Indiana Academy – Organic Chemistry Syllabus Fall 2021

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- It is *very important* to me to respond to your questions or concerns promptly; however, please note that I do receive *a lot* of emails. If for some reason I do not respond within 24 hours, please resend your original email and/or leave me a voicemail message (765-285-7456).
- Please note that if you email me after midnight, it is highly unlikely that I will read that email until sometime the following morning.

Meeting Times:

- **2:00- 2:55 MWF Room: Burris 210**
- Lab: Thursday 2 - 4

Office hours – Note: *I can also meet by appointment.*

- Monday: My office: 8 a.m. – 10 a.m.
- Wednesday: My office: 4 p.m. – 6 p.m.
- Thursday: Burris 210: 8 a.m. – 11 a.m.
- Friday: My office: 8 a.m. – 10 a.m.

Course Description

In this course, the traditional aspects of organic chemistry, which include nomenclature, structure, bonding, and functional groups are examined. The goal is to educate students to think independently about organic chemistry. Students are expected to analyze problems, sort facts, reason by analogy, and look for patterns. Laboratory work is carried out at both the micro-scale and macro-scale level. Selected-topics in biochemistry will be covered, and students will be exposed to biochemical techniques in the laboratory. This course is intended for (but not limited to) students whose college goals include biology, chemistry, or the medical sciences.

Chemistry is a very difficult subject for many students, and Organic Chemistry is no exception. This class is a shares many aspects of learning a foreign language and then applies that language to chemical processes. To be successful, please follow these guidelines:

1. PRACTICE, PRACTICE, PRACTICE! Learning chemistry is like learning a skill.
    a. When you learned to throw a baseball (which I cannot do), ride a bicycle, or play a musical instrument, to be proficient at these skills you have to PRACTICE. Organic chemistry requires the same dedication. Make sure you have time in your schedule to practice these skills. My expectation is that for every hour you spend in class, you will spend *at a minimum* two hours of work outside of class.
2. READ AHEAD! Don't wait for me to cover the topic in class or you will be confused about what I am teaching in class.
3. DON'T FALL BEHIND!

4. This class will explore chemistry that is not typically covered in General Chemistry. I have found that students who were successful in Gen Chem struggle at first in Organic Chem because they want "more of the same." This will not be the same.
5. It is your responsibility to get as much as you can out of this course. ASK QUESTIONS. ATTEND OFFICE HOURS.
6. Form a study group of two or three other students – it will help.

Texts

- Klein, *Organic Chemistry I as a Second Language* 3rd Ed. Wiley, 2012

Attendance/Tardies

It is extremely important that you attend ***all*** class periods. The pace of this course is extraordinarily fast and missing a day can seriously put you behind in this course; however, I do understand that absences happen. Please adhere to the following guidelines in the even you miss a class.

- You will **not** be counted as present if you attending the class while
    - simultaneously attending any activity that draws your attention away from the lecture included but not limited to hair appointments, meetings, or driving unless prior arrangements have been made.
    - If your video is not turned on during class unless prior arrangements have been made
- If you are absent for a school scheduled event such as a field trip or a college trip, you are required to turn in your work ***prior*** to the trip *unless* alternate arrangements have been made with me *prior* to your trip.
- If you have an excused absence,
    - the work that was due on the day of your absence is expected the day you return
    - work that is due the day you return is expected the following class period
- Extended excused absences require that *you* generate a conversation with me *outside* of class so that we can work out a plan to get you caught up.
- Tardy is defined as arriving after class has started. After ten minutes, a tardy will be counted as absent.
- Sleeping in class – first offense will result in a warning, the second offense will result in an unexcused absence.
- No work will be accepted for an unexcused absence.

Cell phones/Computers/Tablets/Calculators

- Cells phones are not to be used in class.
    - Emergency calls can be taken in the hallway
    - During an exam, cell phones must be put on silent, airplane mode, or turned off.
- Computers and/or tablets may be used in class for taking notes.
    - If you are using a computer/tablet during class for anything outside of the scheduled activity/lecture, you will lose the privilege to use these devices during class.
- Occasionally you will need your computer for a lab – you will be given notice when you will need a computer for class.

Academic Integrity

Academic integrity is essential to the mission of the Academy. All students deserve a healthy learning environment and evaluations that are based on their honest independent efforts. A clear sense of academic honesty and responsibility is fundamental to good scholarship and learning.
You are encouraged to *form study groups and to problem solve together*. The normal expectation is that the work on exams is your own and that homework, take-home quizzes, and lab reports, while discussed with other students, is of your own creation. Academic dishonesty will not be tolerated. Please refer to the student handbook.

Examples of dishonesty include sharing your work with another student either electronically or on paper (including labs!), using another student's work to complete your work, and copying answers from the Internet or from the solution manual. You may use resources to help complete your work; you may not directly use another's work.

Late Work

- Late work will not be accepted; however, we are in a strange time right now, and I understand that things happen. It is your responsibility to communicate your needs so that I can work with you.

Laboratory

Many of the labs that you will do in class are inquiry based labs. *Labs make up 20% of your overall grade.* If you miss a lab (and it is an excused absence) then you will be required to make up the lab within six days of the missed lab; however, the due date will not change. You will not be allowed to simply use the data from your lab partner. Learning laboratory techniques is just as important as learning the concepts behind the labs.

- Lab work cannot not be made up for an unexcused absence.
- Sign and return the lab safety contract.

BSU Statement

"Ball State University aspires to be a university that attracts and retains a diverse faculty, staff, and student body. We are committed to ensuring that all members of the community are welcome, through valuing the various experiences and worldviews represented at Ball State and among those we serve. We promote a culture of respect and civil discourse as expressed in our Beneficence Pledge and through university resources found at http://cms.bsu.edu/campuslife/multiculturalcenter."

Mask Policy

The Indiana Academy will follow Ball State University's mask policy (see Section IV). Based on current CDC guidance recommending the wearing of face masks for all people—regardless of vaccination status—in public indoor settings in communities where the rate of coronavirus transmission is high or substantial, all employees, students, and campus visitors are required to wear a mask while inside any University building. This requirement is effective on August 9, 2021. Fully vaccinated people are not required to wear masks outdoors.

Individuals who are not fully vaccinated for COVID-19 are required to wear face masks while inside campus buildings and outside when physical distancing cannot be maintained.

If a student declines to wear a face mask as required, the student will be referred to the Director of Academic Affairs or the Director of Residential Affairs. If the situation occurs in a classroom or other academic setting, it is considered a classroom management issue, and the teacher will remind the student of the requirement and give the student a chance to comply with it prior to referring the matter to the Director of Academic Affairs or the Director of Residential Affairs. Wearing masks is crucial to preventing the spread of COVID-19 to others.

Grade Weights

Weight	Description
45%	Exams
20%	Laboratory
15%	Quizzes
10%	Homework
10%	Final Exam
100%	Total

Grade Scale

Percentage	Letter Grade
≥93	A
90 - 92	A-
87 - 89	B+
83 – 86	B
80 – 82	B-
79 – 77	C+
70 - 76	C
65 - 69	C-
<64	D*

Test Taking Tips

Use the 3-Pass System:

1. Answer the questions that you know. Then…
2. Answer the stuff that you think you know. Then…
3. Finish what you can

Study Tips

1. Ask questions!
2. Rewrite your class notes with the textbook. Synthesize the two into one coherent document.
3. Ask questions!
4. Attend the help sessions.
5. Ask questions!
6. Form a study group.
7. Ask questions!

Additional Resources

http://www.khanacademy.org/science/chemistry

Video lessons! Everything you need to know about chemistry. If you search, you can find just about any topic including Calculus and History.

http://misterguch.brinkster.net/helpdesk2.html

Fairly basic, but the information is very helpful.

http://www.csudh.edu/oliver/demos/index.htm

Good videos on lab techniques

http://etc.usf.edu/clipart/index.htm

More video lessons both in chemistry and biology

http://www2.stetson.edu/mahjongchem/

Chemistry mahjong – well, why not?

http://quizlet.com/7300659/element-flashcards-flash-cards/

Element flashcards

Day	Topic
1	Discuss syllabus, course details 1.1 Introduction to Organic Chemistry
2	1.2 The Structural Theory of Matter 1.3 Electrons, Bonds, and Lewis Structures
3	1.4 Identifying Formal Charges 1.5 Induction and Polar Covalent Bonds 1.6 Atomic Orbitals
4	1.7 Valence Bond Theory 1.9 Hybridized Atomic Orbitals
5	1.10 Predicting Molecular Geometry: VESPR Theory 1.11 Dipole Moments and Molecular Polarit
6	1.12 Intermolecular Forces and Physical Properties 1.13 Solubility
7	2.1 Molecular Representations 2.2 Bond-Line Structures 2.3 Identifying Functional Groups
8	2.4 Carbon Atoms with Formal Charges 2.5 Identifying Lone Pairs 2.6 Three-Dimensional Bond-Line Structures
9	2.7 Introduction to Resonance 2.8 Curved Arrows 2.9 Formal Charges in Resonance Structures
10	2.10 Drawing Resonance Structures via Pattern Recognition
11	2.10 Drawing Resonance Structures via Pattern Recognition
12	2.11 Assessing the Relative Importance of Resonance Structures 2.12 The Resonance Hybrid
13	2.13 Delocalized and Localized Lone Pairs
14	3.1 Introduction to Brønsted Lowry Acids and Bases 3.2 Flow of Electron Density: Curved-Arrow Notation 3.3 Brønsted-Lowry Acidity: Quantitative Perspective
15	3.4 Brønsted-Lowry Acidity: Qualitative Perspective 3.5 Position of Equilibrium and Choice of Reagents
16	3.6 Leveling Effect 3.7 Solvating Effects
17	3.8 Counterions 3.9 Lewis Acids and Bases
18	4.1 Introduction to Alkanes 4.2 Nomenclature of Alkanes 4.3 Constitutional Isomers of Alkanes
19	4.4 Relative Stability of Isomeric Alkanes 4.5 Sources and Uses of Alkanes
20	4.6 Drawing Newman Projections
21	4.7 Conformational Analysis of Ethane and Propane 4.8 Conformational Analysis of Butane 4.9 Cycloalkanes
22	4.10 Conformations of Cyclohexane 4.11 Drawing Chair Conformations
23	4.12 Monosubstituted Cyclohexane 4.13 Disubstituted Cyclohexane

24	4.14 cis-trans Stereoisomerism
25	5.1 Overview of Isomerism 5.2 Introduction to Stereoisomerism 5.3 Designating Configuration Using the Cahn-Ingold-Prelog System
26	5.4 Optical Activity 5.5 Stereoisomeric Relationships: Enantiomers and Diastereomers
27	5.6 Symmetry and Chirality
28	5.9 Chiral Compounds That Lack a Chiral Center 5.10 Resolution of Enantiomers 5.11 E and Z Designations for Diastereomeric Alkenes
26	6.1 Enthalpy 6.4 Equilibria 6.5 Kinetics 6.6 Reading Energy Diagrams
27	6.7 Nucleophiles and Electrophiles
28	6.8 Mechanisms and Arrow Pushing
29	6.10 Drawing Curved Arrows 6.11 Carbocation Rearrangements
30	6.9 Combining the Patterns of Arrow Pushing
31	6.12 Reversible and Irreversible Reaction Arrows
32	7.1 Introduction to Substitution and Elimination Reactions
33	7.2 Nomenclature and Uses of Alkyl Halides 7.3 SN2 Reactions
34	7.4 Nucleophilic Strength and Solvent Effects in SN2 Reactions 7.5 SN2 Reactions in Biological Systems—Methylation
35	7.6 Introduction to E2 Reactions 7.7 Nomenclature and Stability of Alkenes
36	7.8 Regiochemical and Stereochemical Outcomes for E2 Reactions 7.9 Unimolecular Reactions (SN1 and E1)
37	7.10 Kinetic Isotope Effects in Elimination Reactions 7.11 Predicting Products: Substitution vs. Elimination
38	7.12 Substitution and Elimination Reactions with Other Substrates 7.13 Synthesis Strategies
39	8.1 Introduction to Addition Reactions 8.2 Alkenes in Nature and in Industry 8.3 Addition vs. Elimination: A Thermodynamic Perspective
40	8.4 Hydrohalogenation 8.5 Acid-Catalyzed Hydration 8.6 Oxymercuration-Demercuration
41	8.7 Hydroboration-Oxidation 8.8 Catalytic Hydrogenation 8.9 Halogenation and Halohydrin Formation
42	8.10 Anti Dihydroxylation 8.11 Syn Dihydroxylation
43	8.12 Oxidative Cleavage 8.13 Predicting the Products of an Addition Reaction
44	8.14 Synthesis Strategies

Exam #1: 1 - 3
Exam #2: 4 - 6
Exam #3: 7 - 8

Possible Labs – Subject to Change

Lab	
1	Analysis and Purification of Solid Organic Compounds
2	Analysis and Purification of Liquid Organic Compounds
3	Separation of a Mixture Using Chromatography
4	Stereochemistry
5	Natural Product Isolation
6	Spectroscopic and Spectrometric Analysis
7	Spectroscopic and Spectrometric Analysis
8	Multi-step synthesis