Northeastern University
CHEM 1151 General Chemistry for Engineers (CRN 10227, 12840)
Fall 2023

This course has a **co-requisite**: CHEM 1153 - Recitation for CHEM 1151

Instructor: Professor Leonel Murga **E-mail**: l.murga@northeastern.edu

Office: EXP 470 E

Student hours: Th 12:00 p.m. to 1:00 p.m. (Chem Central)
F 11:00 a.m. to 12:00 p.m (Zoom) by appointment through Canvas.
Other times available by appointment. Send me an email to arrange a meeting.

Lecture times:

CRN	Lecture Times	Location
10227	Mon, Wed, Thu 10:30 a.m. to 11:35 a.m	SH 105
12840	Mon, Wed, Thu 4:35 p.m. to 5:40 p.m.	CH 101

Course Delivery Format

Synchronous and in person. Any changes to the delivery format as a consequence of special circumstances will be announced in class.

Classroom Recording

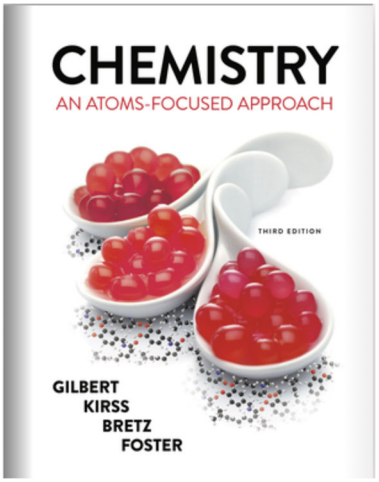
This course, or parts of this course, may occasionally be recorded for educational purposes. These recordings will be made available only to students enrolled in the course, instructor of record, and any teaching assistants assigned to the course.

Only students who have arranged an accommodation with the Disability Resource Center may use mechanical or electronic transcribing, recording, or communication devices in the classroom.

Let your instructor know immediately if you foresee any issues with the classroom recording policy.

Course Requirements

1) Textbook



Chemistry: An Atoms Focused Approach
Gilbert, Kirss, Bretz, and Foster.
3rd ed., 2020
WW Norton
ISBN: 9780393697353 (hardcopy)

You can buy the textbook from:

1) Northeastern University Bookstore
2) From the publisher WWNorton: https://wwnorton.com/books/9780393697353 (hardcover, electronic and other versions available)

2) Paid subscription to Top Hat

Top Hat is a classroom response system allowing you to participate in class through

- text messaging with your cell phone,
- an app on your smart phone or tablet or
- a web browser on your Wi-Fi-capable device (e.g., laptop)

To set up your Top Hat account:

- go to www.tophat.com
- click on "Sign Up", then select "Student" and follow the prompts to set up your account.
- When prompted, use the join code associated to your CHEM 1151 section:

CRN	TopHat Join Code Number	Direct Hyperlink to Course
10227	248232	https://app.tophat.com/e/248232
12840	764573	https://app.tophat.com/e/764573

When you register, **please use your first and last name as the Registrar has it**, **your official Northeastern e-mail address, and your NU ID**. This will allow me to identify correctly your specific Top Hat records.

Online help for setting up your account and using Top Hat is available at Student Overview and Getting Started Guide located at https://support.tophat.com/s/article/Student-Top-Hat-Overview-and-Getting-Started-Guide.

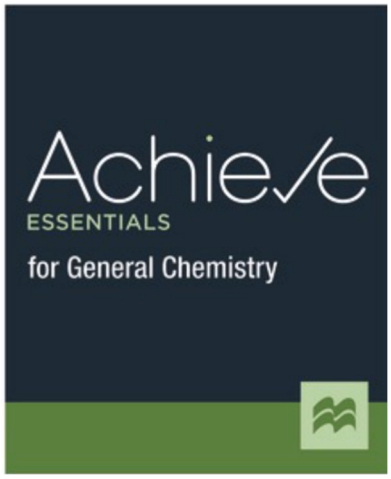
If you run into any problems signing for Top Hat or gaining access to the course, email support@tophat.com.

If you are experiencing any problems with Top Hat at any time, contact the company's helpdesk at https://tophat.com/contact-us/

Once you have registered and entered in your subscription code, you can participate using Top Hat by text messaging, with a Top Hat app, or through a web browser by using the link associated to your class provided in the table above.

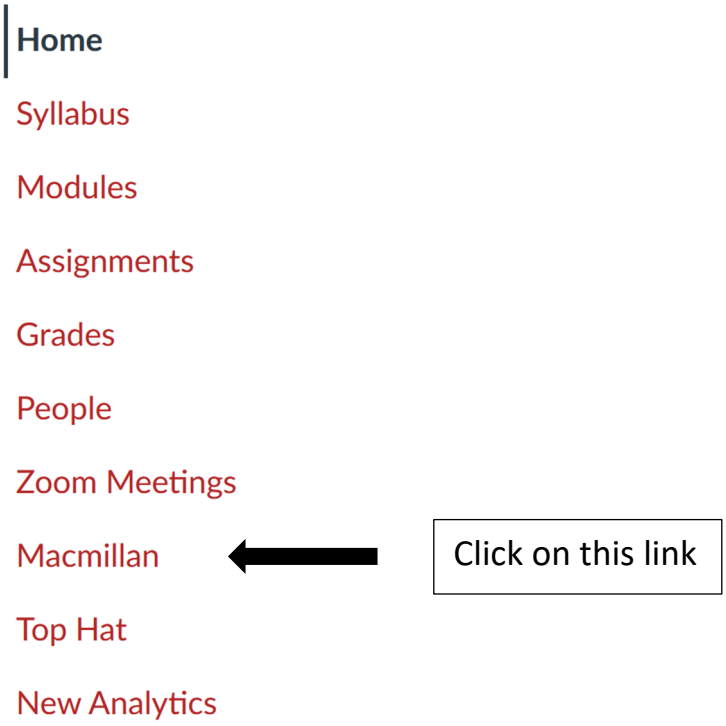
You must have set up an account and have access to TopHat by Monday, September 11, 2023.

3) Paid access to Achieve Learning On-line Homework System



Achieve ordering info:
Product: Achieve Essentials for General Chemistry (**1-Term Access**)
ISBN: 9781319399900

To register in the system, go to the Canvas webpage for the course and click on the Macmillan link on the left-hand side menu to start the process:



You can find detailed instructions on how to proceed in the following YouTube video:

https://www.youtube.com/watch?v=nyInY7J5wSQ

The registration process will ask you for a course code. Select one from the following table according to your lecture schedule:

CRN	Lecture Times	Code
10227	Mon, Wed, Thu 10:30 a.m. to 11:45 a.m.	brcopm
12840	Mon, Wed, Thu 4:35 p.m. to 5:40 p.m.	m9nxrg

Make sure to use your first and last name as it is listed in the Registrar's Office.

If you run into any issues during registration, you can contact McMillan's Technical Support at 800-936-6899 or 24/7 through Chat or Email Support by clicking here.

Be aware that pop-up blockers may interfere with the registration process. This article will walk you through the steps to resolve pop-up blockers.

4) Scientific calculator (e.g., a TI-83, TI-84 Plus, equivalent or better.)

Please bring your calculator with you to lectures, recitations and exams. You will not be allowed to use your cell phone during exams, so you should get used to using the calculator as soon as possible. Do not assume you can borrow a calculator from your instructor, TA or a classmate.

5) Internet Access

Each student is responsible for his or her access to the internet for purposes of this course and for research. Internet access is a required component of this course and will not be accepted as an excuse for missed work. If you know that you will be traveling, then make sure you plan accordingly.

6) Computer, webcam, and microphone

Some office hours will be via Zoom. Also, depending on weather conditions, or unexpected circumstances, there is always the possibility that classes may switch to online mode. Thus, you should have the following:

- a computer device with a functioning webcam and microphone. A headset is recommended.
- knowledge of how to mute your microphone (and camera) in Zoom.
- knowledge of whom to contact at NU for technology-related help. See Student Resources on NU Digital Resilience page at https://digitalresilience.northeastern.edu/support-and-training/ (scroll down to Contact the Service Desk)

Course Description

CHEM 1151 is a one semester course covering important areas of modern chemistry, such as details of the gaseous, liquid, and solid states of matter; intra- and intermolecular forces; and phase diagrams. Presents the energetics and spontaneity of chemical reactions in the context of chemical thermodynamics, while their extent and speed is discussed through topics in chemical equilibria and kinetics. Aspects of electrochemical energy storage and work are considered in relation to batteries, fuel, and electrolytic cells.

Overview of the Course

Engineering is the application of science to practical problem-solving through the design and implementation of technological processes that improve our lives. All designs and processes involve materials at some level, so engineers should have an understanding of materials, especially of how their

physical and chemical properties are related to their atomic and molecular structure. In CHEM 1151 we will explore these relationships. We will also examine the flow of energy that accompanies chemical transformations, particularly those that involve the combustion or electrolytic consumption of fuels. You are expected to already have some knowledge of the basic principles of chemistry that are described in the first chapter of the text so the topics in homework assignment 1 will not be covered in lecture but rather during the first meetings of recitation**. If you have never covered these topics or have trouble with them, please seek additional help. You have several resources including both your recitation instructor and me, your lecture instructor. (See section of syllabus on Resources for Success.) We want to be sure that you start out well.**

Learning Goals:

By the end of this course, you should be able to:

1. Use atomic structure and quantization of energy at the atomic level to explain the chemical properties of the elements.
2. Describe the composition of matter on atomic and molecular scales in terms of chemical formulae and structures.
3. Understand the nature and types of chemical bonding and its consequences for molecular shape and polarity and for electronic materials.
4. Predict key physical properties of pure gases, liquids, and solids and their mixtures and relate the physical properties of gases, liquids and solids to molecular shape and interactions between constituent atoms, ions and molecules.
5. Identify the products of chemical reactions and relate the quantities of reactants consumed and products created using balanced chemical equations.
6. Determine the energy changes that occur in chemical reactions in terms of the thermodynamic properties of reactants and products and apply these energy changes to predict reaction spontaneity.
7. Apply, compare, and contrast kinetic and equilibrium descriptions for chemical reactions.
8. Identify the chemical reactions occurring in batteries and fuel cells and link the reactions to the power generated by these systems.
9. Appreciate the importance and relevance of chemistry in engineering and our global society

Mapping to ABET Student Outcomes (SO):

Students completing CHEM 1151 are expected to have achieved the following measurable ABET Student Outcomes (SO):

- An ability to identify, formulate, and solve problems in chemistry (SO e);
- A proficiency in applying chemical principles to problems of interest to engineers (SO a);
- An ability to use the techniques, skills, and modern tools necessary for chemistry as relevant for engineers (SO k);
- An ability to analyze and interpret chemical data (SO b);

- An ability to apply chemistry to design features of a process or system that meet societal needs (SO c);
- An understanding of impact of technical solutions in global and societal contexts (SO h);
- A recognition of the need for and the ability to engage in lifelong learning by developing a more accurate and richer self-appraisal of themselves as learners (SO i).

Course Structure, Components and Considerations

You are responsible for all material covered in lecture and all announcements made in lecture **even if you are absent**. If you miss all or part of any class, find out from a classmate what you missed. Most announcements will be posted on the Canvas site. PDF Files of the PowerPoints used in lecture will also be posted on Canvas.

1) Attendance Policy

This course will be delivered 100% in person. Attendance during scheduled class times is strongly encouraged. **Part of the final grade will be based on class participation and in-class discussions**. Some exam materials will be based on in-class discussions and presentations.

Please contact me <u>as soon as you learn</u> you may have any major obstacles in attending the class during the scheduled times.

Students have the right to a limited number of excused absences for conditions listed in the Northeastern University Attendance Requirements, including absences due to specific university-sponsored activities, religious holidays, military deployment, wellness days and jury duty. Students are responsible for notifying instructors **in writing via email** when facing an extended leave of absence or extenuating circumstances. Please note that University Health and Counseling Services will not issue documentation of students' illnesses or injuries.

Early communication is key to solving any issues when having attendance problems due to any circumstances. **Do not wait days or weeks** to let your instructor know that you are experiencing a problem that prevents you from attending the regular scheduled lecture.

2) Canvas

Canvas is an on-line course management system (also called learning management system or LMS) that supports all courses at Northeastern University. It is web-based and is designed to provide a convenient method for posting announcements, assignments, grades etc.

You can access Canvas in two ways:

a) Directly through https://canvas.northeastern.edu/
b) Through the student hub.

Once you login into Canvas you will have access to the Canvas sites that have been set up for each of the courses you are enrolled in the semester.

There is also a Canvas mobile application that you can install in your phone. Details can be found at https://bit.ly/3h4ESEr. Note that not all features may be available through the mobile app.

It is your responsibility to check the Canvas site regularly for announcements, course handouts, YouTube videos, video lectures and the PDF files of the PowerPoint slides used in class.

Canvas Technical support and resources including 24/7 phone (1-833-450-3937), and chat can be found on the help icon in Canvas. The Canvas website also has a very detailed user guide and answer to common questions at https://community.canvaslms.com/t5/Student-Guide/tkb-p/student. In addition, you can also access Northeastern University Technical support at 617-373-4357 (xHELP) or by email to help@northeastern.edu.

3) Top Hat Questions and Assignments

During some lectures and/or recitation sessions students will be given opportunities to assess their understanding of key concepts and mastery of important skills by using Top Hat to answer questions presented by the instructor. These assessments are conducted live.

In other instances, the instructor will assign Top Hat questions as offline assignments that must be completed within a certain time frame (usually 48 to 72 hours). **It is your responsibility to check Top Hat for questions that have been marked as assignments**.

Once you have registered and entered in your subscription code, you can participate using Top Hat by text messaging, using the Top Hat app, or through a web browser with the following information:

CRN	TopHat Join Code Number	Direct Hyperlink to Course
10227	248232	https://app.tophat.com/e/248232
12840	764573	https://app.tophat.com/e/764573

If you use a web browser and find you have issues with wireless connectivity, switch to the iOS or Android app and use offline mode, which stores your answers and sends them when you are reconnected. If you have any technical problems using this system, click **the question mark (?) sign** at the top right corner of your Top Hat screen and follow the instructions. Or, you can also email support@tophat.com or visit http://support.tophat.com to access the support forum.

It is highly advisable that you familiarize yourself with all aspects of the Top Hat system before the start of the class by visiting the Quick Students Guide located at

https://support.tophat.com/s/article/Student-Top-Hat-Overview-and-Getting-Started-Guide

Students submitting any response to a question will receive 1 point towards their participation scores. Students submitting a correct answer will receive 1 point towards their correctness scores.

Top Hat participation grades will be determined as the percentage of questions participated in by the student. Top Hat correctness grades will be determined as the percentage of questions correctly answered during the semester. The base for the percentage calculation in both cases will be 90% of the total number of questions asked during the semester rounded up to the **next** integer. For example, let's say that 68 questions were presented during the semester and that student A got the following scores:

Participation 60 out of 68
Correctness 55 out of 68

To calculate the score for student A I will first calculate 90% of 68 questions which is 61.2 and I will round up to the next integer which is 62. This will be the base for the calculation of the grade:

Participation: $\left(\frac{60}{62}\right)\ x\ 100 =\ \ 96.77\%$

Correctness: $\left(\frac{55}{62}\right)\ x\ 100 =\ \ 88.71\%$

The following policies apply to Top Hat questions:

1) It is possible to obtain a score larger than 100%. For example, if student A did not miss any questions during the semester their participation score would be (68/62) x 100 =109.68 %. Those points over 100 will become extra credit (i.e. I will allow for scores larger than 100%).
2) Because of the way the scores are calculated, students can miss up to about 10% of the questions presented during the semester without consequences (the percentage is not exact because of the rounding up used to set the base of the percentage calculation).
3) **There will be no makeup opportunities** for questions you did not answer because you were not present in class or recitation unless there are exceptional circumstances involved (e.g. a jury duty that keeps you aways for several lecture or recitation sessions). In this last case, you must

notify your instructor **immediately** about the situation to make the appropriate arrangements. Late notifications will be the grounds for dismissal of any petitions to make up missed work.

4) Top Hat questions that you did not answer because you were not present in class or recitation due to a Wellness Day will also form part of the 10% of questions you are allowed to miss during the semester.
5) If you are in class but for some reason your answers are not being registered in the system notify your instructor **immediately**. Do not wait days or weeks to let your instructor know that you were present in class at some particular day, but your answers were not registered in the system.
6) It is your responsibility to make sure your Top Hat scores are being recorded correctly. Thus, you should check your gradebook very often to make sure this is the case.
7) Top Hat questions are intended to collective exercises. This means that you are encouraged to collaborate with other students before submitting your final answer.

Your participation and correctness scores, along with individual questions posed in class, recitations or as homework and the answers you submitted to them, can be viewed in your gradebook on Top Hat (not on Canvas). Please note that Top Hat will show you scores based on the total number of questions presented during the semester and not over 90% of the questions given during the semester as the calculation shown above.

4) Homework Assignments

The old adage "Practice makes perfect" is true. Success in chemistry requires, among other things, the development of critical thinking skills and problem-solving skills. The best way to develop these skills is by practice. During the semester you will be required to complete homework assignments available to you through the on-line Achieve system.

Questions in these assignments have been selected to reinforce key concepts and skills for specific topics. For each question, hints are available, and you are allowed multiple tries before submitting a final answer. Feedback is provided in real-time after each try to help you work through incorrect answers. Take these assignments seriously as they can form the basis for questions on exams and quizzes. Solutions will be available after submission.

We encourage you to work with friends when doing homework. Working in study groups can be a very useful strategy for success. You may use your textbook, notes, Google, etc. when working on the assignments.

A schedule for homework assignments is provided in the table below, with specific due dates for individual assignments. All homework sets are due by 11:59 p.m. of the corresponding listed date. Make sure to pay special attention to the due dates for homework sets 11 and 13. Homework number 11 is due on the same day of the third midterm exam and its content will be part of the test. Because of this,

it is highly advisable that you complete the set before its due date. Homework number 13 an extra-credit assignment which means you do not have to turn it in. It is due on Sunday 12/10.

Intended Homework (HW) Schedule[1]

Homework Assignment	Due Date[2]
HW 1	**W 09/13**
HW 2	**W 09/20**
HW 3	**W 09/27**
HW 4	**W 10/04**
HW 5	**W 10/11**
HW 6	**W 10/18**
HW 7	**W 10/25**
HW 8	**W 11/01**
HW 9	**W 11/08**
HW 10	**W 11/15**
HW 11	**W 11/29**
HW 12	**W 12/06**
HW 13 (Extra Credit)[3]	**Su 12/10**

1) The schedule is subject to changes; any change will be announced in class and on Canvas.
2) All HW assignments are due on the indicated date by 11:59PM EST.
3) Homework 13 counts as extra credit and will be due on Sunday, December 10, 2023 by 11:59 pm.

Be aware of the following policies that apply to homework:

- You have unlimited attempts for each question. However, there is a 5% penalty over the value of the question for each try.
- **There is a 5% per day late penalty** for turning homework sets later than the due date unless an extension has been granted by the instructor. In the case of a granted extension, the late penalty starts to accrue with the new due date.
- You can only request one extension during the semester unless you have DRC approved accommodation.
- Homework sets are only available for two weeks after the due date. Homework sets not completed with the two-week period will get zero as a grade.

- A request for an extension can only be placed within two days of the original due date. You cannot request an extension beyond this period.

5) Recitations

As noted at the beginning of this document, this course has a co-requisite course called a recitation. **You must** enroll in one of the recitation sections linked to your lecture. (It will be one of the three listed below for each course.) Recitations have a separate course number, CHEM 1153, and a separate CRN.

CHEM 1153 (Recitations) for CHEM 1151 CRN 10227
(Lecture Times M,W,Th 10:30 a.m. – 11:35 a.m.)

CRN	Day & Time	Room	TA
12379	T 11:45 a.m. – 12:50 p.m.	RI 300	Sean Larmore
13277	T 3:25 p.m. – 4:30 p.m.	EXP 201	Sean Larmore
10849	T 9:50 a.m. – 10:55 a.m.	EXP 203	Sean Larmore

CHEM 1153 (Recitations) for CHEM 1151 CRN 12840
(Lecture Times M,W,Th 4:35 p.m. – 5:40 p.m.)

CRN	Day & Time	Room	TA
12380	T 11:45 a.m. – 12:50 p.m.	SL 015	Nich Nearyrat Phalkum
10199	T 8:00 a.m. – 9:05 p.m.	HT 224	Sean Larmore
10207	T 9:50 a.m. – 10:55 a.m.	HT 224	Megan Forney

We consider the recitation to be an integral part of the course and expect you to attend it weekly. It is in recitations that more difficult concepts and skills introduced in lectures and the reading will be practiced. Recitations provide you with the opportunity to ask questions in a smaller group setting.

During recitation you may have one or more of these activities:

1. Your TA will cover problems related to the material presented during lectures.
2. Your TA will answer questions about the homework.
3. You may be presented with Top Hat questions. The score you get in these questions will form part of the general Top Hat score for the course.
4. You may be given either additional practice problems or problems from your homework. For this type of activity, you are expected to work in groups to solve them. Your TA may collect your work as part of participation checking. You will be notified in advance if this is the case.

Recitations will be graded based on attendance and participation. Thus, **you are required** to attend recitation sessions **in person** unless there is a special circumstance that does not allow you to do so. In this case, talk to your instructor (not your TA) to make any necessary arrangements.

For your attendance to recitation to count towards your grade you must be present for at least 55 minutes out of the 65 minutes of the recitation period. It is **your** responsibility to make sure your attendance has been properly recorded. Your TA will not accept requests to record attendance outside the recitation session period.

The two lowest scores obtained through the semester will be dropped, and the rest will be used to calculate your final grade as explained in the grading section below. This effectively means that you could miss two recitation sessions for whatever reasons through the semester and still obtain the maximum final score. Please note the following policies regarding missed recitation sessions:

1. You do not need to notify your TA or your instructor about not being present during recitation.
2. Not attending a recitation by using a Wellness Day will count as an absence. For example, if you have not attended two recitation sessions and then take a Wellness Day on a recitation day you will have accrued three missed recitation sessions.
3. Top Hat questions presented during recitation are part of your overall Top Hat score and are regulated by the same rules that apply to Top Hat questions presented during lectures.

Your TA will provide additional information on the mechanism of recitations and how they will be graded.

Important: **Bring your calculator and laptop to recitation**.

6) Exams

During the semester there will be three midterm exams. There is also one comprehensive (cumulative) final exam at the end of the semester. All the exams will be closed book tests and will consist of questions that may include a combination of multiple formats (multiple-choice, sorting, true-false, open response, etc.). Exams will assess both conceptual and quantitative understanding of material from lectures, recitations, and homework assignments.

Because our focus is on your understanding and applying concepts and skills rather than on memorization, for each exam, you will be provided with an “Useful Information Package” that will include relevant key definitions, constants, equations, tables and the like.

Exams can be administered either online through Canvas outside our regular hours or, in-class during regular lecture hours. Your instructor will let you know a few days in advance how a given exam will be administered.

There are no makeup exams. If you miss a midterm exam, its grade will be replaced with the grade of the final exam. This can be done **only once**. That is, if you miss two midterm exams only the grade of one of them will be replaced with the grade of the final exam while the other will be zero.

Requests for re-grade of an exam (when applicable) must take place **within one week** of the publication of the test grades on Canvas.

The University Registrar's office will announce the date, time and place of the final exam. The format and administration method (online, in-person) of the final exam will be announced a few days before the end of the semester. **Do not make end-of-semester travel plans until you know when your final exam will be scheduled.** Rescheduling a final exam can only be done under exceptional circumstances (travel savings is not one of them).

7) Grading

Your grade in CHEM 1151 will be determined **by performance** on assignments and examinations. The weight of each component of the course is as follows:

Component of Course	Percentage of Grade
TopHat questions participation percentage	5%
TopHat questions correctness percentage	3%
Homework assignments	15%
Recitation participation and attendance	6%
Three midterm exams – each contributing equally at 16%	48%
Final exam	23%

Course Grade Scale

The final score that you get in the course (see next section) will be converted to a course grade using the following conversion table:

Score	Grade
≥ 93%	A
90% - 92%	A-
87% - 89%	B+
84% - 86%	B
80% - 83%	B-
77% - 79%	C+
74% - 76%	C
70% - 73%	C-
67% - 69%	D+
64% - 66%	D
60% - 63%	D-
0% - 59%	F

Important Considerations Regarding Grade Calculations:

1) Grade calculation policy:

a) The grades of individual exams, quizzes, and homework sets (on a 100 points scale) will be registered as they are with two decimal places. Anything in the third decimal place or beyond will be discarded regardless of its value (i.e. there will be no rounding off).

b) The two lowest grades of your recitation sessions will be dropped. The score of the recitation component of your grade will be calculated as the average with two decimal places of the remaining grades. No rounding off will be applied to this score.

c) Top Hat scores for correctness and participation are provided as percentages for each of the categories. See the Top Hat section above for details on how the calculation of the Top Hat score will be done. The Top Hat scores will be registered and used as they are (no rounding up or down) for the calculation of your final grade.

d) Achieve homework scores will be taken as reported by the Achieve system for each homework set (i.e. no rounding up or down). Your score for the homework component of the grade will be calculated by adding up the 13 individual homework scores and dividing by 12

(remember that homework 13 is an extra-credit assignment). The result of this calculation with two decimal places will be the score for the homework component of your grade. No rounding up or down will be applied to this result.

e) The final score for the course will be calculated by adding up the scores of each component of the grade each multiplied by its corresponding weight (%) and divided by 100. To this result, the following round off policy will be applied: the score will be promoted to the next integer **if the first decimal place** is .5 or larger. Thus, 76.54 and 76.58 both will be promoted to 77. However, 85.48 will remain as 85. The rounded score will become your official score for the course. This score will then be converted to your final grade for the course using the table above.

2) You should **only** contact your instructor regarding a grade change if you believe your exam was graded in error. **Never contact your instructor, at the end of the semester, requesting extra points or privileges that were not available to your classmates**. There will be no extra credit available except what is announced to the whole class. For this reason, it is wise to work conscientiously and diligently from the beginning of the semester.

3) Any request to review your final exam or to address problems with your course grade must be presented to the instructor not later than seven days after the start date of the Spring semester of 2024.

8) Safekeeping of Course Materials

You are responsible for safeguarding all your course documents like exams and quizzes that have been returned to you. In the event of any dispute related to grading or mistakes in the records, you will need to produce the original document to solve the issue. In addition, make sure to keep any email communications between you and the instructor as a record to prove or back up any possible claim. Be warned that a hardcopy of an email message is not a satisfactory record unless it includes the original transmission headers associated to the email message.

9) Course Communications

The official forms of communication for the course are in-class announcements, Canvas announcements and email messages. Check your email and the Canvas course website at least daily to make sure you have not missed any important information about the course. If you did not attend class on a particular day, ask a classmate if any announcements were made during lecture that day. You are responsible for keeping up to date with class announcements even if you were not present on a day when a class announcement was made.

10) Email Messages & Canvas Announcements

Compose your email subject as **CHEM 1151: Your Subject**. Include in your emails your section information. I teach more than one course and emails without the proper identification are sometimes difficult to trace back to the appropriate course. Please allow up to 48 hours (business days) for a response (though I usually answer sooner).

Warning: DO NOT use the Inbox function in Canvas to send email to your instructor.

Make sure to keep copies of any email communications between you and the class instructor.

11) Resources for Success

There are a variety of resources that are available to you to help you succeed in this course. Please take advantage of all of them.

- Recitations: Your first source of help is in the weekly recitation section, which appears as CHEM 1153 on your course schedule. The CRN number for your section should be one of those listed in the table on page 10 of this syllabus. If it does not match, e-mail me as soon as possible so we can switch you to the right section.

  Your recitation instructor is the person who is primarily responsible for help on the assigned homework. Your recitation TA instructor will also have office hours. Details will be provided by your TA once classes start.

- You can meet Professor Murga for help during his office hours (see page 1) online via Zoom. Please set up an appointment with him via the Canvas calendar function beforehand. You may seek individual help or may come as a group. If you need to address a private matter with your instructor, make sure to let him know in advance so he does not schedule any other student at the same time.

- Connections review sessions: The College of Engineering offers weekly Connections CHEM1151 review sessions. They are scheduled for every Monday from 6:30pm to 7:30pm. A flyer will be posted in Canvas with detailed information.

- Tutoring at COE: The College of Engineering Tutoring Center provides peer tutoring for your freshman core classes on weekdays in 153 Snell Engineering. Specific times for individual tutors are available at the Canvas course site.

- Peer Tutoring: The NU Peer Tutoring Program offers a wide range of tutoring services to meet the academic needs of undergraduate students. Northeastern University's Peer Tutoring Program (1 Meserve Hall) has a list of upperclassmen who did well in general chemistry and who are available to assist you with one-on-one peer tutoring. If you need academic assistance, contact the Peer Tutoring Program Monday through Friday from 9:00am to 5:30pm. Peer tutoring services are free and open to all NU undergraduate students. Peer tutoring begins the second week of classes and ends the last day of classes. The Peer Tutoring Program is located in 1 Meserve Hall. Call 617- 373-8931, email peertutoring@northeastern.edu, or visit the weblink above or https://undergraduate.northeastern.edu/peer-tutoring/.

- International Tutoring Center: The International Tutoring Center (ITC) provides current Northeastern University international students with free, comprehensive English language and academic support. The ITC includes English as a Second Language Tutoring (ESL), Language and Culture Workshops, and Reading Workshops. For more information on available workshops and tutoring opportunities visit the ITC at https://international.northeastern.edu/gss/tutoring/.

- Snell Library: Snell Library offers a variety of resources for undergraduate research, including subject-specific Research Guides, help with citation and bibliography, and 24/7 chat support. The library also houses the Digital Media Commons, which offers a variety of resources for instructors and students for multimedia projects.

12) Special Accommodations

If you have a disability that you believe may require special accommodations for this course, including the taking of exams, contact the Disability Resource Center (DRC) located in 20 Dodge Hall, http://www.northeastern.edu/drc/ and extension 2675. They can offer information and assistance to help manage any challenges that may affect your performance in coursework. The University requires that you provide documentation of your disability to the DRC in order to be offered an accommodation. Should you require an accommodation, you will be asked to bring paperwork to me. **No accommodation can be provided without previous written authorization from DRC**.

13) Unforeseen Circumstances

The instructor reserves the right to make changes in the scheduling of due dates for exams and other assignments in response to a weather emergency or other unforeseeable circumstance.

14) Excused Absences and Make-Ups

Absences will be excused only under appropriate circumstances (*e.g.*, illness, death of an immediate family member, or other unusual situation) and at the discretion of the instructor.
Please refer to the individual sections on Top Hat, recitations, exams, and homework for a description of the individual policies regarding missed work in each area. Most of the policies cover the most often encountered situations. In the case of exceptional circumstances not covered by these policies (e.g. a jury service that will keep you away for days or weeks) please talk to your instructor as soon as possible to make arrangements.

Students who misuse or abuse requests for excused absences or extension of due dates for homework will be subjected to the appropriate disciplinary action per university policies.

15) University Academic Integrity Policy (UAIP)

The University's academic integrity policy at OSCCR (http://www.northeastern.edu/osccr/academic-integrity-policy) discusses actions regarded as academic violations and their consequences for students. I strongly advise you to visit the OSCCR webpage and get familiar with the UAIP. Remember that "I didn't know I couldn't do that" is not an acceptable excuse.

You must always assume that UAIP is in effect even if you have not been explicitly told so.

16) Copyright of Course Material

In this course (and in others as well) you may have access to class notes, exams, PowerPoint Slides, PDF Files etc. that will be referred to as "class material" from now on.

It is important that you understand that these class materials are considered intellectual property and as such are protected by a copyright either owned by your instructor, the university or both.

Among other things, a copyright regulates the reproduction and distribution of an intellectual property. For example, you cannot make a copy of a whole book, or write a song than is identical to another song except for a few notes. Likewise, you cannot upload to a website or an electronic forum someone else's essay without the explicit permission of whoever wrote it. All these cases are a breach of the copyright of the authors.

Keep in mind the following rules when handling class material:

- You cannot upload **any** class material to internet sites like (but not limited to) Chegg.com, CourseHero.com, Reddit.com, etc. (from now on referred to as the internet).
- Uploading any questions from an exam or homework to the internet is not allowed under any circumstances. It is considered not only a violation of copyright but also of UAIP.

- Do not remove copyright notices from any class material. Example of such notices are "This content is protected and may not be shared, uploaded or distributed.", "© Fred Smith 2020" or similar.
- Your textbook is not considered class material, but it is protected by a copyright usually owned by its author, the publisher or both. You are responsible to handle the material associated with the textbook according to the rules set forth by the textbook copyright owner.

17) Title IX

The University strictly prohibits sex or gender discrimination in all university programs and activities. Information on how to report an incident of such discrimination (which includes sexual harassment and sexual assault) is located at http://www.northeastern.edu/titleix.

18) Equal Opportunity Policy

Northeastern University is committed to providing equal opportunity to its students and employees, and to eliminating discrimination when it occurs. Northeastern University prohibits discrimination or harassment on the basis of race, color, religion, religious creed, genetic information, sex, gender identity, sexual orientation, age, national origin, ancestry, veteran or disability status. The policy can be found at: https://www.northeastern.edu/policies/pdfs/Policy_on_Equal_Opportunity.pdf

19) Inclusion and Diversity

I value all students regardless of their background, country of origin, race, religion, gender, sexual orientation, ethnicity, or disability status, and am committed to providing a climate of excellence and inclusiveness within all aspects of the course. If there are aspects of your culture or identity that you would like to share with me as they relate to your success in this class, I would be happy to meet to discuss. Also, if you have any concerns in this area or are facing any special issues or challenges, I encourage you to discuss the matter with me as you feel comfortable, with assurance of full confidentiality (only exception being mandatory reporting of NU Academic Integrity Policy violations and Title IX sex and gender discrimination).

20) Expectations

You are expected to:

- Arrive on time for every lecture class having already viewed the posted lecture notes and prepared to participate in all in-class discussions and problem-solving sessions.
- Arrive on time for every recitation class having attempted the homework problems and prepared to discuss their solutions.
- Read the assigned readings.

- Submit all homework assignments on time.
- In the event of an absence from lecture or recitation, immediately notify Professor Murga.
- If you miss a class, discuss what you missed with a classmate; check the course's Canvas site for class notes and any announcements.
- Check the course's Canvas site regularly for announcements and other useful resources.
- Take responsibility for your learning:
    - Organize into study groups
    - Seek help when you need it
- Treat your instructors and other students in your class with respect. Cell phone and iPad rings should be turned off during class.
- Observe and abide by the rules of ethical behavior outlined in the Student Handbook and Northeastern's Academic Integrity Policy and the Honor Code of the College of Engineering.
- Respond in a timely fashion to all written and/or oral requests by the instructor and /or your TA and/or your academic advisor.
- Participate in the end-of-semester TRACE survey.
- Follow the rules and regulations related to COVID-19 on-campus presence.

Important Notice

I expect the syllabus to stay in its present form through the duration of the course. However, I reserve the right to introduce any changes in the syllabus necessary to guarantee the smooth functioning of the course through the semester. If any changes are implemented, I will post an announcement in the Canvas site for the course explaining what changed and the reason for the change.

CHEM 1151 – Fall 2023

Intended Lecture Content and Lecture Schedule[1]

Date	Topic	Chapter Reading Gilbert et al. (2020)
W 9/06	Welcome. Introduction to the course. Topic 01: Basic Concepts & Atomic theory (Covered in Video Lectures)	Ch 2 (2.1-2.4)
Th 9/07	Topic 02: Quantum nature of matter & light; atomic spectra	Ch 3 (3.1-3.5)
M 9/11	Topic 03: Electron configurations	Ch 3 (3.5-3.9)
W 9/13	Topic 04: Chemical formulas & composition	Ch 1 (1.6); Ch 2 (2.5)
Th 9/14	Topic 05: Elemental analysis Topic 06: Chemical Bonds and bond characteristics	Ch 7 (7.5-7.7) Ch 4 (4.1-4.2; 4.6)
M 9/18	Topic 07: Lewis structures	Ch 4 (4.4-4.8)
W 9/20	Topic 07: Lewis structures (Cont.)	Ch 4 (4.4-4.8)
Th 9/21	Topic 08: Type of compounds and Their Names.	Ch 4 (4.3)
M 9/25	Topic 09: Molecular geometry & polarity	Ch 5 (5.1-5.3)
Tu 9/26	**Last day to drop a course without a W grade**	
W 9/27	Topic 10: Molecular geometry based on hybridized orbitals	Ch 5 (5.4-5.5)
Th 9/28	Topic 11: Bonding in metals & Band Theory	Ch 4 (4.1: Metallic bonds); Ch 5 (5.7), Ch 18 (18.4-18.5)
F 09/29	**Last Day to File a Final Exam Conflict**	
M 10/02	Topic 12: Intermolecular forces (IMFs)	Ch 4 (4.1) Ch 6 (6.1-6.3)
W 10/04	Topic 12: IMFs, physical properties	Ch 6 (6.4)
Th 10/05	Topic 13: Phase diagrams **Midterm Exam 1. Topics 1 through 11[3].**	Ch 6 (6.5)
M 10/09	**Indigenous Peoples Day (no classes)**	
W 10/11	Topic 14: Structure of crystalline solids	Ch 18 (18.1)
Th 10/12	Topic 15: The Ideal Gas & Ideal Gas mixtures Topic 16: Solutions	Ch 9 (9.1-9.9) Ch 8 (8.1-8.2)
M 10/16	Topic 17: Electrolytes; Colligative Properties	Ch 8 (8.3); Ch 11 (11.1-11.5)

W 10/18	Topic 18: Stoichiometry, limiting reactants, & %-yield	Ch 7 (7.1-7.4)
Th 10/19	Topic 19: Work, Heat & The First Law of Thermodynamics	Ch 10 (10.1-10.4)
M 10/23	Topic 20: Heat Transfer Among Objects & in Phase Changes	Ch 10 (10.4, 10.5)
W 10/25	Topic 21: Energy flow in reactions	Ch 10 (10.5-10.7)
Th 10/26	Topic 21: Energy flow in reactions (Cont.)	Ch 10 (10.5-10.7)
M 10/30	Topic 22: Entropy; Second Law and Third Law of Thermodynamics, Gibbs Energy and Spontaneity	Ch 12 (12.1-12.5)
W 11/01	Topic 22: Entropy; Second Law and Third Law of Thermodynamics, Gibbs Energy and Spontaneity (Cont.) **Midterm Exam 2. Topics 12 through 20[3].**	Ch 12 (12.6-12.7)
Th 11/02	Topic 23: Rates of reaction & rate laws	Ch 13 (13.1-13.3)
M 11/06	Topic 24: Integrated rate laws	Ch 13 (13.3)
W 11/08	Topic 25: Reaction energetics; Reaction Mechanisms; Collision Theory; Arrhenius Equation; Catalysis	Ch 13 (13.4)
Th 11/09	Topic 25: Reaction energetics; Reaction Mechanisms; Collision Theory; Arrhenius Equation; Catalysis (Cont.)	Ch 13 (13.5-13.6)
M 11/13	Topic 26: Reversible reactions, equilibrium constants and equilibrium calculations	Ch 14 (14.1-14.4)
W 11/15	Topic 26: Reversible reactions, equilibrium constants and equilibrium calculations (Cont.)	Ch 14 (14.5-14.6; 14.8)
Th 11/16	Topic 26 (Cont): Solubility Topic 27: Le Châtelier's Principle	Ch 16 (16.8) Ch 14 (14.7)
M 11/20	Topic 28: Relating thermodynamics & chemical equilibrium	Ch 14 (14.9-14.10)
W 11/22	**Thanksgiving Recess (no classes)**	
Th 11/23	**Thanksgiving Recess (no classes)**	
M 11/27	Topic 29: Acid/base equilibria	Ch 8 (.8.4), Ch 15 (All); Ch 16 (16.2)
W 11/29	Topic 29: Acid/base equilibria (Cont.) **Midterm Exam 3. Topics 21 through 28[3].**	Ch 8 (.8.4), Ch 15 (All); Ch 16 (16.2)

Th 11/30	Topic 30: Electrochemistry	Ch 8, Ch 17 (8.7, 17.1-17.6)
M 12/04	Topic 31: Electrochemistry (Cont.)	Ch 8, Ch 17 (8.7, 17.1-17.6)
W 12/05	TBA **Last Day of Classes**	
Th 12/07	**Reading Day** **Last Day to Drop a Course with a W Grade**	
F 12/08	**First Day of Final Exams**	
F 12/15	**Last Day of Final Exams**	

1) **The schedule and/or content of lectures is subject to change; any change will be announced in class and on Canvas.**

2) Content included in each test may be adjusted by the instructor depending on the flow of the course. A class announcement will be made a few days before each test detailing the content of the exams.

3) Dates of exams are subject to change. An announcement will be made if such a change becomes necessary. In the case of online exams, the time at which the test will be released will be announced in class at least 24 hours in advance.