CHM 112: General Chemistry II

Dr. Maria Donnelly
madon@uri.edu

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 25th 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.

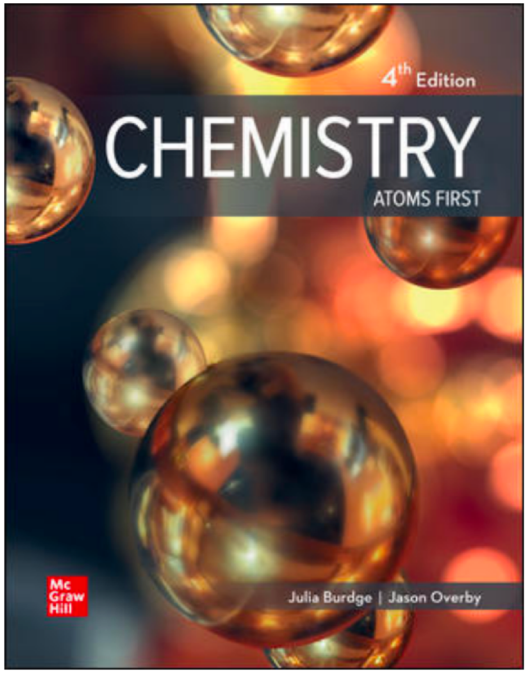
See your CHM 114 Brightspace site for an introductory presentation with details about safety training and lab and department policies. This information will be covered in lab the first week of classes!

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

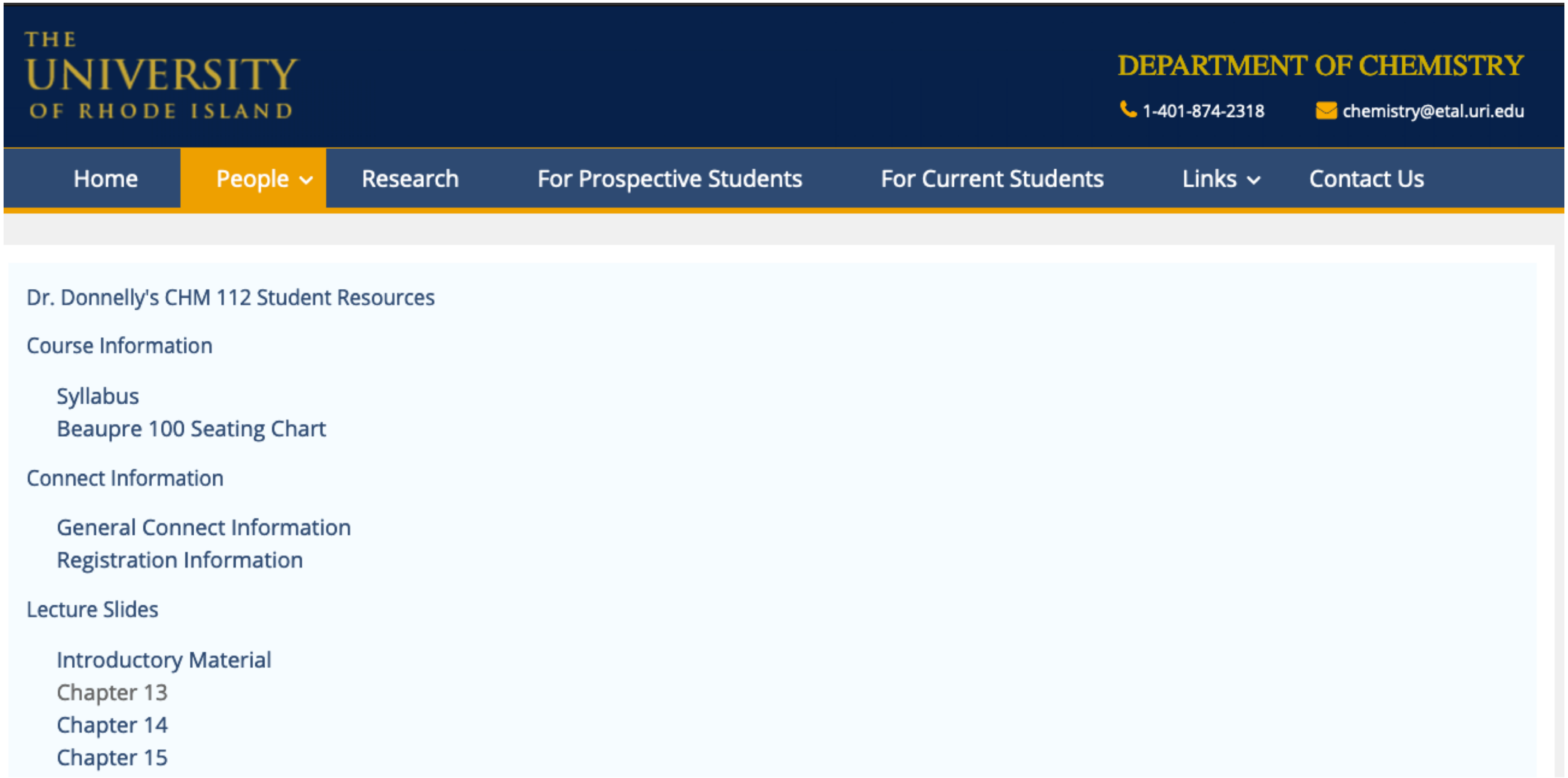
https://www.chm.uri.edu/index.php/misc-user-page/?buttonname=miscbutton&person=mdonnelly&topicname=CHM112


4th Edition
CHEMISTRY
ATOMS FIRST
Mc Graw Hill
Julia Burdge | Jason Overby

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 UNIVERSITY OF RHODE ISLAND
DEPARTMENT OF CHEMISTRY
1-401-874-2318
chemistry@etal.uri.edu
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For Current Students
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Dr. Donnelly's CHM 112 Student Resources

Course Information

- Syllabus
- Beaupre 100 Seating Chart

Connect Information

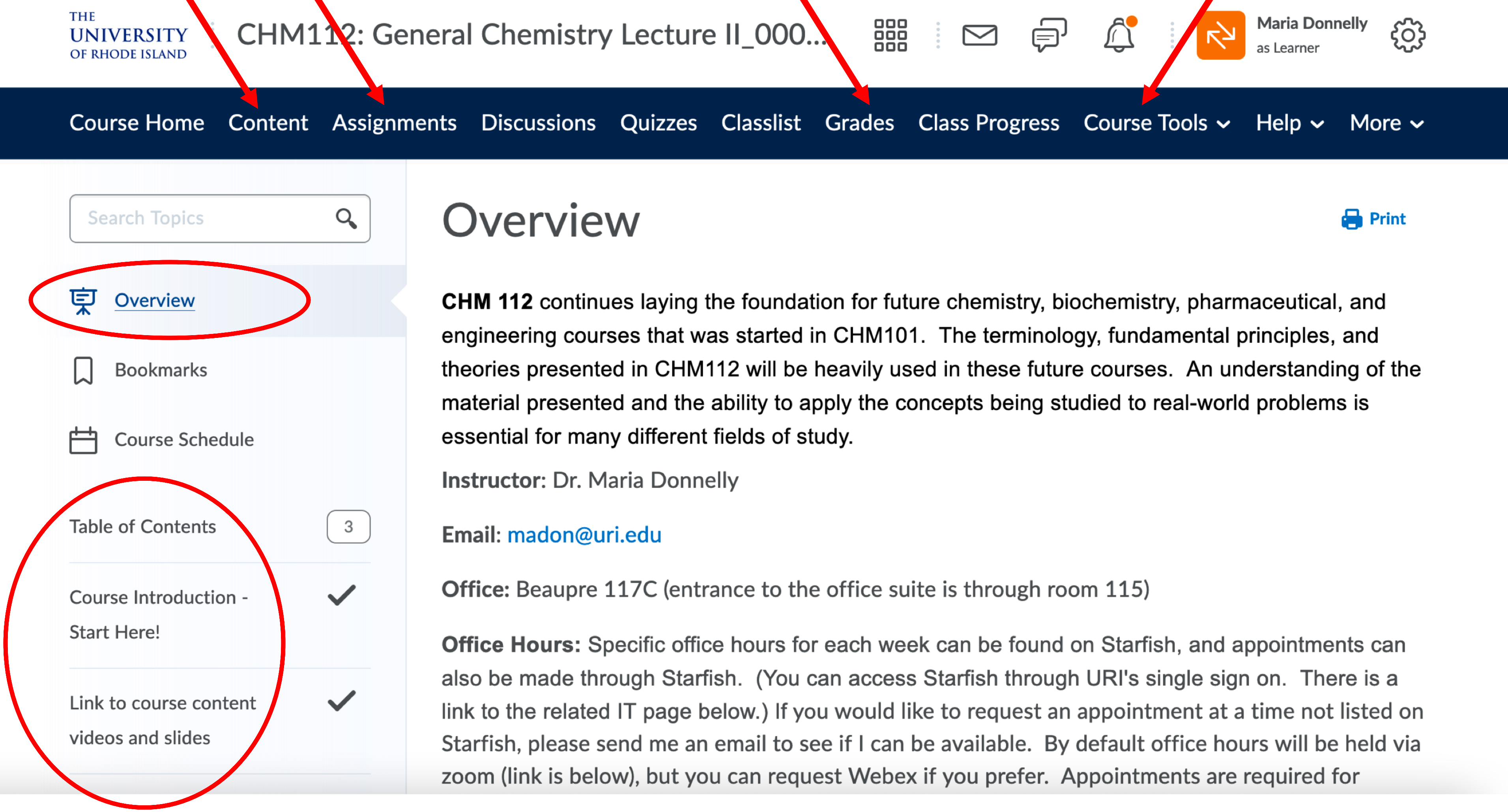
- General Connect Information
- Registration Information

Lecture Slides

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

Brightspace

To get to announcements


THE UNIVERSITY OF RHODE ISLAND
CHM112: General Chemistry Lecture II_000...
Maria Donnelly
as Learner
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Course Introduction - Start Here!
Link to course content videos and slides
Print

Overview

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

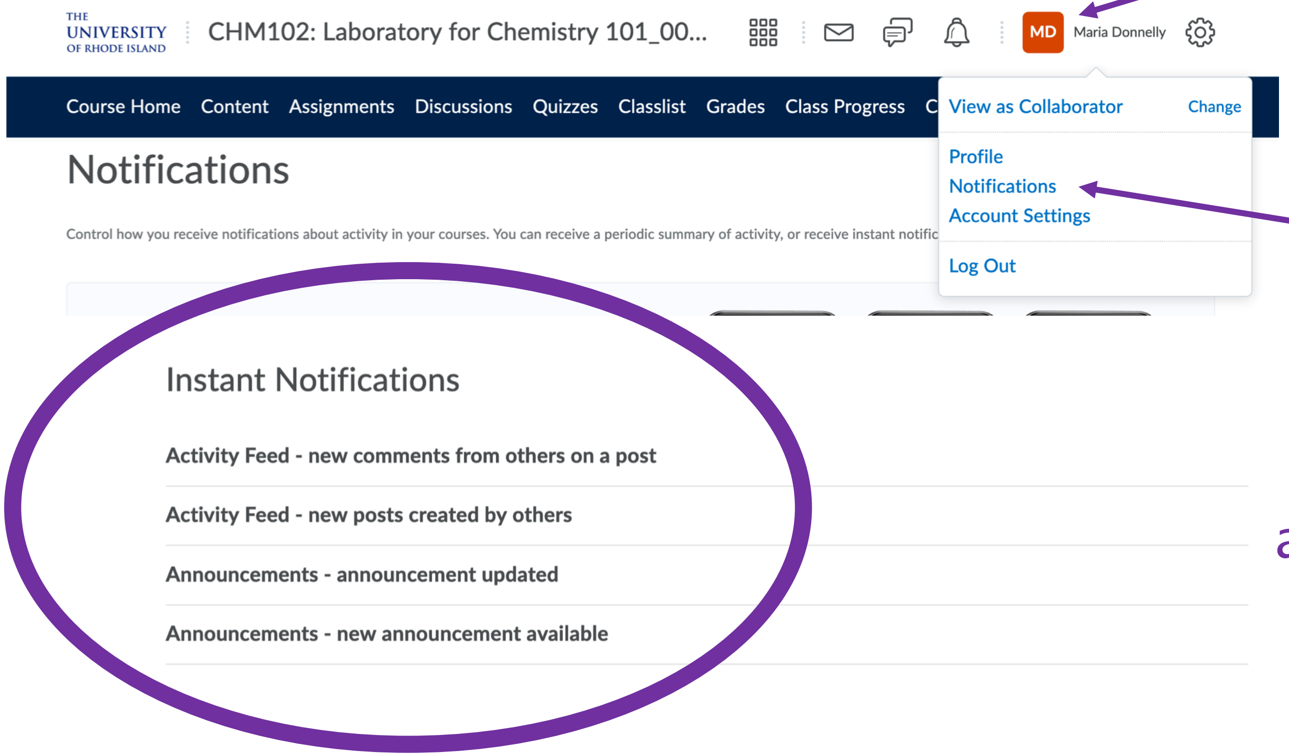
Office: Beaupre 117C (entrance to the office suite is through room 115)

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 will need to opt in to receive email notifications from Brightspace
  3. Post grades


THE UNIVERSITY OF RHODE ISLAND
CHM102: Laboratory for Chemistry 101_00...
MD
Maria Donnelly
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Notifications

Control how you receive notifications about activity in your courses. You can receive a periodic summary of activity, or receive instant notific

Instant Notifications

Activity Feed - new comments from others on a post

Activity Feed - new posts created by others

Announcements - announcement updated

Announcements - new announcement available

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

Select notifications

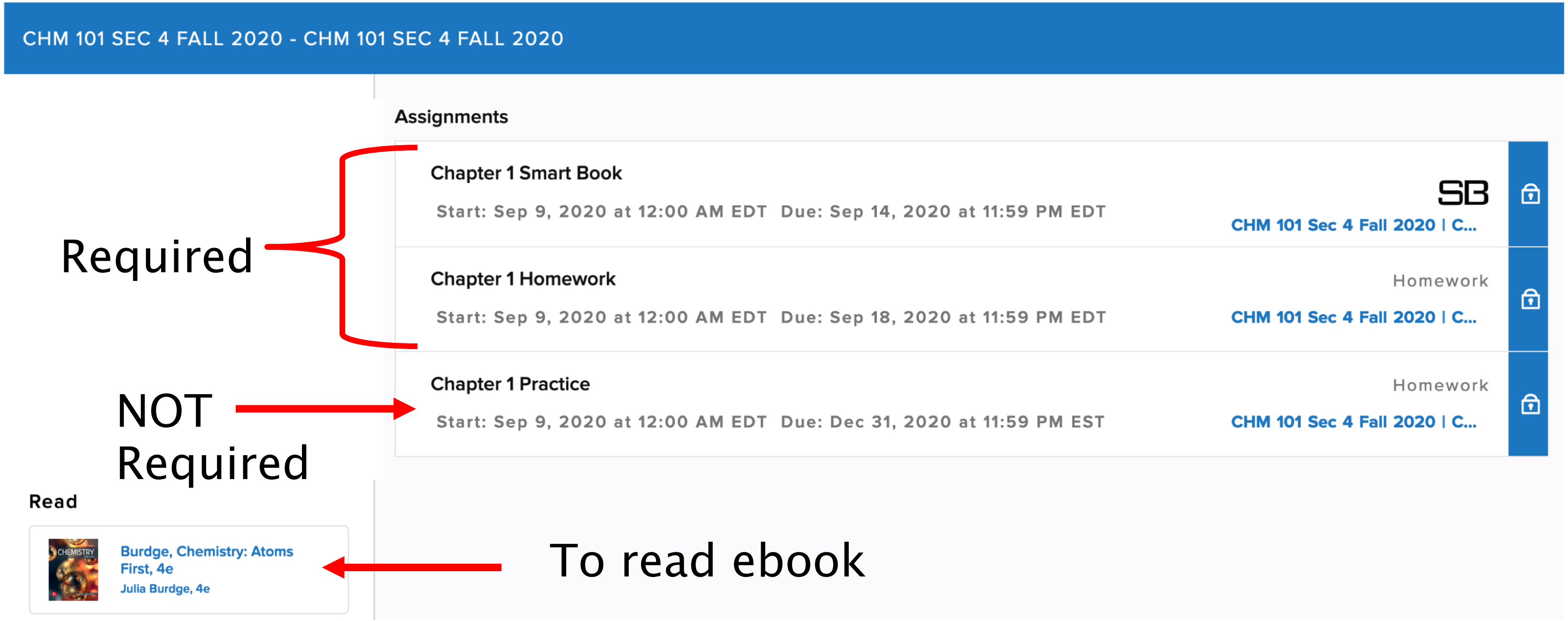
At a minimum, get notifications for announcements. You can get additional notifications if you choose

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

Chapter 1 Smart Book
Start: Sep 9, 2020 at 12:00 AM EDT Due: Sep 14, 2020 at 11:59 PM EDT
SB
CHM 101 Sec 4 Fall 2020 | C...

Chapter 1 Homework
Homework
Start: Sep 9, 2020 at 12:00 AM EDT Due: Sep 18, 2020 at 11:59 PM EDT
CHM 101 Sec 4 Fall 2020 | C...

Chapter 1 Practice
Homework
Start: Sep 9, 2020 at 12:00 AM EDT Due: Dec 31, 2020 at 11:59 PM EST
CHM 101 Sec 4 Fall 2020 | C...

Read

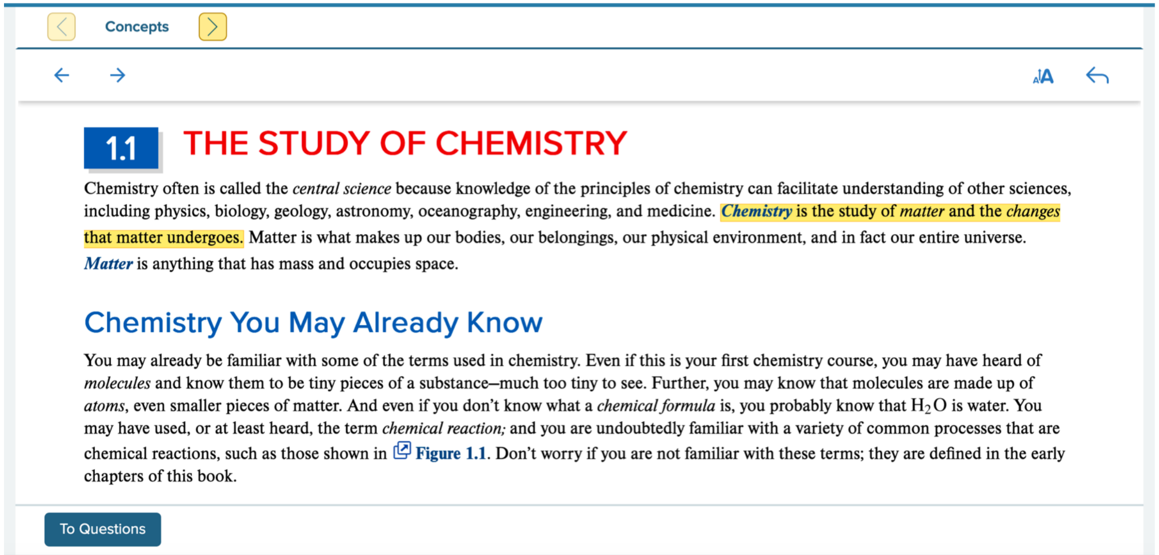
Burdge, Chemistry: Atoms First, 4e
Julia Burdge, 4e

Required

NOT Required

To read ebook

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



1.1 THE STUDY OF CHEMISTRY

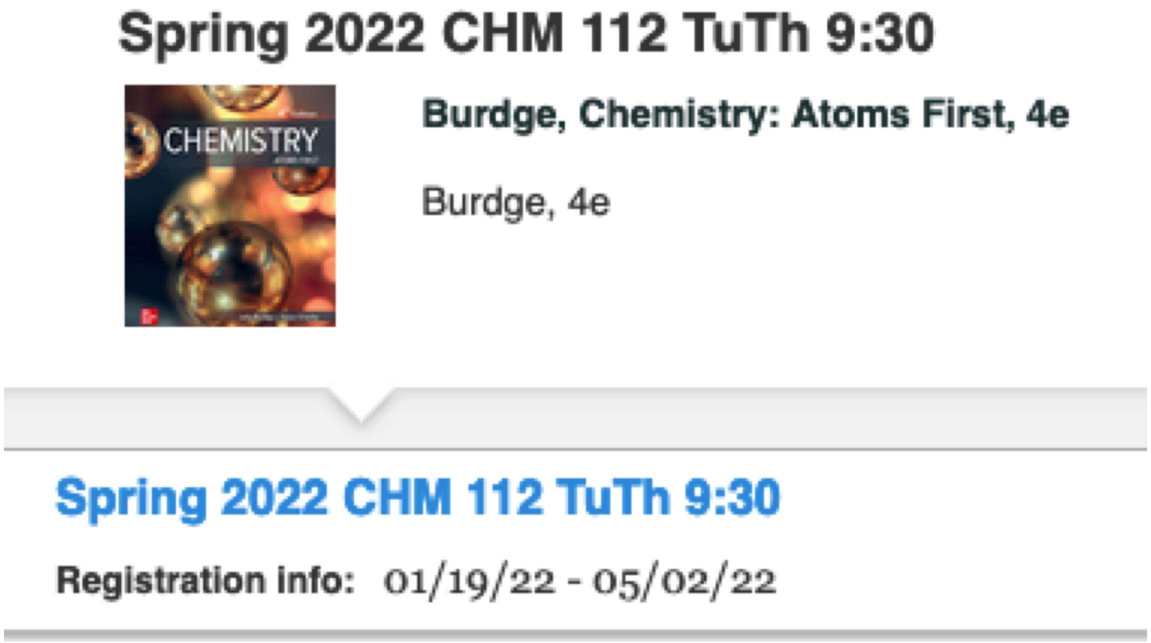
Chemistry often is called the *central science* because knowledge of the principles of chemistry can facilitate understanding of other sciences, including physics, biology, geology, astronomy, oceanography, engineering, and medicine. ***Chemistry*** is the study of *matter* and the *changes* that matter 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 H_2O 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.

Connect Registration

Registration Information is section specific!



Spring 2022 CHM 112 TuTh 9:30

Burdge, Chemistry: Atoms First, 4e

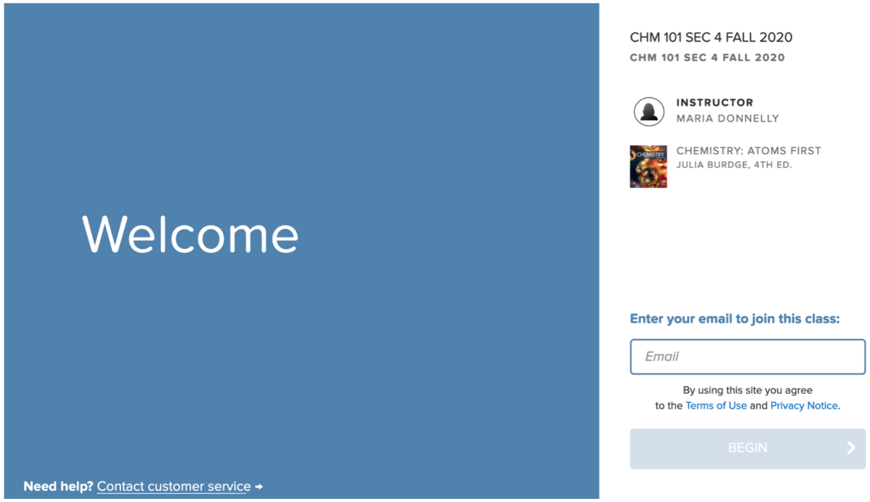
Burdge, 4e

Spring 2022 CHM 112 TuTh 9:30

Registration info: 01/19/22 - 05/02/22

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

Connect Registration



Welcome

Need help? Contact customer service →

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

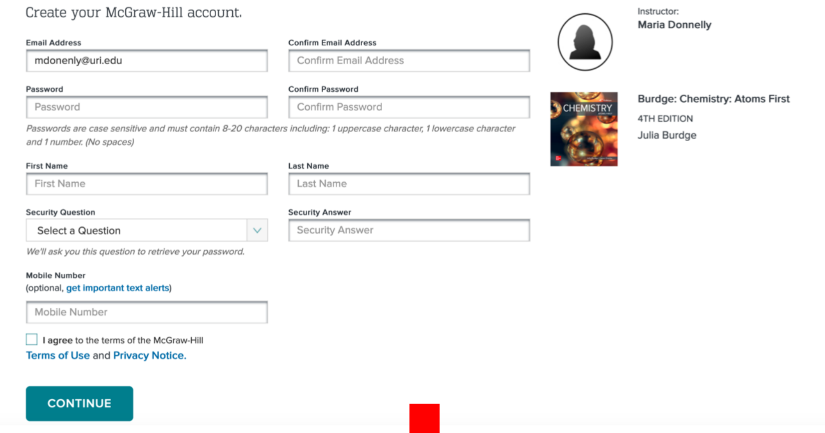
INSTRUCTOR
MARIA DONNELLY

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.



Create your McGraw-Hill account.

Email Address: mdonenly@uri.edu

Confirm Email Address: Confirm Email Address

Password: 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.

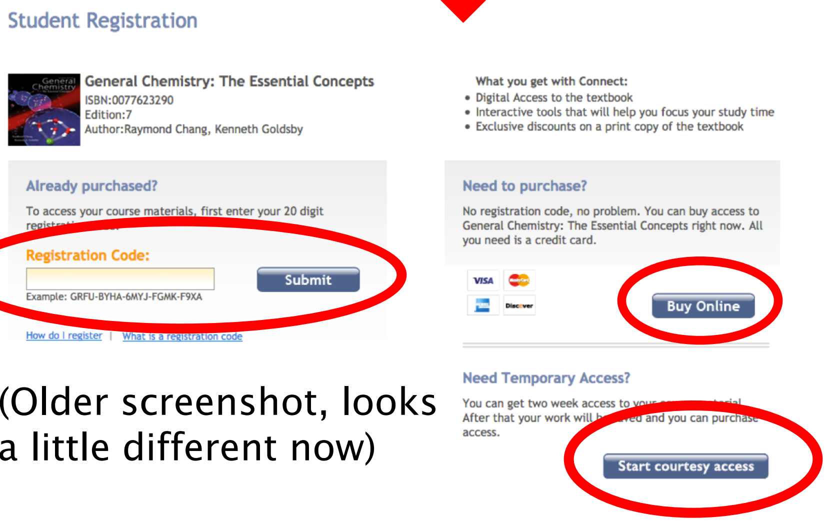
Mobile Number
(optional, get important text alerts)

Mobile Number

☐ I agree to the terms of the McGraw-Hill Terms of Use and Privacy Notice.

Instructor:
Maria Donnelly

Burdge: Chemistry: Atoms First
4TH EDITION
Julia Burdge



Student Registration

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

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

Already purchased?

To access your course materials, first enter your 20 digit registration [illegible]

Registration Code:

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

How do I register | What is a registration code

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.

Need Temporary Access?

You can get two week access to your [illegible] After that your work will [illegible] and you can purchase access.

(Older screenshot, looks a little different now)

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.

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**	**Thursday Feb. 10th**
15	Entropy and Gibbs Energy	4-6
16	Chemical Equilibrium	
Exam 2	**Chapters: 15 & 16**	**Tuesday March 8th**
17	Acids, Bases, and Salts	7-10
18	**Acid-Base Equilibria** and Solubility Equilibria	
Exam 3	**Chapters: 17 & first part of 18**	**Thursday April 7th**
18	Acid-Base Equilibria and **Solubility Equilibria**	11-13
19	Electrochemistry	
Exam 4	**Chapters: second part of 18 & 19**	**Thursday April 28th**
****Final Exam: Thursday May 5th 8:00 – 11:00 am**		

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

Important Spring 2022 Semester Dates:

- Monday Feb. 14th – last day to drop courses with no transcript designation of "W"
- Monday Feb. 21st – President's Day, classes do NOT meet
- Monday March 7th – Last day to drop classes in ecampus (after this date, a form is required that must be signed by your Academic Dean)
- March 14th–20th – Spring Break
- Tuesday March 22nd – Freshmen Mid–Term grades
- Monday May 2nd – last day of classes
- Wednesday May 18th – final grades due in ecampus

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:

Course Avg. = (Homework Avg. x 0.15) + (Exam Avg. x 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
    - HWK Avg.=(pts. earned/total # of pts possible)*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. Any grade of incomplete must be approved by the department chair and the dean. In order to receive an incomplete, a student's **course work must have been passing** and the student **must have completed at least half of the coursework for the semester**. Incompletes should be made up within one year of the semester in which the grade of incomplete was assigned. **If an incomplete is not made up prior to the two year grade change deadline established by the University, 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.**

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!!!

See me or a CHM 102 or 114 TA RIGHT AWAY 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:	Ionic:
NO = nitrogen monoxide	$Ca_3(PO_4)_2$ = calcium phosphate
N_2O_4 = dinitrogen tetroxide	Fe_2Cl_3 = 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_2SO_4

Nitric Acid: HNO_3

Perchloric Acid: $HClO_4$

Carbonic Acid: H_2CO_3

Phosphoric Acid: H_3PO_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

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