CHM 112: General Chemistry II

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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 24th
Required introductory/safety sessions are held the first week!

Safety Training is required for all Chemistry Labs

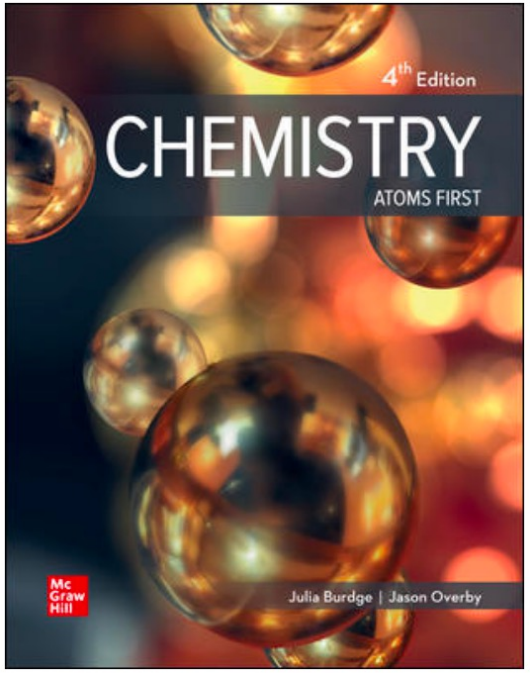
You must complete the required on-line lab safety module before attending your first experiment.

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

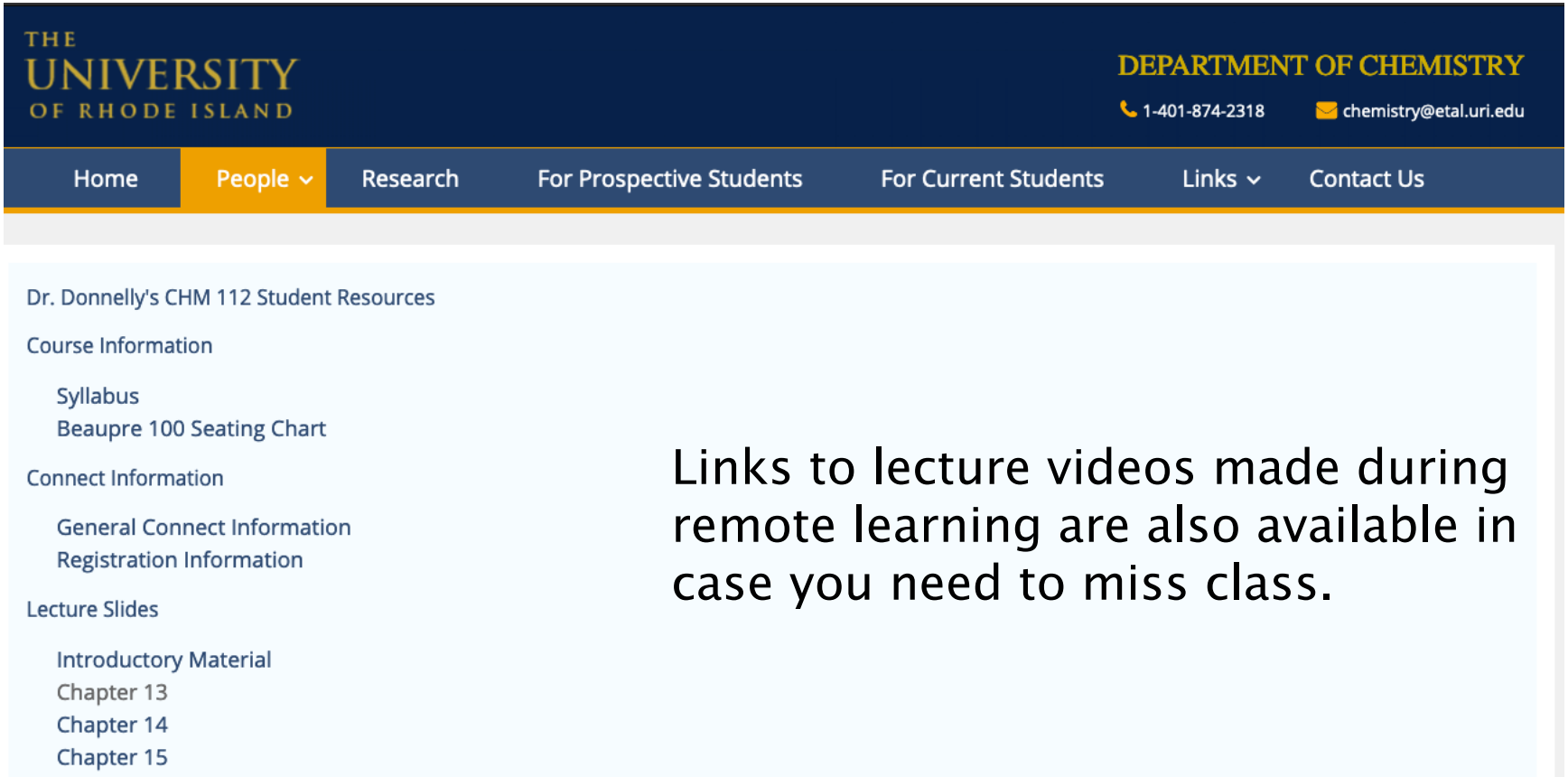
- Book: Chemistry: Atoms First 4th edition
  - By Julia Burdge & Jason Overby
  - Published by McGraw Hill
  - Can use either paper or electronic
- Access to Connect online homework
  - Smart Book assignments
  - Homework assignments
- Scientific calculator
- Brightspace/URI email
  - Gradebook
  - Announcements
  - 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



Chapters 13-19

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

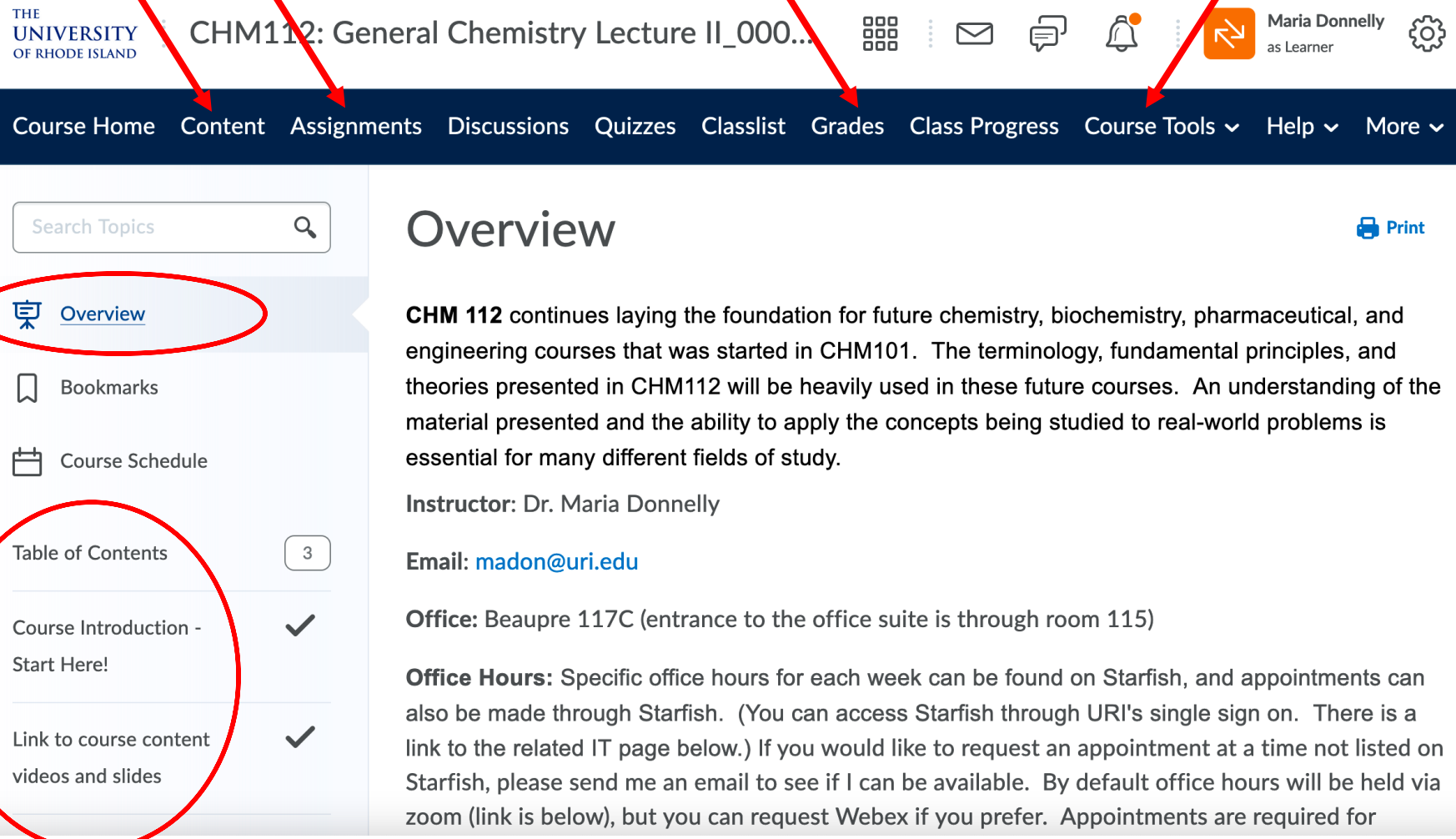
https://www.chm.uri.edu/index.php/misc-user-page/?buttonname=miscbutton&person=mdonnelly&topicname=CHM112



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

Brightspace

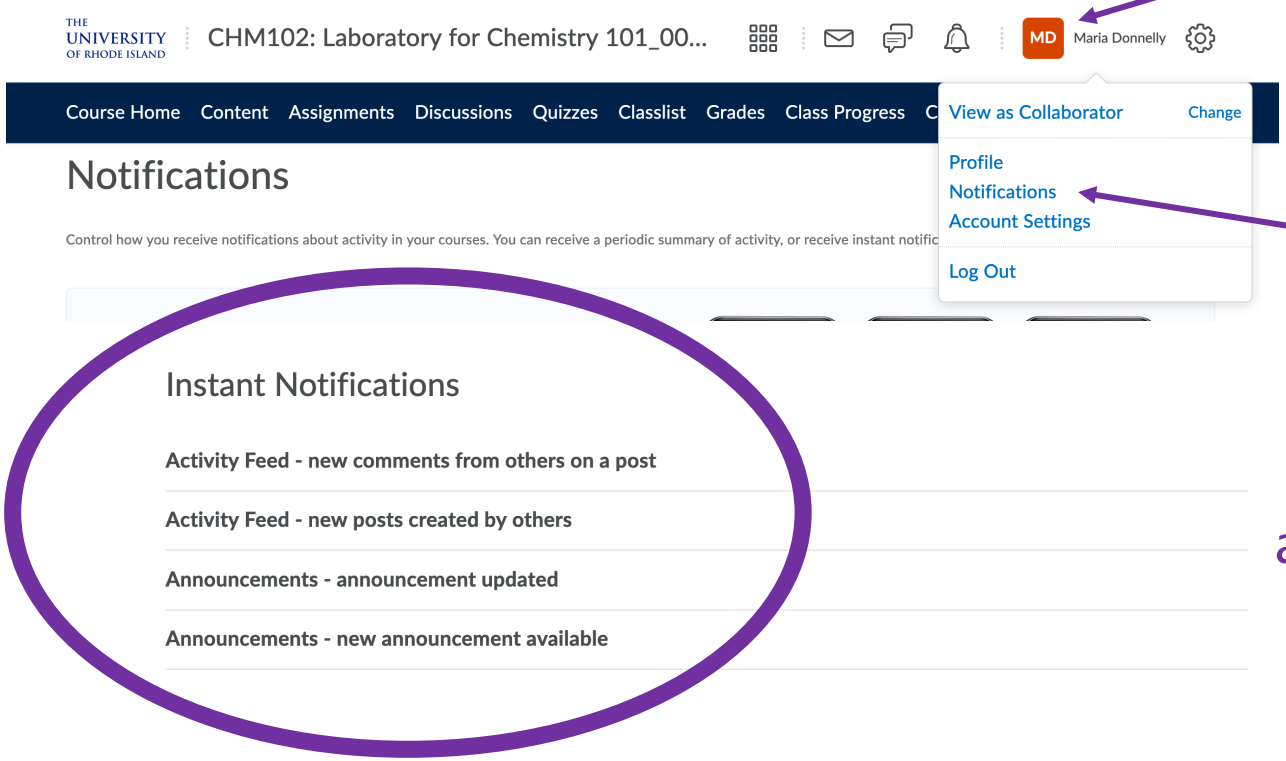
To get to announcements



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



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

Select notifications

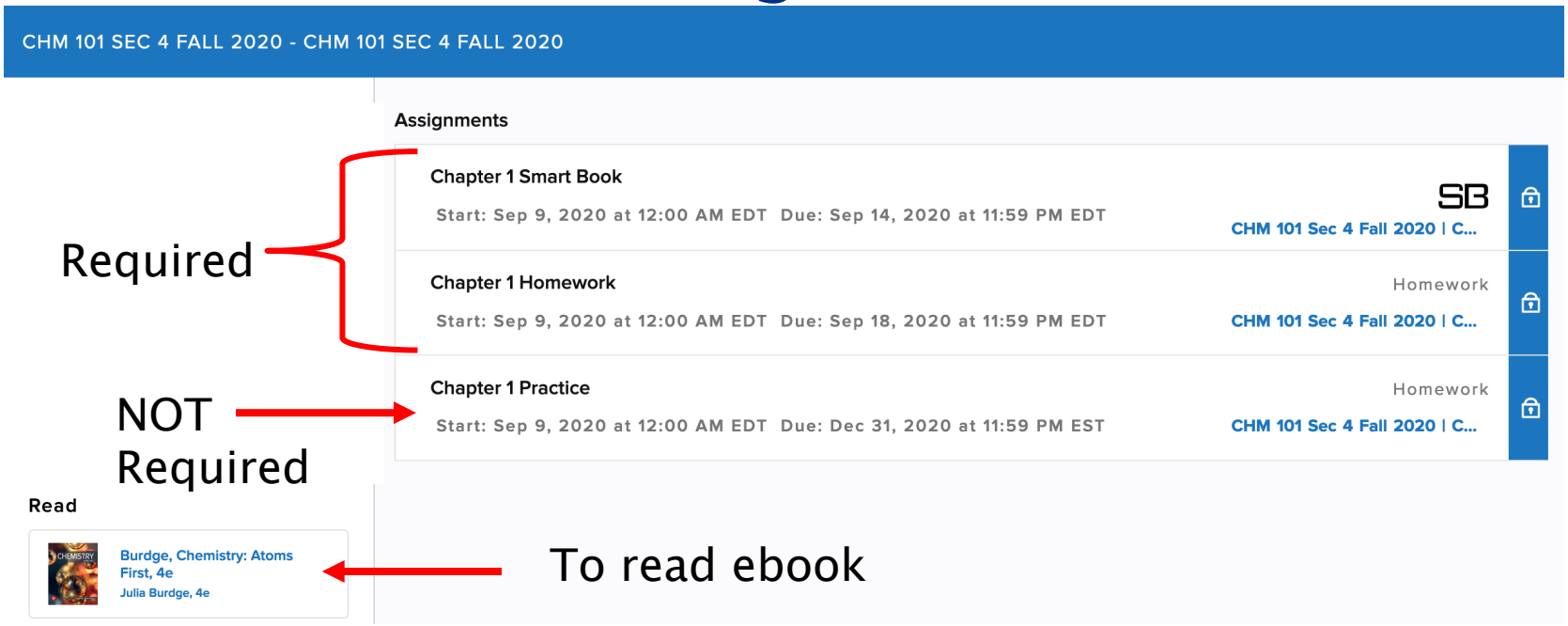
At a minimum, get notifications for announcements. You can get additional notifications if you choose

Course Organization & Expectations

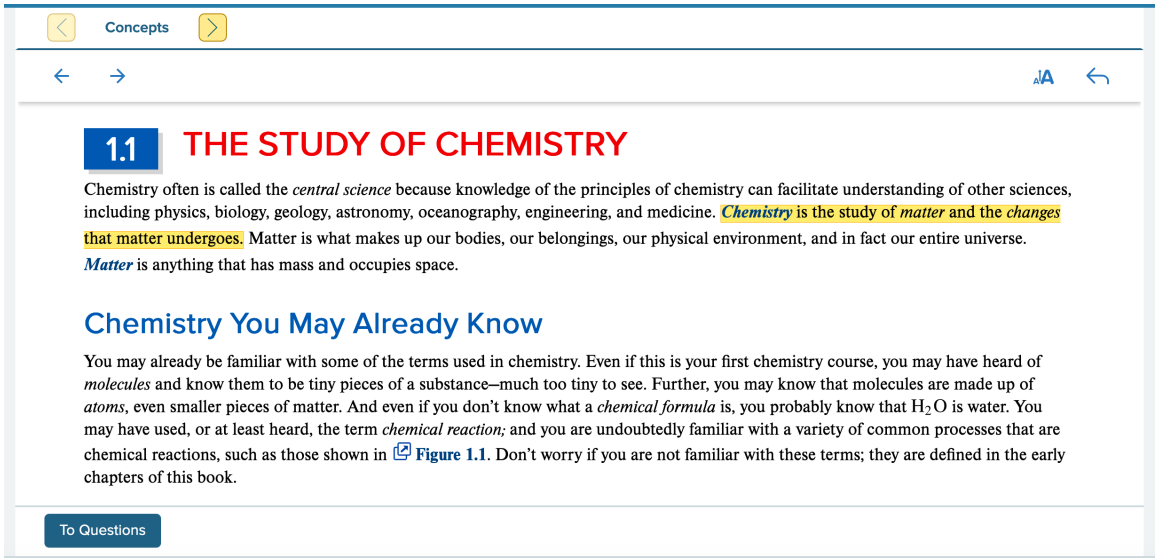
Homework

- 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

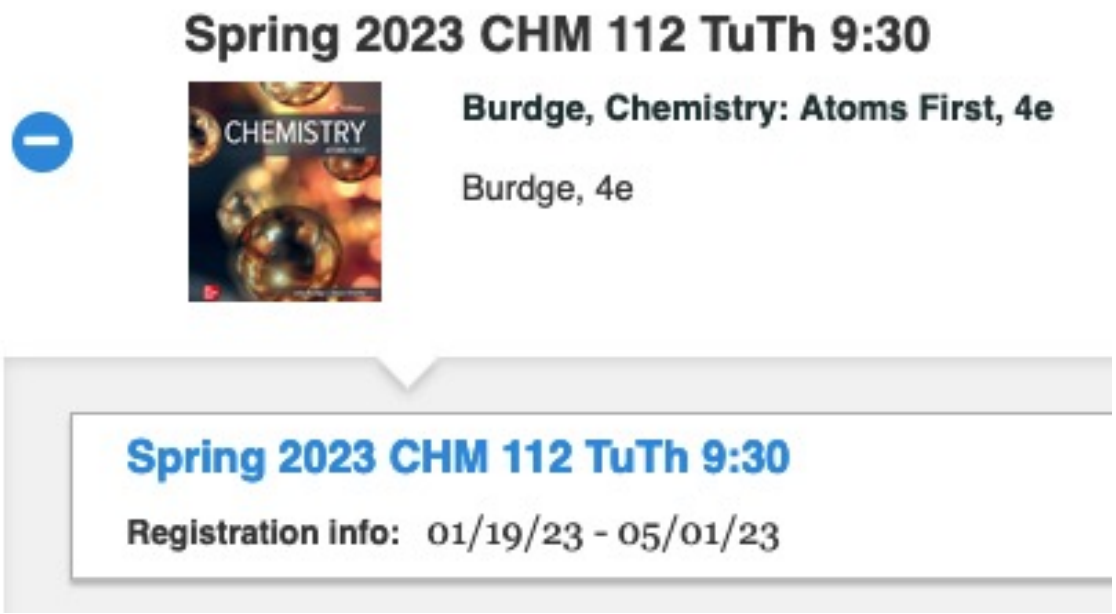


Questions are required. All questions must be answered to receive full credit.



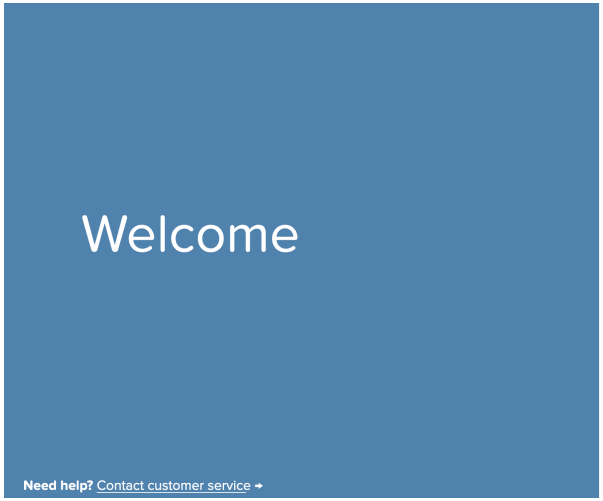
Connect Registration

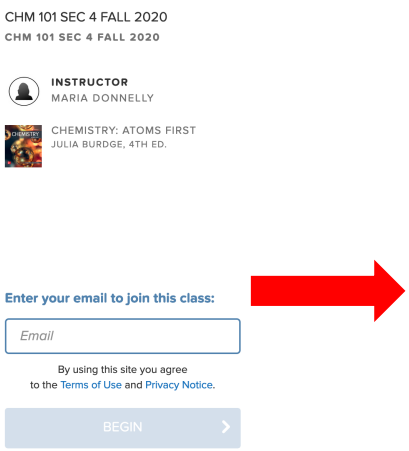
Registration Information
is section specific!

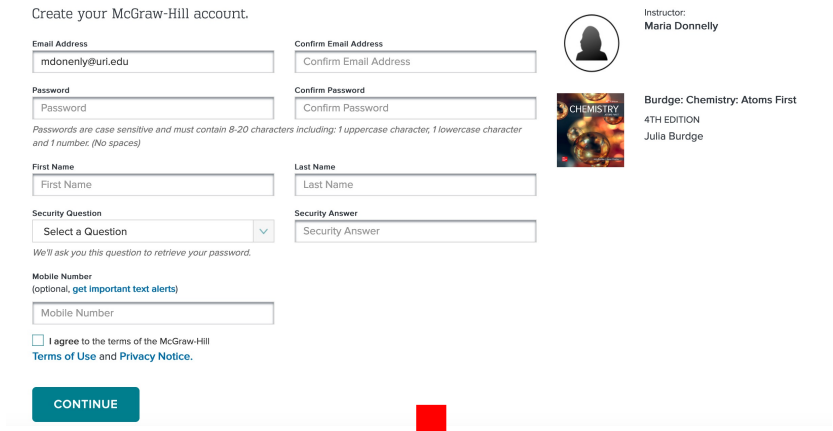


There is a link to your sections registration page in Brightspace.

Connect Registration



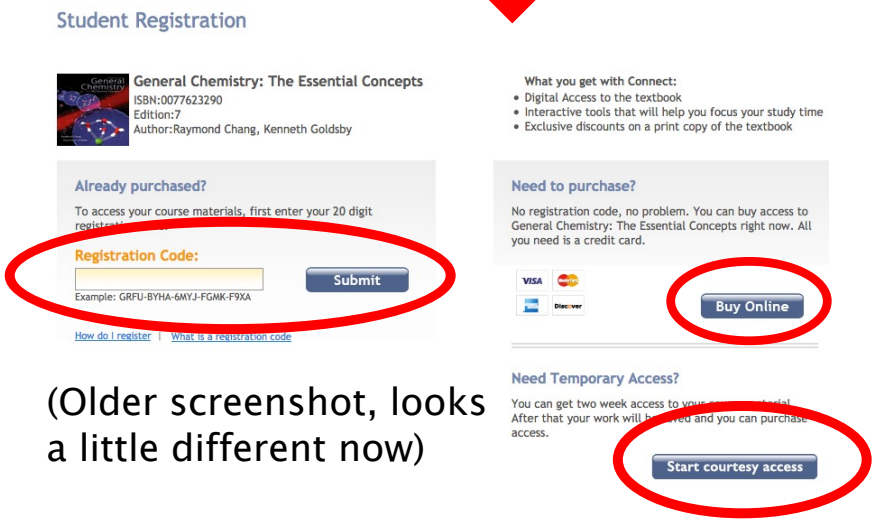




A two week courtesy access is available if you cannot immediately purchase an access code.

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.



(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**	**Thursday Feb. 9th**
15	Entropy and Gibbs Energy	4-6
16	Chemical Equilibrium	
Exam 2	**Chapters: 15 & 16**	**Tuesday March 7th**
17	Acids, Bases, and Salts	7-10
18	**Acid-Base Equilibria** and Solubility Equilibria	
Exam 3	**Chapters: 17 & first part of 18**	**Thursday April 6th**
18	Acid-Base Equilibria and **Solubility Equilibria**	11-13
19	Electrochemistry	
Exam 4	**Chapters: second part of 18 & 19**	**Thursday April 27th**
****Final Exam: Tuesday May 9th 11:30am – 1:30pm**		

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

Important Spring 2023 Semester Dates:

- Monday Feb. 13th – last day to drop courses with no transcript designation of "W"
- Monday Feb. 20th – President's Day, classes do NOT meet
- Monday March 6th – Last day to drop classes in ecampus (after this date, a form is required that must be signed by your Academic Dean)
- March 11th–19th – Spring Break
- Tuesday March 21st – Mid-Term grades (First Year Students)
- Monday May 1st – last day of classes
- Tuesday May 16th – 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
1/23	M	
1/24	Tu	Introduction & CH 13
1/25	W	
1/26	Th	CH 13
1/27	F	CH 13 Smart Book due
1/30	M	
1/31	Tu	Chap 13 & 14; CH 13 HW due
2/1	W	
2/2	Th	CH 14
2/3	F	CH 14 SB due
2/6	M	
2/7	Tu	CH 14; CH 14 HW A due
2/8	W	
2/9	Th	**Exam 1 Chapters 13 & 14**
2/10	F	CH 14 HW B due

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!!!

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:	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 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