# College Chemistry II

CH 122 – Spring 2020

***Lecture CRN: 43436***

***Lab CRN: 43648***
***Lab CRN: 43649***

**Instructor:** Dr. Dylan Fast
**Contact:** fastd@linnbenton.edu
**Office:** Madrone Hall 209
**Office Hours:** after lecture or by appointment

## Course Information:

The second of a three term college chemistry sequence for students in human performance, certain health occupations programs, agriculture, animal science, and fisheries and wildlife. This sequence is for students who have had no previous training in chemistry and whose program of study requires only a one-year sequence of college chemistry. Topics include thermochemistry, gases, liquids, solids, intermolecular forces, solutions, chemical kinetics, and chemical equilibrium.

## Student Learning Outcomes:

1. Solve scientific problems with quantitative methods regarding thermochemistry, gases, molarity, bonding, phase changes, colligative properties, chemical kinetics, and chemical equilibrium.
2. Apply chemical principles related to intermolecular attractions of pure substances and solutions, properties of gas, liquid, and solid, phase transitions, colligative properties, chemical kinetics, and chemical equilibrium.
3. Understand how to work safely in a laboratory environment while observing and accurately recording and reporting measurements related to chemical phenomena.

## Minimum Requirements:

Prerequisites: MTH 111 College Algebra and CH 121 College Chemistry with a grade of "C" or better. Corequisite: CH 122L College Chemistry II Lab.

## Workload Expectation:

The college has determined that a student taking chemistry course spends a minimum of 3 – 4 hours of work per week outside of class for every credit hour for self-study. Examples of outside work include writing lab reports, reading, reviewing lecture materials, study time, working practice problems, and doing homework assignments.

## Required Course Materials (Available on the Moodle site):

1. Access Code for Knewton Alta Online Homework (The access code from last term works.)
2. Chemistry 122 Laboratory Manual and Lecture Manual

## Attendance and Classroom Decorum:

Class attendance and participation are very important to be successful in the learning of chemistry. Students are encouraged to engage in activities and/or discussions. This includes online Zoom meetings as a replacement for lecture and office hours and forum board discussions for assistance with problem solving.

## Grade Assessments:

Your grade will be assigned based on your performance in the following areas:

| | | | | |
|---|---|---|---|---|
| Laboratory Exercises | 8 x 10 pt. | = | 80 pt. | (13.3%) |
| Homework | 4 x 10 pt. | | | |
| | 2 x 15 pt. | = | 70 pt. | (11.7%) |
| Learning Assessments | 4 x 75 pt. | = | 300 pt. | (50%) |
| Final Exam | | | 150 pt. | (25%) |
| Total | | | 600 pt. | |

## Course Grade:

Assignment of course grades will follow an approximate breakdown of

- A = 90-100% Excellent Work
- B = 80-89% Good Work
- C = 70-79% Average Work
- D = 60-69% Poor Work
- F = 0-59% Failing Work

An incomplete grade (I) may be given at the discretion of the instructor. However, a student must have a passing grade at the time an incomplete is assigned.

## Learning Assessments (LAs):

The LAs are designed to evaluate student's understanding of the materials that they have learned from the previous weeks. Each LA is worth 75 points. Total of 300 points can be earned from LAs.

## Exam Policies:

Exam must be taken at the scheduled time unless prior arrangement is made. Students who have conflicts with exam days due to other College functions, illness, or family emergencies must contact the instructor prior to the exam. Documentation of the College function, illness and/or family emergency must be provided to schedule a make-up exam. Any academic dishonesty during any exams including cheating, using electronic devices, cell phones, lecture materials, or books that are not permitted, will result in a score of ZERO for the exam!

A missed final exam will receive a score of zero.

## Laboratory Exercise

The laboratory experience is a vital part of this course. Students are expected view the lab materials in the allotted time. Failure to complete and turn all of the assigned laboratory reports may result in a lowered grade. **You must receive at least 70% of the total lab points in order to pass the course regardless of passing the lecture. Also, if you miss more than three labs or turn in fewer than five reports you will not receive a passing grade for the course.** No make-up labs will be given.

## Online Homework:

To succeed in chemistry, like learning a foreign language, you should study and practice every day. As material is covered you will find the problems are easier to work and not as time consuming as if they are attempted just before the due date. Refer to the schedule for homework due dates. You can access **Knewton Alta Online Homework** via Moodle. Each homework assignment is worth 10 points. Homework is due by 11:59 pm on the dates listed in the lecture schedule.

**NOTE:** This homework is adaptive to each learner. If you don't get consecutive correct answers, the system will think that you have not mastered a particular topic; therefore, it will throw more problems at you. If this happens, please get help from your instructor to avoid frustration.

*For late homework, students can turn in completed assignments after the due date up to 2 days late. However, there will be 5% penalty per day late.*

**For your first time doing homework, the Knewton Alta Online Homework will prompt you to enter an access code. You can purchase this access code online or at the LBCC bookstore. Knewton Alta offers a grace period on payment; for most courses, this is 14 days from the first day of the term.**

## Resources:

Your success is very important to me! I encourage you to seek help from one or more of the following resources:

1. Instructor office hours (see the front page for days, times and locations)
2. Ask questions during lecture (or immediately before/after lecture)
3. Science Help Desk
4. Academic Support (http://linnbenton.edu/future-students/academic-support/)

## Science Help Desk:

The Science Help Desk will be held online this term. The Help Desk is staffed approximately 20 hours per week. Hours of the Help Desk are posted in the will be posted to the Moodle site when available.

## Roadrunner Resource Center for Basic Needs:

Any student who has difficulty affording tuition, course materials, hygiene materials, food, who lacks a safe and stable place to live, who needs transportation, and believes this may affect their performance in the course, is urged to contact the Roadrunner Resource Center for support (Resources@linnbenton.edu).

## Center for Accessibility Resources:

LBCC is committed to inclusiveness and equal access to higher education. If you have approved accommodations through the Center for Accessibility Resources (CFAR) and would like to use your accommodations in the class, please talk to your instructor as soon as possible to discuss your needs. If you believe you may need accommodations but are not yet registered with CFAR, please visit the CFAR Website for steps on how to apply for services or call (541) 917-4789.

## Tips for Success:

- Review lecture notes after lecture; clarify confusing points immediately; use your notes to guide your studying
- Doing homework problems regularly
- Form a study group; take turns "teaching" each other concepts/problems
- Repeat homework and/or worksheet problems until you can do them quickly, without looking at any notes or answer keys

## Drop/Withdraw Policy:

If you are withdrawing from the class you must file a Schedule Change Form with Registration or use WebRunner. If you formally drop the class by Monday of the second week of the term, you will receive a tuition refund. If you withdraw after the Monday of the second week of instruction through the seventh week a 'W' will show up on your transcript. No withdrawals are allowed after the end of the seventh week. An instructor may not assign a "W" grade.

If you received financial aid or veteran's benefits PLEASE talk with associates at the appropriate office to determine what effects on eligibility dropping a course will have. Don't jeopardize your eligibility!! You can contact the Financial Aid Office by calling (541) 917-4850 or by visiting the Financial Aid Office in Takena Hall.

If you stop attending the course without formally withdrawing you will continue to accumulate grades (zeroes for all assignments not turned in) and will receive the grade assigned by the instructor. You will also be held accountable for all charges on your account.

## Academic Integrity:

"An instructor has the right to issue a grade of F for the course in which the instructor has reason to believe the student has cheated. A student has the right to appeal such action in accordance with the Students' Rights, Responsibilities and Conduct Policy." The preceding statement is Administrative Rule No. 7030-02.

## LBCC Comprehensive Statement of Nondiscrimination:

LBCC prohibits unlawful discrimination based on race, color, religion, ethnicity, use of native language, national origin, sex, sexual orientation, gender, gender identity, marital status, disability, veteran status, age, or any other status protected under applicable federal, state, or local laws. For further information see Board Policy P1015 in our Board Policies and Administrative Rules.

## Changes to the Syllabus:

The instructor reserves the right to change the contents of this syllabus due to unforeseen circumstances. You will be given notice of relevant changes in class, through a Moodle Announcement, or through LBCC e-mail.

# Course Content

## Chapter 8 – Thermochemistry

8.1 Nature of Energy and the First Law of Thermodynamics
8.2 Thermal Energy, Temperature, and Heat
8.3 Measuring Heat
8.4 Enthalpy - Heat of Reaction ($\Delta H_{rxn}$)
8.5 Measuring Enthalpy from Calorimetry
8.6 Measuring Enthalpy from Hess's Law
8.7 Measuring Enthalpy from Standard Enthalpies of Formation

## Chapter 9 – Gases

9.1 Pressure
9.2 Simple Gas Laws
9.3 The Kinetic Molecular Theory
9.4 The Ideal Gas Law and Its Applications
9.5 Mixtures of Gases and Partial Pressure
9.6 Gas Stoichiometry

## Chapter 10 – Solids, Liquids & Their Intermolecular Forces

10.1 Intermolecular Forces
10.2 Properties of Liquids
10.3 Phase Transitions
10.4 Phase Diagrams

## Chapter 11 – Solutions

11.1 Types of Solutions
11.2 Formation of Solutions and Dissolution Process
11.3 Electrolytes
11.4 Factors that Affect Solubility
11.5 Concentration Units
11.6 Dilution of Solution
11.7 Colligative Properties

## Chapter 12 – Chemical Kinetics

12.1 Chemical Reaction Rate
12.2 Factors Affecting Reaction Rate
12.3 Collision Theory
12.4 Differential Rate Laws
12.5 Integrated Rate Laws
12.6 Reaction Mechanisms

## Chapter 13 – Chemical Equilibrium

13.1 Concept of Dynamic Equilibrium
13.2 Reaction Quotient (Q) and Equilibrium Constant (K)
13.3 Chemical Equations and Equilibrium Constant Relation
13.4 Equilibrium Calculations
13.5 Le Chaterlier's Principle

# Lecture Schedule

**Note: This schedule of topics, homework due dates, and exam dates is subject to change.
All homework assignments are due by 11:59 pm on the date indicated in the lecture schedule.

| Week No. | Mon. | Wed. | Thurs. | Fri. |
|---|---|---|---|---|
| **1** (4/6-4/10) | Introduction Syllabus 8.1-8.3 | 8.4 | *No Lab – Online setup support* | 8.5 |
| **2** (4/13-4/17) | 8.6 – 8.7 | 9.1 – 9.2 | *Lab 1: Safety Training* | ***LA 1*** ***Ch8 HW due*** |
| **3** (4/20-4/24) | 9.3 – 9.4 | 9.4 – 9.5 | *Lab 2: Energy Content of Fuels* | 9.5 – 9.6 ***Ch9 Part 1 HW due*** |
| **4** (4/27-5/1) | 10.1 | 10.2 – 10.3 | *Lab 3: Gases* | ***LA 2*** ***Ch9 Part 2 HW due*** |
| **5** (5/4-5/8) | 10.3 – 10.4 | 11.1 – 11.2 | *Lab 4: Geometry/Polarity Worksheets* | 11.3 – 11.4 ***Ch10 HW due*** |
| **6** (5/11-5/15) | 11.5 – 11.6 | 11.7 | *Lab 5: Chroma. in Fruit Juice Analysis* | ***LA 3*** ***Ch11 Part 1 HW due*** |
| **7** (5/18-5/22) | 11.7 | 12.1 | *Lab 6: Instant Cold & Hot Packs* | 12.2 – 12.3 ***Ch11 Part 2 HW due*** |
| **8** (5/25-5/29) | *Memorial Day* | 12.4 | *Lab 7: Colligative Properties* | ***LA 4*** ***Ch12 Part 1 HW due*** |
| **9** (6/1-6/5) | 12.5 | 12.6 | *Lab 8: Clock Reaction* | 13.1 – 13.2 ***Ch12 Part 2 HW due*** |
| **10** (6/8-6/12) | 13.3 – 13.4 | 13.5 | *Le Chatelier's Principle Demo* Overview 13.5 | ***Final Exam*** ***Ch13 HW due*** |

**Learning Assessments:**

LA 1 covers materials in chapter 8
LA 2 covers materials in chapter 9
LA 3 covers materials in chapter 10
LA 4 covers materials in chapter 11

**Final Exam (**covers chapter 12 & 13**)**