CHEM 31F (93249): General Chemistry Fall 2020*

I. Lecture

Lecturer: Erik Ruggles, Ph.D.

Office: The Internet Ethereal (Innovation 333)

Email: Erik.Ruggles@uvm.edu

Office Hours: T,Th: 1:15-2:30pm
Or by appointment (Virtual Chat using Teams)

Group Office Hours:

Ruggles: W,F 10am-12pm; T,Th 11am-1pm

Hoeltge: M,W 11am-1pm

Goldberg: T 2-3:30pm and W 3:30-5pm

Pratt: M,W,F 10am-12pm and T,Th 12-2pm

Virtual Class Time: T,Th: 1:15-2:30pm

Location: Your Work Station using Teams

Textbook: There are four options to purchase **"Chemistry Structure and Properties" 2nd Ed., by Tro** (*Pearson Publishing; Full text ISBN-13: 978-0-13-429393-6*) **along with Mastering Chemistry online access.** 1) The full textbook and mastering can be bought on Pearson's online site (~$300; text and mastering), or 2) at the UVM bookstore (~$160; UVM custom textbook, solutions manual, and mastering), or 3) just digital access (~$120; etext and mastering) or 4) purchase a used textbook and MasteringChemistry (~$75 mastering separately). *The digital solutions manual will be provided for free but also comes with the UVM package and has the complete solutions to all the assigned problems.* ***The most bang for your buck is the UVM bookstore package (option 2), but the most economical is a used textbook and digital access (option 4).***

Assignments and Lecture: The assignments are broken down into Modules and can be found in BlackBoard (BB) under the **2. Assignments** link. Each module contains Lecture Videos, Homework Problem Sets, and Homework Video Examples of Problems (for extra help). ***These will be assigned after each class period and you are expected to watch the lecture(s) and attempt the homework prior to the next virtual class time***. The Video Lectures for discussions on Tuesdays and Thurdays will be used to cover new material and concepts along with sample problem solving. The Homework Problem Sets will strengthen your connection between concept and the mathematics that describes the concept. I strongly encourage you to do as many problems as possible, the more you practice the better you will get. Use the Homework Problem Video Examples for extra help. My video lecture notes as well as in class discussions will be posted in pdf format on BB (**4. Course Materials** link). In class discussions will be recorded and then posted in video format on Teams.

Virtual Class Time: Class will be held virtually from 1:15-2:30pm Tuesday and Thursday. Class is meant for question and answers. Questions could be homework related, lecture related, exam related, etc. The module assigned should be finished prior to class discussion as I want to use this time to clarify lecture concepts and homework problems. I will be omnipresent on **5. Discussion Boards** (within BB) for question and answer as well as be available by email as much as possible. In class discussions will be recorded and then posted in video format on Teams and will be posted in pdf format on BB (**4. Course Materials** link).

Office Hours: Our virtual class time is pretty much the same as office hours. However, if you have questions of a more personal nature and feel the need to meet in private then feel free to set up an individual meeting with me via email that fits both of our schedules. There are also Group Office Hours. Every Professor of Chem31 has a set of Group Hours that any student can attend with questions (you don't have to be their student to attend). This tries to replicate the lost ability of students to just stop into the office.

Extra Practice: For added examples, blank old exams from my 2019 classes, SI Sessions, as well as their answer keys are posted on BB within **4. Course Materials**. Remember that even though questions will change from year to year, the concepts will remain the same. ***Do not study with just the old exams!*** The Meat and Potatoes, or Seitan and Broccoli, is in the Homework Problems. Also there are homework problem videos posted on Blackboard for extra "at-home" help.

Recitations: Throughout the semester I will hold recitations on the Monday evening from 6:45-7:45 pm on Teams. The Sunday before a mid-semester exam I will hold an exam review session from 9:00-10:30 am also on Teams. These problem sessions are meant to address your questions about lecture topics and/or homework problem solving, so come prepared with questions. Review sessions will be recorded and then posted in video format on Teams and will be posted in pdf format on BB (**4. Course Materials** link).

Homework Quizzes: There will be ten graded homework quizzes (best 10 out of 12) during the semester. These assignments will occur once we finish a chapter and will be found in MasteringChemistry. To access, log in to BB and follow the **3. MasteringChemistry** link. You will have several days to complete each assignment, but I would not wait until the last moment.

Exams: The exams are scheduled to be open on ***Mondays from 6:40pm-9:40pm. Exams will be taken on BlackBoard at the digression of the student.*** There are no scheduled make up dates. The three Mid-Semester Exams are the same regardless of Chem31 Section, so all Chem31 students are being tested the same. The Mid-Semester Exams are written to take 1.5 hours to compete, but every student has a full 3 hours to take the exam (*double time already provided to all, so ACCESS time accommodations not applicable*). The only exception to this is the Final Exam (*ACCESS time accommodations will be allowed*). All exams and quizzes can be accessed after their due dates for practice, save for the final exam. While I do not mind discussing the final, copies of the final exam will not be distributed. While taking the exams only non-programmable non-graphing calculators are permitted. No other electronic devices are allowed (i.e. no cell phones, mp3 players, ipods, etc.). ***Students caught using sources other than themselves as well as any other electronic device other than a non-programmable non-graphing calculator will receive a zero for the exam.***

Exam Dates:

September 21	Exam 1
October 19	Exam 2
October 29	Last Day to Withdraw
November 16	Exam 3
December XX	Final Exam

*All times are on Vermont time

II. Laboratory

Lab Manuals: All experiments can be found online on your lab's BB website as individual pdfs. Please make sure you ***print out each experiment and bring to lab*.**

Lab Notebook: A notebook with carbon-less copies is required for recording lab data. All data is to be recorded in ink (not pencil). A carbon-less copy lab notebook can be bought at UVM's bookstore.

Safety Eye Wear: Everyone in the lab must wear OSHA approved (EZ87stamped) safety glasses or goggles once any experimentation has been started. Students not observing this rule will receive a **ZERO** for the experiment, warnings will not be given. Safety eyewear can be purchased at the UVM bookstore or in the Discovery Building stockroom. ***Contact Lenses are a potential health hazard and can be worn in the laboratory only if no other types of corrective lenses are available. If you have to wear contact lenses then you must wear goggles and please let your TA know.***

COVID-19 Safety Masks: Safety masks compliant with UVM standards need to be worn at all times. Students not observing this rule will receive a **ZERO** for the experiment, warnings will not be given. These have been provided to you from UVM.

Lab Attire: This is a chemical laboratory dress appropriately! It is best to wear full pants and a shirt with at least short sleeves. Shorts and short pants (capris, crops, etc.) are not allowed in the laboratory. Shirts that expose the shoulders, midriff, or back are also not allowed. Proper footwear is also necessary in the laboratory. Full shoes, preferably constructed of leather or other chemically resistant material, should be worn in when in the laboratory. Open toed shoes, open backed shoes, and shoes that expose the top or other portions of the foot are not allowed. If you arrive at lab in inappropriate attire, you will not be allowed to perform the experiment that day.

Prior to Start of Lab: Purchase your lab manual, lab notebook, and safety glasses. Also, on Blackboard review and complete the Safety Presentation and Safety Quiz. ***If you have not purchased or completed these items you will not be able to begin the lab portion of the course.***

Attendance: Students must attend the lab section they are assigned to. If more than two labs are missed you will receive an **F** for the course. Only the academic dean of your college may grant an incomplete. An unexcused absence will result in a **ZERO** grade for the laboratory experiment. Official documentation of sickness or a family crisis is required for an excused absence. If there is a need to reschedule your lab time to one that is not your assigned time you must obtain permission from me a week in advance.

Lab Videos: Prior to attending your lab it is mandatory to view the video that accompanies the lab. These videos demonstrate the proper use of new equipment and the safe handling of chemicals. Videos can be found at: https://www.youtube.com/channel/UC8r6fR2K-8xAtsf-_a8edMg.

III. Course Grade

Percent Ranges for Grades:

I cannot say in advance which point ranges correspond to which letter grades, but I will give approximate correlations throughout the semester following each of the exams. Please note that you are not competing with each other for grades in this course: if everyone scores in the "A-range," I will give everyone "A"s for the course (really!). I encourage you all to work together as you study, to help each other learn the material, but do also recognize that all graded work must be solely your own, so be prepared to work independently to demonstrate your mastery of the material.

How to Calculate Your Points:

1) Class = **750 total points** (75% of grade; exams and homework)

1a) Mid-Semester Exams = **375 points** (125 points/exam)

1b) Homework = **125 points** (12.5 points/assignment)

1c) Final Exam = **250 points**

There are three mid-semester exams (each 125 points) and a final exam (250 points). If your final is your lowest grade it will count only as one unit. If one of the mid-semester exams is your lowest grade then your final will count as two units. The lowest mid-semester exam grade will be replaced by the percentage on the final. If you are absent from an exam official documentation of sickness or family crisis is required or you will receive a **ZERO** for the exam. Students with legitimate excuses will be permitted to take the exam early. Except in very unusual circumstances makeup exams will not be administered after the scheduled exam time.

Example 1:	Exam 1	Exam 2	Exam 3	Final
Actual Scores:	106.25 (85%)	56.25 (45%)	97.5 (78%)	187.5 (75%)
Counted Scores:	106.25 (85%)	93.75 (75%)	97.5 (78%)	187.5 (75%)

Homework Score: 105.0 (84%) Class Points = 485.0 exam + 105.0 homework

Total = 590.0 points

Example 2:	Exam 1	Exam 2	Exam 3	Final
Actual:	87.5 (70%)	97.5 (78%)	95.0 (76%)	170.0 (68%)
Counted:	87.5 (70%)	97.5 (78%)	95.0 (76%)	170.0 (68%)

Homework Score: 87.5 (70%) Class Points = 446.25 exam + 87.5 homework

Total = 537.5 points

2) Laboratory = **250 lab points** (25% of grade)

Safety Quiz	1 point
Prelab (3 pts/per)	27 points
Lab Reports (15 pts/per)	100 points
Quizzes (8 pts/per)	72 points
	250 points

3) Course Grade Determination

Add up your points from class and lab and then use the chart at the beginning of this section to determine your course grade.

Example 1:

590.0 class points

\+ 200 lab points

790.0 total points/1000 points = 79.00%

Example 2:

537.5 class points

\+ 200 lab points

737.5 total points/1000 points = 73.75%

To summarize:

[(Ex1 + Ex2 + Ex3 + Final + Homework + Lab = Total Points

(Total Points)/1000] x 100 = Total Percent

Academic Integrity

Offenses against the Code of Academic Integrity (i.e. cheating) are deemed serious and insult the integrity of the entire academic community. Any suspected violations of the code are taken very seriously and will be forwarded to the Center for Student Ethics and Standards for further investigation.

http://www.uvm.edu/policies/student/acadintegrity.pdf

IV. Tentative Lecture Schedule and End-of-Chapter Homework

Dates	***Chapters***	***Homework Problems (Learning Objectives)***
Aug 31 - Sept 4	Syllabus	(Class Dynamics)
	E	ChE: 19,21,23,25,27,29,33,37,39,41,45,47,49,51,53, 55,59,61,65,71,73,75,79,81,87,89,91,95,99, (ModuleE: Dimensional Analysis, Conversions, Significant Figures and Density)
	1	Ch1: 35,39,43,45,49,53,55,57,59,61,63,65,67,71,75, 77,79,83,85,87,89,91,93,97,103,105,107,109,117, (Module1: History and Current Understanding of Atoms, Elements and Molecules, The Mol)
Sept 7	**LABOR DAY HOLIDAY**	
Sept 7 - 11	1 and 2	Ch2: 35,37,39,41,43,51,53,55,57,59,61,63,65,67,69, 71,73,79,85,89,91 (Module2: Light, Energy and Fireworks, Quantum Mechanical View of the Atom)
Sept 14	**LAST DAY TO ADD/DROP COURSE**	
Sept 14 - 18	2	
Sept 21	**EXAM 1****	**Chapters E, 1, and 2****
Sept 21 - 25	3	Ch3: 41,43,45,47,49,51,53,55,57,59,61,63,65,67,69, 71,73,75,77,79,81,83,87,89,91,93,95,97,101,103,109, 115,127,135 (Module3: Electron Configurations and Periodic Trends)
Sept 28 - Oct 2	4	Ch4: 29,31,33,35,37,39,43,45,47,49,51,53,55,57,61, 63,65,67,69,71,75,77,79,83,87,93,95,97,101,103,105, 109,111,117,119,121,123,125,127,137 (Module4: Molecules and Molecular Molar Mass, Nomenclature and Determination of Molecular Formulas.

**Extent of exam material will depend on our progress in lecture.

Dates	Chapters	Homework Problems (Learning Objectives)
Oct 5 - 9	4 and 5	Ch5: 23,25,27,29,31,35,37,41,43,45,47,49,51,53,55, 57,59,61,63,65,69,71,73,75,79,81,83,85,91,95,97,99, 101 (Module5: Bonding, Resonance, Lewis Octet Theory, VSEPR Theory, Molecular Shape and Polarity)
Oct 12 -16	5	
Oct 19	**EXAM 2****	**Chapters 3, 4, and 5****
Oct 19 - 23	11	Ch11: 35,37,39,41,43,45,47,49,51 (Module11a: Forces of Attraction and the Physical Properties they control)
	6	Ch6: 25,29,31,33,35,39,41,43,45,49,51,53,55,57,59, 61 (Module6: Valence Bond Theory and Molecular Orbital Theory)
Oct 29	**LAST DAY TO WITHDRAW FROM COURSE**	
Oct 26 - 30	6 and 7	Ch7: 15,17,19,21,23,25,27,29,31,33,35,37,39,41,43, 45,47,49,53,55,57,61,63,65,67,69,71,75,81,85 (Module7: Chemical Reactions, Balancing, Stoichiometry, Limiting Reagent, Theoretical Yield and Percent Yield)
Nov 2 - 6	7 and 8	Ch8: 21,23,25,27,29,31,33,35,37,39,41,43,45,47,49, 51,53,55,57,59,61,63,65,67,69,71,73,75,77,79,81,87, 91,93,99 (Module8: Solution Concentration, Aqueous Reactions, Precipitation, Acid-Base, Gas-Evolution and Reduction-Oxidation Reactions)

**Extent of exam material will depend on our progress in lecture.

Dates	Chapters	Homework Problems (Learning Objectives)
Nov 9 - 13	8 and 9	Ch9: 31,33,35,37,39,41,43,45,47,49,51,53,57,59,61, 63,65,67,69,71,73,75,77,79,81,83,85,87,89,91,93,95, 99,101,107,111,113,117,119,123 (Module9: Thermodynamics, Calorimetry and Enthalpy)
Nov 16	**EXAM 3****	**Chapters 6, 11, 7, 8, and 9****
Nov 16 - 20	9	
Nov 23 - 24	10	Ch10: 25,29,31,33,35,37,39,41,43,45,47,49,51,53,55, 57,59,61,63,67,69,71,73,77,79,81,83,85,87,89,91,93, 95,99,101,105,107,113,123,125,127 (Module10: Simple Gas Laws and Ideal Gas Law, Dalton's Law of Partial Pressures, Gas-Reaction Stoichiometry and Real Gases)
Nov 25 - 27	**THANKSGIVING HOLIDAY**	
Nov 30 - Dec 4	10 and 11 Review	Ch11: 53,57,59,61,63,65,67,69,71,73,77,81,85,87,93 (Module11b: Temperature Dependence, Vapor-Pressure Heating Curve for Water and Phase Diagrams)
Dec XX	**Final Exam**	**Cumulative**

**Extent of exam material will depend on our progress in lecture.

V. Laboratory Schedule

Lab Groups A and B

Date	***Experiment***	***Description****
Aug 31 - Sept 4	**Purchase Items**	Purchase lab manual and safety glasses
Lab A and Lab B	**Online**	On Blackboard, review and complete the *Introduction to Lab*
Sept 7 - 11 ***Lab A and Lab B***	**Online**	On Blackboard, review and complete the *Lab Safety Presentation and Quiz*
Sept 14 - 18	Check In	
In Person Lab A	Experiment 1 Assignment Due	Density Determination Safety Presentation and Safety Quiz
Online Lab B	Experiment 2 Assignment Due	Flame Emission Safety Presentation and Safety Quiz
Sept 21 - 25	Check In	
Online Lab A	Experiment 2 Assignment Due	Flame Emission Exp1: Lab Report Exp2: Prelab and Quiz
In Person Lab B	Experiment 1 Assignment Due	Density Determination Exp1: Prelab and Quiz Exp2: Lab Report
Sept 28 - Oct 2		
Online Lab A	Experiment 3 Assignment Due	Ionization Energy/Atomic Exp2: Lab Report Exp3: Prelab and Quiz
In Person Lab B	Experiment 4 Assignment Due	Determination of Chemical Formula Exp1: Lab Report Exp4: Prelab and Quiz

Date	***Experiment***	***Description***
Oct 5 - 9		
In Person Lab A	Experiment 4 Assignment Due	Determination of Chemical Formula Exp3: Lab Report Exp4: Prelab and Quiz
Online Lab B	Experiment 3 Assignment Due	Ionization Energy/Atomic Exp4: Lab Report Exp3: Prelab and Quiz
Oct 12 -16		
Online Lab A	Experiment 5 Assignment Due	Chemicals Models 2 (VSEPR) Exp4: Lab Report Exp5: Prelab and Quiz
In Person Lab B	Experiment 6 Assignment Due	Separating a Mixture of Compounds Exp3: Lab Report Exp6: Prelab and Quiz
Oct 19 - 23		
In Person Lab A	Experiment 6 Assignment Due	Separating a Mixture of Compounds Exp5: Lab Report Exp6: Prelab and Quiz
Online Lab B	Experiment 5 Assignment Due	Chemicals Models 2 (VSEPR) Exp6: Lab Report Exp5: Prelab and Quiz
Oct 26 - 30		
In person Lab A	Experiment 7 Assignment Due	Chemical Reactions Exp6: Lab Report Exp7: Prelab and Quiz
Online Lab B	Experiment 8 Assignment Due	Limiting Reagent and Excess Reagent Exp5: Lab Report Exp8: Prelab and Quiz

Date	***Experiment***	***Description***
Nov 2 - 6		
Online Lab A	Experiment 8 Assignment Due	Limiting Reagent and Excess Reagent Exp7: Lab Report Exp8: Prelab and Quiz
In Person Lab B	Experiment 7 Assignment Due	Chemical Reactions Exp8: Lab Report Exp7: Prelab and Quiz
Nov 9 - 13		
In Person Lab A	Experiment 9 Assignment Due	Acid-Base Titration Exp8: Lab Report Exp9: Prelab and Quiz
Online Lab B	Experiment 10 Assignment Due	Heat Capacity and Enthalpy Exp7: Lab Report Exp10: Prelab and Quiz
Nov 16 - 20		
Online Lab A	Experiment 10 Assignment Due	Heat Capacity and Enthalpy Exp9: Lab Report Exp10: Prelab and Quiz
In Person Lab B	Experiment 9 Assignment Due	Acid-Base Titration Exp10: Lab Report Exp9: Prelab and Quiz
Nov 23 - 27	**No Labs**	
Nov 30 - Dec 4		
Lab A and Lab B	***Online***	Conclustion of Lab

Online Lab Group

Date	***Experiment***	***Description****
Aug 31 - Sept 4	**Purchase Items**	Purchase lab manual and safety glasses
	Online	On Blackboard, review and complete the *Introduction to Lab*
Sept 7 - 11	**Online**	On Blackboard, review and complete the *Lab Safety Presentation and Quiz*
Sept 14 - 18	Check In	
Online Lab	Experiment 1 Assignment Due	Density Determination Safety Presentation and Safety Quiz
Sept 21 - 25	Check In	
Online Lab	Experiment 2 Assignment Due	Flame Emission Exp1: Lab Report Exp2: Prelab and Quiz
Sept 28 - Oct 2		
Online Lab	Experiment 3 Assignment Due	Ionization Energy/Atomic Exp2: Lab Report Exp3: Prelab and Quiz
Oct 5 - 9		
Online Lab	Experiment 4 Assignment Due	Determination of Chemical Formula Exp3: Lab Report Exp4: Prelab and Quiz
Oct 12 -16		
Online Lab	Experiment 5 Assignment Due	Chemicals Models 2 (VSEPR) Exp4: Lab Report Exp5: Prelab and Quiz

Oct 19 - 23		
Online Lab	Experiment 6 Assignment Due	Separating a Mixture of Compounds Exp5: Lab Report Exp6: Prelab and Quiz
Oct 26 - 30		
Online Lab	Experiment 7 Assignment Due	Chemical Reactions Exp6: Lab Report Exp7: Prelab and Quiz
Nov 2 - 6		
Online Lab	Experiment 8 Assignment Due	Limiting Reagent and Excess Reagent Exp7: Lab Report Exp8: Prelab and Quiz
Nov 9 - 13		
Online Lab	Experiment 9 Assignment Due	Acid-Base Titration Exp8: Lab Report Exp9: Prelab and Quiz
Nov 16 - 20		
Online Lab	Experiment 10 Assignment Due	Heat Capacity and Enthalpy Exp9: Lab Report Exp10: Prelab and Quiz
Nov 23 - 27	**No Labs**	
Nov 30 - Dec 4		
Online Lab	**Online**	Conclusion of Lab

VI. ACCESS Accommodations

Student Learning Accommodations Statement

In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact ACCESS, the office of Disability Services on campus. ACCESS works with students to create reasonable and appropriate accommodations via an accommodation letter to their professors as early as possible each semester.

Contact ACCESS: A170 Living/Learning Center - 802-656-7753 - access@uvm.edu.

ACCESS Office: http://www.uvm.edu/~access/

Policy on disability certification and student support:
http://www.uvm.edu/~uvmppg/ppg/student/disability.pdf

VII. Religious Holidays

Religious Holiday Policy Statement

Religious Holidays: Students have the right to practice the religion of their choice. If you need to miss class to observe a religious holiday, please submit the dates of your absence to me in writing by the end of the second full week of classes. You will be permitted to make up work within a mutually agreed-upon time.

VIII. Illness Accommodations

The Center for Health and Wellbeing does not provide students with notes verifying medical illness. This approach makes the best use of their limited medical resources by not having students who are required to provide verification of a recent illness utilize appointment times which can be used for students who require evaluation and therapy. Instead, contact your college's Dean's office so they can report your illness to all of your professors.

When students experience a serious illness requiring hospitalization or when an extended absence from class is foreseen, a Center staff member will (with the student's permission) notify the Dean's Office of the student's College or School so that faculty members can be made aware and the student supported in working successfully through the absence.

IX. COVID-19 Accommodations

Due to COVID-19 we advise that a student feeling any symptoms should get checked out before attending an in-person class. Keep in mind that if a student attends an in-person class and tests positive for COVID-19 that they are putting other students at risk and possibly quarantine. So when in doubt, go get tested.