. Detailed instructions will be given around Week 8. Your poster will need to clearly define and explain the topic you are covering, give an overview of the chemical reaction and its role in society, describe important and relevant thermodynamic and/or kinetic data, including enthalpy, entropy, Gibbs free energy, reaction rates, along with other relevant information, describe the importance/relevance of the reaction, and explain any disadvantages/issues with the reaction. Your poster will be graded on accuracy, completion, visual presentation, focus, organization, references, and style. This poster is worth 10% of your overall grade in the course, with 1% of this based on peer evaluation participation. Final drafts are due for peer evaluation by 5pm on Monday, November 28. Your final product is due no later than 11:59pm on Wednesday, December 7.

**Grading Breakdown**

Your grade will be determined according to the following distribution:

- Quizzes (4) - 28%
- In-Class Work - 5%
- Video Quizzes (due before lecture) - 4%
- Homework - 10%
- Laboratory - 29%
- Final Project - 10%
- Final Quiz - 14%

To receive a passing grade, satisfactory work must be done in both lab and the lecture portions of the course. You are encouraged to check your grades on the Chem 105b website.

**Grading Scale**

Course final grades will be determined using the following scale:

<table>
<thead>
<tr>
<th>Grade</th>
<th>(%)</th>
<th>Minimum Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>93-100</td>
<td>930</td>
</tr>
<tr>
<td>A-</td>
<td>90-92.9</td>
<td>900</td>
</tr>
<tr>
<td>B+</td>
<td>87-89.9</td>
<td>870</td>
</tr>
<tr>
<td>B</td>
<td>83-86.9</td>
<td>830</td>
</tr>
<tr>
<td>B-</td>
<td>80-82.9</td>
<td>800</td>
</tr>
<tr>
<td>C+</td>
<td>77-79.9</td>
<td>770</td>
</tr>
<tr>
<td>C</td>
<td>73-76.9</td>
<td>730</td>
</tr>
<tr>
<td>C-</td>
<td>70-72.9</td>
<td>700</td>
</tr>
<tr>
<td>D+</td>
<td>67-69.9</td>
<td>670</td>
</tr>
<tr>
<td>D</td>
<td>63-66.9</td>
<td>630</td>
</tr>
<tr>
<td>D-</td>
<td>60-62.9</td>
<td>600</td>
</tr>
<tr>
<td>F</td>
<td>Below 60% Less than 600 points OR less than 145 lab points earned</td>
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</tbody>
</table>
We do our best to inform you on your progress in the course by assigning an approximate letter grade at the end of the third week. This is based on your performance in the course to date. Note: this advisory letter is no guarantee of your final grade. Final grades are assigned using the grading scale, above. You are encouraged to check your scores often in Blackboard.

OTHER COURSE INFORMATION

Course Notes
Lecture notes will be available on the course website.

Office Hours
You are strongly encouraged to see any TA during their office hours, not just your own. Office hours for all TAs will be posted on the lab or class website.

Grading Timeline
Graded labs will be returned one week after they are submitted. All other graded work will be available for review on Blackboard within 48 hours of the due date with the exception of the final project, which will take more time. You can view your grades at any time on the Blackboard site.

Your Rights and Responsibilities
As a member of this course, you, the student, have the right to fair and equitable grading. Every effort will be made to grade assignments consistently, quickly, and with some amount of helpful feedback. If an error in grading is made, you are allowed to ask for a regrade of the assignment, in which we will take a more careful look at your work to make sure it was graded according to the grading rubric. In courses with multiple sections, every effort will be made to communicate and coordinate across sections to avoid large difference in grading outcomes. You further have the right to ask for help in the course. Office hours are times set aside by course instructors and teaching assistants to meet with you, individually or in groups, to answer questions and help with issues throughout the semester. While attendance at office hours is optional, you are highly encouraged to attend if you have questions or concerns. Private, one-on-one appointments are also available for more confidential discussions.

Your opportunity to learn the course material is our primary goal. We agree to help you achieve mastery of the material in exchange for your agreement to make a good-faith effort to learn it. This means that all work submitted in this course must be your own. You may not use outside sources for answers to assignments (for example, pre-lab questions, lab reports, quiz questions, homework assignments, etc.). While you may collaborate with others on laboratory work and homework assignments, work must be in your own words and reflect your good-faith efforts. It is never acceptable to use outside “tutors” or others to furnish answers for you (for example, you may not consult Chegg.com, reddit, CourseHero, etc. or hire others to complete assignments for you). If you have not done so already, please familiarize yourself with the discussion of plagiarism and other forms of academic dishonesty in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct. The posting of course materials (including course recordings, quiz questions or answers, workbook content, homework assignments, lab reports or quizzes, or any other course-related content) to ANY internet site is strictly prohibited.
outside help during weekly quizzes is a violation of the USC Honor Code. Posting of course material is a violation of US copyright law and the USC Student Conduct Code.

**COVID-19 Policy**

Students are expected to comply with all aspects of USC’s COVID-19 policy. Failure to do so may result in removal from the class and referral to Student Judicial Affairs and Community Standards.
# Course Schedule: A Weekly Breakdown (Tentative – changes will be announced in lecture or on Blackboard)

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Topics</th>
<th>Readings</th>
<th>Assignments</th>
</tr>
</thead>
</table>
| Aug 22-28 | M: Course Intro  
W: Reaction Rates & Rate Laws  
F: Order & Half-Life | 15.2-15.3  
15.4, 21.6 | Assessment Survey, Syllabus Quiz  
Video Quizzes |
| Week 2 | M: "Pseudo" Order Reactions  
W: Reaction Coordinate Diagrams; Activation Energy & Catalysis  
F: Mechanisms | 15.5-15.7  
15.6 | Video Quizzes  
HW 1 (8/31) |
| Aug 29-Sept 4 | M: Holiday  
W: Kinetics Wrap-Up  
F: Group Activity | Video Quizzes  
HW 2 (9/7) |
| Week 3 | M: Equilibrium Expressions & Constants  
W: ICE Tables; Using the Approximation  
F: Solubility Equilibrium; Le Châtelier’s Principle | 16.2-16.7  
16.8  
18.5-18.6; 16.9 | Video Quizzes Quizz 1 (9/13) |
| Sept 5 - 11 | Video Quizzes  
HW 3 (9/13) |
| Week 4 | M: Weak & Strong Acids; pH & pOH  
W: pH of Salt Solutions  
F: Common Ion Effect; Intro to Buffers | 17.2-17.7  
17.8  
18.2-18.3 | Video Quizzes  
HW 4 (9/28) |
| Sept 12-18 | Video Quizzes  
HW 5 (9/5) |
| Week 5 | M: pH of Buffer Solutions; Titrations  
W: Solubility & Acids  
F: Group Activity | 18.4  
18.5-18.6 | Video Quizzes  
HW 6 (9/12) |
| Sept 19-25 | Video Quizzes  
HW 7 (10/26) |
| Week 6 | M: Aqueous Equilibrium Wrap-Up  
W: Entropy, Microstates; Spontaneity  
F: Entropy Changes; Gibbs Free Energy | 19.2-19.3  
19.4-19.8 | Video Quizzes Quizz 2 (10/4)  
HW 5 (9/5) |
| Sept 26-Oct 2 | Video Quizzes  
HW 8 (11/2) |
| Week 7 | M: Non-Standard Conditions  
W: Thermodynamics Wrap-Up  
F: Fall Break | 19.9-19.10 | Video Quizzes  
HW 9 (11/9) |
| Oct 3-9 | Video Quizzes  
HW 10 (11/26) |
| Week 8 | M: Redox Review; Half-Reactions  
W: Galvanic Cells; Cell Notation  
F: Group Activity | 20.2  
20.3-20.4 | Video Quizzes |
| Oct 10-16 | Video Quizzes  
HW 11 (11/26) |
| Week 9 | M: Electrochemical Work; Concentration Cells  
W: Electrochemistry Wrap-Up  
F: Transition Metals; Coordination Chemistry | 20.5-20.9  
26.2-26.3, 17.11 | Video Quizzes Quizz 3 (10/25)  
HW 7 (10/26) |
| Oct 17-23 | Video Quizzes  
HW 12 (11/26) |
| Week 10 | M: Naming & Drawing Compounds  
W: Isomers  
F: Optical Isomers | 26.4  
22.3 | Video Quizzes  
HW 13 (11/26) |
| Oct 31-Nov 6 | Video Quizzes |
| Week 11 | M: Intro to Crystal & Ligand Field Theory; Spectrochemical Series  
W: Group Activity  
F: Holiday | 26.5 | Video Quizzes  
HW 9 (11/9) |
| Nov 7-13 | Video Quizzes Quizz 4 (11/15) |
| Week 12 | M: Inorganic Wrap-Up  
W: Intro. to Hydrocarbons; Organic Naming  
F: Functional Groups | 22.2-22.5  
22.8 | Video Quizzes  
HW 10 (11/26) |
| Nov 14-20 | Video Quizzes  
HW 11 (11/26) |
| Week 13 | M: NO CLASS – work on your final project Thanksgiving Break | Final Project Work |
| Nov 21-27 | Final Project Draft Due (11/28)  
Video Quizzes |
| Week 14 | M: Spectroscopy | Video Quizzes |
| Nov 28-Dec 2 | | |
### Statement on Academic Conduct and Support Systems

#### Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” [policy.usc.edu/scampus-part-b](http://policy.usc.edu/scampus-part-b). Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, [policy.usc.edu/scientific-misconduct](http://policy.usc.edu/scientific-misconduct).

#### Support Systems:

**Counseling and Mental Health** - (213) 740-9355 – 24/7 on call

[studenthealth.usc.edu/counseling](http://studenthealth.usc.edu/counseling)

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

**National Suicide Prevention Lifeline** - 1 (800) 273-8255 – 24/7 on call

[suicidepreventionlifeline.org](http://suicidepreventionlifeline.org)

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

**Relationship and Sexual Violence Prevention and Services (RSVP)** - (213) 740-9355(WELL), press “0” after hours – 24/7 on call

[studenthealth.usc.edu/sexual-assault](http://studenthealth.usc.edu/sexual-assault)

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

**Office of Equity and Diversity (OED)**- (213) 740-5086 | Title IX – (213) 821-8298

[equity.usc.edu](http://equity.usc.edu), [titleix.usc.edu](http://titleix.usc.edu)

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations. The university also prohibits sexual assault, non-consensual sexual contact, sexual misconduct, intimate partner violence, stalking, malicious dissuasion, retaliation, and violation of interim measures.

**Reporting Incidents of Bias or Harassment** - (213) 740-5086 or (213) 821-8298

[usc-advocate.symplicity.com/care_report](http://usc-advocate.symplicity.com/care_report)

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity |Title IX for appropriate investigation, supportive measures, and response.

**The Office of Student Accessibility Services** - (213) 740-0776

[osas.usc.edu](http://osas.usc.edu)
USC welcomes students with disabilities into all of the University’s educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at www.osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu

**USC Campus Support and Intervention** - (213) 821-4710

[campussupport.usc.edu](http://campussupport.usc.edu)

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

**Diversity at USC** - (213) 740-2101

[diversity.usc.edu](http://diversity.usc.edu)

Information on events, programs and training, the Provost’s Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

**USC Emergency - UPC** - (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

[dps.usc.edu](http://dps.usc.edu), [emergency.usc.edu](http://emergency.usc.edu)

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

**USC Department of Public Safety - UPC** - (213) 740-6000, HSC: (323) 442-120 – 24/7 on call

[dps.usc.edu](http://dps.usc.edu)

Non-emergency assistance or information.