CHEM101 Sect. H01 (STAR 44454) Principle of Chemistry I Hybrid Course (GenEd/Natural Sciences – IAI P1 902 L)

Spring 2019 Syllabus

**Course:** CHEM 101 Principle of Chemistry I Hybrid Course (GenEd/Natural Sciences – IAI P1 902 L)

**Credit Hours:** Four semester credit hours

**Method of Delivery:** Online lectures and 2 hours of laboratory weekly.

**Weekly Review Section:** Wed. 4:00 pm – 6:00 pm, Currens 202 (starting from Jan. 30).

**Laboratory Location:** 021-023, 025-026 sections (Currens 327)

**Instructor:** Dr. Mai-Lei Chen, Office: Currens 519-B, Phone: 298-2578; Fax: 298-2180, Email: m-chen2@wiu.edu

**Office Hours:** Mon. 10:00 am - 11:00 am and 1:00 pm - 2:00 pm; Wed. and Fri., 10:00 am - 11:00 am or by appointment.

**Communications:** In order to foster a sense of community, I will be available by emails and by Skype (Skype account: mlchen1000) or by Zoom Meeting (You need to use your WIU email address to register a free Zoom account first (zoom.us). please email me to make arrangements for Skype or Zoom. Usually, I’ll reply your emails within 12 hours unless I notify you in advance if I cannot access internet.

**Western Online Technical Requirements:**
http://www.wiu.edu/CITR/resources/wo_tech_requirements.php
You need a computer and an internet connection so you can access our online course materials posted on Western Online. You also need to have Skype account in case you want to communicate with me by Skype.

**Required Textbooks:**

**Lecture:** *Introduction to General, Organic, and Biochemistry*, 10th Ed., 2013 by Bettelheim, Brown, Campbell, Farrell and Torres; Student Copy ISBN: 978-1-133-10508-4

Students enrolled in this course are levied a non-refundable laboratory usage fee of $35 to cover the cost of consumable supplies utilized during the semester.

**Course Description:** (IAI P1 902 L)

A survey for students who do not plan to take chemistry beyond the 100 level. Application of the general principles of inorganic and organic chemistry to biological environmental, and applied sciences.

**Prerequisites:** One year of high school algebra or MATH 099N, and either one year high school chemistry or CHEM 100.

**Goals of the Course:** This course is designed to give the student a basic grounding in all of the basic areas of general chemistry. The laboratory sessions are coordinated with the lecture topics so students can benefit from their hands-on experience reflecting what they learn from the lectures.

**Course Learning Objectives:** After students finish this hybrid course, they will be able to measure matters, write electron configuration, name ionic and covalent compounds and write their formulas, balance chemical and nuclear equations, calculate molar mass and the moles, define acid-base and calculate pH, calculate percentage of concentration and molarity. The detail learning objectives are listed in the followings:

**Week 1 (01/14 - 01/20)**

**Chapter 1. Matter, Energy and Measurement**

**Learning Objectives:** After students complete this chapter, they will be able to:
1. use exponential notation to represent very large or very small numbers as powers of 10
2. use metric system
3. determine the number of significant figures
4. do unit conversions by the factor-labeled method
5. describe states of matter
6. calculate density and specific gravity
7. classify potential and kinetic energy
8. describe how heat is transferred and use heat equation

**Assignments:**
1. Reading chapter 1 (p. 1-26)
2. Chapter 1 homework Practice
3. Chapter 1 Quiz

**Lab 1: Density and Specific Gravity** (Lab manual p. 9-23)
**Week 2 - 3 (01/21 - 02/03)**

**Chapter 2. Atoms**

**Learning Objectives:** After students complete this chapter, they will be able to:
1. classify matter
2. describe Dalton’s atomic theory
3. describe atomic structure
4. use the Periodic Table
5. write electron configurations
6. describe the trends of the Periodic Table (Periodic properties)

**Assignments:**
1. Reading chapter 2 (p. 31-61)
2. Chapter 2 homework Practice
3. Chapter 2 Quiz

**Lab 2: Separation of the components of a Mixture** (Lab manual p. 25-33)

**Week 4 - 5 (02/04 - 02/17)**

**Chapter 3 Chemical Bonds**

**Learning Objectives:** After students complete this chapter, they will be able to:
1. describe the octet rule
2. name anions and cations
3. describe the two major types of chemical bonds, ionic and covalent
4. name ionic and covalent compounds
5. draw Lewis structures
6. describe resonance and draw curved arrows and push electrons
7. predict bond angles in covalent molecules
8. determine the polarity and the molecular shape of molecules

**Assignments:**
1. Reading chapter 3 (p. 68-99)
2. Chapter 3 homework Practice
3. Chapter 3 Quiz

**Lab 3: Empirical Formulas of Compounds** (p. 35-45)

**Week 6 - 7 (02/18 - 03/03)**

**Chapter 4 Chemical Reactions**

**Learning Objectives:** After students complete this chapter, they will be able to:
1. classify physical and chemical reactions
2. balance chemical equations
3. predict the reactivity of ions in aqueous solutions
4. describe oxidation and reduction
5. describe formula and molecular weights
6. use the mole to calculate mass relationship
7. calculate mass relationships in chemical reactions
8. identify endothermic and exothermic reactions

**Assignments:**
1. Reading chapter 4 (p.108-133)
2. Chapter 4 homework Practice
3. Chapter 4 Quiz

**Lab 4: Chemical Reactions and Equations** (Lab manual 47-60)
**Lab 5: Chemicals in Everyday Life** (Lab manual p. 61-71)

**Week 8 (03/04 - 03/10)**

**Chapter 5 Gases, Liquids, and Solids**

**Learning Objectives:** After students complete this chapter, they will be able to:
1. define three states of matter
2. describe gas pressure and its measurement
3. describe the kinetic molecular theory of gases
4. use the laws that govern the behavior of gases
5. use Avogadro’s Law, the Ideal Gas Law, and Dalton’s Law.
6. identify the types of attractive forces exist between molecules
7. describe the behavior of liquids at the molecular level
8. describe the properties of various types of solids
9. use a phase diagram to interpret phase changes and the energy involved

**Assignments:**
1. Reading chapter 5 (p. 140-169)
2. Chapter 5 homework Practice
3. Chapter 5 Quiz

**Lab 6: Behavior of Gases: Molar Mass of a Vapor** (Lab manual p. 73-86)

**Week 9 (03/11 - 03/17) Spring Break**

**Week 10 - 11 (03/18 - 03/31)**

**Chapter 6 Solutions and Colloids**

**Learning Objectives:** After students complete this chapter, they will be able to:
1. classify most common types of solutions
2. describe the properties of solutions.
3. identify factors that affect solubility
4. describe the most common units for concentration
5. explain why water is a good solvent
6. describe colloids and their properties
7. describe colligative properties: freezing point depression, boiling point elevation, and osmolarity

**Assignments:**
1. Reading chapter 6 (p.177-204)
2. Chapter 6 homework Practice
3. Chapter 6 Quiz

Lab 7: Soluble and Insoluble Salts (Lab manual p. 87-98)
Lab 8: Analysis of Alum (Lab manual p. 99-109)

Week 12 (04/01 - 04/07)

Chapter 7 Reaction Rates and Chemical Equilibrium

Learning Objectives: After students complete this chapter, they will be able to:
1. measure reaction rates
2. describe molecular collisions
3. explain the relationship between activation energy and reaction rate
4. describe how to change a chemical reaction rate
5. identify whether a reaction has reached equilibrium
6. calculate and interpret an equilibrium constant
7. use Le Chatelier’s Principle to predict the direction of a chemical reaction

Assignments:
1. Reading chapter 7 (p. 210-234)
2. Chapter 7 homework Practice
3. Chapter 7 Quiz

Lab 9: Reaction Rates and Equilibrium (Lab manual p. 111-125)

Week 13 - 14 (04/08 - 04/21)

Chapter 8 Acids and Bases

Learning Objectives: After students complete this chapter, they will be able to:
1. define acids and bases (Arrhenius, Lowry-Brønsted theory)
2. define the strength of acids and bases
3. identify conjugate acid-base pairs
4. name common acids and bases
5. predict the position of equilibrium in an acid-base reaction
6. use acid ionization constants
7. describe the properties of acids and bases
8. describe the acidic and basic properties of pure water
9. define and calculate pH and pOH
10. calculate concentration by using titration methods
11. describe buffers and calculate the pH of a buffer using the Henderson-Hasselbalch equation

Assignments:
1. Reading chapter 8 (p.139-270)
2. Chapter 8 homework Practice
3. Chapter 8 Quiz

Lab 10: Acid-Base Titration (Lab manual p. 127-139)
Week 15 (04/22 - 04/28)

Chapter 9 Nuclear Chemistry

Learning Objectives: After students complete this chapter, they will be able to:
1. describe radioactivity
2. describe nuclear radioactive decay (alpha-, beta-, gamma - decay)
3. balance a nuclear equation
4. calculate nuclear half-life
5. explain how radiation dosimetry is related to human health
6. define nuclear fission and nuclear fusion

Assignments:
1. Reading chapter 9 (p.275-300)
2. Chapter 9 homework Practice
3. Chapter 9 Quiz

Week 16 (4/29) Exam 3

Week 17 (05/06) Final Exam

Course Communication Plan

The key to success for our online course is keeping in close communication. Therefore, please feel free to contact me whenever you have questions or concerns. I will try my best to get back to you as soon as possible, usually within 12 hours. You can reach me by email at m-chen2@wiu.edu.

In order to foster a sense of community, I will also be available by Skype (Skype account: mlchen1000), please email me to make arrangements for Skype. If students prefer, I will set up a group in Skype so students will have a chance to participate in a group chat and to interact with other classmates.

My expectations for your participation in CHEM101 Hybrid Course:

1. All your online course materials and relevant website links will be posted on the Western Online in weekly folders.

2. The deadline for your quiz submission is always on Sunday, at 8:00 pm. For quizzes, you have Two attempts. The higher one will be counted as your grade. Please see the course schedule (Please see the syllabus p. 10-11) for the details of the weekly topics and the deadlines for the quiz submission.
3. **Exams:** CHEM101 Hybrid Course has four exams and a Final Exam which will be given on the scheduled dates Listed in the below:

**CHEM101 Four 50-minute Exam Schedules:**

Exam 1: February 18, Monday - Chapters 1 - 3  
Exam 2: March 20, Wednesday - Chapters 4 - 5  
Exam 3: April 8, Monday - Chapters 6 - 7  
Exam 4: April 29, Monday - Chapters 8 – 9

You can take your exams from one of the following choices on the exam day:

1. 12:00 pm – 12:50 pm in Currens 203  
2. 2:00 pm – 2:50 pm in Currens 203  
3. 6:00 pm – 6:50 pm in Currens 203  
4. Distance Education Test Center- WIU Macomb Campus  
   http://www.wiu.edu/global_education/testing.php

**Exams Proctored at Macomb Testing Center**  
The Testing Center is located in Horrabin Hall 10. Students must schedule appointments with Testing Center staff. **Schedule appointments at least 48 hours in advance.**  
- Call (309) 298-2496 for an appointment.  
- **Testing times** are Monday through Friday from **8:15 am to 4:15 pm.**  
- **Photo IDs** are required to test.  
- **Parking passes** are available upon request.  
- Contact the Testing Center **as soon as possible** if you cannot keep your appointment.

4. **Quad City Test Center**  
   http://www.wiu.edu/qc/student_life/student_services/testingCenter.php  
   The Testing Center is located in the Quad Cities Complex Building A, room 2215. Testing is by appointment only  
   - Student schedules appointment with testing center staff  
   - **Make appointments at least 48 hour (2 business days) in advance**  
   - Please contact the Center as soon as possible if you cannot keep your appointment  
   - To schedule an exam, please contact:  
     Leslie Mose  
     Quad Cities Complex, Building A, room 2215  
     Appointment Line: (309)743-0985  
     LA-Mose@wiu.edu
Final Exam (Chapter 1 - 9): May 6, Monday
You can take your Final exam from one of the following choices on the exam day:
1). 1:00 pm – 2:50 pm in Currens 203
2). 3:00 pm – 4:50 pm in Currens 203
3). 6:00 pm – 7:50 pm in Currens 203
4). Distance Education Test Center- WIU Macomb Campus
   http://www.wiu.edu/global_education/testing.php
5). Quad City Test Center.
   http://www.wiu.edu/qc/student_life/student_services/testingCenter.php

4. Chapter Quizzes: Quizzes will be posted in WesternOnline under “Assessment”. You have two attempts for each chapter quiz. The highest grade will be counted. There are 9 chapter quizzes and your best 8 quizzes will be counted as your grade. There is no quiz makeup if students miss the deadlines for submitting their quizzes online.

   * Exams and quizzes will be multiple-choice format.

5. Lab: Students need to register a CHEM101 Lab section and attend the weekly Lab (Please see the Lab syllabus).

Exam Policy
* You only need a pencil and a simple scientific calculator for your exam. All electronic devices such as cell phone, iPod, iPad, Labtop, smart watch et al, are not allowed during the exam.
* If a student takes the exam paper out of the classroom during or after the exam, he or she will get a zero for that exam.

* All hats, caps, and hoods that cover your ears are not allowed to be worn during exams. The instructor reserves the right to assign seating for the students during exams and/or any other time deemed necessary.

Makeup exams will only be given if the absence is due to an official university trip with advance notice, an important personal event cleared with me in advance, or a personal or family emergency with documentation. Oversleeping or forgetting the date of an exam will not be accepted as an excuse. If you know about a conflict in advance, I may allow you to take a "makeup" exam earlier than the scheduled time. EXCUSES MUST BE SUPPORTED WITH DOCUMENTATION, and it is your responsibility to obtain this documentation. If you do not provide documentation, there will be no makeup.

MAKE-UP EXAMS WILL BE SHORT ANSWER FORMAT. Make-up exams must be taken within one week of the scheduled time, except in exceptional circumstances such as an extended illness.
If you miss the Final Exam, your final letter grade will be one letter grade lower automatically.

**Homework Practices (Optional):** Since critical thinking and problem solving are important components of chemistry, homework and answers keys will be posted on WesternOnline in order to help students grasp principles and concepts discussed in class. Regular practice will help your overall exam scores.

**Outside work requirements for the course:** Students are expected to study, review and learn all materials posted in the unit modules, as well as read assigned chapters in the textbook, and to work on Chapter Practice Questions posted on Western Online. Generally a minimum of two hour of outside study time is required for each credit hour of this hybrid course.

**Chemistry Resource Center:** Currens 107. Free tutoring and/or help is provided by the department through the Chemistry Resource Center.

**Participation Bonus:** To encourage students to participate/communicate with classmates or me, there are 6 discussions will be posted in some weekly modules. If students post their response, they will earn 5 bonus points bonus for each discussion topic. Students can earn up to 30 bonus points that will be added to your gradebook for your final grade calculation.

**Performance and Grading scale:**

**Lecture part:** You must earn at least 45% (270 points) of the maximum points attainable (600) in the lecture part or you automatically fail the course.

**Laboratory part:** You must earn at least 60% (120 points) of the maximum points attainable (200) in the lab part or you automatically fail the course.

**Grading System**

<table>
<thead>
<tr>
<th>Component</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Lecture exams (100 points each)</td>
<td>= 400 points</td>
</tr>
<tr>
<td>1 Final exam</td>
<td>= 120 points</td>
</tr>
<tr>
<td>8 Best Quizzes (10 points for each)</td>
<td>= 80 points</td>
</tr>
<tr>
<td>Lab</td>
<td>= 200 points</td>
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</tbody>
</table>

Total: 800 points
Grading Scale: Letter grades for the course will be assigned based on the following point system out of a maximum of 800 points:

\[
\begin{align*}
\geq 704 & \ (88\%) = A \\
672 < 703 & \ (84\% - 87.9\%) = A- \\
640 < 671 & \ (80\% - 83.9\%) = B+ \\
608 < 639 & \ (76\% - 79.9\%) = B \\
576 < 607 & \ (72\% - 75.9\%) = B- \\
544 < 575 & \ (68\% - 71.9\%) = C+ \\
512 < 543 & \ (64\% - 67.9\%) = C \\
480 < 511 & \ (60\% - 63.9\%) = C- \\
456 < 479 & \ (57\% - 59.9\%) = D+ \\
432 < 455 & \ (54\% - 56.9\%) = D \\
390 < 431 & \ (50\% - 53.9\%) = D- \\
< 389 & = F
\end{align*}
\]

Exam grades are based on the total number of correct answers, and all grades are final. No curve will be applied to exam grades, and no “retakes” will be allowed. No “extra point” assignments will be made or applied to grades. Students can view their individual quiz and exam scores on WesternOnline (WIU ECom is required for login).

No incomplete will be given to a student with a failing grade in the course. No incomplete will be given in this course unless the student experiences a documented emergency that takes him/her away from the university for at least two consecutive weeks and/or causes him/her to miss the final exam. The student must notify the instructor of this emergency before the final exam.

You are expected to finish your quizzes, examinations, and discussion by your own. Any student convicted of academic dishonesty, (including plagiarism) may receive a failing grade and may be subject to further academic penalties, such as possible expulsion from the university. (See academic dishonesty policy http://www.wiu.edu/policies/acintegrity.shtml.)

WIU Policies for Students with disabilities: In accordance with University values and disability law, students with disabilities may request academic accommodations where there are aspects of a course that result in barriers to inclusion or accurate assessment of achievement. To file an official request for disability-related accommodations, please contact the Disability Resource Center at 309-298-2512, disability@wiu.edu or in 143 Memorial Hall. Please notify the instructor as soon as possible to ensure that this course is accessible to you in a timely manner.
University values, Title IX, and other federal and state laws prohibit sex discrimination, including sexual assault/misconduct, dating/domestic violence, and stalking. If you, or someone you know, has been the victim of any of these offenses, we encourage you to report this to the Title IX Coordinator at 309-298-1977 or anonymously online at: http://www.wiu.edu/equal_opportunity_and_access/request_form/index.php. If you disclose an incident to a faculty member, the faculty member must notify the Title IX Coordinator. The complete Title IX policy is available at: http://www.wiu.edu/vpas/policies/titleIX.php.

The following action is prohibited under the Student Conduct Code:
Disorderly Conduct: Any behavior which disrupts the regular or normal functions of the University community, including behavior which breaches the peace or violates the rights of others. Any student convicted of academic dishonesty, can receive a failing grade and may be subject to further academic penalties.

Web address for Academic Integrity Policy:
(http://www.wiu.edu/policies/acintegrity.php)

Web address for Student Rights and Responsibilities:
(http://www.wiu.edu/policies/acintegrity.php)

Emergency Preparedness: The WIU Office of Risk Management and Emergency Preparedness provides resources on how to respond to emergency situations. Please view the video resources at www.wiu.edu/rmep/ (Click “Resources” on the right side of the page). If the fire alarms sound and/or students are asked to evacuate the building all students should proceed immediately to the nearest exit and gather at the southwest corner of the Higgins parking lot (near the fence) until the “all clear” is given.
CHEM101 Hybrid Course, Lecture Schedule, Spring 2019  Dr. Chen

Week 1  Matter, Energy, and Measurements (Chapter 1)  
(01/14-20)  Chapter 1 Quiz (Chap. 1-3) is due on Sun., 1/27, at 8:00 pm

Week 2 - 3  Atoms (Chapter 2)  
(01/21-02/03)  Chapter 2 Quiz is due on Sun., 2/3, at 8:00 pm.

Week 4 – 5  Chemical Bonds (Chapter 3)  
(02/04-17)  Chapter 3 Quiz is due on Sunday, 2/17, at 8:00 pm.  
02/18  Exam 1 (Chapter 1 - 3)

Week 6 – 7  Chemical Reactions (Chapter 4)  
(02/18-03/03)  Chapter 4 Quiz is due on Sunday, 3/3, at 8:00 pm.

Week 8  Gases, Liquids, and solids (Chapter 5)  
(03/04-03/10)

Week 9  Spring Break (No Course Assignment)  
(03/11-3/17)  Chapter 5 Quiz is due on Monday, 3/18, at 8:00 pm.

Week 10-11  Solutions and Colloids (Chapter 6)  
(03/18-03/31)  
03/20  Exam 2 (Chapter 4 - 5)  
Chapter 6 Quiz is due on Sunday, 3/31, at 8:00 pm.

Week 12  Reaction Rates and Chemical Equilibrium (Chapter 7)  
(04/01-04/07)  Chapter 7 Quiz is due on Sunday, 4/7, at 8:00 pm.  
04/08  Exam 3 (Chapter 6 - 7)

Week 13-14  Acids and Bases (Chapter 8)  
(04/08-04/21)  Chapter 8 Quiz is due on Sunday, 4/21, at 8:00 pm.

Week 15  Nuclear Chemistry (Chapter 9)  
(4/22-4/28)  Chapter 9 Quiz is due on Sunday, 4/28, at 8:00 pm.

Week 16  
04/29  Exam 4 (Chapter 8 - 9) in Currens 203 (12:00 pm - 12:50 pm; 2:00 pm - 2:50 pm; or 6:00 pm - 6:50 pm).

Week 17  
05/06  Final Exam (Chapter 1-9) in Currens 203 (1:00 pm - 2:50 pm; 3:00 pm - 4:50 pm; or 6:00 pm - 7:50 pm).

THIS COURSE SCHEDULE IS SUBJECT TO CHANGE UPON NOTIFICATION BY INSTRUCTOR.