

College Chemistry III CH 123 – Fall 2019

Lecture CRN: 26717 **Meeting Time:** M W 2 – 3:20 PM; F 2 – 2:50 PM (MH 208)
Instructor: Ommidala Pattawong, Ph.D.
Contact: pattawo@linnbenton.edu
Office Hours: After lecture or by appointment
Office: Madrone Hall 209

Lab CRN: 26718 **Meeting Time:** Tu 2 – 4:50 PM (MH 206)
Instructor: Omid Sadeghihosseinabadi, Ph.D.
Contact: sadegho@linnbenton.edu
Office: Madrone Hall 211

Course Information:

This is the third 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 rates of reactions, chemical equilibrium, acid/base equilibrium, buffers, ionic equilibrium, thermodynamics, and electrochemistry.

Student Learning Outcomes:

1. Solve scientific problems with quantitative methods regarding rates of reactions, chemical equilibrium, thermodynamics, and electrochemistry.
2. Apply chemical principles related to chemical kinetics, rates and mechanisms of chemical reactions, equilibrium, thermochemistry, and electrochemistry.
3. Work safely in a laboratory environment while observing and accurately recording measurements related to chemical phenomena.

Minimum Requirements:

Prerequisite: CH 122, CH 202, or CH 222 with a grade of C or better.

Workload Expectation:

Students taking chemistry courses are expected to work a minimum of 3-4 hours of work per week outside of class for every credit hour. Examples of outside work include reading, review lecture materials, study time, practice problems, homework assignments, and doing lab assignments.

Required Course Materials (Available for you to purchase at the bookstore):

1. Principles of Chemistry: A Molecular Approach, 3rd Ed., Tro. (*The 1st and 2nd editions are okay. Note that the pages will be different from what lecture refers to.*)
2. CH123 Lecture Manual
3. CH 123 Laboratory Manual
4. Access Code for Knewton Alta Online Homework (*The access code from last term works.*)
5. Bound Laboratory Notebook with numbered pages and carbonless copies. There may be sufficient space remaining in your CH 122 laboratory notebook.
6. Non-graphing/non-programmable Scientific Calculator (TI 30xa). Students will be required to use a non-graphing/non-programmable scientific calculator for quizzes and/or exams.

Optional Course Materials (Available for you to purchase at the bookstore):

1. Lab coat
2. Personal Safety Goggles

Attendance and Classroom Decorum:

Class attendance and participation are very important to be successful in the learning of chemistry. Students are expected to attend class regularly, on time, and engage in activities and/or discussions. Students should avoid entering the classroom late or leaving before the class ends, as it is distracting to students and instructors. Students are required to turn off their cell phones during class periods. **If a student needs to use a cell phone (call or text) they are expected to leave the classroom to do so.** The use of a laptop computer during lecture and lab are only allowed for assigned course materials, i.e. lecture is not a time to do homework.

Grade Assessments:

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

Best 7 out of 8 lab reports	7 x 16 pts	=	112 pts (16%)
Project presentation		=	35 pts (5%)
Online homework	6 x 15 pts	=	90 pts (13%)
Learning assessments	4 x 63.25 pts	=	253 pts (36%)
Final Exam			210 pts (30%)
Total			700 pts (100%)

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. **Your grade in the course is assigned based on your performance on the assessments, final exam, homework, labs, etc.; your letter grade will NOT be assigned based on the instructor's subjective opinion of your effort in the course.**

Exam Policies:

All exams are given in class. Examinations 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. "My alarm did not go off" or "My car would not start" are not valid excuses. Leave early and have a plan B. Transporting oneself to class on-time is the responsibility of every student who chooses to take part in an adult learning environment.

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!

The final exam is comprehensive. You may bring one 3" x 5" notecard with notes on both sides to the final exam. A missed final exam will receive a score of zero. **The final exam will be given on Wednesday, December 11th 3:00 – 4:50 PM in MH 208**

Exam Re-Grade Request:

All exam re-grade requests must be submitted in writing to a course Instructor within one week of the exam being returned to students. The entire exam will be re-graded for accuracy. The re-grade request will be compared against a photocopy of the originally graded exam. Note: Arithmetic errors will be corrected immediately and are not considered re-grade requests.

Chemistry in Society Presentation

You will work in groups of 4 to present a 20-minute PowerPoint presentation on the assigned topic. Details of expectations and format will be given in lab.

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 63.25 points. Total of 256 points can be earned from LAs.

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 site. 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 answers, the system will think that you have not mastered in 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, students will receive a deducted 5% penalty from the completed score per day late.

For your first time doing homework, the Knewton Alta Online Homework will prompt you to enter 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.

Laboratory Exercise:

The laboratory experience is a vital part of this course. Students are expected to attend the laboratory at their scheduled time. Failure to complete the laboratory work or to hand in 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.

Extra Credit:

1. *Lab Exercise Completion:* If you turn in ALL of your lab exercises, your lowest lab score will be dropped, and it will be used as extra credit.
2. *Self-Reflection:* Students who submit self-reflection for their study habit and how they study for chemistry are eligible for 5 extra credit points. The self-reflection will give you a chance to reflect on your performance in class and, more importantly, on the effectiveness of your study habit. The self-reflection will be given in class. You will answer the questions sincerely for these extra credits. Please see course schedule for the exam reflection deadline.

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 is located on the first floor of Madrone Hall in the atrium area. The Help Desk is staffed approximately 20 hours per week. Hours of the Help Desk are posted in the Help Desk area and throughout Madrone Hall.

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](tel:5419174789).

Tips for Success:

- Attend every lecture, and lab session, and come prepared!
- 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:

I reserve 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

**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.

- Chapter 13** Chemical Kinetics
13.2 – The rate of a chemical reaction
13.3 – The rate law: the effect of concentration on reaction rate
13.4 – The integrated rate law: the dependence of concentration on time
13.5 – The effect of temperature on reaction rate
13.6 – Reaction mechanisms
13.7 – Catalysis
- Chapter 14** Chemical Equilibrium
14.2 – The concept of dynamic equilibrium
14.3 – The equilibrium constants (K)
14.4 – Expressing the equilibrium in terms of pressure
14.5 – Heterogeneous equilibria: reactions involving solids and liquids
14.6 – Calculating the equilibrium constant from measuring equilibrium concentrations
14.7 – The reaction quotient: predicting the direction of change
14.8 – Finding equilibrium concentrations
14.9 – Le Chatelier's Principle
- Chapter 15** Acids and Bases
15.2 – The nature of acids and bases
15.3 – Definitions of acids and bases
15.4 – Acid strength and the acid ionization constant (K_a)
15.5 – Autoionization of water and pH
15.6 – Finding the $[H_3O^+]$ and pH of strong and weak acid solutions
15.7 – Base solutions
15.8 – The acid-base properties of ions and salts
15.9 – Acid strength and molecular structure
15.10 – Lewis Acid and Bases
- Chapter 16** Aqueous Ionic Equilibrium
16.2 – Buffers
16.3 – Buffer effectiveness: buffer range and buffer capacity
16.4 – Titrations and pH curves
16.5 – Solubility equilibria and the solubility product constant
16.6 – Precipitation
16.7 – Complex ion equilibria
- Chapter 17** Free Energy and Thermodynamics
17.2 – Spontaneous and nonspontaneous processes
17.3 – Entropy and the second law of thermodynamics
17.4 – Heat transfer and change in the entropy of the surroundings
17.5 – Gibbs free energy
17.6 – Entropy changes in chemical reactions (ΔS°_{rxn})
17.7 – Free energy changes in chemical reactions (ΔG°_{rxn})
17.8 – Free energy changes for nonstandard states
17.9 – Free energy and equilibrium (ΔG°_{rxn} to K_{eq})
- Chapter 18** Electrochemistry
18.2 – Balancing oxidation – reduction equations
18.3 – Voltaic (or galvanic) cells
18.4 – Standard electrode potentials
18.5 – Cell potential, free energy, and the equilibrium constant
18.6 – Cell potential and concentration

Lecture Schedule

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All homework assignments are due by 11:59 pm on the date indicated in the lecture schedule.

Week No.	LECTURE	LAB	LECTURE		
	Mon.	Tues.	Wed.	Thurs	Fri.
1 (9/30-10/4)	Introduction 13.2	<i>Syllabus & Research Project Overview</i>	13.3		13.3, 13.5, 13.7
2 (10/7-10/11)	13.4, 13.6 HW Ch 13 Part 1 Due	<i>Lab 1: From Fat to Fuel (Biodiesel Synthesis)</i>	14.2 – 14.5		LA 1
3 (10/14-10/18)	14.6 – 14.7 HW Ch 13 Part 2 Due HW Ch 14 Part 1 Due	<i>Lab 2: Clock Reaction Project Outline Due</i>	14.7 – 14.8		14.8 – 14.9
4 (10/21-10/25)	15.2 – 15.4, 15.9 – 15.10 HW Ch 14 Part 2 Due	<i>Lab 3: Le Chatelier's Principle</i>	15.4 – 15.5		LA 2
5 (10/28-11/1)	15.5 – 15.6 HW Ch 15 Part 1 Due	<i>Lab 4: pH of Acids, Bases, and Salts</i>	15.6 – 15.7		15.7 – 15.8
6 (11/4-11/8)	16.2 – 16.3 HW Ch 15 Part 2 Due	<i>Lab 5: Buffers 1st Presentation Draft Due</i>	16.4		LA 3
7 (11/11-11/15)	NO CLASS HW Ch 16 Part 1 Due	<i>Lab 6: Acid Content in Vinegar</i>	16.4 – 16.5		16.5 – 16.6
8 (11/18-11/22)	17.2 – 17.4 HW Ch 16 Part 2 Due	<i>Lab 7: Acid Content in Fruit Juice</i>	17.6 – 17.7		LA 4
9 (11/25-11/27)	17.9	<i>Lab 8: Fuel Efficiency 2nd Presentation Draft Due</i>	17.8		NO CLASS
10 (12/2-12/6)	18.2 – 18.5 HW Ch 17 Due	Project Presentations	18.5 – 18.6		18.5 – 18.6 HW Ch 18 Due

Learning Assessments:

LA 1 covers materials in chapter 13.
LA 2 covers materials in chapter 14.
LA 3 covers materials in chapter 15.
LA 4 covers materials in chapter 16.

Final Exam:

Wednesday, December 11th 3:00 – 4:50 PM in MH 208