CHEM 1110

Fall 2020

Dr. Mark Noirot

Course Description

This is an introductory chemistry course for non-science majors. It is designed for students whose major does not require the more mathematically intensive CHEM 1210 or CHEM 1220 courses and is the first of a two-semester sequence. Progression is made from the basic math, measurement, and inorganic chemistry through an introduction to organic chemistry.

Prerequisite/Restriction: MATH 1050 (prerequisite/corequisite) OR a C or better in MATH 1010 OR an Accuplacer score of 60 or better OR MATH ACT of 24 OR MATH SAT of 570 OR satisfactory completion (C or better) of the MATH 0995 as a prerequisite. MATH 1045 can be a substitute with instructor approval.

CHEM 1110 is a 4 credit university level breadth physical science (BPS) course.

Semester(s) Traditionally Offered: Fall, Spring

Fees

There are no direct fees.

Course Objectives

By the end of this course, you will be able to:

1. Identify the nature and type of inorganic, ionic, organic, and biochemical structures.
2. Describe the major inter-molecular forces associated with different structures and describe the effects on material properties.
3. Identify and describe major biochemical metabolic pathways and relate them to food type and diet.

Instructor

Mark D. Noirot, Ph.D.
mark.noirot@usu.edu
office 435-678-8193
Location: USU Blanding, BLT 111
Class Scheduled meetings: MWF 1:30 pm to 2:45 pm - full semester

Canvas Information

Canvas is the where course content, grades, and communication will reside for this course.

- [http://canvas.usu.edu](http://canvas.usu.edu)
  - Your username is your A#, and your password is your global password (the same one you use for Banner or Aggiemail).
- For Canvas, Passwords, or any other computer-related technical support contact the IT Service Desk.
  - 435 797-4357 (797-HELP)
  - 877 878-8325
  - [http://it.usu.edu](http://it.usu.edu)
  - servicedesk@usu.edu

Course Resources

Required Textbook:
General, Organic, and Biological Chemistry, An Integrated Approach, 1ed or 2ed or 3ed
Laura Frost, Todd Deal, Karen C. Timberlake

Course Requirements
Each student will:

1. Access the Course through CANVAS
2. Take exams and complete homework assignments through the CANVAS LMS or portal.
   1. Exams can be taken using Proctorio software to monitor ... or
   2. Exams can be taken at USU approved Proctored Testing Centers.

Evaluation Methods and Criteria

Course grade is determined by scores on homework quizzes ~35%, and 4 typically independent exams ~65%. No exam scores are "dropped".

Students may use the proctoring software to take online exams at non-conventional locations. Students are responsible for ensuring the quality of internet service is adequate. The environment must be private, quiet, and well lit. Students may not wear hats, sunglasses, or any item that interferes with the recording of their faces and eyes during the exam. Student faces must be well lit and on screen at all times. Students must not be backlit and obscured by the lighting behind them. This can all be tested and verified by the student before taking every exam. Behavior during the exams is recorded and evaluated.

Evaluation by the Instructor is completely at his discretion! Evaluation can occur at any time during or after an exam.

Course Content

Also - see the content in the Modules Section

1. Matter – introduction to atoms, elements, molecules, and mixtures
   1. Metric Units and unit conversions
   2. Metric prefixes
   3. States of matter
      1. Gasses – Boyle’s Law gas calculations
      2. Significant figures in calculations
      * Rounding

1. Scientific notation

1. Classifying Matter
   1. Pure substances
2. Mixtures
   2. Physical changes vs chemical changes

2. Atoms and Radioactivity
   1. Isotopes: Atomic number and Mass number
   2. The Mole and molar quantities
   3. Very brief discussion – electronic configuration
   4. Radioactivity
      1. Alpha, Beta, Gamma
      2. Half Life
         - Applications in medicine

1. Nuclear equations

3. Compounds and Molecules
   1. The Octet Rule
   2. Ion Formation / Ionic compounds
   3. Covalent Bonding
      1. Lewis dot and stick structures
      2. Simple covalent bonds
   4. Electronegativity
      1. Polar covalent bonds
      2. Polar molecules
   5. Organic Compounds
      1. Alkanes - names
      2. Representations, Lewis structures, skeletal structures, condensed structural formulas
   3. Fatty Acids
   4. Functional Groups - identify
      1. Alkanes, alkenes, alkynes
      2. Aromatics
         - Ethers

1. Thiol, sulfide, disulfides
2. Amines
3. Aldehyde and Ketones
   - Carboxylic acids / carboxylate
   - Ester

1. Amide

1. Isomers
1. Conformational
2. Structural
   - Cis / trans in alkenes and cycloalkanes

1. Naming simple alkanes and substituted alkanes
2. Haloalkanes
3. Chirality

5. Carbohydrates
1. Monosaccharides
   1. Aldehydes and ketones
   2. Multiple chiral centers and Fischer Projections
      - Alpha-D-Glucose

1. Enantiomers, epimers, diastereomers
2. Oxidation and reductions of organic molecules – general
   1. Benedict’s test for reduction sugars
   2. Sugar acids and sugar alcohols
   3. Ring formation
      1. Anomeric carbon
      2. Hemiacetal
      3. Glycosidic bonds
         1. Alpha or beta ring determination, numbering schema
         2. Naming glycosidic bonds
         4. Disaccharides
            1. Maltose
            2. Lactose
            3. Sucrose
            5. Polysaccharides
               1. Amylose
               2. Amylopectin
               3. Glycogen
               4. Cellulose
               5. Chitin
         6. Blood types by carbohydrate flags
        4. Intermolecular Forces
           1. London Forces
           2. Dipole dipole attractions
           3. Hydrogen bonding
           4. Ion dipole attractions
           5. Solubility – golden rule of solubility
           6. Soaps and detergents / amphipathic molecules

   3. Glycosidic bonds
7. Intermol Forces and Changes of state
8. Structural Features of Fats, Oils, unsaturation, trans fats
9. Intermol Forces and Cell Membranes
   1. Phospholipid bilayer
   2. Polar regions
      - Non-polar region
1. Cholesterol and proteins in the membrane

7. Solutions
   1. Homogeneous vs Heterogeneous systems
   2. Colloids and suspensions
   3. Dissolution and solubility
   4. Chemical equilibria
      1. Strong electrolytes
      2. Weak electrolytes
      5. Concentration
         1. Various units: molarity, equivalents, ppm, ppb, % wt wt, % wt/vol
         2. Dilution calculations
   6. Osmosis and Diffusion
   7. Transport across cell membranes
8. Acids, Bases, and Buffers in the body
   1. Definitions
   2. Strong acids/bases
   3. Weak acids/bases
   4. Chemical Equilibria
      1. Equilibria constant expressions
      2. Ka values
      5. Le Chatelier’s Principle
      6. Conjugate acid base pairs
5. pH and measuring pH - \([H_3O^+]\)
8. Ka, pKa, and acid strength
9. Intro to amino acids
10. Buffer conditions

Grade Scheme

The following grading standards will be used in this class:
<table>
<thead>
<tr>
<th>Grade</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>100 % to 93.0%</td>
</tr>
<tr>
<td>A-</td>
<td>&lt; 93.0 % to 90.0%</td>
</tr>
<tr>
<td>B+</td>
<td>&lt; 90.0 % to 87.0%</td>
</tr>
<tr>
<td>B</td>
<td>&lt; 87.0 % to 83.0%</td>
</tr>
<tr>
<td>B-</td>
<td>&lt; 83.0 % to 80.0%</td>
</tr>
<tr>
<td>C+</td>
<td>&lt; 80.0 % to 77.0%</td>
</tr>
<tr>
<td>C</td>
<td>&lt; 77.0 % to 73.0%</td>
</tr>
<tr>
<td>C-</td>
<td>&lt; 73.0 % to 70.0%</td>
</tr>
<tr>
<td>D+</td>
<td>&lt; 70.0 % to 67.0%</td>
</tr>
<tr>
<td>D</td>
<td>&lt; 67.0 % to 60.0%</td>
</tr>
<tr>
<td>F</td>
<td>&lt; 59.0 % to 0.0%</td>
</tr>
</tbody>
</table>

Course Schedule/Outline

Outline dates and assignments

Attendance and Excused Absences Policy

Attendance is highly encouraged and has proven to be essential to success for most students in this class. Attendance is not monitored, rewarded with points, or penalized. Exams must be taken during specified time periods. The exam timing may be shifted as needed during the semester. Scheduled dates and times are subject to change. Students must contact the instructor in advance of an exam to request exception. Typically, exams are not taken early.

Nonattendance Policy

Students May Be Dropped For Nonattendance

If a student does not attend a class during the first week of the term or by the second class meeting, whichever comes first, the instructor may submit a request to have the student dropped from the course. (This does not remove responsibility from the student to drop courses which he or she does not plan to attend.) This option is typically used for classes that are full and the instructor is trying to make a seat available for another student, but may be considered for other courses. Requests must be made during the first 20 percent of the course and will be considered on an individual student basis. Students who are dropped from courses will be notified by the Registrar's Office through their preferred e-mail account (see 2018-2019 General Catalog (Links to an external site.)).
Assumption of Risk

All classes, programs, and extracurricular activities within the University involve some risk, and certain ones involve travel. The University provides opportunities to participate in these programs on a voluntary basis. Therefore, students should not participate in them if they do not care to assume the risks. Students can ask the respective program leaders/sponsors about the possible risks a program may generate, and if students are not willing to assume the risks, they should not select that program. By voluntarily participating in classes, programs, and extracurricular activities, a student does so at his or her own risk. General information about University Risk Management policies, insurance coverage, vehicle use policies, and risk management forms can be found at: [http://www.usu.edu/riskmgt/](http://www.usu.edu/riskmgt/) (Links to an external site.)

Library Services

All USU students attending classes in Logan, at our Regional Campuses, or online can access all databases, e-journals, and e-books regardless of location. Additionally, the library will mail printed books to students, at no charge to them. Students can also borrow books from any Utah academic library. Take advantage of all library services and learn more at [libguides.usu.edu/rc.](http://libguides.usu.edu/rc.) (Links to an external site.)

Classroom Civility

Utah State University supports the principle of freedom of expression for both faculty and students. The University respects the rights of faculty to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede the learning process. Disruptive classroom behavior will not be tolerated. An individual engaging in such behavior may be subject to disciplinary action. Read [Student Code Article V Section V-3](http://www.usu.edu/riskmgt/) (Links to an external site.) for more information.

University Policies & Procedures

**Academic Freedom and Professional Responsibilities**

Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. [Faculty Code Policy #403](http://www.usu.edu/riskmgt/) (Links to an external site.) further defines academic freedom and professional responsibilities.

**Academic Integrity – "The Honor System"**
Each student has the right and duty to pursue his or her academic experience free of dishonesty. To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge: "I pledge, on my honor, to conduct myself with the foremost level of academic integrity." A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize. A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the Utah State University community;
- Understands that each act of academic dishonesty devalues every degree that is awarded by this institution; and
- Is a welcomed and valued member of Utah State University.

Academic Dishonesty

The instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined the University’s Student Code. Acts of academic dishonesty include but are not limited to:

- **Cheating**: using, attempting to use, or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity. Unauthorized assistance includes:
  - Working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done “individually;”
  - Depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
  - Substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work;
  - Acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission;
  - Continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity;
  - Submitting substantially the same work for credit in more than one class, except with prior approval of the instructor; or engaging in any form of research fraud.
- **Falsification**: altering or fabricating any information or citation in an academic exercise or activity.
- **Plagiarism**: representing, by paraphrase or direct quotation, the published or unpublished work of another person as one’s own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

For additional information go to: [ARTICLE VI. University Regulations Regarding Academic Integrity](Links to an external site.)

Sexual Harassment/Title IX
Utah State University is committed to creating and maintaining an environment free from acts of sexual misconduct and discrimination and to fostering respect and dignity for all members of the USU community. Title IX and USU Policy 339 (Links to an external site.) address sexual harassment in the workplace and academic setting.

The university responds promptly upon learning of any form of possible discrimination or sexual misconduct. Any individual may contact USU's Affirmative Action/Equal Opportunity (AA/EO) Office (Links to an external site.) for available options and resources or clarification. The university has established a complaint procedure to handle all types of discrimination complaints, including sexual harassment (USU Policy 305 (Links to an external site.), and has designated the AA/EO Director/Title IX Coordinator as the official responsible for receiving and investigating complaints of sexual harassment.

**Withdrawal Policy and "I" Grade Policy**

Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term ‘extenuating’ circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor.

**Students with Disabilities**

USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the Disability Resource Center (DRC) (Links to an external site.) as early in the semester as possible (University Inn # 101, (435) 797-2444, drc@usu.edu). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.

**Diversity Statement**

Regardless of intent, careless or ill-informed remarks can be offensive and hurtful to others and detract from the learning climate. If you feel uncomfortable in a classroom due to offensive language or actions by an instructor or student(s) regarding ethnicity, gender, or sexual orientation, contact:

- Division of Student Affairs: https://studentaffairs.usu.edu (Links to an external site.), (435) 797-1712, studentservices@usu.edu, TSC 220
- Student Legal Services: https://ususa.usu.edu/student-association/student-advocacy/legal-services (Links to an external site.), (435) 797-2912, TSC 326,
- Access and Diversity: http://accesscenter.usu.edu (Links to an external site.), (435) 797-1728, access@usu.edu; TSC 315
- Multicultural Programs: http://accesscenter.usu.edu/multiculture (Links to an external site.), (435) 797-1728, TSC 315
LGBTQA Programs: [http://accesscenter.usu.edu/lgbtqa](http://accesscenter.usu.edu/lgbtqa), (435) 797-1728, TSC 3145

Provost’s Office Diversity Resources: [https://www.usu.edu/provost/diversity](https://www.usu.edu/provost/diversity), (435) 797-8176

You can learn about your student rights by visiting:
The Code of Policies and Procedures for Students at Utah State University: [https://studentconduct.usu.edu/studentcode](https://studentconduct.usu.edu/studentcode)

**Grievance Process**

Students who feel they have been unfairly treated may file a grievance through the channels and procedures described in the Student Code: Article VII.

**Full details for USU Academic Policies and Procedures can be found at:**

- Student Conduct ([Links to an external site.](http://accesscenter.usu.edu/lgbtqa))
- Student Code ([Links to an external site.](http://accesscenter.usu.edu/lgbtqa))
- Academic Integrity ([Links to an external site.](http://accesscenter.usu.edu/lgbtqa))
- USU Selected Academic Policies and Procedures ([Links to an external site.](http://accesscenter.usu.edu/lgbtqa))
- USU Academic Policies and Procedures ([Links to an external site.](http://accesscenter.usu.edu/lgbtqa))
- Academic Freedom and Professional Responsibility Policy ([Links to an external site.](http://accesscenter.usu.edu/lgbtqa))

**Emergency Procedures**

In the case of a drill or real emergency, classes will be notified to evacuate the building by the sound of the fire/emergency alarm system or by a building representative. In the event of a disaster that may interfere with either notification, evacuate as the situation dictates (i.e., in an earthquake when shaking ceases or immediately when a fire is discovered). Turn off computers and take any personal items with you. Elevators should not be used; instead, use the closest stairs.

**Course Summary:**

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<thead>
<tr>
<th>Date</th>
<th>Details</th>
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<tbody>
<tr>
<td>Fri Sep 11, 2020</td>
<td>Assignment <a href="http://accesscenter.usu.edu/lgbtqa">Science Conceptions I</a></td>
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<td>Assignment <a href="http://accesscenter.usu.edu/lgbtqa">CH 1 Quiz</a></td>
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<td>Assignment <a href="http://accesscenter.usu.edu/lgbtqa">CH1 video</a></td>
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<tr>
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<td>Details</td>
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<td>Sat Sep 12, 2020</td>
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<td>Fri Sep 18, 2020</td>
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<td>Tue Sep 22, 2020</td>
<td>Assignment <strong>CHEM 1110 Exam 1</strong></td>
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<td>Sat Sep 26, 2020</td>
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<td>Wed Nov 11, 2020</td>
<td>Assignment <strong>Exam 2 CH3 and CH4</strong></td>
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<td>Sat Nov 28, 2020</td>
<td>Assignment <strong>Exam 3 CH5 and CH6</strong></td>
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<td>Wed Dec 9, 2020</td>
<td>Assignment <strong>Science Conceptions II</strong></td>
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<td>Mon Dec 14, 2020</td>
<td>Assignment <strong>Exam 4 CH7 &amp; CH8</strong></td>
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<td>Assignment <strong>EC</strong></td>
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<td>Assignment <strong>Post-Breadth Physical Sciences (BPS): Criteria 1</strong></td>
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<td>Assignment <strong>Pre-Breadth Physical Sciences (BPS): Criteria 1</strong></td>
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<td>Sunday</td>
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<tr>
<td>30 August 2020</td>
<td>31 August 2020</td>
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Assignments are weighted by group: