

CHM 112: General Chemistry II

Dr. Maria Donnelly
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Chemistry: Atoms First, 4th ed
J. Burdge & J. Overby, McGraw Hill

Ch. 13: Physical Properties of Solutions

Ch. 14: Chemical Kinetics

Ch. 15: Entropy & Gibbs Energy

Ch. 16: Chemical Equilibrium

Ch. 17: Acids, Bases, & Salts

Ch. 18: Acid Base Equilibria & Solubility Equilibria

Ch. 19: Electrochemistry

Concepts build on each other &
on knowledge from CHM 101

**Chemistry Labs Start Tuesday Jan 23rd
Required introductory/safety sessions
are held the first week!**

**Safety Training is required for all
Chemistry Labs**

**You must complete the required on-line lab
safety module before attending your first
experiment. This module will be completed
during the first lab meeting!**

**See your CHM 114 Brightspace site for an introductory
presentation with details about safety training and lab
and department policies. This information will be
covered in lab the first week of classes!**

Course Organization & Expectations

Required Materials

- Book: Chemistry: Atoms First 4th edition
 - By Julia Burdge & Jason Overby
 - Published by McGraw Hill
 - Can use either paper or electronic
- Access to Connect online homework
 - Smart Book assignments
 - Homework assignments
- Scientific calculator
- Brightspace/URI email
 - Gradebook
 - Announcements
 - Links to course resources
 - Possibly some additional assignments
- Many course resources can also be accessed through <https://www.chm.uri.edu/index.php/misc-user-page/?buttonname=miscbutton&person=mdonnelly&topicname=CHM112>



Chapters 13–19

Useful Information: Course & Introductory Information, Lecture Notes, etc.

<https://www.chm.uri.edu/index.php/misc-user-page/?buttonname=miscbutton&person=mdonnelly&topicname=CHM112>

The screenshot shows the top navigation bar of the Department of Chemistry website. The left side features the University of Rhode Island logo. The right side displays the department name, phone number (1-401-874-2318), and email address (chemistry@etal.uri.edu). Below the navigation bar, the 'People' menu is expanded, showing a list of resources for Dr. Donnelly's CHM 112 course, including course information, connect information, and lecture slides.

THE UNIVERSITY OF RHODE ISLAND

DEPARTMENT OF CHEMISTRY
1-401-874-2318 | chemistry@etal.uri.edu

Home | **People** ▾ | Research | For Prospective Students | For Current Students | Links ▾ | Contact Us

Dr. Donnelly's CHM 112 Student Resources

Course Information

- Syllabus
- Beaupre 100 Seating Chart

Connect Information

- General Connect Information
- Registration Information

Lecture Slides

- Introductory Material
- Chapter 13
- Chapter 14
- Chapter 15

Links to lecture videos made during remote learning are also available in case you need to miss class.

Brightspace

To get to
announcements

THE
UNIVERSITY
OF RHODE ISLAND

CHM112: General Chemistry Lecture II_000...



Maria Donnelly
as Learner



Course Home Content Assignments Discussions Quizzes Classlist Grades Class Progress Course Tools ▾ Help ▾ More ▾

Search Topics



[Overview](#)

Bookmarks

Course Schedule

Table of Contents

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Course Introduction -
Start Here!

Link to course content
videos and slides

Overview

Print

CHM 112 continues laying the foundation for future chemistry, biochemistry, pharmaceutical, and engineering courses that was started in CHM101. The terminology, fundamental principles, and theories presented in CHM112 will be heavily used in these future courses. An understanding of the material presented and the ability to apply the concepts being studied to real-world problems is essential for many different fields of study.

Instructor: Dr. Maria Donnelly

Email: madon@uri.edu

Office: Beapre 117C (entrance to the office suite is through room 115)

Office Hours: Specific office hours for each week can be found on Starfish, and appointments can also be made through Starfish. (You can access Starfish through URI's single sign on. There is a link to the related IT page below.) If you would like to request an appointment at a time not listed on Starfish, please send me an email to see if I can be available. By default office hours will be held via zoom (link is below), but you can request Webex if you prefer. Appointments are required for

Announcements also – must opt in!

Communication

- Check your URI email account frequently!
- Brightspace will be used to
 1. Provide resources & links to useful information
 2. Communicate important information to students
 - You may need to opt in to receive email notifications from Brightspace
 3. Post grades

The screenshot shows the Brightspace interface for a course titled "CHM102: Laboratory for Chemistry 101_00...". The user's name, Maria Donnelly, is visible in the top right corner. A purple arrow points to the user's name, with the text "Click on the box by your name to get the drop down box". Below the name, a dropdown menu is open, showing options: "View as Collaborator", "Profile", "Notifications", "Account Settings", and "Log Out". A purple arrow points to the "Notifications" option, with the text "Select notifications". Below the dropdown, the "Notifications" section is visible, with a purple oval highlighting the "Instant Notifications" section. This section lists four notification types: "Activity Feed - new comments from others on a post", "Activity Feed - new posts created by others", "Announcements - announcement updated", and "Announcements - new announcement available".

Click on the box by your name to get the drop down box

Select notifications

At a minimum, get notifications for announcements. You can get additional notifications if you choose

Course Organization & Expectations

Homework

- Homework will be completed and submitted through the McGraw Hill Connect online homework program
- There are two types of homework
 - Homework assignments (1 or 2 per chapter)
 - Ten points per question
 - Best to complete after attending lecture on material
 - Can be submitted late automatically with 2% per day loss of credit
 - Smart Book assignments (1 per chapter)
 - 100 points each, graded based on completion
 - Assigned toward the beginning of the chapter as an introduction to the material – essentially these are your “read the chapter” assignments
 - To submit late, email me to request an extension
- Initial due dates are on Tuesdays and Fridays
- There will also be **OPTIONAL** practice assignments with additional questions.

Connect Assignments

CHM 101 SEC 4 FALL 2020 - CHM 101 SEC 4 FALL 2020

Assignments

Required	Chapter 1 Smart Book	Start: Sep 9, 2020 at 12:00 AM EDT Due: Sep 14, 2020 at 11:59 PM EDT	SB	🔒
	Chapter 1 Homework	Start: Sep 9, 2020 at 12:00 AM EDT Due: Sep 18, 2020 at 11:59 PM EDT	Homework	🔒
	Chapter 1 Practice	Start: Sep 9, 2020 at 12:00 AM EDT Due: Dec 31, 2020 at 11:59 PM EST	Homework	🔒

NOT Required

Read

Burdge, Chemistry: Atoms First, 4e
Julia Burdge, 4e

To read ebook

Questions are required. All questions must be answered to receive full credit.

Concepts

1.1 THE STUDY OF CHEMISTRY

Chemistry often is called the *central science* because knowledge of the principles of chemistry can facilitate understanding of other sciences, including physics, biology, geology, astronomy, oceanography, engineering, and medicine. **Chemistry is the study of matter and the changes that matter undergoes.** Matter is what makes up our bodies, our belongings, our physical environment, and in fact our entire universe. **Matter** is anything that has mass and occupies space.

Chemistry You May Already Know

You may already be familiar with some of the terms used in chemistry. Even if this is your first chemistry course, you may have heard of *molecules* and know them to be tiny pieces of a substance—much too tiny to see. Further, you may know that molecules are made up of *atoms*, even smaller pieces of matter. And even if you don't know what a *chemical formula* is, you probably know that H₂O is water. You may have used, or at least heard, the term *chemical reaction*; and you are undoubtedly familiar with a variety of common processes that are chemical reactions, such as those shown in [Figure 1.1](#). Don't worry if you are not familiar with these terms; they are defined in the early chapters of this book.

To Questions

Connect Registration

Registration Information
is section specific!

Spring 2024 CHM 112 TuTh 9:30



Burdge, Chemistry: Atoms First, 4e

Burdge, 4e

Spring 2024 CHM 112 TuTh 9:30

Registration info: 01/19/23 - 05/01/23

There is a link to your sections registration
page in Brightspace.

Connect Registration

Welcome

CHM 101 SEC 4 FALL 2020
CHM 101 SEC 4 FALL 2020

INSTRUCTOR
MARIA DONNELLY

CHEMISTRY: ATOMS FIRST
JULIA BURDGE, 4TH ED.

Enter your email to join this class:

Email

By using this site you agree
to the [Terms of Use and Privacy Notice](#).

BEGIN >

Need help? [Contact customer service](#) →

Create your McGraw-Hill account.

Email Address
mdonnelly@uri.edu

Confirm Email Address
Confirm Email Address

Password

Confirm Password
Confirm Password

Passwords are case sensitive and must contain 8-20 characters including: 1 uppercase character, 1 lowercase character and 1 number. (No spaces)

First Name
First Name

Last Name
Last Name

Security Question
Select a Question

Security Answer
Security Answer

We'll ask you this question to retrieve your password.

Mobile Number
(optional, [get important text alerts](#))

Mobile Number

I agree to the terms of the McGraw-Hill
[Terms of Use and Privacy Notice](#).

CONTINUE



Instructor:
Maria Donnelly



Burdge: Chemistry: Atoms First
4TH EDITION
Julia Burdge

A two week courtesy access is available if you cannot immediately purchase an access code.

If you purchased a two year access code last semester, you will not need a new one.

If you purchased the 4 month access code last semester, you will need to purchase a new code.

Student Registration



General Chemistry: The Essential Concepts
ISBN:0077623290
Edition:7
Author:Raymond Chang, Kenneth Goldsby

Already purchased?

To access your course materials, first enter your 20 digit registration code.

Registration Code:

Example: GRFU-BYHA-6MYJ-FGMK-F9XA

Submit

[How do I register?](#) | [What is a registration code?](#)

What you get with Connect:

- Digital Access to the textbook
- Interactive tools that will help you focus your study time
- Exclusive discounts on a print copy of the textbook

Need to purchase?

No registration code, no problem. You can buy access to General Chemistry: The Essential Concepts right now. All you need is a credit card.



Buy Online

Need Temporary Access?

You can get two week access to your course materials. After that your work will be saved and you can purchase access.

Start courtesy access

(Older screenshot, looks a little different now)

Course Organization & Expectations

Exams

- Exams will be held in Beaupre 100 at the scheduled class time.
 - Dates are in the syllabus and the schedule in this presentation
- You will be assigned a seat for your exams
 - When you arrive, your exam will be waiting for you at your seat with your name on it
 - Leave your bag at the front, take your calculator and something to write with, and begin your exam
- Calculators with advanced functions (able to read pdf files, access the internet, etc.) cannot be used on exams.
- There will be four in-class exams and one final exam
 - To eliminate the need for make-up exams, if you miss an in-class exam, your final will count twice in place of the missed exam.
- If you feel there is an error in the grading of your exam, you must bring this to my attention within 48 hrs of the graded exam being returned to you. No grade changes will be considered after this time

General Course Schedule

Chapter	Title	Week/Date
13	Physical Properties of Solutions	1-3
14	Chemical Kinetics	
Exam 1	Chapters: 13 & 14	Tuesday Feb. 13th
15	Entropy and Gibbs Energy	4-6
16	Chemical Equilibrium	
Exam 2	Chapters: 15 & 16	Tuesday March 5th
17	Acids, Bases, and Salts	7-10
18	Acid-Base Equilibria and Solubility Equilibria	
Exam 3	Chapters: 17 & first part of 18	Thursday April 4th
18	Acid-Base Equilibria and Solubility Equilibria	11-13
19	Electrochemistry	
Exam 4	Chapters: second part of 18 & 19	Thursday April 25th
**Final Exam: Thursday May 2nd 8:00 – 10:00am		

** Final exam dates are set by the University and are subject to change

Important Spring 2024 Semester Dates:

- Monday Feb. 12th – last day to drop courses with no transcript designation of “W”
- Monday Feb. 19th – President’s Day, classes do NOT meet
- Monday March 4th – Last day to drop classes in ecampus (after this date, a form is required that must be signed by your Academic Dean)
- March 10th–17th – Spring Break
- Tuesday March 19th – Mid-Term grades (First Year Students)
- Monday April 29th – last day of classes
- Tuesday & Wednesday April 30th & May 1st – reading days
- Tuesday May 14th – final grades due in ecampus

Extended Course Schedule

- Tentative – Dates for chapters being covered & assignment due dates are subject to change due to pace of the class.
- In Semester Exam dates will not change unless classes are cancelled.
- See Connect for most current assignment due dates.
- Full extended schedule can be found in the syllabus and schedule module on Brightspace.

Assignment due – Blue

Date	Day	Chapters & Assignments
1/22	M	
1/23	Tu	Introduction & CH 13
1/24	W	
1/25	Th	CH 13
1/26	F	CH 13 Smart Book due
1/29	M	
1/30	Tu	Chap 13 & 14; CH 13 HW due
1/31	W	
2/1	Th	CH 14
2/2	F	CH 14 SB due
2/5	M	
2/6	Tu	CH 14; CH 14 HW A due
2/7	W	
2/8	Th	CH 14 & 15
2/9	F	CH 14 HW B due
2/12	M	
2/13	Tu	Exam 1 Chapters 13 & 14
2/14	W	
2/15	Th	CH 15; CH 15 SB due
2/16	F	

Course Organization & Expectations

Grading

Online Homework, Smart Book, & Attendance Quizzes	15 %
4 Lecture Exams* (17 % each)	68 %
Final Exam	17 %
Total	100%

- Your final course average will be calculated using the following formula:

$$\text{Course Avg.} = (\text{Homework Avg.} \times 0.15) + (\text{Exam Avg.} \times 0.85)$$

- The homework average includes homework assignments, smart book assignments, & attendance quizzes
 - Each homework assignment counts for a given number of points based on the number of questions
 - Each Smart Book assignment counts for 100 points
 - Each attendance quiz counts for 20 points
 - $\text{HWK Avg.} = (\text{pts. earned} / \text{total \# of pts possible}) \times 100$
- To eliminate the need for make-up exams, the final exam will count twice in place of a missed semester exam.

Incomplete Policy

Incomplete grades cannot be assigned except in the case of a real emergency. In order to receive an incomplete, a student's **coursework must have been passing** and the student **must have completed at least half of the coursework for the semester.** Students receiving a grade of Incomplete should discuss arrangements to complete the work prior to the following midsemester. **If an incomplete is not resolved within two years, or the semester before the student graduates, whichever comes first, the "I" will be replaced with a grade calculated for the student based on the work completed and including zeroes for any work not completed.** If the student does not discuss arrangements to resolve the incomplete by the end of the semester following the incomplete, the grade of "I" may be changed to a grade calculated for the student based on the work completed and including zeroes for any work not completed as early as the end of that semester unless there are extenuating circumstances which prevent a discussion on resolving the incomplete from being held at that time.

Be Courteous to Your Classmates

- If you arrive late/need to leave early, use the back entrance
- Your peers can be a great resource, but please wait till after lecture to talk with them/ask them questions
- Give everyone a chance to answer
- Remember why you are here
 - TV shows, games, movies, & social media will not help you learn
 - they are also visible to the students sitting behind you & can be quite distracting

Getting Help

Make sure to seek help right away if you feel you are struggling with material

- Office hours
 - Use Starfish to sign up for a time (or just stop by!)
 - Beaupre 117C is in the corridor behind room 115 (the study room at the beginning of the lab corridor)
 - Appointments are not required, but those with appointments receive priority for their scheduled time.
 - Email me to schedule a time if you need to meet remotely.
 - Can also email questions
- Chemistry department TAs also hold office hours
 - Held in Beaupre 115
 - Can ask any 112 or 114 TA for help
 - Link to the TA office hour schedule will be posted in Brightspace as soon as it is available.
- AEC also offers tutoring (www.uri.edu/aec)

I am happy to help!!!



Your choices will determine your level of success

- **Attendance is important**
 - prepare in advance – become familiar with key terms & ideas
 - pay attention, ask me questions
 - print out slides and bring them with you to take notes on
- **Assignments are designed to help you learn**
 - focus on WHY you need to follow certain steps to solve problems rather than trying to memorize the steps
 - ask yourself what you do and do not understand
- **Complete assignments on time**
 - mastery of early material will help with material covered later
 - avoid having assignments build up & losing points due to lateness
- **Seek help right away!**
 - office hours
 - TAs in Beaupre 115 Learning Center
 - AEC tutoring group or walk in tutoring

CHM 101 Knowledge is Essential!!!

Some CHM 101 information that you will need is listed on the following slides.

See me or a CHM 102 or 114 TA ASAP if you need help remembering CHM 101

Can also use the resources from my CHM 101 class – the link is in Brightspace

Science Basics

Measurements:

- SI units & prefixes
- Scientific notation - know how to work with your calculator
- Rounding & significant figures

Dimensional Analysis

- Use of dimensional analysis to solve problems
- Conversions between mass, volume, moles, etc.

Percents, fractions, ratios (mass, elemental, moles, etc.)

- Know the difference between them & how to find them for chemical systems.

Chemical Formulas & Names

Formulas:

- First element symbol is the most positive (metal if ionic)
- If both in same column, first element is lowest
- Covalent – subscripts based on # atoms in molecule
- Ionic – subscripts based on balancing charges

Names

- Salts & binary molecules – 2 words, one for each element, with first element in formula written first
- 2nd word has -ide ending (if not a polyatomic ion)
- Covalent – prefixes indicate # atoms of each element
- Ionic – Roman Numerals indicate charge of cation if more than one charge is possible

Covalent:

NO = nitrogen monoxide

N₂O₄ = dinitrogen tetroxide

Ionic:

Ca₃(PO₄)₂ = calcium phosphate

Fe₂Cl₃ = Iron (III) chloride

Polyatomic Ions

Group of bonded atoms that share a charge

Know the names & formulas of the following:

Ammonium (NH_4^+)

Hydronium (H_3O^+)

Acetate (CH_3COO^-)

Carbonate (CO_3^{2-})

Chlorate (ClO_3^-)

Perchlorate (ClO_4^-)

Sulfate (SO_4^{2-})

Nitrate (NO_3^-)

Nitrite (NO_2^-)

Phosphate (PO_4^{3-})

Cyanide (CN^-)

Permanganate (MnO_4^-)

Hydroxide (OH^-)

Stoichiometry

Mass & Moles

- Finding molar mass
- Conversion between mass & moles
- Using Avogadro's # to convert between particles & moles

Chemical Equations

- Writing & balancing chemical equations
- Phase meanings (s, l, g, aq)
- Determining amount of products (or reactants, etc.), including limiting reagents

Percent Composition of Materials

- Calculate mass percent
- Calculate mass of a material from mass percent

Solution Chemistry

Molarity

- Calculating molarity
- Conversions between mass, moles & liters

Solutions & Dilutions

- Using $M_1V_1 = M_2V_2$
- Calculate mass of solid needed to make a solution

Acid-Base Titrations

- Identifying acids & bases
- Ionization properties of acids & bases
- Determining concentration of unknown solutions using titration

Know these Acids:

Hydrochloric Acid:	HCl
Sulfuric Acid:	H ₂ SO ₄
Nitric Acid:	HNO ₃
Perchloric Acid:	HClO ₄
Carbonic Acid:	H ₂ CO ₃
Phosphoric Acid:	H ₃ PO ₄

You will encounter them frequently

Redox Reactions

Oxidation Numbers

- Determining the oxidation number of each atom in a chemical formula

Write & Balance Redox equations

- Knowing what was oxidized & reduced
- Determining the number of electrons transferred

Redox Titrations

- Determining concentration of unknown solutions using titration
- Essentially solution stoichiometry problems

Gases & Thermodynamics

Ideal Gas Equation

- Know how to use it
- Using the correct units based on R
- Be able to solve for a variable in $PV=nRT$ to be used in other problems (like you did in gas stoichiometry)

Enthalpy (ΔH)

- Understanding enthalpy of reactions
- Endothermic vs. Exothermic
- Using enthalpy tables to calculate enthalpy of reactions
- Hess' Law

Elements & Compounds

The Electronic Structure of Atoms

- Understanding atomic structure & how it influences reactivity

The Periodic Table

- Using the Periodic Table to get information about elements

Chemical bonding

- Understanding how atoms interact with each other to form bonds
- Understanding Lewis Structures & molecular structure

Math skills are also important

Solving Problems with the line equation: $y=mx+b$

- Know how to solve for slope, etc.
- Be able to solve the equation when logarithms are present: $\ln(y) = mx + \ln(b)$
- Be able to solve with inverses: $1/y = mx = 1/b$

Logarithms (log) & natural logarithms (ln)

- Be able to use these functions on your calculator
- See appendix 3 in your book for more info on logs

Algebra & solving equations

Scientific notation & working with exponents

Square, cubed, & other root functions