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

In-person Chemistry Labs Start Tuesday Feb. 9th Required introductory Lab Zoom meetings week of Feb. 1st

Safety Training is required for all Chemistry Labs

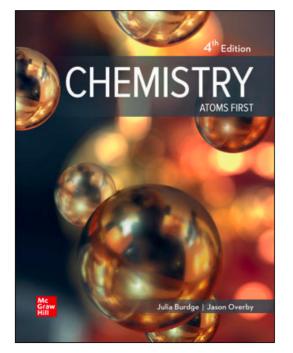
You must complete the required on-line lab safety module before attending your first in-person lab.

See your CHM 114 Brightspace site for an introductory video with details about safety training and lab and department policies

This introductory video must be viewed before the start of in-person labs. DO NOT WAIT UNTIL MONDAY Feb. 8th!!!

Required Materials

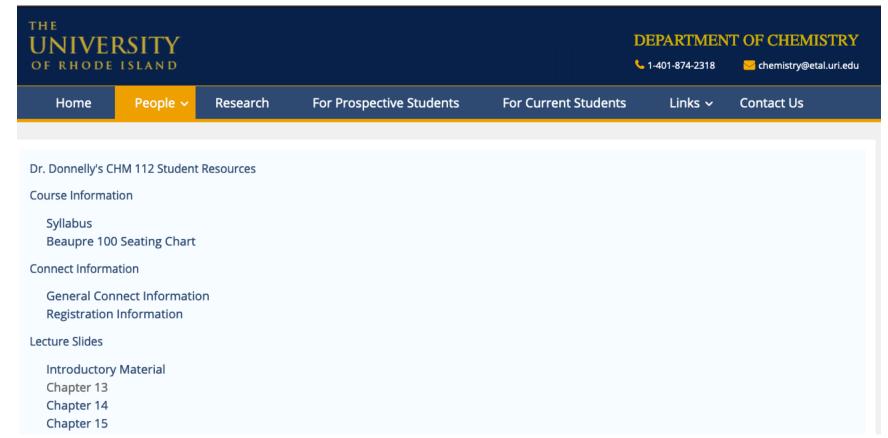
- Book: Chemistry: Atoms First 4th edition
 - By Julia Burdge & Jason Overby
 - Published by McGraw Hill
 - Can use either paper or electronic
 - Access to Connect online homework
 - Smart Book assignments
 - Homework assignments
 - Scientific calculator
 - Brightspace/URI email
 - Exams
 - Gradebook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

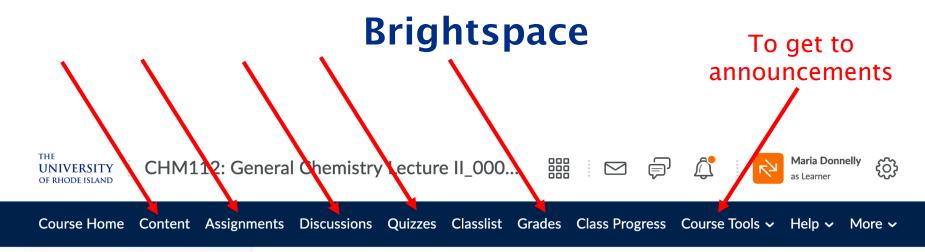


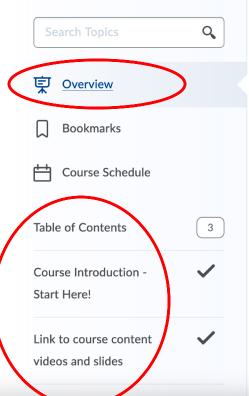
Chapters 1-12

Useful Information: Course & Introductory Information, Lecture Notes, Links to Lecture Videos etc.

https://www.chm.uri.edu/index.php/misc-userpage/?buttonname=miscbutton&person=mdonnel ly&topicname=CHM112







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

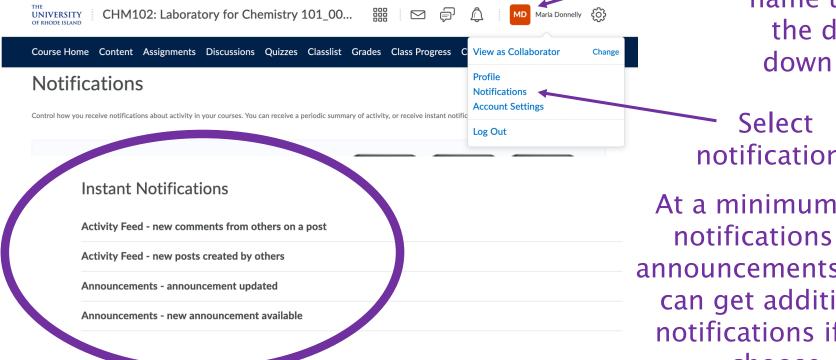
Office: Beaupre 117C (entrance to the office suite is through room 115)

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. Take exams & submit group work assignments
 - Post grades



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

notifications

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

Course Organization

Asynchronous Portion

- Lectures will consist of PowerPoint presentation videos with sample problems worked out as examples
 - Videos will be posted online with links available via Brightspace
 - Can be watched at a time convenient to you
 - Make sure to watch videos early enough to be able to complete your homework on time & be prepared for exams
 - Videos should be available at least until the end of the semester
 - Homework will be completed and submitted through McGraw Hill's Connect Program.
 - Has specific due dates (Mondays & Fridays)
 - Can submit early!

Required Synchronous Portion

- Students will meet once a week on Thursdays at the normal class time to work through problems in groups.
 - Meetings will be held via zoom.
 - You will be assigned a "CHM 112 Support Group", and will work through problems as a group in breakout rooms
 - Groups will be changed about half way through the semester to allow you to meet other students. Groups that really want to stay together will be given the option to remain as a group.
 - I will be available to answer questions
 - The groups will submit their work via Brightspace by ~ 11:00am (each student must submit their work)
 - Grades will be based on attendance; 50 pts per meeting
 - One absence is permitted without penalty
 - · I will drop into the breakout rooms to take attendance
 - Work will not be graded
 - Solutions will be posted at the end of the week

Optional Synchronous Portion

- Tuesday meetings will be optional
 - Meetings will be held via zoom during the scheduled class time.
 - The exact format of the optional meetings will vary based on student needs throughout the semester.
 - The discussion portion of Brightspace will be used to allow students to request topics to be covered, ask questions in advance, request that I go over certain problem types, etc.
 - Students are also welcome to ask questions during the meetings (they do NOT need to be asked in advance).
 - The ability to ask in advance will help me to have example problems ready and will hopefully encourage more students to ask questions.
 - Anonymous posts will be allowed.



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Schedule

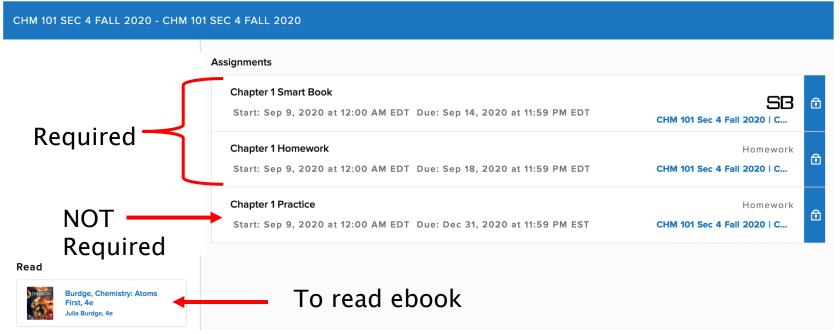
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturd			
January									
24	25	26	27	28 Intro Mtg	29	30			
	February								
31	1 SB13	2 Optional Mtg	3	4 Group Work C13	5 HW13	6			
7	8 SB14	9 Optional Mtg	10	11 Group Work C14	12 HW14a	13			
14	15	16 Optional Mtg	17	18 Exam 1	19 HW14b	20			
21	22 SB15	23 Optional Mtg	24	25 Group Work C15	26 HW15	27			
March									
28	1 SB16	2 Optional Mtg	3	4 Group Work C16	5 HW16a	6			
7	8	9 Optional Mtg	10	11 Exam 2	12 HW16b	13			
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28	29	30 Optional Mtg	31						
April									
				1 Exam 3	2 HW18a	3			
4	5	6 Optional Mtg	7	8 Group Work C18	9 HW18b	10			
11	12 SB19	13 Optional Mtg	14	15 Group Work C19	16 HW19a	17			
18	19	20 Optional Mtg	21	22 Exam 4	23 HW19b	24			
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Graded on 7 of 8 required class meetings. Tuesday sessions are optional.

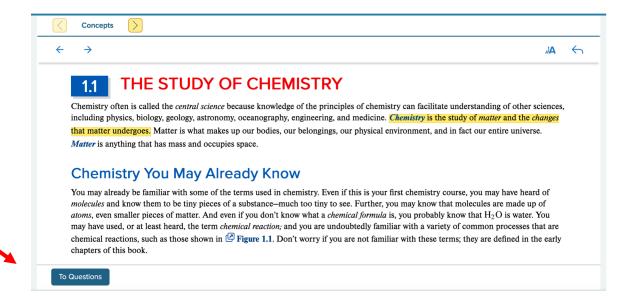
Homework

- 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 watching lecture video
 - 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
 - To submit late, email me to request an extension
- There will also be **OPTIONAL** practice assignments with additional questions.

Connect Assignments



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



Schedule

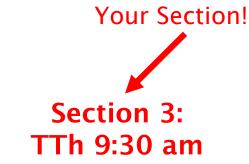
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Smart Book due dates (in purple) Homework due dates (also purple)

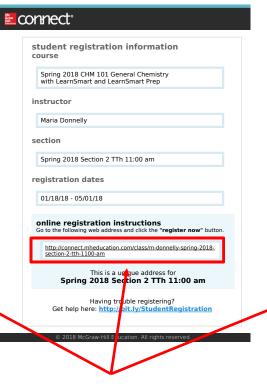
Connect Registration

Registration Information is section specific!

Section 1: Spring 2018 TTh 9:30 am Section 2: Spring 2018 TTh 11:00 am



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	student registration information course
	Spring 2018 CHM 101 General Chemistry with LearnSmart and LearnSmart Prep
i	nstructor
	Maria Donnelly
S	Spring 2018 Section 1 TTh 9:30 am
	online registration instructions Go to the following web address and click the "register now" button.
	https://connect.mheducation.com/class/m-donnelly-spring- 2018-section-1-tth-930-am
	This is a unique address for Spring 2018 Section 1 TTh 9:30 am
	Having trouble registering? Get help here: http://bit.ly/StudentRegistration
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	udent registration information urse
	Spring 2021 CHM 112 TuTh 9:30
n	structor
	Maria Donnelly
e	ction
	Spring 2021 CHM 112 TuTh 9:30
	online registration instructions Go to the following web address and click the "register now" button.
	ttps://connect.mheducation.com/class/m-donnelly-spring-2021-chm-112-tuth-930
	This is a unique address for Spring 2021 CHM 112 TuTh 9:30
	Having trouble registering? Get help here: https://bit.ly/StudentRegistration

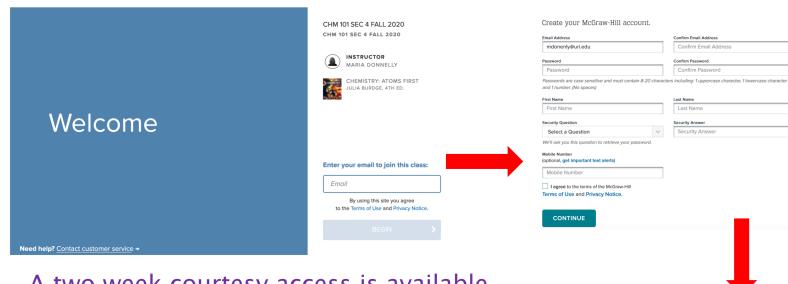
Link to registration page

Maria Donnelly

4TH EDITION

Julia Burdge

Connect Registration

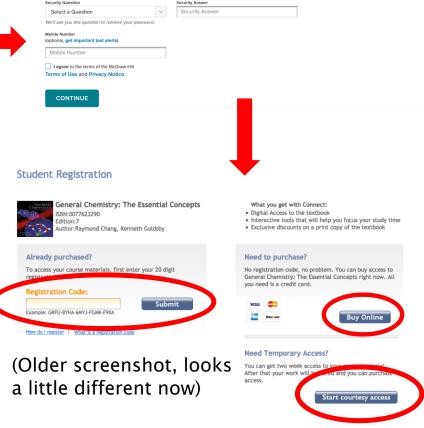


A two week courtesy access is available if you cannot immediately purchase an access code.

IF you purchased a <u>two year</u> access code last semester, you will not need a new one.

If you purchased the 6 month access code last semester, you will need to purchase a new code.

If you purchased a two year access code for Chang in a previous semester, email me.



Exams

- Exams will be held at the scheduled class time.
 - Dates are in the syllabus and the schedules in this presentation
- Exams will be completed and submitted through Brightspace
 - Questions will be in the quizzes section
 - Multiple choice questions will be answered in the quizzes section
 - Work & answers for short answer questions must be uploaded in the assignments section for grading.
 - The uploaded work is what I will grade for your exam
 - Single pdf files are the best for grading & viewing feedback
 - There is info in Brightspace about ways to turn your work into a single pdf file
 - If you have trouble submitting work for your short answer questions, email me your work BEFORE THE SUBMISSION DEADLINE
 - Points will be deducted from exams that are submitted late.



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Exams con't

- Exams will be open book & notes.
- Use of google or help from another individual is not permitted and is considered academic dishonesty – see policies in the syllabus & University manual.
- 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.

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Semester exams are listed in red. Final exam is currently May 4th from 8:00-11:00am

Grading

Online Homework, Smart Book, & Participation	20 %
3 of 4 Lecture Exams* (20 % each)	60 %
Final Exam	20 %
Total	100%

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

Course Avg. = (Homework Avg. \times 0.20) + (Exam Avg. \times 0.80)

- The homework average includes homework assignments, smart book assignments, & group work participation
 - 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 group work counts for 50 points
 - HWK Avg.=(pts. earned/total # of pts possible)*100
- To eliminate the need for make-up exams, you will be graded on 4 out of 5 exams.

Incomplete Policy

Incomplete grades <u>cannot</u> 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.

Getting Help

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

- Office hours will be held via zoom (webex also available by request).
 - Use Starfish to sign up for a time
 - Zoom address will be provided in Starfish
 - If you prefer webex let me know
 - Email me to ask for a meeting outside of office hours
- Chemistry department TAs also hold office hours
 - There will be a single Webex address for TA help in gen chem
 - Can ask any 114 TA for help
 - Also a CHM 112 TA Athina
 - Will hold office hours & Extra help sessions
 - 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

Watching the videos is VERY important

- They are the lectures I would give in an in-person class!!!
- prepare in advance become familiar with key terms & ideas
- pay attention, write down questions to ask
- print out slides and use them to take notes on
- if you get tired, take a break & finish the video later!

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 hoursAthina & CHM 114 TAs

- AEC

CHM 101 Knowledge is Essential!!!

See me, Athina, or a CHM 102 or 114 TA RIGHT AWAY if you need help remembering CHM 101

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_2CI_3 = Iron (III) charide

Polyatomic Ions

Group of bonded atoms that share a charge

Know the names & formulas of the following:

Ammonium (NH₄+)

Hydronium (H₃O⁺)

Acetate (CH₃COO⁻)

Carbonate (CO_3^{2-})

Chlorate (ClO₃-)

Perchlorate (ClO₄-)

Sulfate (SO₄²⁻)

Nitrate (NO₃-)

Nitrite (NO₂-)

Phosphate (PO₄³⁻)

Cyanide (CN⁻)

Permanganate (MnO₄-)

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, I, 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: H₂SO₄

Nitric Acid: HNO₃

Perchloric Acid: HClO₄

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