

# SYLLABUS

## CH102 General Chemistry 2 - Summer 2016

Welcome to CH102 - General Chemistry 2. This is the second semester of a year-long course intended primarily for science majors, pre-medical students, engineering students who require a one-year course in chemistry, and other interested students. This syllabus is designed to answer many questions you may have. Please read it over and then keep it handy to use throughout the semester.

Summer courses are notoriously fast-paced and the likelihood for getting left behind is higher than in a normal fall/spring course. You are encouraged to follow the advice outlined in the document below and to seek help at the first sign of trouble.

### Course Staff

This course is given by Professor Binyomin Abrams:

Office Hours: Mondays and Wednesdays at 3pm in SCI 200B  
Communication: [abramsb@bu.edu](mailto:abramsb@bu.edu) (e-mail, preferred) and 617.353.2480 (office phone, emergencies)  
Course Website: <http://learn.bu.edu/>

The discussion leaders and their office hours (all held in SCI 200B - the atrium on the second floor) are:

Sarah (Mon 1pm) and Melissa (Thurs 6pm) lead discussions in KCB 103 (last names: A–E)  
Stephanie (Mon 4pm) and Sinead (Wed 4:30pm) lead discussions in KCB 104 (last names: F–Ma)  
Jessica (Tues 4pm) and Andrew (Wed 1pm) lead discussions in KCB 106 (last names: Me–Z)

All students are invited, and encouraged, to attend **any** of the office hours (even for other discussion leaders). Any questions that you may have about the course can be sent to [ch102summer-questions@bu.edu](mailto:ch102summer-questions@bu.edu). E-mails sent to this address will reach all of the course staff simultaneously.

Professor Alex Golger ([golger@bu.edu](mailto:golger@bu.edu)) is in charge of the laboratory portion of CH102; all laboratory-related questions should be directed to him.

### Texts and Tools

The required materials for the course are available at the Boston University Bookstore:

1. Mahaffy, P.; et. al. *Chemistry: Human Activity, Chemical Reactivity* (2nd custom edition), ISBN 978-1-305-28420-3 (e-book can be purchased directly at [http://www.cengagebrain.com/micro/BostonUChem101\\_102](http://www.cengagebrain.com/micro/BostonUChem101_102) and other options for purchasing the textbook are posted under “Announcements” on blackboard).<sup>1</sup>
2. Scientific (non-graphing) calculator capable of doing logarithms (recommended: <http://goo.gl/uRZQ8K>)
3. We will be using Top Hat for classroom responses and engagement. Details below.
4. Golger, General Chemistry Laboratory Manual, Hayden McNeil Publishing.
5. Laboratory notebook, Hayden McNeil Publishing,
6. Approved safety goggles (face-forming) and laboratory coat<sup>2</sup>.

You will need to make sure that you acquire items 1-3 **before** the first lecture (don't forget to bring your device for Top Hat to lecture). Items 4-6 are required for the lab and you must have procured these items *before* the first lab session.

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<sup>1</sup>Your eBook subscription includes detailed help on all of the end-of-chapter questions. To access this help, and all of the other eResources in each chapter, login to <https://login.cengagebrain.com>. Next to the “MindTap Reader” listing, click on Open, to display the eBook Table of Contents. Click any chapter you are interested in, to display its detailed contents. Select part of the chapter you are interested in to access all of its eResources.

<sup>2</sup>State Law requires that safety goggles be worn in the laboratory. Contact lenses are forbidden in the lab; all students who wear contacts should wear prescription glasses under their safety goggles. All students must wear the appropriate clothing: long pants, long sleeves and closed shoes (no sandals or flip-flops).

## Classroom response system and other electronic devices in lecture/discussion

We will be piloting a new classroom response system this summer: Top Hat ([www.tophat.com](http://www.tophat.com)). You will be able to submit answers to in-class questions using Apple or Android smartphones and tablets. You can visit the Top Hat Overview (<https://goo.gl/2VmNnI>) within the Top Hat Success Center which outlines how you will register for a Top Hat account, as well as provides a brief overview to get you up and running on the system. An email invitation will be sent to you by email. Note: because this is a pilot, there will be *no charge* for a subscription for the service to join our class.

We will use Top Hat for classroom engagement, periodic attendance, and some quizzes; that said, recent studies (see: <http://goo.gl/F0YKJj>) have shown that taking notes with electronic devices (computers, tablets, etc.) leads to **lower performance** by students on exams. For this reason, we **require** that you take notes using the traditional pen and paper mode. Similarly, while you will use your cellphones or tablets for answering Top Hat questions, make sure to keep them down when they are not in use so that you might best benefit from the lectures.

## Course Organization

### Course Schedule

The course consists of three required components:

- lecture (M/T/W/Th 10am-12noon in SCI 113)
- discussion (T/W/Th 8:30-9:30am - rooms listed above), and
- lab (T/Th 1pm-4pm in SCI 268).

You are required to attend **all** of the course meetings for all of the components (lecture, lab, and discussion). Top Hat quizzes will be given in all of the lectures. Additionally, quizzes will be given regularly in discussion - absence will result in a grade of zero.

Make sure to register for the Top Hat course (email will be sent to students) before the first lecture of the summer. You can register for Top Hat by following the instructions posted on blackboard ([learn.bu.edu](http://learn.bu.edu)).

If you have not yet registered for all three components of the course, please do so right away. All grade records are based on the registrar information, so we require that you be officially registered and that you attend the corresponding lecture, discussion, and lab. Students will be assigned to individual discussion sections before the first discussion.

### Exams and Quizzes

There will be two lecture exams and a cumulative final exam:

- Exam #1: Monday, July 18<sup>th</sup>, from 10am-12noon in LSEB B01;
- Exam #2: Monday, August 1<sup>st</sup>, from 10am-12noon in LSEB B01;
- Final Exam: Thursday, August 11<sup>th</sup>, from 9am-12noon in LSEB B01.

Due to the small size of the course, no makeup exams will be offered for missed exams<sup>3</sup>. A missed exam will result in a grade of zero. A missed final exam will result in an I (incomplete) grade for the course, so please make end-of-semester travel plans accordingly.

In addition to the lecture exams, there will be regular quizzes given during discussion. Each discussion quiz will count equally. These quizzes are meant to assess your understanding of topics covered in previous lectures and homework. If you are absent, the missed quiz counts as 0. No makeup quizzes will be given. The discussion quizzes count for a total of 15% of your course grade.

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<sup>3</sup>Emergency situations, with proper documentation, will be accepted according to the absence policy detailed below.

Top Hat quizzes will be given in lectures. These quizzes are meant to assess your preparation for the material to be covered that day in lecture, and your work in the class. If you are absent, the missed quiz counts as 0. No makeup quizzes will be given. The lecture quizzes and participation count for a total of 15% of your course grade.

## Absence Policy

Attendance at all lectures, discussions, and labs is mandatory. Quizzes given in lecture, and lecture participation, will count for 15% of your course grade. If you arrive late to lecture, please enter as inconspicuously as possible. Your colleagues will appreciate it.

Attendance will not be taken in discussion. Rather, the quizzes that will be given (anywhere from once to three times per week) will indicate who is attending. There are no make-up quizzes and a missed quiz receives a grade of zero. You are required to attend your assigned discussion section - only quizzes taken in the appropriate section will count for a grade. Students arriving late for a quiz will not receive extra time to complete the quiz.

Similarly, attendance will not be taken in lab. Keep in mind that there will be no opportunity for makeup labs. Missing a lab will result in a grade of zero on the lab assignment. Please also be aware that due to the fact that important safety information will be disseminated at the beginning of lab, arriving late in lab may preclude your participation.

## Academic Conduct

All students at Boston University are expected to maintain high standards of academic honesty and integrity. It is the responsibility of every student to be aware of the Academic Conduct Code's contents and to abide by its provisions, as detailed at: <http://www.bu.edu/academics/cas/policies/academic-conduct/>

Please note carefully that we treat cheating<sup>4</sup> with **zero tolerance**. At minimum, the consequences of cheating are that the score for work on which cheating occurs counts as zero and that a letter detailing the cheating is sent to the student's advisor, the dean of CAS, and placed in the student's academic file. Possible further consequences are referral to Academic Conduct Committee, and additional penalties, including possible expulsion from university. None of these consequences are at the discretion of the instructors, but rather are governed by Boston University's policies.

## What is covered in CH102?

This course has been designed to be an introduction to general chemistry that integrates laboratory explorations with the development of the analytical tools necessary to understand and guide those explorations. Some particular aspects that will be emphasized are: mathematics as a tool for the exposition and manipulation of chemical concepts, and the connection between microscopic models of matter and its macroscopic properties.

As this is a continuation course from CH101, your understanding of the concepts covered in that course are prerequisite to the work done in CH102. While they will not be directly tested, those concepts may be necessary to correctly understand the new material.

## Lecture

In this course we will cover chapters 11-18 of the course text:

- Chapter 11, Gases
- Chapter 12, Mixtures and colligative properties
- Chapter 13, Chemical equilibrium
- Chapter 14, Acids and bases
- Chapter 15, Solids and solubility

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<sup>4</sup>Here, "cheating" refers to any violation of the student academic conduct code. There are no *small* infractions.

- Chapter 16, Electrochemistry
- Chapter 17, Spontaneity and free energy
- Chapter 18, Kinetics

## Laboratory

The laboratory part of this course will let you see first-hand chemical principles and processes in action. It will also give you experience with some of the methods scientists use to do chemical research. Your laboratory will consist of seven experiments, which have been scheduled as nearly as possible with and supporting discussions in regular lectures. A detailed schedule of the laboratory portion of the course is available on the course blackboard site.

## Grading

In general, an “A” grade represents excellence and complete mastery of the course material; a “B” corresponds to very good mastery of the material; a “B-/C+” is an average performance; a “C” represents below average performance; and a “D” corresponds to insufficient mastery of the course material.

Letter grades **are not** assigned to individual exams, labs, or quizzes. Your overall course letter grade is assigned based on your **total score** for the course; the course staff will not speculate as to your expected grade until ALL of the grades for the course are in. There are no fixed percentages of A grades, B grades, etc...

No makeup exams will be given. The exams (including the final exam) count for 50% of your course grade.

Each discussion quiz will count equally and the lowest quiz score will be dropped. These quizzes are meant to assess your understanding of topics covered in previous lectures and in the homework, and to develop your skills as you prepare for the exams. If you are absent, the missed quiz counts as zero. No makeup quizzes will be given. The discussion quizzes count for a total of 15% of your course grade.

Each lecture quiz will count equally and, together with participation scores, will count for 15% of your course grade. These quizzes are designed to assess your preparation work (reading before lecture) and work during lecture.

The lab score counts for 20% of your course grade. The breakdown of the lab grades will be discussed in lab. A missed lab counts as zero.

## Questions Regarding Grades

Any question concerning the grading of an exam, quiz, or laboratory report must be brought to the attention of your discussion or laboratory teaching fellow during the class session in which it is returned to you; material will not be accepted for regrading afterwards.

Indicate on the face of the exam, quiz, or laboratory report the questions you wish re-graded and your reasons for believing that they were mis-graded. **The entire work will be re-graded.** Be sure you have made **no alterations in your work**. When your exams are returned you will be provided with a green pen. All notes on the exam must be made in the green pen. We occasionally photocopy your graded work to make spot checks against regrade requests. Please note that the penalties for academic misconduct are severe, as detailed in Boston University's Academic Conduct Code, available from CAS Academic Advising.

## Overall Course Grade

The course grade will be determined as follows:

Component	% Grade
Exams	50%
Discussion Quizzes	15%
Lecture Participation and Quizzes	15%
Laboratory	20%

## Suggestions for Success

Learning chemistry requires persistence, diligence, and hard work. During the academic year (fall and spring), faculty normally suggest that you plan to spend a significant number hours per week on this course (over and above the scheduled contact hours). During the summer, each of the 6 weeks has approximately the same number of contact hours as 2.5 academic-year weeks. If you are willing to devote the time, and you spend it wisely and effectively, you will be able to perform your best in this course. Here are some specific suggestions that students have found helpful.

### Lecture Preparation

You will get the most out of lecture if you have worked through the textbook **beforehand**. This includes reading the text, **working through the worked-examples in the text**, working through the exercises in the chapter (and at the end), and doing the Interactive and e-resources on the side margins. This will give you a good jumping-off-point for the lectures.

### Lecture Follow-up

After each lecture, you should work through your lecture notes to be sure you understand everything that was covered. The next step is to do **a lot of problems** (more than the minimum number that are assigned as homework).

### Working Problems

Chemistry is a quantitative science and understanding of its concepts is cemented by **solving problems**. The text offers many problems for you to attempt - these are a good place to start (especially the online resources). For success you should do as many of these as you can. If you run into problems you should ask for help from your teaching fellow or the professor.

Additionally, some more challenging problems will be assigned in lecture and discussion. It is important that these be completed before the next lecture (or discussion).

### Discussions

There are three discussion sessions per week - these problem solving sessions will give you a chance to work in groups to solve problems, some of which are exam-caliber. These sessions are also a particularly good time to work through the problems that you haven't been able to solve.

Quizzes will be given during at least one (if not more) of the three weekly sessions. These are geared towards helping you, and the instructors, determine which topics you understand and which require further work. Additionally, exams will be returned and discussed during these discussions. Any questions about exams or problem sets should be addressed to your discussion TF during this time.

### Tutorial sessions (a.k.a. office hours)

You are strongly encouraged to attend office hours frequently. They are a great opportunity to work through problem in groups, get support from course instructors, and ask questions. **Note:** you do not need to have a question or an appointment to attend these open hours. Rather, come frequently and maximize your effort by getting support. These tutorial sessions are helpful for all students.

An important note about getting answers to your questions: e-mail is not a replacement for office hours. While instructors will certainly respond to personal, private, and urgent matters by email, they will not be regularly answering content-related questions by email. To get answers from instructors, please attend **any** of the office hours listed above (not just your instructors).

## Detailed Course Schedule

Week of	Lecture Topics / Notes	Tuesday Lab	Thursday Lab
7/4	No classes (M) Chapter 11 (TW) Chapter 12 (RF*)	No labs	Mandatory Check-in and lecture (1pm in SCI 268)
7/11	Chapter 13 (MT) Chapter 14 (WR)	Lab #1 - Gas laws (pg. 13)	Lab #2 - Colligative properties (pg. 43)
7/18	<b>Exam #1</b> (M) Chapter 14 (TW) Chapter 15 (R) Chapter 16 (R)	Lab #3 - Equilibrium (pg. 61)	Lab #4 - Acid-base titration (pg. 81)
7/25	Chapter 16 (MT) Chapter 17 (WR)	Lab #5 - Solubility (open project) (pg. 107)	Lab #6 - Electrochemistry (pg. 121)
8/1	<b>Exam #2</b> (M) Chapter 17 (TW) Chapter 18 (R)	Lab #6 - Part 2 (open project)	Lab #7 - Kinetics, part 1 (pg. 149)
8/8	Chapter 18 (MTW) <b>Final Exam</b> (R) <sup>†</sup>	Submit Lab #7 at 1pm	

\* Monday's Schedule on Friday.

† Final exam will begin at 9am.

### Note on Labs:

Lab sessions are held SCI 268. There are two three-hour laboratories each week. Laboratory experiments are on Tuesday and Thursday, 1-4pm. There is a Mandatory Introductory lab lecture on Thursday, July 7th, at 1-2pm in SCI 268. All (brief) lab reports are due at the **beginning** of the following lab period. Brief report for lab #6 is due on 8/4.