

CHEM 2B INTRODUCTION TO ORGANIC AND BIOCHEMISTRY Spring 2019

Total Number of Units: 5
Hours of Lecture Per Week: 3

Prerequisite: Chem 2A or 1A
Hours of Laboratory Per Week: 3

Hours of Discussion Per Week: 1

Course Instructor: Cliff, Phone: 242-2323. web page: <http://www.cliffchemistry.com> and Shasta College online.

Office Hours: M 10:30 - 11:00AM; T 11:00AM – 2:00 PM; W 9:30 – 11:00 AM and by appointment in 1412.

Catalog Course Description: A survey of the major classes of organic compounds including structure, nomenclature, properties, reactions, and the reaction mechanisms; an introduction to the biochemistry of proteins, carbohydrates, lipids, nuclei acids and their basic metabolic reactions. Suitable for nursing, dental hygiene, agriculture/natural resource and other non-science majors NOTE: Students must provide those materials which are of continuing value outside of the classroom setting (goggles).

Student Learning Outcome: Students will be able to find, interpret, analyze and apply information and data to solve problems and answer questions in chemistry.

Governing Principle: I will use a variety of techniques to provide the environment to help you learn about the information, thought processes, and methodologies used in all sciences, particularly chemistry, which will allow you to succeed in this class and future classes. Practical applications will be emphasized. **YOU must WORK for your SUCCESS while we LEARN and have FUN.** I look at higher education as something more than just asking you to regurgitate facts. I teach students as I do professionals in the private sector. I will illustrate processes of the mind emphasizing thinking and Life Long Learning. I will bring in current events and address relevant issues not in the text. I will show you how to find information on the Internet and how to discriminate the reliability of internet sites. I expect students to pay attention and ask thoughtful questions. I expect you to read the text and **especially my notes** online and do practice problems daily.

Materials for the Class: (The text, the solutions manual, and other materials are available in the Science Learning Center.)

General, Organic, and Biological Chemistry, 7th ed. McMurry. Publisher: Prentice-Hall ISBN 0321750837

I will also accept the 5th, ISBN 0131877488, or 6th, ISBN 0136054501, editions as textbooks for the course. You can find the 5th and 6th editions very cheap online.

Laboratory Manual: Catalyst, Cliff Gottlieb Introduction to Organic and Biochemistry Do not buy this until after 1st class.

Learning Catalytics access – will cover first class meeting

Wi-Fi enabled device – If you don't have one, please see me so we can make arrangements

Lab Safety Goggles – Must meet ANSI Standard 287.1 1989(can be purchased from Science Club on 1st day of lab; about \$6)

Lecture Procedure: You are expected to attend lecture. Come prepared before each class by completing the required materials online. Participation using Learning Catalytics will count toward your grade. Graded homework will be done online using Shasta College online program (Canvas). You will also be required to use Canvas to access notes, homework and materials for the class.

Methods of Evaluation/Grading Scale: Each of you has the innate ability to earn an "A". I hope that each of you will **work to achieve an "A"!!** All work must be done in **black or blue ink or grey pencil!!**

1. 400 points on exams. Four exams are 100 points each. Each exam will have some extra credit.
2. 100 points on quizzes. Quizzes will be count 10 points each. There will be 12 quizzes, two of which are extra credit. So there are 20 extra credit points. It is possible to earn up to 120 points out of 100 points possible. Quizzes are taken in the discussion sessions only and must be done in the same week.
3. 90 points for Classroom participation using Learning Catalytics. Typically, 2 to 6 points per lecture. No make-up allowed under any circumstances. <u>No open notes.</u> You will have the opportunity to earn at least 105 points so there will be at least 15 extra points possible. Take your total points shown on Learning Catalytics and divide them by 2 to get your classroom participation points. (Each question is worth ½ point but Learning Catalytics does not do fractions.) Unless you have made arrangements with me, <u>you must physically be in the classroom or you will lose ALL of your Learning Catalytics Points for the semester.</u> No make-ups are possible.
4. 80 points for homework. Graded homework will be done online using the Shasta College online program. One homework for each of 16 chapters. Each homework is worth 5 points.
5. 100 lab points. Lab is worth 100 points. It is NOT the sum of all your labs. It is your lab AVERAGE times ten.
6. There may be other required or optional assignments or in class questions worth up to 100 points each.
7. Course grades based on following total points (770 total points): A = 693 pts; B = 616 pts; C = 539 pts; D = 462 pts

THE POINT VALUES FOR THESE GRADES ARE IN STONE AND WILL NOT BE DEVIATED EVEN BY ONE POINT!

Your final course grade is based on total points NOT PERCENT!!! Ignore the percent on Canvas!!

There is **no credit other than outlined above. DO NOT ASK IF THERE IS MORE EXTRA CREDIT!**

No make-up or LATE exams, quizzes, or homework are allowed unless you have immediate family or personal health or legal emergencies. Call me as soon as possible, typically the same day, to notify me of your emergency. If you have health, legal, or sports non-emergencies, you may be able to make arrangements to take an exam, quiz or submit homework early. You must contact me with sufficient lead-time of at least one week to make arrangements. **I do not drop exams. Keep all graded work!!**

After the second exam and before drop day, I update your points on the Canvas gradebook and review them with you. Otherwise do not ask me to figure out your grade or I will deduct 5 points from your course total. However, I will discuss your progress and general performance in the class at any time, **JUST ASK.** If you have any corrections or grade questions about any graded material, you must notify me within one calendar week after the material is returned to the class. No adjustments in grades will be made after this time. I reserve the right to create grading policies to cope with atypical situations. Finally, you probably are aware that only you can get your education--no professor can give you an education. **You are responsible for yourself.** I am responsible to help you help yourself. Your success in this class is a reflection of your effort. **Here is the bottom line: COMMUNICATE with me BEFORE the FACT and I will work with you to make accommodations. After the fact makes things impossible. I will help you in any way that I can. Please communicate with me any issue or situation no matter how small so I may help you! Communicate early and often. And one more thing: NO FREAKING OUT!!**

LECTURE AND LAB CLASSROOM BEHAVIOR/ETIQUETTE: Come to class on time. In class **do not socialize, talk, or engage in any behavior that is unrelated to or distracting from the class.** If you must leave class early, notify me at the beginning of class, sit near the door, and exit quietly. Except for Learning Catalytics **Turn off your cell phones and computers except when using Learning Catalytics, NO EXCEPTIONS!** If there are reasons you need your cell phone, please see me before class. This is a college classroom and you are expected to behave like adults who wish to learn. The individual or class will be **warned with a YELLOW CARD** regarding any inappropriate behavior. After that individuals or the entire class gets a **RED CARD.** A Red Card means you are ejected from the class and lose 10 points off your grade. For subsequent RED CARDS, the point deduction doubles each time and you will have to schedule a conference with me before you can return to class. You may not record or video any part of the class without my consent.

ACADEMIC HONESTY: **DON'T CHEAT!** I will not tolerate cheating which I define to include the one who knowingly gives as well as the one who receives. It also includes "signing" the roll sheet for someone else, using someone else's Learning Catalytics, answering Learning Catalytics when not in the classroom, and copying other's work. The penalty for the first offense is a zero on the work involved, a 50 point fine that is deducted from your grade and being reported to the Vice-President of Student Services. For the second offense, the fine increases to 100 points. If you have concerns regarding academic honesty, or to report cheating, please see me. All work is to be completed individually unless explicitly stated otherwise.

Discussion Procedure: Discussions are question, answer, practice sessions. The hour will conclude with a 10-point quiz. Expect a quiz each week. If you cannot attend your regular discussion in a particular week, try to attend the other discussion section. There are no late or make-up quizzes. The two discussions sections are on Monday at 9:30 AM in 1415 and at 1 PM in 1414.

Lab Procedure: **ALL PERSONAL CELL PHONES, TABLETS AND LAPTOPS MUST BE TURNED OFF** unless you have a special situation which you will discuss you're your lab instructor. You may use the computers in lab to access class notes on Canvas only. **NO GOOGLING** unless directed by your instructor. You will need the lab manual. All lab entries must be in blue or black ink or pencil with **PENCIL** preferred. Every lab will require a write-up, which you will submit at the end of class. In your submissions you must clearly record and communicate data and your answers. Labs must be handed in at the end of lab period unless you get the lab instructors approval but never later than Wednesday of the same week. You must attend! **NO MAKE-UP LABS.** You may be able to attend the other lab section if you must miss your scheduled lab period. The lab periods are M 2:00 – 4:50 PM and T 8-11 both in 1414. Do not come late!! Some labs may end early but do not plan to leave early. Labs will be worth 10 points each. If your lab work and lab report indicates high quality work, you will receive a 9.5. Errors, omissions or lower quality work will receive lower grades. Extraordinary work may receive a score of 10. Up to 30% of the total lab points may be deducted from your grade based on your behavior, participation, ability to follow directions, and acting in a safe and professional manner. **Missed labs are graded as a zero. You must pass the lab to pass the class.** You are responsible for knowing and following the safety rules from the safety handouts and lecture and acting in a safe manner at all times. **VIOLATION OF SAFETY RULES WILL LEAD TO EXPULSION FROM THE CLASS.** If you are not sure, **ASK.**

OTHER RESOURCES: **Science Learning Center.** It has tutors and other resources available if you are on campus

Academic accommodations imposed by a disability: Academic adjustments due to a disability or serious medical condition: Students should contact the office of Partners in Access to College Education (PACE) for authorization of

academic adjustments (accommodations) for this course. The office is located in room 2006 (242-7790). Students will need to provide documentation that verifies the condition and the type of limitations that may result. The staff in PACE have been designated with the authority to 1) evaluate that documentation, 2) determine which academic adjustments are appropriate to this course, and 3) facilitate the provision of approved academic adjustments. Students will submit notices directly to the course instructor regarding specific academic adjustments that are authorized for this class.. www.shastacollege.edu/student-services/dsps

NON-DISCRIMINATION STATEMENT: The Shasta-Tehama Trinity Joint Community College District (“Shasta College”), in accordance with applicable Federal and State Law, does not discriminate on the basis of race, color, national origin, sex, religious preference, age, disability (physical and mental), pregnancy (including pregnancy, childbirth, and medical conditions related to pregnancy or childbirth), gender identity, sexual orientation, genetics, military or veteran status or any other characteristic protected by applicable law in admission and access to, or treatment in employment, educational programs or activities at any of its campuses. Shasta College also prohibits harassment on any of these bases, including sexual harassment, as well as sexual assault, domestic violence, dating violence, and stalking. Inquiries regarding equal opportunity and non-discrimination may be directed to:

Greg Smith, Associate Vice President of Human Resources, (530) 242-7649, gsmith@shastacollege.edu

Sandra Hamilton Slane, Associate Dean of Students, (530) 242-7799, sslane@shastacollege.edu

Tentative Schedule

Week starting	Chapter Schedule for 5 th and 6 th editions	Suggested End of Chapter Problems (evens) for 5 th and 6 th editions	Chapter Schedule for 7 th and 8 th edition	Suggested End of Chapter Problems (evens) for 7 th ed	Lab Activity
1/22	12	Ch 12 18 – 72	12	Ch 12 20 – 72	Alkanes (Handout)
1/28	13	Ch 13 24 – 86	13	Ch 13 24 – 90	Hydrocarbons (handout)
2/4	14	14.24 - 74	14	14.22 - 74	Alcohols, Phenols, &
2/11	15	15.22 - 64	15	15.22 - 64	Amines
2/19	Exam 1 Wed 2/20	Exam 1 Ch 12-15	Exam 1 Wed 2/20	Exam 1 Ch 12-15	TBA
2/25	16	16.18 - 64	16	16.20 - 68	Aldehydes-Ketones
3/4	17	17.30 - 86	17	17.32 - 84	Carb. Acids-esters
3/11	18	18.30 - 90	18	18.34 - 100	Peptides-Proteins
3/18	19 & Exam 2 (3-20)	19.19 – 25 all; 19.26 – 82 Exam 2 Ch 16-19	19 & Exam 2 (3-20)	19.26 – 92 Exam 2 Ch 16-19	Enzymes
3/25	22	22.21 – 25 all; 22.30 – 94	21	21.25-29 all; 34-88; 94	Types of Carbohydrates
4/1	22 and 21	21.20 – 78, 98	21 and 20	20. 22-88	Tests for Carbohydrates
4/8	21 and 23	23.16-21 all, 22 - 86	20 and 22	22.21,22;28-64;70-86	Digestion:Carb-Proteins
4/15	Spring Break				
4/22	Exam 3 4/22 Start Chapt. 24	Exam 3 Ch 21- 23	Exam 3 4/22 Start Chapt.23	Exam 3 Ch 20-22	Tie Dye
4/29	24 & 25	24.19 – 24 all; 24.26 – 86	23 & 24	23.28 – 102	Saponification – soaps
5/6	25 & 26	25.9, 14 – 60 26.19 – 25 all; 26 – 74	24 & 25	24.12,14,20-27all;29-82 25.23-28 all; 30-80	Lipids
5/13	26 & 27	27.6 – 11 all; 14 - 58	25 & 26	26.23-29 all; 30-62	DNA extraction
5/20	Exam 4	Exam 4 Ch 24-27	26 & Exam 4	Exam 4 Ch 23-26	TBA

Course objectives: Upon completion of this course, the student will be able to:

- Identify the functional groups for the major classes of organic and bioorganic compounds.
- Draw structures for these compounds.
- Correctly name these compounds
- Describe physical properties for these compounds including water solubility and polarity.
- Recognize the presence of hydrogen bonding and diagram it
- Recognize structural and geometric isomers
- Describe shapes of organic molecules
- Describe crude oil distillation and cracking and burning of alkanes.
- Recognize and write equations for substitution, elimination and addition reactions.
- Recognize and write equations for the synthesis of organic compounds.
- Recognize and write equations for organic acid/base reactions.
- Recognize and write equations for addition and condensation polymerization.
- Recognize oxidation and reduction reactions
- Describe mechanisms for the reactions in objectives, 7, 8, 9 and 10.
- Recognize chirality from structure.
- Describe the rotation of plan polarized light by optical isomers and use + and – correctly
- Define structures as D or L
- Define and recognize enantiomers, meso compounds, diastereomers, and racemic mixtures.
- Define and recognize monosaccharide, disaccharide, polysaccharide, trise, tetrose, pentose, hexose, aldose, and ketose.
- Recognize acetals, ketals, hemiacetals, and hemiketals and reducing sugars from structures.
- Write equations for the formation of hydrolysis of disaccharides and polysaccharides.
- Recognize alpha and beta glycosidic linkages
- Define lipids in terms of solubility properties.
- Classify lipids.
- Write the equations for the saponification of lipids.
- Distinguish between soaps and detergents.
- Describe two types of rancidity in fats.
- Describe proteins using amino acids shorthand
- Draw the protonated, deprotonated, and zwitter ion forms of amino acids
- Based on pH and pI, determine which amino acid form is most prevalent in a given solution
- Classify proteins
- Describe primary, secondary, tertiary and quaternary structure of proteins and the bonding involved.
- Describe hydrolysis and denaturation of proteins and the causatives agents.
- Identify the components of RNA and DNA.
- Describe the primary and secondary structure of RNA and DNA
- Use shorthand to represent the bases of RNA and DNA.
- Describe replication, transcription and translation.
- Define gene, exon, intron, and mutation.

39. Understand the role of mutation in evolution.
40. Describe genetic "engineering" and its societal uses.
41. Classify enzymes.
42. Describe mechanisms of enzyme activity.
43. Describe factors which effect enzyme activity.
44. Define catabolism and anabolism
45. Describe the citric acid cycle, glycolysis, oxidative phosphorylation and fermentation.
46. Describe the biosynthesis of carbohydrates, lipids and amino acids.
47. Describe the way different neurotransmitters work.
48. Describe the most recent thinking regarding nutritional needs diet.
49. Describe the digestion of carbohydrates, lipids, and proteins.
50. Differentiate between water and fat soluble vitamins and other compounds.
51. Describe how caloric intake effects body mass

SCIENCE LEARNING CENTER

Life Science Building – 1600 Room 1626 530-242-2325

www.shastacollege.edu/ScienceLearningCenter

Margaret Savage, SLC Coordinator

The Science Learning Center offers a comfortable study environment and a variety of resources to assist students in any of the Science classes. There are computer programs that cover specific topics, old tests, Text books for most courses and the Solution Manuals that go with them. Microscopes and slides are available for reviewing some labs and FREE TUTORING.

FREE TUTORING is done by students who have successfully completed the course; often with the same instructor. Tutors must have a "B" or better in the courses they tutor. They can help you initiate good study habits and organizational skills to maximize your study time. They can also help to clarify any confusing concepts. When there is interest, we run study groups that are led by tutors.

OTHER RESOURCES AVAILABLE

- **Copy Machine** A copy machine is available in the computer area for .10 per copy.
- **Office Supplies** For your use, we have a paper cutter, stapler, scissors, tape and colored pencils .
- **Calculators** We have both basic scientific and graphing calculators. They can be checked out for use in the center and for test-taking. We hold your driver's license.
- **Computers** We have four internet connected computers with Microsoft Office suite installed. Printing is available off the computer for \$0.10 a page. We also have 2 Laptops to use in the center.

STUDYING IN THE SLC: There is room available for students to study alone or in groups. We have one small room where students can isolate to minimize distractions. You are allowed to eat in the SLC.

The SLC is a friendly, helpful, encouraging environment, which could become your home away from home. Come in and check it out. **OPEN: MON. & WED. 7:30 AM – 6 PM; TUES. & THURS. 7:30 AM – 4 PM; FRI. 7:30 AM – 3 PM**

ADDING A CLASS

Students may add a full-term class through the fourth week of the term.* After the first two class meetings, approval of the instructor is required to add the class, which includes both the signature of the instructor and the first date of attendance. **IT IS THE STUDENT'S RESPONSIBILITY** to pick up the form from the Admissions and Records Office and take it to the instructor for approval. The student must then return the form to the Admissions and Records Office or Extended Education Center for processing before the add is finalized.

DROPPING A CLASS WITHOUT RECORD

Students may drop a class, and have no notation appear on their transcripts, through the fourth week* or 30% of the term for classes less than a semester in length. **IT IS THE STUDENT'S RESPONSIBILITY TO DROP CLASS (ES).** The necessary forms are available from Admissions and Records, Extended Education Centers, or by mail. If a student intends to drop a class and stops attending but fails to file the necessary forms, a failing letter grade may be assigned by the instructor.

WITHDRAWING FROM A CLASS WITH A "W" GRADE

Students may withdraw from a class after the official "drop" date and up through the fourteenth week or 75% of the term for classes less than a semester in length. The notation "W's" will appear on the student's transcript and will not be used in calculations of grade point average. Excessive "W" shall, however, be used as factors in probation and dismissal procedures. **IT IS THE STUDENT'S RESPONSIBILITY TO OBTAIN FORMS AND SUBMIT THE NECESSARY PAPERWORK TO WITHDRAW FROM A CLASS.** Forms are available from Admissions and Records, Extended Education Centers, or by mail. Students who have not dropped or withdrawn from a class before the end of the fourteenth week or 75% of the term will be assigned a course grade.

ATTENDANCE

Students are expected to attend all class meetings. A student who fails to attend the first meeting of a course without notifying the instructor may be dropped from the class. In addition, an instructor may drop a student during the first 30% of the term for excessive absences. Nevertheless, **IT IS ALWAYS THE STUDENT'S RESPONSIBILITY TO OFFICIALLY DROP OR WITHDRAW** from the class. Students who fail to file the necessary forms, even though they stop attending class