Chem& 263 Fall 2021

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**Class Time**: This class is mostly asynchronous, which means it does not meet at any particular time. Instead, you are free to watch the lectures whenever convenient, as they are all pre-recorded. However, the exams, of which there are three, take place on campus at a specific time (see below). Those are the only three hours where your attendance is required.

**Textbooks**: PLKE, Organic Laboratory Techniques, 4<sup>th</sup> edition (in a pinch, other editions OK, but this will cause you headaches as things move around)

There are a few old digital exams (with keys) available in the Files section. If you want more, a packet of about 20 years worth of old exams (with answer keys) is available from the bookstore. It's not required, but I *strongly* recommend it for exam practice.

**Office Hours:** Essentially all hours are office hours now. Whenever you have questions, just send me an e-mail and I will answer it as soon as I read it. Most questions can be answered with e-mail text or by re-directing you to certain lectures, but if it needs something more elaborate, I'll create a mini-lecture for you and send you the link. We can also meet by Zoom at any time if you think that would be helpful.

**Exams:** There will be three 100-point exams, about every 3 weeks, on the following days: (note: these are the only three times in the quarter where you <u>must</u> be at Bellevue College)

Tuesday, Oct. 26 at 2:30PM

Tuesday, Nov. 16 at 2:30PM

Tuesday, Dec. 7 at 2:30PM (once you finish this exam, you're all done!)

The three exams take place on campus in room S324. While in the building, you will need to wear a mask. It is probably not worth buying a parking pass, since we are only on campus three times. The most logical option would probably be to use the metered parking lots. Each exam is one hour.

Exams are open notes. The notes have to be handwritten by you (no textbooks, old exams, photocopies, or anything electronic), but there is no limit to the amount. You can bring in one notecard, or ten, or a hundred, or whatever number you want (and it doesn't have to be on notecards--you can use papers or notebooks). They just all have to be handwritten by you.

**Grade:** Your grade is based on a total of 400 points (three 100-point exams, four 10-point lab reports, and three 20-point lab reports). There is no extra credit. Your percentage corresponds to the following grades:

А	95+	C+	77-79
A-	90-94	С	73-76
B+	87-89	C-	70-72
В	83-86	D	60-69
B-	80-82	F	below 60

**Lectures:** Lectures are pre-recorded, and stored in the Modules section of Canvas. They are organized by topic and are best studied in the order they are presented. Each will also indicate in the title which exam they go with. Each one contains new information about reactions, mechanisms, naming, etc. with lots of worked examples. You have the flexibility of watching them whenever you want (or re-watching them), but try not to fall behind. The material adds up quickly. Aim to finish watching the lectures well before the exam date so you can give yourself time to practice with the old tests. The class was created from an instructor (me) who has no training or experience with online classes, so there are likely to be mistakes. Please be understanding.

The first two tests of this class closely mirrors last quarter: more functional groups (aldehydes, ketones, carboxylic acids, amines, etc.) and their reactions, nomenclature, properties, and mechanisms. The third test of the quarter will be devoted to biochemistry (DNA, proteins, lipids, and carbohydrates). If you have had Biology before, you will probably find this part fairly easy.

**Labs:** Regrettably, we cannot have any labs this quarter. But there will still be seven lab reports, of a sort. Four of these are normal 10-point labs, which are very similar to ones you have done in the past. There are questions assigned from the textbook and/or from me. Everything you need to do is listed on the assignment page. There are also three 20-point lab reports. These are a little different. One is the separation scheme...the second is ID of an unknown Liquid...the third is ID of an unknown solid. Both unknown ID labs are performed at the same time.

Separation Scheme (lab 55, p.496): For this lab, you must devise a procedure for separating and isolating two of three compounds in a mixture that you will be assigned. It is this procedure that you submit. Your procedure should be very detailed...imagine writing up a lab procedure for a first time organic chemistry lab student (as you once were). Don't just say "Extract the organic layer" (which is the organic layer?), "add hydrochloric acid" (how much acid? What concentration?) or "Heat" (for how long? At what temp?). Make sure all the necessary instructions are there. You don't have to isolate all three...just two of the three. On p. 497, at the bottom of the page in the footnote, there are a list of four different mixtures. You may select any of these four as your mixture. This is worth 20 points and due at 2:30 on Oct. 21.

Unknown ID (experiment 54, p. 448): Imagine you have been given an unknown solid and an unknown liquid. You must identify each—there is a list in appendix 1 (p. 958) of all the possibilities, organized by functional group. You'll want to read part 4 (starting on p. 448) of your textbook for ideas on how to go about this. For the week of November 17-24, you may perform a total of 15 (virtual) tests of your choosing--presumably about half on the liquid and half on the solid, but if you figure one out early and wish to concentrate more tests on the other, that is fine (Note that derivatives count as three tests). All the tests that are available to you are in the lab textbook (the only one you cannot do is IR or NMR spectroscopy). Here's a list of all the possible tests, all of which are described in detail in your textbook:

Solubility	Belstein	Silver Nitrate
MP or BP	Sodium Iodide	Ferrous hydroxide
Na fusion: Nitrogen	Na fusion: Sulfur	Na fusion: Halide
Bromine	Potassium Permanganate	Ignition
2,4-DNP	Tollens	Chromic Acid
lodoform	Ferric Chloride	pH (only if water sol)
Sodium Bicarbonate	Silver nitrate	Neutralization Eq.
Sodium hydroxide	Ferric Chloride	Cerium (IV)
Bromine water	Nitrous acid	Acetyl Chloride
Lucas	Chromic acid (alternative)	lodoform
Ferric hydroxamate	Basic hydrolysis	

Alternatively, if you wish, you may obtain a (virtual) derivative instead of performing a test. A derivative costs 3 tests to perform, so choose wisely. The derivatives available are:

Semi-carbazone	2,4-DNP	p-Toluidide
Anilide	Amide	Napthyl Urethane
Bromo	Benzamide	Picrate
Acetamide	3,5-dinitrobenzoate	Phenyl Urethane

It's up to you which tests to perform, but keep in mind there are far more tests than you have time to perform (remember you can only do 15 tests--and derivatives count as three). It will therefore be necessary to choose the ones that make the most sense for your situation. The "lab" takes place over the course of 7 days. Starting at 2:30PM on Wednesday, November 17, you can let me know which tests you would like to perform at any time. You can ask for several at the same time, or just one—it's up to you. I will respond with the results as soon as I can. Then you can decide what to do next. Keep in mind that once a test is submitted, you cannot change your mind, so make sure you're picking the best test before you submit.

In real lab, not all the results would be conclusive. Your melting or boiling point, for example, would likely be a little off. To reflect this, melting point and boiling point results you get will not always be spot on. Your mp and bp will be off by up to ten degrees (determined randomly). It could be in either direction (also determined randomly). That applies to your unknown and also any derivatives you might perform.

Here's a sample of a typical round: You would send an e-mail saying "I want to perform the Belstein test and a semi carbazone derivative on the solid. I would like to do the sodium bicarbonate test on the liquid" (note that this would "cost" 5 tests...one for the Belstein, 3 for the derivative, and one for the sodium bicarbonate test) and I would respond "The Belstein test produces a green flame. The semicarbazone derivative has a mp of 134. The sodium bicarbonate test produces no bubbles." You would need to interpret what those results mean, and then decide which tests you should perform next, in light of what you have learned.

The only information you get is the results of those tests. There is no additional information (like appearance or smell). This is your party, so to speak, so do not expect any help from me—in particular, there is no point asking me what a test result means or what test you should do next. That is your call. It may sound tricky but this is now my

third time running this class online, and in the past, most students got both their unknowns correct

You must submit the identity of each of your unknowns by 2:30PM on November 24 at the latest, but earlier is perfectly fine. Some of you may decide to run through the whole thing on the first day. Others may prefer to space it out—just don't leave things too late. Remember all tests will involve some delay as you await results from me. There's no report per se. All you hand in is the name of the compound. It is worth 20 points for the solid and 20 for the liquid. You can submit them at different times (if, for example, you figure out the liquid early and want to get it out of the way), but both must be handed in by 2:30PM on November 24.