GENERAL INFORMATION

Chemistry 112A
Section 1: MWF, 9:10 a.m. Simon Hall 1, Prof. Richard Mabbs
Section 2: MWF, 11:10 a.m. Laboratory Sciences 300, Prof. John Bleeke

Instructors:
Professor John Bleeke, McMillen Labs 501
Professor Richard Mabbs, McMillen Labs 513
Dr. Jia Luo, Louderman 448
Dr. Megan Daschbach, Louderman 452

COURSE ADMINISTRATIVE ASSISTANT: Ms. Cassandra Parker (Office: McMillen Labs, Room 419). Office Hours: 2:00 pm – 4:00 pm, M-F.


WEBSITE: The Chem 112A website contains general information, announcements, reading assignments, solutions to assigned problems, quizzes, and exam problems. The course website is found on the Blackboard website (https://bb.wustl.edu).

COURSE CALENDAR: The course calendar can be found on the Blackboard website linked under Course Calendar.

LECTURE SECTIONS: There are two lecture sections this semester. These sections will cover the same topics in the same order, and all recitation classes will cover the same material. In addition, both sections will have the same exams and problem sets, and the quizzes will cover the same material. The two sections will be effectively identical.

RECITATION SUBSECTIONS: Weekly recitation subsections will be held on Thursdays beginning on Thursday, January 22nd. Standard one-hour recitations (sections A-E, J-M, R-V) are held at 9:00 a.m., noon, and 3:00 p.m. Extended (sections I, Q, and Z) and POGIL (sections F-H, N-P, W-Y) recitations are held at 8:30 a.m., 11:30 a.m., and 2:30 p.m. You must register for and attend the SAME Recitation Class the entire semester. These classes will discuss lecture material and additional illustrative problems. The recitations will include weekly quizzes and discussions of selected topics and problems from lecture material. Enrollment is limited to 38 students per subsection. A student may enroll in any recitation subsection that is open. Section changes can be made using on-line registration. If you wish to switch into one of the extended recitation sections, please contact Dr. Luo.

Students may take quizzes only in the recitation subsections in which they are enrolled. The quizzes will be worth a combined semester total of 100 points. Semester quiz scores will be determined as follows. Eight (8) quizzes will be given. In calculating the total quiz score, the lowest score will be dropped and remaining total will be multiplied by the ratio 10/7. Quizzes will be given every week beginning on January 29th, except for the weeks of mid-term exams, the week of spring break, and the last week of class. There are no make-up quizzes.

CALCULATORS: For Chemistry 112 offered in the 2014-2015 academic year, only the following models of electronic calculator will be allowed during quizzes and exams:

The preferred models for ease of calculation are the following 4-line calculators:
- TI-30XS Multiview
- TI-34 Multiview

The following 2-line calculators are also acceptable:
- TI-30Xa
- TI-30X II (solar)
- TI-36X

PLEASE NOTE: The TI-30XS-PRO and the TI-36X-PRO are NOT allowed.
No exceptions will be granted and this policy will be strictly enforced. These are all four- or two-line, non-programmable, non-graphing calculators. They are available from the WU bookstore, and also from (among other places) Walgreens, Comp USA, Staples, RadioShack, OfficeMax, Office Depot, and, of course, Amazon. **Please note:** your calculator must be approved by your TA during the first Recitation session on January 22nd before you take the first quiz on January 29th.

**PROBLEM SETS:** Problem sets will be assigned every Friday. Most of the problems will be assigned from the textbook; any additional problems not given in the textbook will be posted in the Problem Set Assignments folder in the Files section of the Blackboard-Chem 112A course website. Solutions for the problem sets will be posted in the Problem Set Solutions folder, one week after each is assigned, in the Files section of the Blackboard-Chem 112A website. The course homepage is found on the Blackboard website ([Internet address: https://bb.wustl.edu](https://bb.wustl.edu)).

**ACCESS TO SUPPLEMENTARY PROBLEMS:** Problems from the weekly Peer-led Team Learning (PLTL) study-group sessions will be posted every Monday morning. PLTL study problems will be posted under the PLTL Problems folder in the Files section of the Blackboard-Chem 112 course website. Solutions to these problems are not posted. Questions about these problems may be asked at help sessions.

Problems from the weekly POGIL recitations will be posted every Friday morning. POGIL recitation problems will be posted under the Recitation Problems folder in the Files section of the Blackboard-Chem 112 course website. Solutions to these problems are not posted. Questions about these problems may be asked at help sessions.

**MID-TERM EXAMS:** Three mid-term exams (worth 100 points each) will be given on:

<table>
<thead>
<tr>
<th>Exam</th>
<th>Day</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>Tuesday</td>
<td>February 10</td>
<td>6:30 pm - 8 pm</td>
</tr>
<tr>
<td>Exam 2</td>
<td>Tuesday</td>
<td>March 17</td>
<td>6:30 pm - 8 pm</td>
</tr>
<tr>
<td>Exam 3</td>
<td>Tuesday</td>
<td>April 14</td>
<td>6:30 pm - 8 pm</td>
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All exams will consist of problems and short-answer questions. The exams are closed book and closed notes. Rooms for exams will be announced in lecture, will be posted as an announcement on the Blackboard-Chem 112A website ([https://bb.wustl.edu](https://bb.wustl.edu)). **Please do not contact the Chemistry Department Office for room numbers.** Graded Exams may be picked up the Friday after each exam in Lab Sciences 400 between 1:30-3:00 p.m. A student ID will be needed to pick up the exam. Any exams not picked up during these times may be retrieved directly from Ms. Cassandra Parker in McMillen Labs Room 419 (on presentation of a valid student ID) during her office hours. **There are no make-up exams.**

**FINAL:** A 200-point, cumulative final exam will be given on **Tuesday, May 5th, 8 - 10 a.m.** Graded final exams may be picked up on **Friday, May 8th, from 9:00 to Noon in McMillen Labs 419.** A student ID will be needed to pick up the final. Any exam not picked up during that time may be retrieved directly from Ms. Cassandra Parker in McMillen Labs Room 419 (on presentation of a valid student ID) during her office hours.

**EXAM REGRADES:** To submit a regrade request, students **must** execute the following procedure. A properly completed regrade request form must be **stapled** to the first page of the exam listing a **brief** explanation of each grading error. The entire exam must be turned in. **NOTHING ON THE EXAM PAGES MAY BE CHANGED.** If additions or changes to the graded exam are made, the regrade request will be invalidated and disciplinary action will be taken (see Ethics section below).
Regrade requests for mid-term exams **must** be turned in by **4:30 p.m. on the Wednesday after the exam is returned to you.** Submit regrade requests to the regrade cabinet marked “Chem 111/112” on the 2nd floor of Lab Sciences.

Regrade requests for the **final exam** **must** be turned in or received by (if returning via US mail) 4:30 p.m. on Friday, May 22**nd**, 2015.

**Please note: absolutely no regrade requests will be considered after the regrade deadlines listed here.**

To ensure fair and equal treatment of all students, all changes in exam scores will be made only through this formal, written regrade process.

Requests for corrections of simple clerical errors or incorrect addition of exam total scores will not be considered to be regrade requests, and such corrections will be made at any time during the semester, for any number of points.

**SCORES:** Quiz and Exam scores can be checked through **My Grades** on the Blackboard-Chem112A website. The scores will be updated every two weeks. To obtain scores from the web, your WUSTL key and password is required.

**GRADES:** Final grades will be out of 500 points. At the end of the semester, each student will have the following scores: a quiz score normalized to 100 points, three mid-term exams each worth 100 points, and a final exam worth 200 points. One score will be dropped before the final point total is calculated. This dropped score will be either the quiz normalized score, one mid-term exam, or one half of the final exam total score --whichever is lowest. Overall course letter grades will be assigned in a way not stricter than the general guideline for the grade cutoffs shown below. The instructors reserve the right to adjust the letter grades to lower total point values.

<table>
<thead>
<tr>
<th>Letter Grade Range</th>
<th>Points (out of 500)</th>
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<tbody>
<tr>
<td>A</td>
<td>385 +</td>
</tr>
<tr>
<td>B</td>
<td>275 – 384</td>
</tr>
<tr>
<td>C</td>
<td>185 – 274</td>
</tr>
<tr>
<td>D or lower</td>
<td>&lt; 185</td>
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(For instance, a point total of between 275 and 384 will guarantee at least a “B range” (B, B+ or B-) course grade.) “Plus” and “minus” grades will be assigned at the instructors' preference.

In the “Credit/No Credit” grade option, “Credit” will require a letter-grade equivalent of C- or above. Students are urged to keep their quizzes and exams as a safeguard against bookkeeping errors.

**HELP SESSIONS:** Dr. Luo and Dr. Daschbach will hold weekly help sessions beginning on **Tuesday, January 27, 2015.** We recommend that students participate in one help session per week.

<table>
<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Room</th>
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<tbody>
<tr>
<td>Tuesday (Luo)</td>
<td>3:00 – 4:30 p.m.</td>
<td>January 110</td>
</tr>
<tr>
<td>Wednesday (Daschbach)</td>
<td>2:00 – 3:30 p.m.</td>
<td>Crow 206</td>
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</table>
OFFICE HOURS: Professors Bleeke and Mabbs will hold weekly office hours beginning the week of January 26th. NOTE: Office hours will not be held during the weeks of exams.

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<thead>
<tr>
<th>Day</th>
<th>Time</th>
<th>Room</th>
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<tbody>
<tr>
<td>Monday (Bleeke)</td>
<td>1:00 – 2:00 p.m.</td>
<td>McMillen Labs 501</td>
</tr>
<tr>
<td>Friday (Mabbs)</td>
<td>12:00 – 1:00 p.m.</td>
<td>McMillen Labs 513</td>
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EXAM REVIEW SESSIONS: Professors Bleeke and Mabbs will offer special exam review sessions on the Mondays of mid-term exam weeks. These sessions are listed in the following table:

<table>
<thead>
<tr>
<th>Exam Number</th>
<th>Day</th>
<th>Time</th>
<th>Professor</th>
<th>Room</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Monday, February 9</td>
<td>3:00-4:30 pm</td>
<td>Prof. Bleeke</td>
<td>Simon 1</td>
</tr>
<tr>
<td>2</td>
<td>Monday, March 16</td>
<td>3:00-4:30 pm</td>
<td>Prof. Mabbs</td>
<td>Simon 1</td>
</tr>
<tr>
<td>3</td>
<td>Monday, April 13</td>
<td>3:00-4:30 pm</td>
<td>Prof. Bleeke</td>
<td>Simon 1</td>
</tr>
</tbody>
</table>

MESSAGES: Students wishing to discuss a confidential or procedural issue with an instructor may request an appointment by e-mail at genchem@wustl.edu, or by speaking to the instructor immediately after class. Students are requested not to phone or email the instructors, except for significant emergencies.

LECTURE NOTES: Lecture notes will be taken by Teaching Assistants. You may request a copy of these notes via email to the course email at genchem@wustl.edu (please note: the email must be sent from your @wustl.edu account and must include your full name and student ID number).

LECTURE VIDEOS: Video of all lectures will be posted in the Blackboard pages for this course. To access the videos, click on ‘Lecture Videos’ in the Blackboard course menu. Under this tab, the uploaded taped lectures will be organized by section/instructor. Click on the lecture section you wish to view and then find the video you would like to watch (videos are organized by date). To view the video in "full screen" mode, click the blue link below the thumbnail. The video will open in a new tab of your browser. Videos will appear on Blackboard within 24 hours of their recording. If you have problems accessing the videos, please contact Student Technology Services by submitting a trouble ticket at sts.wustl.edu, or stopping by the STS Help Desk in Gregg Hall on the South 40. Please remember that the availability of the videos is dependent on the availability of Blackboard. Blackboard is unavailable every Friday from 3:00 a.m. to 5:00 a.m. for scheduled maintenance.

i-CLICKERS: This semester, both sections of Chem 112 will be using i-Clicker technology during every class. Each student will need to check out an i-Clicker from Olin Library in order to participate. This device is free to each student registered in the course, so be prepared to present your student ID at the Olin library reference desk. Return your i-Clicker after classes end and before May 1, 2015. Students who do not return their i-Clicker at the conclusion of the semester will be charged for the replacement of the device.

i-Clickers will be registered on the first day of Recitation.

SECTION CHANGES: Section changes can be made using online registration. If you have any questions or problems, please see Dr. Luo or Dr. Daschbach.

PLTL STUDY GROUPS: There are optional PLTL study groups that meet once a week on Saturday or Sunday for a two-hour workshop. Each study group works together on prepared problems that are designed to be solved cooperatively, with a PLTL undergraduate leader facilitating the group. The groups utilize collaborative-learning strategies in their sessions. The leader does not help solve the problems, but guides and encourages the group.
Online sign-up for PLTL begins at 5:00 p.m. on Monday, January 12th. The link to the online application may be found after 5:00 pm on January 12 under the Links Section of the Blackboard-Chem 112 course Web site.

The application will close at 11:59 p.m. on Sunday, January 18th; however, students who submit their application by 1:00 pm on Thursday, January 15th will be guaranteed placement into a study group. Group information will be sent to your Washington University e-mail address on Friday, January 23rd. The first PLTL sessions will be held on Saturday, January 24th or Sunday, January 25th. You must attend all PLTL sessions if you choose to join a group.

ACADEMIC MENTORS: Academic mentors are available for group workshops. Students should go to Cornerstone: Center for Advanced Learning (located in Gregg Hall on the South 40) to join a group. Additional information can be obtained from the Cornerstone website (http://cornerstone.wustl.edu).

DISABILITY SERVICES: Washington University is committed to providing accommodations and/or services to students with documented disabilities. Students who are seeking support for a disability should contact the Disability Resource Center (DRC) at 935-5970. DRC is located at Cornerstone in Gregg Hall on the South 40. Disability Resources is responsible for approving and arranging all accommodations for University students.

ETHICS: Evidence of cheating or attempted cheating will be forwarded to the Committee for Student Academic Integrity, and we will follow the committee’s recommendations. Please refer to the Statement of Student Academic Integrity” on the Washington University website at:

http://www.wustl.edu/policies/undergraduate-academic-integrity.html

Please note: all graded quizzes and exams are scanned and filed prior to returning to students.

DISCLAIMER: The Instructors reserve the right to modify the information on this syllabus during the semester.
Chemical Equilibria (Chapter 14, excepting 14.3 and 14.7): 4 Lectures. Nature of chemical equilibrium; the Law of Mass Action; equilibrium constants; predicting the direction of reactions; equilibrium calculations; Le Chatelier's principle.

Acid-Base Equilibria (Chapter 15): 6 Lectures. Classification and properties of acids and bases; strong and weak acids and bases; the autoionization of water; the pH scale; the pH of weak acids and bases; buffers; titrations and indicators; polyprotic acids.

Solubility Equilibria (Chapter 16): 3 Lectures. Solubility products; common ion effect; precipitation and selective precipitation.

Thermodynamics, Part 1: (Chapter 12): 5 Lectures. Heat, work and energy; the first law; systems, state functions, path functions, cycles and processes; calorimetry; enthalpy; heat capacity; enthalpies of physical and chemical changes.

Thermodynamics, Part 2: (Chapter 13, 14.3, 14.7): 6 Lectures. Nature of spontaneous processes; entropy and spontaneity (the second law); the microscopic interpretation of entropy; entropy changes in physical and chemical processes; the third law; standard molar entropies; Gibbs free energy; the thermodynamic description of equilibrium; temperature dependence of equilibrium constants.

Electrochemistry (Chapter 17): 6 Lectures. Galvanic cells; Gibbs free energy and cell voltage; concentration effects and the Nernst equation; pH meters; batteries; fuel cells; corrosion; electrolysis.

Chemical Kinetics (Chapter 18): 5 Lectures. Rates of chemical reactions; rate laws; reaction mechanisms; the effect of temperature on reaction rates; collision theory; catalysis and catalysts.

Physical Equilibria (Chapters 10, 11): 6 Lectures. Vapor pressure of pure liquids; the variation of vapor pressure with temperature; freezing and melting; phase diagrams; solutions and solubility; colligative properties; binary liquid mixtures.