

Chemistry 30B: Introduction to General, Organic, and Biochemistry II**S20**

Dr. Brophy

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Please note that **Canvas Messages** are the most reliable way to get in touch with me.

Course Webpage: Canvas. *Turn on Canvas notifications to receive class announcements.*

For Spring 2020, All lectures and laboratory content and materials will be posted online in Canvas. My intention is to record all my lectures so you can watch them on your own schedule. Class times are reserved for Zoom conferences which will include additional practice problems and discussions. Your attendance is strongly encouraged.

Class Conferences TuTh 11:30 am – 1:20 pm (lecture)
 Tu 9:30 am – 10:20 am (section 1 lab)
 Th 9:30 am – 10:20 am (section 2 lab)

Virtual Office Hours: Friday 12:30 pm – 3:50 pm. ***during my virtual office hours, I will be available for scheduled Zoom meetings and by email***

Zoom Meeting Room: <https://cccconfer.zoom.us/my/drbrophy>
 Password to be sent separately

Important Dates

Add Day April 25, 2020 Last day to *add*.
Drop Day April 26, 2020 Last day to *drop* the course without a withdraw being recorded.
Withdraw June 5, 2020 Last day to *withdraw* from the course.

Exam Dates

There will be two midterm exams and one cumulative final exam. All exams will be open-book take-home exams. You may use your notes and any other course materials that are available to you. Exams will be distributed on Thursday afternoons and they will be due the following Tuesday by 11:30 am.

	Content (Smith Chapters)	Due Date
Midterm Exam 1	4, 11 – 15	May 5, 2020
Midterm Exam 2	16 – 21	June 2, 2020
Final Exam	4, 11 – 24	June 23, 2020

Required Materials

- **Textbook** *General, Organic, and Biological Chemistry*, 4th edition by Smith. For this quarter, McGraw-Hill has generously provided us with **free ebook access** through the Connect homework system. If you wish to purchase a physical copy, I encourage you to buy a used copy of an older edition.
- **Calculator** A scientific calculator with natural log functionality is necessary and sufficient for this class. If you have already purchased a graphing calculator for another class, you may use it on exams and quizzes; however, *we will not use the graphing functionality*. Recommended models:
<https://www.amazon.com/Texas-Instruments-MultiView-Scientific-Calculator/dp/B000PDFQ6K>
https://www.amazon.com/dp/B005QXO8J0/ref=dp_cerb_3

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- **Computer and printer access.** All Spring 2020 classes at De Anza College are being conducted online due to the COVID-19 crisis. You will require a computer with internet access and a printer throughout this course.
 - **A PDF App** Throughout the quarter, you will turn in handwritten assignments (including exams) by creating a PDF file and uploading this file to Canvas. Recommended apps include GeniusScan and CamScanner.

Recommended Materials

- **Chem101 app.** We will use Chem101 for online homework. Access is free for the Spring quarter, and you may wish to download the app to your phone or tablet.

I expect you to use the resources available to you, share resources with your classmates, and ask for help when needed.

Syllabus Statement

This course syllabus is a contract. Please read it carefully and completely in its entirety before asking me any questions regarding the course schedule, content, requirements, grading, etc. You are expected to adhere to the De Anza College Student Code of Conduct Administrative Policy 5510 at all times. This syllabus is a living document. **All corrections and changes to this syllabus will be announced through Canvas.**

This class is divided into two separate instructional periods: a lecture period devoted to the primary course material and a lab period for conducting lab experiments. Everyone will have the same lecture period, but a different lab period depending on which section you are enrolled in. At De Anza College, the lab and lecture may not be taken as separate courses under any circumstances.

Course Description

This class is for students entering the allied health fields. The focus of the second part of Introduction to General, Organic, and Biochemistry is organic and biochemistry. The topics included in organic chemistry are: hydrocarbons, alcohols, thiols, ethers, carboxylic acids, esters, amines, and amides. Various physical and chemical properties of these organic substances will be studied along with nomenclature and structural features. The topics included in biochemistry are: carbohydrates, fatty acids and lipids, amino acids and proteins, nucleic acids and DNA. Various physical and chemical properties of these biological molecules will be studied. A brief introduction to metabolism will also be discussed.

Prerequisites

Chemistry 1A, Chemistry 25, or Chemistry 30A
EWRT 211 and READ 211 (or LART 211), or ESL 272 and 273.

Hours

The study of chemistry combines both macroscopic and microscopic views of the natural world with mathematical models to explain and predict phenomena. This is a 5-unit class, and you should expect to spend **15 hours per week** on class assignments. Divide this work throughout the week so that you don't get overwhelmed. Set aside a time and place that you can work on class materials every day.

Grade Scale

To succeed in this course, you will need to exhibit consistent and sustained effort throughout the quarter. Your final grade will be based on your final percentage out of the total points available.

Final %	Grade ¹⁻³
>99.0	A+
90.0 – 98.9	A
88.0 – 89.9	A–
85.0 – 88.9	B+
80.0 – 84.9	B
78.0 – 79.9	B–
75.0 – 77.9	C+
68.0 – 74.9	C
63.0 – 67.9	D+
55.0 – 62.9	D
<55%	F

¹This grade scale is approximate and may be adjusted at the end of the quarter to the benefit of the student.

²If your average in the lab portion of the course is less than 60%, you will receive an F as a final grade.

³A+ grades will be given to students who demonstrate excellence in the following three areas: lecture, lab and class participation.

Study Tips

1. Complete the assigned reading before coming to class. Review 30A topics that are unfamiliar. Write down any vocabulary words that you do not understand as well as their definitions.

2. Take *handwritten* notes during class and review your notes regularly. Write down any questions you have and bring them to office hours or e-mail your instructor.
3. ***Do a little bit every day.*** After every lecture, review the reading assignment and complete in-chapter and end-of-chapter exercises.
4. Join a study group. Work on problem sets together. The best way to learn the material is to teach it to somebody else.
5. If you feel that you are a poor test-taker, ***complete and turn in all assignments on time*** in order to pass the class.
6. Take care of yourself! Stay well-rested and drink water.

Academic Integrity

Students are expected to adhere to the policy on academic integrity that is outlined in the De Anza College manual (<https://www.deanza.edu/studenthandbook/academic-integrity.html>). ***I expect all submitted work to represent your own understanding of the material and to be written in your own words.*** Cheating, copying, plagiarizing, etc. will not be tolerated, and the minimum consequence will be receiving a zero on that assignment and the incident will be reported to the Dean of Student Services. All laboratory data used in calculations and reported in lab reports must be collected by each student. Multiple instances of academic dishonesty may result in failing the course.

HOMEWORK

Lecture Tickets

Lecture tickets will be submitted through Canvas assignments. There will be a lecture ticket for every lecture (2 per week), and they will be due at 11:59 pm on Thursdays and Sundays. By having multiple lecture tickets due through the week, I hope to help you pace your progress through the course. Lecture tickets will be graded for completion and not accuracy. They will help me gauge the effectiveness of your progress in the course. Each lecture ticket will be worth 5 points.

CHEM101 Assignments

We will use Chem101 as an online homework platform through the course. Access is free with the class access code. There will be 11 Chem101 assignments through the quarter: a structure review and one assignment for each week's content. CHEM101 assignments will be due on Mondays at 11:59 pm. Each assignment will be worth 10 points.

LearnSmart

LearnSmart assignments will be assigned through McGraw-Hill connect. The first two LearnSmarts for Chapters 4 and 11 are worth 5 points each. The remaining LearnSmarts are worth zero points, and it is up to you if you want to use them.

Graded Discussion Posts

To encourage interaction and class discussion, graded discussion posts will be opened on Canvas for every lecture topic. Each discussion post will be worth 1 point, and you may earn a maximum of 15 points through discussion points. There will be at least 18 discussion points this quarter.

Recommended practice problems

Consistent practice is an essential component of learning, and homework questions will often be similar to exam questions. Recommended practice problems from the textbook will be posted for each chapter; however, homework will not be graded. In general, the answers to these questions may be found in the back of the textbook and solutions are readily available online. ***Collaboration with classmates is expected and encouraged.***

EXAMS

Exams

There will be two midterm exams and one cumulative final exam. Exams will be take-home and open-book and each exam will be worth 100 points. Exams will consist of short answer questions with the opportunity for partial credit. You must show your work in order to receive credit for any answer. I am more interested in how you think about a problem than your final answer. Exams will be released on Friday at 12:30 pm and due the following Monday by 11:30 am. Late exams will not be accepted unless you have made prior arrangements with me.

LABS

Virtual Laboratory Experiments

Virtual laboratory experiments and simulations will be performed using Labster. This platform is free through Canvas, however, it is glitchy and requires a desktop or laptop computer. I encourage you to complete each simulation; however, I will also post videos of each simulation. Completion of each simulation will be worth zero points. Associated assignments may include, but are not limited to, worksheets, calculations, and screen shots of virtual lab benches. The number of points available for each experiment and due date will vary throughout the quarter.

Lab Surveys

Pre-lab surveys will be posted on Canvas. You should complete the survey after watching the lab lecture and before starting the lab activity.

Lab Quizzes

There will be a lab quiz administered through Canvas each week. Lab quizzes will cover concepts and techniques related to each week's lab. Lab quizzes must be completed each Monday by 11:59 pm.

Lecture Schedule

Chemistry 30B will cover material presented in chapters 11 – 24 of Smith's *General, Organic, and Biological Chemistry*, 4th edition. Every effort will be made to keep to the lecture schedule below.

Week	Date	Day	Lecture Topics and Assigned Reading
1	4/14	Tu	Chemical Structure Review •Lewis dot structures •VSEPR and molecular geometry <i>Smith GOB Chapter 4</i>
	4/16	Th	An Introduction to Organic Chemistry •What makes chemistry “organic”? •Structures of organic molecules •What is a functional group? •Properties of organic compounds <i>Smith GOB Chapter 11</i>
2	4/21	Tu	Alkanes •Linear, branched, and cyclic •IUPAC nomenclature •Physical properties •Reactivity: halogenation <i>Smith GOB Chapter 12</i>
	4/23	Th	Unsaturated Hydrocarbons •Alkenes and alkynes • <i>cis-trans</i> isomers •Reactivity of alkenes •Polymers <i>Smith GOB Chapter 13, sections 1 – 8</i>
3	4/28	Tu	Unsaturated Hydrocarbons •Aromatic compounds •Nomenclature of benzene derivatives •Reactivity of aromatic compounds <i>Smith GOB Chapter 13, sections 9 – 13</i> Heteroatoms: Oxygen, Halogens, and Sulfur •Alcohols •Ethers •Alkyl Halides •Thiols <i>Smith GOB Chapter 14</i>
	4/30	Th	Same Formula, Different Shape “These things are the same, and yet they are different.” •Structural isomers •Geometric isomers •Chirality •Fischer Projections <i>Smith GOB Chapter 15</i>
4	5/5	Tu	Aldehydes and Ketones •The central importance of the carbonyl functional group •Reactivity of aldehydes and ketones •Reduction of aldehydes and ketones <i>Smith GOB Chapter 16</i>
	5/7	Th	Carboxylic Acids •Revisiting the carbonyl •Nomenclatures and physical properties •Carboxylic acids in consumer products •Acidity of carboxylic acids •Reactivity: Converting carboxylic acids to esters and amides <i>Smith GOB Chapter 17, sections 1–4, 6, 8</i>
5	5/12	Tu	Esters and Amides •Nomenclatures and physical properties •Reactivity: hydrolysis •Synthetic polymers <i>Smith GOB Chapter 17, sections 5, 9–11</i>
	5/14	Th	Amines

			<ul style="list-style-type: none"> •Nomenclature and physical properties •Reactivity: amines as bases •Alkaloids and neurotransmitters <i>Smith GOB Chapter 18</i>
6	5/19	Tu	Lipids <ul style="list-style-type: none"> •Fatty acids and lipids •Sources of lipids: fats and cell membranes •Reactivity: hydrolysis •Can you survive on a no-fat diet? Fat-soluble vitamins <i>Smith GOB Chapter 19</i>
	5/21	Th	Carbohydrates <ul style="list-style-type: none"> •Monosaccharides in their open and closed forms •Fischer projections and Hayworth projections <i>Smith GOB Chapter 20, sections 1 – 3</i>
7	5/26	Tu	Carbohydrates <ul style="list-style-type: none"> •Reactivity: reduction and oxidation •Glycosidic bonds in disaccharides and polysaccharides <i>Smith GOB Chapter 20, sections 4 – 8</i>
	5/28	Th	Amino Acids and the Peptide Bond <ul style="list-style-type: none"> •Amino acids and the zwitterionic form •The 20 common naturally-occurring amino acids •Peptide bond formation •Biologically active peptides <i>Smith GOB Chapter 21, sections 1 – 5</i>
8	6/2	Tu	Proteins and Enzymes <ul style="list-style-type: none"> •When does a peptide become a protein? •Protein structure: primary, secondary, tertiary quaternary •Breaking proteins down: hydrolysis and denaturation •Reactivity of proteins: enzyme activity •The lock and key model <i>Smith GOB Chapter 21, sections 6 – 11</i>
	6/4	Th	Nucleic Acids: The Building Blocks of DNA <ul style="list-style-type: none"> •Nucleosides, nucleotides, and nucleic acids •Phosphodiester linkages •The structure of DNA •RNAs <i>Smith GOB Chapter 22, sections 1 – 5</i>
9	6/9	Tu	DNA Replication and Protein Synthesis <ul style="list-style-type: none"> •Transcription and translation •The genetic code •Errors in the code: mutations and genetic diseases •Recombinant DNA •The polymerase chain reaction <i>Smith GOB Chapter 22, sections 6 – 11</i>
	6/11	Th	Metabolism <ul style="list-style-type: none"> •An introduction to metabolic pathways •ATP and energy production •Couple reactions •Coenzymes <i>Smith GOB Chapter 23, sections 1 – 4</i>
10	6/16	Tu	Metabolism <ul style="list-style-type: none"> •The citric acid cycle •The electron transport chain <i>Smith GOB Chapter 23, sections 5 – 7</i>
	6/18	Th	Metabolism <ul style="list-style-type: none"> •Glycolysis •Fatty acid metabolism •Amino acid metabolism <i>Smith GOB Chapter 24, sections 1 – 3, 7, 9</i>
11	6/23	Tu	Final Exam 11:30 am – 1:30 pm

Student Learning Outcome(s):

- *Differentiate the general reactions of the principle organic functional groups.
- *Evaluate the major classes of biological compounds from a chemical perspective.