# UNIVERSITY CHEMISTRY II CHEM1101L (Lab)

Spring 2021

**Lab Time and Location:** W 9:30 - 11:30 **Room:** S235
**Instructor**: Gaumani Gyanwali – Ph. D.: OSU-Stillwater; MS, BS: Tribhuvan University
**Office Location:** S244
**Office Hours:** Posted on the office door
**Contact Information:** Office: (479)-394-7622, Ext. 1339
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**Prerequisite**: Successful completion of University Chemistry I CHEM1103 and University Chemistry I lab CHEM1101

**Required materials**:

1. Laboratory manual: General Chemistry II Lab Manual, Gaumani Gyanwali (Published January 2021)
2. Lab safety goggles
3. Calculator capable of roots, exponents, and logarithms

**Face Mask Policy:** As per the Executive Order from the governor of Arkansas, all students are required to wear a proper face covering that completely covers the nose and mouth while on campus and in class. Masks with holes or masks that do not completely cover nose and mouth are not acceptable. Any student that does not have a proper mask will leave class and be referred to the Vice Chancellor for Student Affairs for possible disciplinary action.

**Food and Drink:** Food and drinks, including water are not allowed in the lab at any time.

**Course Description**: This is a basic chemistry laboratory course for 1 credit designed to meet the experimental needs of students planning to take advanced science majors such as Physics, Chemistry, Engineering, Forestry, Biology, Pharmacy, Medicines, etc. This laboratory course may not be taken separately without taking University Chemistry II CHEM1203 prior or currently.

**Program Outcomes:** Students will increase their
-writing, reading, speaking, and listening skills,
-competency in mathematics, utilizing their analytical and occupational skills to solve real life problems,
-understanding of different cultures and societies across the globe and how both have changed over time,
-understanding of basic principles and their application in the field of physical sciences and biological sciences, and
-technological and research skills.

**Rationale:** Through the study of chemistry, problem solving experiences, and laboratory activity, the student develops an understanding of mater and the laws that explain the interactions between matters, including the energy changes involved. The gained knowledge is applicable in upper level chemistry courses.

**Course Objectives:** Upon completion of University Chemistry II laboratory, the student should be able to:

1. Perform experiments using technology and designed to reinforce the concepts studied in the lecture, analyze the results, and derive conclusions. Main topics include study of colligative properties, reaction rate constant and factors affecting reaction kinetics, equilibrium shift, pH measurements of household chemicals, weak mono- and polyprotic acids, solubility product constant calculations and thermodynamics of sparingly soluble salt, electrochemical and electrolytic cells.
2. Prepare formal laboratory reports on the experiments performed, draw proper conclusions, analyze scientific error, and present graphs or charts on the findings. (Components: collaboration, data collection, calculation and formulation, proper grammar and format, documentation, logical argument, hands-on skills)

**Topical/Unit Outline and Tentative Schedule for Lab:**

| Date | Experiment Title | Page Number |
|---|---|---|
| 1/13 | Syllabus, safety agreement, safety quiz | |
| 1/20 | 1. Molar Mass Using Freezing Point Depression | 5 |
| 1/27 | 2. Identify an Unknown Sugar Using Boiling Point Elevation | 15 |
| 2/3 | 3. Factors that Affect the Reaction Kinetics | 25 |
| 2/10 | 4. Rate Constant for Iodination of Acetone | 39 |
| 2/17 | 5. Le-Châtelier's Principle: Shift of Equilibrium | 51 |
| 2/24 | 6. Kitchen Chemistry | 67 |
| 3/3 | *Make-Up (need to notify one week ahead)* | - |
| 3/10 | 7. pH Titration I: $K_a$ of a Weak Monoprotic Acid | 77 |
| 3/17 | 8. pH Titration II: Titration Curve of a Triprotic Acid | 85 |
| 3/24 | *Spring Break- No lab* | |
| 3/31 | 9. Solubility Product of a Sparingly Soluble Salt | 95 |
| 4/7 | 10. Thermodynamically Controlled Reaction of Borax | 105 |
| 4/14 | 11. Electrochemistry: Galvanic Cells and Electroplating | 115 |
| 4/21 | *Make-up (need to notify one week ahead) -Lab Reports last due date* | - |
| 4/28 | - | |

**Course Conduct:** The lab will be performed once a week and a laboratory manual is provided as a guide to perform designated experiments within the laboratory period. The data must be collected properly following the guided principles of chemistry and scientific experimentation techniques mentioned in the manual. There are three steps to properly performing an experiment and completing a laboratory report.

1. Study the Introduction section in the lab manual for that experiment. Complete the Pre-laboratory Questions before coming to the lab.
2. Perform the experiment or several experiments in that chapter and fill up the data page as well as answer all the given questions.
3. Prepare a formal laboratory report following the guideline given at the end of the lab manual and following the format mentioned. Submit the completed lab report the next lab period (usually 1 week later).

**UA Rich Mountain Credit Hour Calculator:** For every course credit hour, you should expect to spend at least five clock hours per week of concentrated attention on course-related work,

including but not limited to time studying the Introduction, completing the Pre-lab work, finishing the experiment and recording the data, preparing the lab report.

**Course Requirements / Evaluation (Grading):**

Your grade for this lab course comes from the following:

| | |
|---|---|
| 11 Lab reports @ 20 each | = 200 (lowest one dropped after submitting all) |
| **Total points possible** | **= 200** |

The final grade for the course will be determined by dividing the student's total number of points earned by the number of possible points. Grades are assigned using the following percentage scale, after rounding the calculated percentage to the nearest whole number:

| | |
|---|---|
| 90-100 | **A** |
| 80- 89 | **B** |
| 70- 79 | **C** |
| 60- 69 | **D** |
| <60 | **F** |

**Class Procedures/Student Requirements**:

On-Campus Resources: A general guideline will be provided to how to perform experiments and how to prepare a laboratory report based on the experiments. You should follow the instructions clearly and completely to get the optimum benefit of not only understanding the objective of the experiments but also to get good grades.

Attendance Policy: You must attend the lab and must complete the experiment yourself. Cannot copy other's data to prepare the lab report.

Assignment Due Dates: Lab reports will be due the next week of the lab period.

Make-up Work Policy**:** Make up work should be competed promptly after the absence when available. You must make up to be able to fill the data pages, use the Pre-lab for grades, and to prepare the lab report.

Cell Phone Policy**:** Do not use your cell phone during the experiment.

Grading:

1. Pre-laboratory questions and the data pages including the questions: 10 points.
2. Laboratory Report: 10 points.

**Academic Dishonesty**: It is expected that each student shall do his/her own work on class works, quizzes, exams, and lab reports. Cheating, copying other's answers, writing other's statement without citing their reference are all considered plagiarism and are penalized from allowing no point in that particular unit up to dismissal from the whole course, depending on the severity of the offense.

**Disability Policy:** It is the policy of UA Rich Mountain to accommodate students with disabilities, pursuant to state and federal law. Any student with a disability who needs

accommodations should contact the Vice-Chancellor for Student Affairs Office, 394-7622, ext. 1400.

**Arkansas Clean Air Act**: In compliance with the Arkansas Clean Air Act, UA Rich Mountain is a smoke and tobacco free facility. Students and guests are to refrain from the use of all tobacco products while on campus.

**Student Misconduct**: Students committing misconduct are subject to disciplinary sanction(s) and/or restrictions. Misconduct or prohibited behavior includes, but is not limited to endangerment, harassment, disruption, sexual misconduct, illegal drugs and/or alcohol, fire or safety issues, gambling, property violations, computer violations or other violations as listed in the UA Rich Mountain catalog.

**UA Rich Mountain Mission:** UA Rich Mountain provides transformative education to all learners.* **under review*

# Credit Hour Requirement Calculator

| | | | | |
|---|---|---|---|---|
| **Course Information** | | | | |
| Department, Course Number | CHEM1103(Lecture) and CHEM1101(Lab) | | | |
| Course Title | University Chemistry I | | | |
| Credit Hours | 3 + 1 = 4 | | | |
| Mode of Delivery | Traditional | | | |
| Weeks in Part of Term | 15 | | | |
| Level of Reading Material | Advanced/Scientific/Technical (2) | | | 2 |
| Reading Level of Students | Average Student (2) | | | 2 |
| Average Pages per Hour | 10 | | | |
| | | | | |
| | | *Enter either week or term, not both* | | |
| **Contact Hours** | | **Hours/Week** | **Hours/Term** | **Total Hours** |
| Lecture/Recitation | | | 45 | 45 |
| Lab Contact Hours | | | 24 | 24 |
| | **Pages Asg'd** | **Hours/Week** | **Hours/Term** | |
| **Syllabus Items** | | | | |
| Reading | 380 | | | 38 |
| Assignment | | 1 | | 15 |
| Quiz | | 1 | | 15 |
| Researching Lab questions | | 2 | | 30 |
| Reviewing for exams | | | 10 | 10 |
| | | | | 0 |
| | | | | 0 |
| | | | | 0 |
| | | | | 0 |
| | | | | 0 |
| | | | | |
| **Total Hours** | | | | 177 |
| **Required Hours** | | | | 150 |
| **Difference** | | | | Ok + 27 |