GENERAL CHEMISTRY FOR ENGINEERS: 01:160:159; FALL 2022
IN CLASS LECTURES AND RECITATIONS

Lecturers: Prof. Emmanuel Hove and Professor Lipika Roychowdhury

COURSE COORDINATOR: Prof. Emmanuel Hove

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(you must use "159" in the subheading)

Office: 370 Wright Labs, Busch Campus.

Office phones: 848 445 3310 (Hove) & 848 445 7443 (Roychowdhury)

Office Hours: (TBA)

Lectures will be held in ARC 103.

We expect you to be present and engaged at all scheduled class times.

Lecture schedule:
Section 01; Mon & Th 10:35 AM – 11:30 AM (ARC 103)
Section 02; Tue & Th 4:05 PM – 5:00 PM (ARC 103)

All recitations will be held in class. ALW recitations (sections 01, 04, 05, 12 & 16) will also be held in class. The recitation schedule will be posted in Canvas. You should go to the recitation section you are registered for. Permission from the recitation instructor(s) will be needed to go to different recitation classes.

Course LMS: Visit https://canvas.rutgers.edu.

We will be using the Canvas website for all communications with students. You should login to this website using your Rutgers netID and password. Once on Canvas, click "courses" and then CHEM 159 Fall 2022, which brings you to the course site.
In case of technical problems encountered using the site, it is your responsibility to contact the Canvas Help Desk immediately, to resolve the issue. You can email tech support at help@canvas.rutgers.edu or phone them at 877 361 1134

Students with disabilities:

If you have a disability, please make the necessary arrangements for the lecturer to receive a letter of accommodation by the first week of the course, from your College Disability Concerns Coordinator, at, Disability Services (732 932 2848 or dsoffice@rci.rutgers.edu), before the first exam.

TEXTBOOK: "Chemistry, Structure and Properties" 2nd Ed by Nivaldo J. Tro

You also have the option to use the Rutgers Custom Edition of "Chemistry: Structure and Properties", Second Edition, by Nivaldo Tro. Lecture material and suggested practice problems originate in this book. The textbook is available online as an e-book at https://www.vitalsource.com/products/chemistry-nivaldo-j-tro-v9780134551326

Lecture notes: Lecture notes have been posted on the Canvas website for this course (in the modules & files section).

ACADEMIC INTEGRITY AT RUTGERS: Students are expected to maintain the highest level of academic integrity. We will enforce that and you should be familiar with the university policy on academic integrity:

http://academicintegrity.rutgers.edu/academic-integrity-policy/

Violations will be reported and enforced according to this policy.

Use of external sources to obtain solutions to homework assignments or exams is cheating and a violation of the University Academic Integrity policy. Cheating in the course may result in penalties ranging from a zero on an assignment to an F for the course, or expulsion from the University. Posting of homework assignments, exams, recorded lectures, or other lecture materials to external sites without the permission of the instructor is a violation of copyright and constitutes a facilitation of dishonesty, which may result in the same penalties as explicit cheating.

Online Homework

Online homework will be assigned through the website https://my.elearning.rutgers.edu every week, with the exception of the weeks of the midterm exams.

More detailed information will be provided by the eLearning department during the first week of class.

GENERAL CHEMISTRY FOR ENGINEERS (01:160:159)
GENERAL INFORMATION, FALL 2022

Welcome to Chemistry 159, the first semester of General Chemistry for Engineers. This handout provides information concerning course policies and procedures. You are responsible for all the information in this handout. A syllabus may be attached or provided separately.

The material for this course is copyrighted and may not be used / posted on any other web site at or outside of Rutgers without permission. Any violation of this policy will be treated as an academic integrity violation and will be referred to the Office of Student Conduct and appropriate channels for action.

LEARNING GOALS FOR STUDENTS

1. Understand and Apply Basic Principles and Concepts in Chemistry as Applied to Engineering Topics Specifically[1]:

    - Nomenclature
    - Stoichiometry
    - Reactivity
    - Gases
    - Thermochemistry
    - Our Current Model of Atom
    - Quantum Mechanics and Atomic Orbitals
    - Molecular Orbital Theory/Application to Metals
    - Molecular Shape and VSEPR Theory
    - Chemical Bonding

2. Explain and be Able to Assess the Relationship Among Assumptions, Method, Evidence, Arguments, and Theory in the Analysis of Chemistry and Chemical Systems as demonstrated by the following[2]:

    - Interpretation of Graphical and Tabular Data
    - Expression of Physical, Chemical or Engineering Processes in a Mathematical Form
    - Solving Equations to Determine the Value of Physical, Chemical, and Engineering Variables
    - Development of the Ability to Relate the Concepts Learned in the First Goal to Each Other in Ways that Were Not Directly Explained in Class
    - Development of Critical Thinking Skills for the Application of Knowledge to Engineering Processes
    - Understanding of the Basics of the Scientific Method by Applying a Relevant Body of Knowledge to the Evaluation of Existing Scientific Studies and the Design of Studies to Test Specific Hypotheses

Assessment of Students

An integrated approach to assessing the achievement of the learning goals 1 and 2 will be used. This includes the use of a mixture of written quizzes, multiple choice exam questions, among others aimed specifically at each of these learning goals.

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[1]Core Curriculum Goal e

[2]Core Curriculum Goal f

LECTURERS AND COORDINATOR/ADMINISTRATOR

Lecturers: Dr. Lipika Roychowdhury (second half of the course)
lipikar@chem.rutgers.edu

Dr. Emmanuel Hove (first half of the course)
ehove12@chem.rutgers.edu or ehove@chem.rutgers.edu

Course Coordinator/Administrator: Dr. Emmanuel Hove
ehove12@chem.rutgers.edu or ehove@chem.rutgers.edu

OFFICE HOURS: Will be posted on Canvas. You are welcome to attend any of the office hours that fit your schedule regardless of your recitation section or instructor. All instructors work as a team.

REQUIRED MATERIALS (same as will be used in Chemistry 160 next semester)

Please note we are not using online homework or Connect +. You do not need to purchase the interactive component Connect +.

1. *Chemistry ;Structure and Properties, 2nd Ed, by Nivaldo J. Tro*. Lecture material and homework problems originate in this textbook.
2. *The textbook for this course is Rutgers custom edition, available in the bookstore, together with the student's solutions manual. The e version of the text is also available online.*
3. Scientific calculator (logarithms, exponentials, powers, roots, etc.). This does not have to be an expensive calculator. **Expensive, programmable calculators (graphing calculators) are not allowed in this course and** are considered a violation of academic integrity if used.

4. You also have the option of using the Rutgers Custom Edition of "Chemistry: Structure and Properties", Second Edition, by Nivaldo Tro. Lecture material and suggested practice problems originate in this book. The textbook is available online as an e-book at https://www.vitalsource.com/products/chemistry-nivaldo-j-tro-v9780134551326

5. You can also access the E-textbook in the course canvas website, i.e., if you have paid for the services. Details for accessing this version are posted in the canvas announcements.

LABORATORY REQUIREMENT

Introduction to Experimentation (01:160:171) is a one-semester, one-credit laboratory requirement. It may be taken in either the fall, winter, or the spring semester (or in the summer). Chem. 171 is a prerequisite or a co-requisite for Chem. 160, the second semester of General Chemistry for Engineers. Chem. 171 begins with the first day of classes, and the first meeting is more than a check-in period. Chem. 159 or equivalent is a prerequisite or a co-requisite for Chem. 171.

ALTERNATIVE COURSES

Course coordinators and college advisors will be glad to assist you in making decisions on alternative courses. Here are some basic guidelines, but you should always check with your Dean and Department to take an alternative course since your department sets the course requirements:

1. If your problem-solving and quantitative reasoning skills at the level of high school algebra are very weak, you may want to drop Chem. 159 immediately and enroll in the one-semester, three-credit course "Introduction to Chemistry", Chemistry 134. This is NOT a substitute for Chem. 159. You may then take Chem. 159 next fall; or you may take Chem. 161/101 next spring, summer, or fall. Chem. 161/101- Chem 162/102 is the "non-engineers" version of Chem. 159-160, but is acceptable and suitable for engineers. A different textbook may be used, and each semester of Chem. 161/101 – Chem 162/102 (lecture and required recitation) is a total of a four-credit course: more lecture time is scheduled. Chem. 162/102 is also offered in the spring, summer, and fall semesters. Engineering programs will accept Chem. 161/101-162/102.

2. There is another alternative. If you discover after several weeks that, despite adequate study, you are not prepared for Chem. 159, you may want to take the one-semester, two-credit course "Preparation for General Chemistry", Chemistry 133. This starts in mid-October and is the same as Chem. 134 from mid-October through December. You will not be at a disadvantage because you start this course in October, but you should continue with Chem. 159 until Chem. 133 begins. The special procedure and deadline for switching into Chem. 133 will be announced in October. Chem. 134/133 is offered only in the fall semester.

3. The chemistry department offers also a special version of Chem. 161/101-162/102 in the fall and spring semesters, respectively. This version is called General Chemistry Solid Gems and covers the same material as regular Chem. 161/101-Chem 162/102 but has more lecture time than regular Chem. 161-162, two recitations per week, more quizzes, more exams, and smaller classes.

4. If you are interested in taking a more advanced course in place of Chem. 159-160, you should consider "Honors General Chemistry", Chemistry 163-164. Chem. 163 is offered only in the fall, and Chem. 164 is offered only in the spring. High school chemistry is a prerequisite, and Calculus I and II are co-requisites for Chem. 163 and Chem. 164, respectively. Switching into Chem. 163 should be done as soon as possible. For further information, you can contact the Chemistry Department.

5. If you are a life sciences or pharmacy major or plan to attend pharmacy school, you may want to take Chem. 161/101-Chem 162/102, or Chem. 163-164, not Chem. 159-160. If you plan to attend medical or dental school, you may want to take Chem. 161/101-Chem 162/102, or Chem. 163-164, not Chem. 159-160. Chem. 159-160 is shorter and two credits less. Chem.159-160, although designed for engineering students, is also acceptable for these majors.

CLASSROOM MANAGEMENT SYSTEM (CANVAS)

We will be using Canvas this fall (URL: http://canvas.rutgers.edu/) as a classroom management system. You should check this site regularly. However, this site is not a substitution for you not attending lectures or recitation. If you check it now, you may find a number of documents posted. If you are registered and a Rutgers Student, you will automatically be a "member" of the online class. You will need your NetID to login. You should read the documents, especially the Syllabus, Grading Policies, the Announcements and other material very carefully. During the course many additional documents will be posted on the web site including practice exams, and useful information or explanations about important topics. There is a discussion board and a chat room. Canvas is where the scores will be posted. .

LECTURES

You are scheduled for two lectures per week, each 55 minutes in length. The details are as follows:

Section 01

Mondays 10:35 AM - 11:30 AM
Thursdays 10:35 AM – 11:30 AM

Section 02

Tuesdays and Thursdays (4:05 PM – 5:00 PM)

All the lectures will be held in ARC 103

Attendance is of utmost importance since the lecturers will be emphasizing and clarifying important and difficult concepts. You are responsible for what transpires in lecture, including any announcements and changes to the syllabus, and for picking up a copy of all lecture handouts. You are also responsible for all the assigned readings and problems, whether or not they are explicitly discussed in class. The material must be read **before** as well as after any given lecture. The syllabus is an approximation. The actual pace of the class will have to be determined by the abilities of the class itself. Some days, we will be ahead of the syllabus; some days we may be behind.

Any changes in the course format and/or information about exams and quizzes will be announced in lecture. Take notes! Do not rely on Canvas only and attend classes in a timely manner.

RECITATIONS AND QUIZZES (Scientific Calculators Only)

You are scheduled for one 55-minute recitation per week. **Memorize your recitation section number and the name of your recitation instructor.** The correct schedule of all recitation sections is given in the on-line Schedule of Classes (subject to change) and in Canvas. Schedule changes can be made during the first few days of classes. After that time, section changes are not possible.

Recitation is a problem-solving and help session. Seriously attempt all of the assigned homework problems before recitation. Select a few which you would like to see worked out in class, and try to have specific questions about the homework problems and about any material that is not clear in the textbook or the lectures. Be prepared, and do not hesitate, to ask questions in order to use recitation time effectively. Recitation is an important part of this course.

4 quizzes will be given during the semester, all in recitation. You can find the quiz dates in the syllabus published separately. All quizzes will count; none will be dropped. Each quiz is expected to be roughly 20 to 30 minutes long

The quizzes are intended to help you to keep up with the course. Superficial understanding of the material is not enough: you need to learn to do the homework with the textbook closed, and practice really helps. Avoid inappropriate use of the solutions manual.

EXAMS (Scientific Calculators Only)

There will be two mid term exams and the final exam, all in person.

ACADEMIC INTEGRITY

All University polices on academic integrity will be strictly enforced. Any involvement with cheating, the fabrication or invention of information used in an academic exercise, or facilitating academic dishonesty of others will result in serious consequences ranging from reprimand to expulsion. Bringing information into an exam, whether stored electronically or on paper, shall be considered cheating. Having a cell phone or pager at hand during a test shall be considered *prima facia* evidence of cheating. All electronic devices, other than a scientific calculator must be completely turned off (Vibrate and standby modes are not accepted) and out of sight during testing. No gadgets (cell phones or other devices) are allowed with the ability to communicate with others during the exam (text or any other form). Cell phones and gadgets cannot be carried on you or in your pockets during the exam, as such texting is not allowed during the exam. Use of a calculator with the ability to communicate with other calculators, that are programmable, that have any permanent alphanumeric memories ("graphing" calculators) is expressly forbidden. Use of such calculators may result in a score of zero on the quiz or exam during which it was discovered and the involvement of the Office of Student Conduct and appropriate personnel. Signing for another student (for example on an attendance sheet) is considered to be a violation of academic integrity.

The University's policy on Academic integrity can be found at:

http://academicintegrity.rutgers.edu/policy-on-academic-integrity

We cannot see everything that occurs in the course. If you observe any violations of the rules, you owe it to yourself and your fellow students to report it. If you do not

report, you are also hurting your own grade. This will affect the overall curve. You can report it to one of the proctors/instructors during the exam if you would like to remain anonymous. We will treat these reports in the strictest confidence.

GRADING

The course grade (A, B+, B, C+, C, D, F) will be based on the total number of points that a student accumulates and the final curve at the end of the semester. The maximum score is expected to be about **550 points** distributed **roughly** as follows:

	Points	%
Exam 1	100	TBD
Exam 2	100	TBD
Final Exam	180 - 210	TBD
Quizzes	80	TBD
Online Homework	50	TBD
Total	Approx. 550	100

The total may change based on the circumstances of the final exam. The final grade will be based on the total number of points accumulated compared to the total accumulated by the rest of the class and your performance on the final exam. There is no "preset" number of points needed to obtain an "A," "B," or "C." The conversion between point total and letter grade is not yet established and will be determined at the end of the semester. **Any student who fails the final exam may fail the course regardless of the total number of points.**

There is no minimum passing score on the final exam, however anyone who scores low on the final may end up with a grade lower than his or her points might otherwise have earned. For example, a student in the C+ point range and low on the final might be given a grade of C or D (or lower). Further, we might assign a failing grade to anyone who scores very low on the final, regardless of the grade indicated by the points, depending on the circumstances.

The exams are not curved individually. At the end of the semester, a grade will be assigned based on the total score. However, a tentative and rough letter grade solely based on the exam may be given during the semester as a very rough guide as how you performed on that exam. The final letter grade for this course will not be based on the rough and tentative letter grades for the individual exams.

If you find yourself doing poorly, come see the instructional staff and read the sections on obtaining help. At the end, we can only grade you on the basis of your performance in the course, which includes the evaluations in class (quizzes, examinations, activities, pop quizzes, etc. and our subjective opinion of what you have learned).

We are sure you understand, there is no extra credit in this class. It is unfair to the rest of the students. Please do not ask if you can do extra work to improve your grade. You are graded on your **performance** in the course. For obvious reasons, you will not be graded on how hard you worked, or other factors such as personal reasons, financial issues, losing a scholarship, inability to apply for a specific program, not making the Dean's list, non-payment for your course, being a senior, being offered a job, your family situations, the impact on your GPA, a course requirement, transfer of the course to another school, your work requirements, the potential of you getting suspended etc… For the same reasons that we cannot arbitrarily give you a better grade, we

cannot do the reverse, we cannot change a D to an F.

We will not disclose what the final point ranges are. We make every effort to include non-point related evaluations to adjust the grades to accurately reflect the level of learning you have demonstrated. Thus, two students with identical numbers of points may receive different grades, if that is warranted based on overall performance and improvement throughout the semester.

We will not discuss the grades and performance of other students with you.

Please understand we can only communicate with you about your issues. We cannot discuss your grades and related matters with others or with your parents.

STUDENTS WITH DISABILITIES (Provide letter by the end of the second week of the course)

Please contact the office of Disability Services at **https://ods.rutgers.edu/** or tel: 848-445-6800 if you need a permanent or a temporary accommodation.

If you have a disability, you must contact the course coordinator and recitation instructor right away to make the necessary arrangements to support a successful learning experience. Also, you must arrange for the course coordinator/recitation instructor to receive a letter from your College's Disability Concerns Coordinator verifying that you have a disability by the end of the second week of the course.

GENERAL COMMENTS AND ADDITIONAL HELP

General Chemistry is considered by many students to be a difficult course. In order to be successful, you must be conscientious and devote considerable time to the course material. Your success will depend primarily on your ability to analyze logically the wording in the chemical problems assigned for homework and given on quizzes and exams. You must learn to relate the basic concepts to the mathematical expressions that describe them. For most students, the best way to learn the material is to work on the homework problems independently, with the solutions manual closed. Good analytical skills and problem solving techniques must be acquired in order to pass the exams that consist primarily of word problems. Rote memorization of the book will not allow you to pass the course. **Chemistry is a cumulative subject where one principle builds upon another.** This course in general chemistry moves along at a fast pace and you need to stay on top of the material at all times. Experience shows that students who fall far behind encounter difficulties and rarely catch up again.

If, despite attending all lectures and recitation classes and working out all homework problems, you realize that some difficulties remain with understanding the course material, then seek help early! We encourage you to see any instructor in the course. We will be glad to assist you as long as you take the initiative. Feel free to contact The Rutgers Learning Centers (https://rlc.rutgers.edu/) for various forms of assistance.

CHAIN OF COMMAND

In general, routine questions regarding course material, homework problems, quizzes, quiz absences, exam scores, etc. should be directed first to your recitation instructor. Only for further information, or if the above procedure fails to resolve a particular problem, should you contact Dr. Hove, the course coordinator/administrator. Send the coordinator/administrator e-mail or contact the coordinator/administrator in person. Please do not call the chemistry department.

WEATHER AND OTHER EMERGENCIES

Check the Rutgers website for any information concerning campus operations due to weather conditions or other emergencies. The "Campus Operating Status" can be found at

http://nb.rutgers.edu/about-us/new-brunswick-campus-operating-status.

or by going to the main New Brunswick webpage at

http://nb.rutgers.edu

Changes in schedule and other adjustments will be announced on Sakai or by email. Students are still responsible for all the material even if a particular lab is cancelled due to weather emergency.

When announcements are made, campus status information will also be available through:

- Rutgers University Facebook page
- Rutgers University Twitter (@RutgersU)
- RU-info Channel on RU-tv 3
- RU-info Call Center at 732-445-INFO (4636)

For more information about the university's policy concerning adverse weather conditions, please visit http://emergency.rutgers.edu/weather.shtml.

Campus status information will also be available through these media stations and their websites:

- News-12 New Jersey
- New Jersey 101.5 (FM)
- WCTC Radio (1450 AM)
- WCBS Radio (880 AM)
- The Breeze Radio (107.1 and 99.7 FM)
- WRNJ Radio (1510 AM, 104.7 and 92.7 FM)
- WRSU Radio (88.7 FM)