# Course Description

An introduction to organic and biological chemistry for students of the health professions. Topics include the structure, properties and reactions of organic compounds, carbohydrates, lipids, proteins, and nucleic acids, enzyme activity and metabolic pathways and the storage and transmission of genetic information. Emphasis is on physiological and clinical correlations. Three credits (three hours lecture per week).

Pre-requisite: C or better in CHM 115 and CHM 115L or permission of course director. Co-requisite: CHM116L or permission of course director.

# University Learning Outcomes (ULO)

* **ULO1:**Knowledge of Human Cultures and the Physical and Natural World
* **ULO2:**Intellectual and Practical Skills
* **ULO3:**Personal and Social Responsibility
* **ULO4:**Integrative and Applied Learning­
* **ULO5:**Immersed in the Critical Concerns of the Sisters of Mercy of the Americas

# Program Learning Outcomes (PLO)

* **PLO1**: Express an appreciation and understanding of a variety of aesthetic, literary, cultural and ideological traditions.(ULO 2, 3)
* **PLO2**: Engage meaningfully in a community of scholarship through inquiry, research and the communication of ideas. (ULO 2, 4)
* **PLO3**: Evaluate historical, political, economic and scientific data while recognizing the interrelatedness of events and processes. (ULO 1, 2, 3, 4)
* **PLO4:** Demonstrate an understanding of the impact of technology on society. (ULO7)
* **PLO5**: Reflect upon the relationship of the Divine to the human experience. (ULO 2, 3, 4)
* **PLO6**: Examine and understand the dynamics of individual and group behavior. (ULO 2, 4)
* **PLO7**: Demonstrate an understanding of quantitative reasoning. (ULO 1, 2, 4)
* **PLO8**: Engage in constructive activities of service to the community in light of the Gospel tradition as experienced through the Mercy charism that shapes the College. (ULO 2, 3, 4)

# Course Learning Outcomes (CLO)

* **CLO1:** Demonstrate the quantitative and qualitative skills needed to succeed in chemistry, including the ability to read and interpret graphs, the ability to apply algorithms to problem solving, and the ability to employ critical-thinking skills. The student will demonstrate these abilities through performance on formative and summative assignments on MasteringChemistry and performance on examinations.
* **CLO2:** Demonstrate the mastery of specific knowledge and skills in chemistry listed in the learning objectives for each chapter posted on the Blackboard site and the ability to make connections between concepts in chemistry. The student will demonstrate this mastery through performance on formative and summative assignments on MasteringChemistry and performance on examinations.
* **CLO3:** Apply the fundamental principles of chemistry to the composition, structures, and processes of human physiology. The student will demonstrate this ability through performance on formative and summative assignments on MasteringChemistry and performance on examinations.

# Student Expectations

Students are expected to:

* Ask probing and insightful questions related to course content.
* Make meaningful and relevant connections and application to their own learning process.
* Be productive and contributing members of class discussions.

# Required Course Materials

* Timberlake, K. C. (2016). *General, organic, and biological chemistry: Structures of life* (5th ed.). Boston, MA: Pearson.

ISBN-13: 978-0-13-389931-3

It is recommended that you purchase the eText with MasteringChemistry license access directly from Pearson: [MasteringChemistry with Pearson eText - Instant Access - for General, Organic, and Biological Chemistry: Structures of Life, 5th Edition.](http://www.mypearsonstore.com/bookstore/masteringchemistry-with-pearson-etext-instant-access-0133899314)

# Suggested Point Values

|  |  |  |
| --- | --- | --- |
| **Assessment** | **Point Value** | **Due** |
| **Week 1** |  |  |
| Homework: Week 1 MasteringChemistry: Ch. 12.1–12.4 | 100 |  |
| Week 1 Test | 200 |  |
| **Week 2** |  |  |
| Homework: Week 2 MasteringChemistry: Ch. 12 & 13 | 200 |  |
| Discussion Question: Polymers | 40 |  |
| Discussion Question: Polycyclic Aromatic Hydrocarbons | 40 |  |
| Week 2 Test | 200 |  |
| **Week 3** |  |  |
| Homework: Week 3 MasteringChemistry: Ch. 14 & 15 | 200 |  |
| Week 3 Test | 200 |  |
| **Week 4** |  |  |
| Homework: Week 4 MasteringChemistry: Ch. 16 & 17 | 200 |  |
| Discussion Question: Fats and Oils in Foods | 40 |  |
| Week 4 Test | 200 |  |
| **Week 5** |  |  |
| Homework: Week 5 MasteringChemistry: Ch. 18 & 19 | 200 |  |
| Discussion Question: Glycosylated Hemoglobin | 40 |  |
| Week 5 Test | 200 |  |
| **Week 6** |  |  |
| Homework: Week 6 MasteringChemistry: Ch. 20 & 21 | 200 |  |
| Discussion Question: Vitamins | 40 |  |
| Week 6 Test | 200 |  |
| **Week 7** |  |  |
| Homework: Week 7 MasteringChemistry: Ch. 22 | 100 |  |
| Discussion Question: DNA Manipulation and the Ethics of Immortality | 40 |  |
| Week 7 Test | 200 |  |
| **Week 8** |  |  |
| Homework: Week 8 MasteringChemistry: Ch. 23 & 24 | 200 |  |
| Week 8 Test | 200 |  |
| **Total Points** | **3240** |  |

**Grading Scale**

|  |  |
| --- | --- |
| **Grade** | **Range** |
| A | 93-100 |
| A- | 90-92 |
| B+ | 87-89 |
| B | 83-86 |
| B- | 82-80 |
| C+ | 77-79 |
| C | 73-76 |
| C- | 70-72 |
| D+ | 67-69 |
| D | 63-66 |
| D- | 60-62 |
| F | 59 |

# Course Schedule

|  |  |  |
| --- | --- | --- |
| **Week** | **Start** | **End** |
| One | <insert start date> | <insert end date> |
| Two |  |  |
| Three |  |  |
| Four |  |  |
| Five |  |  |
| Six |  |  |
| Seven |  |  |
| Eight |  |  |

# Weekly Learning Modules

|  |  |  |
| --- | --- | --- |
| **Week One: Introduction to Organic Chemistry and Alkanes** | | |
| ***Learning Objectives*** | ***Alignment*** | |
| * 1. Identify the characteristic properties of organic versus inorganic compounds. | CLO1, CLO2 | |
| * 1. Write the IUPAC names and draw the condensed structural formulas and the skeletal formulas for the first 10 straight chain alkanes starting with methane. | CLO1, CLO2 | |
| * 1. Write the IUPAC names and draw the condensed structural formulas and the skeletal formulas for the branched chain alkanes containing four, five, and six carbons. | CLO1, CLO2 | |
| * 1. Identify the physical and chemical properties of alkanes. | CLO1, CLO2 | |
| * 1. Write a balanced chemical equation for the combustion of an alkane. | CLO1, CLO2 | |
| * 1. Classify organic compounds according to the functional group (groups) they contain. | CLO1, CLO2 | |
| ***Resources, Activities, and Preparation***  *Utilize these resources and complete these activities in preparation for your graded assignments.* | ***Alignment*** | ***AIE*** |
| **Tutorials**  During this course you will be asked to use and participate in various technologies to complete activities and assignments.  **Review** the tutorials available on Blackboard as needed.  **Click** the **Student Resources** button from the menu on the left. | N/A | N/A |
| **Weekly Participation and Discussion**  The purpose of the weekly discussions is to provide you with a way to synthesize the concepts presented in this course. Each week, you will respond to the discussion questions with a substantive post of 200-to 250-words that addresses all the prompts for the question by 11:59 p.m. EST of the listed due date. By the conclusion of each week, Sunday at 11:59 p.m. EST, you will make at least one substantive comment of 100-to 150-words to three of your classmates’ posts for each assigned discussion question. Your comments must further the discussion by following the RISE Model for meaningful feedback. It is recommended that you check in periodically throughout the week to ensure that you are meeting the participation requirement.  **Review** the RISE Model for Peer Feedback, located on Blackboard. |  |  |
| **Student Introduction Discussion Forum**  **Introduce** yourself by answering the following questions in the Student Introduction discussion forum:   * What is your academic background? * What area are you currently working in? * What are your personal interests outside of work? * What is one detail about you that will help us remember you?   You can also include appropriate pictures of yourself, your family, pets, and so forth in your post.  **Read** and respond to your classmates’ discussion posts as appropriate. | N/A | Discussion =  **1 hour** |
| **MasteringChemistry Registration**  MasteringChemistry is an online, interactive resource that includes readings, multimedia examples, practice problems, and quizzes. You will use it throughout the course to complete a number of practice activities and for-points assignments. Complete the following as early as possible in Week 1 to register with MasteringChemistry:   * Ensure you have the following information before attempting registration:   + COURSE ID: Your instructor will post the Course ID in the Announcements forum. It will use a format like *MCprofessor12345*.   + ACCESS CODE: This is the access code provided with your purchase of your hard cover or eText from Pearson. * Navigate and follow the instructions to complete your registration with [MasteringChemistry](http://www.pearsonmylabandmastering.com/northamerica/masteringchemistry/students/get-registered/index.html).   After you gain access to MasteringChemistry, you are ready to begin completing your assignments. You may wish to review the [Mastering Student User Guide](http://www.pageturnpro.com/Pearson-Education/52438-Mastering-Student-Getting-Started-Guide/index.html%231) before beginning to use MasteringChemistry.  **Complete** the Introduction to MasteringChemistry within the MasteringChemistry module.  **Post** any questions and comments about the reading in the MasteringChemistry Registration discussion forum. | N/A | Review technology tools and tutorials =  **1 hour** |
| **Differences Between CHM115 and CHM116 – Organic and Biological Chemistry**  **Read** the following:  Studying and working through the problem sets in CHM116 requires a different mindset than working through the problem sets of CHM115. In CHM115, it was possible to learn general principles and applicable formulas, like the gas laws, and complete the course work satisfactorily. In CHM116, your course work will include spatial reasoning and may require more critical thinking, like applying concepts of molecular modeling to a chemical formula in the best way. Much of the work involves the special relationships between atoms and molecules, and how these relationships change. One of the **key principles** to remember throughout CHM116, is that the form of a chemical structure dictates its biological function, or how it works. In other words:  **FORM DICTATES FUNCTION**  In CHM116, the more you practice, the more likely you are to succeed. It is recommended you practice working through text sample problems and problem sets. You should also complete all the homework problem sets at least once. Additionally, you may want to review the problem sets contained in each chapter of the textbook and supplemental activities section of this course. Your hard work and effort will translate into a better understanding of the principles of organic and biological chemistry.  **Recommended:** Purchase an organic chemistry [model set](http://www.indigo.com/molecular_models/student_sets/68845NV-chemistry-models-organic-molecules-set-basic-student.html?osCsid=uocgemgctbpd0dp6v8n8mqjdt3).  This kit retails for about $16 and helps you to visualize and work through multiple problem sets in CHM116, allowing you to build three-dimensional models of many chemical structures you will work with in the course. This kit would be especially helpful in the Week 2 Lab Activities. | N/A | N/A |
| **Weekly Reading**  **Read** Ch. 12.1–12.4 of *General, Organic, and Biological Chemistry.* | 1.1, 1.2, 1.3, 1.4, 1.5, 1.6 |  |
| **Video: Introduction to Organic Chemistry**  **Watch** the following videos on naming hydrocarbons available on YouTube:   * [“Hydrocarbon Power! Crash Course Chemistry”](https://www.youtube.com/watch?v=UloIw7dhnlQ) (11:31) * [“Representing Structures of Organic Molecules”](http://youtu.be/pMoA65Dj-zk) (7:28) | 1.1, 1.2, 1.3, 1.4, 1.5, 1.6 |  |
| **Videos: Functional Group Identification**  **Watch** the following videos on functional group identification available on YouTube:   * [“Organic Chemistry: functional groups”](https://www.youtube.com/watch?v=okv2us6pVxo) (21:33) | 1.6 |  |
| ***Supplemental Resources and Activities***  *Explore these optional resources to deepen your understanding.* | ***Alignment*** | ***AIE*** |
| **Adobe Connect Live Discussion**  **Review** [Adobe Connect Resources](https://sites.gmercyu.edu/student-resources/adobe-connect-resources/).  **Participate** in the scheduled live session with the course instructor. This session will provide an overview of the class and discuss the major assignments in the course.  **Prepare** to ask questions concerning the content of the week and the course as a whole.  Note: A recorded lecture will be made available to those who are unable to attend the live session. |  | Live Discussion: lecture and discussion = **1 hour** |
| ***Graded Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | ***Alignment*** | ***AIE*** |
| **Homework: Week 1 MasteringChemistry: Ch. 12.1-12.4**  **Complete** the Week 1 MasteringChemistry Ch. 12 Homework.  **Review** your answers and the feedback from MasteringChemistry.  **Post** all questions and comments in the discussion forum. | 1.1, 1.2, 1.3, 1.4, 1.5, 1.6 | Review interactive problem set and post response =  **1 hour** |
| **Week 1 Test**  **Complete** the Week 1 Test in Mastering Chemistry over the topics covered in Ch. 12 of *General, Organic, and Biological Chemistry.*  *Note*: All weekly exams are open-book and questions are randomly pulled from a large pool of questions for each chapter. You have a time limit of 120 minutes to complete the exam. You can only take the exam once and you only get one chance to answer each question. | 1.1, 1.2, 1.3, 1.4, 1.5, 1.6 | Assessment=**1 hour** |

# Faculty Notes

**Text Options:** Instructors may wish to allow the option of the hard cover version of the text for students who prefer a hard copy. Please review and direct students to the appropriate option: <http://www.mypearsonstore.com/bookstore/general-organic-and-biological-chemistry-structures-0321966929>.

**Assignment Suggested Point Values:** These are just suggestions and instructors should feel free to change the values or weights as they deem appropriate – just remember to inform students of any such material changes.

**Instructors should contact their Pearson representative before the classes begin to confirm their class information and access to the instructor version of the online software.**

**Tests:** All tests are taken within the MasteringChemistry website. Grades provided in MasteringChemistry need to be manually transferred to Blackboard.

**Course Setup**

**General Questions and Discussion Forum:** This course includes a discussion forum for general questions, comments, and concerns. This forum is intended for any course-related commentary not found within a specific weekly discussion. This forum is not graded. Make sure to monitor this forum for student posts. You are encouraged to make an announcement advertising this forum and monitor and post regularly to build engagement.

**Adobe Connect:** Consider posting an announcement asking students to submit any questions or topics they'd like addressed ahead of time. The instructor can then utilize those questions that come up in the first part of the week to tailor the live Adobe Connect class session that would be scheduled toward the later part of the week. That 1-hour synchronous session will allow students the opportunity to go over any questions they had with the homework and clarify any misconceptions they have about the course content. All Adobe Connect sessions should be recorded and a link to the recording be posted to the course page so any student who misses the session can review it later in the week.

*Note:* It is the instructor’s choice as to what day they will schedule the Adobe Connect Live Session, but it is recommended that they schedule this session for Wednesday of the week so students have plenty of time to review their homework prior to the deadline on Sunday.

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| Week Two: Alkenes, Alkynes, Aromatic Compounds, Alcohols, Phenols, Thiols, and Ethers |  |  |
| ***Learning Objectives*** | ***Alignment*** | |
| * 1. Write the IUPAC names for the alkenes and alkynes with up to five carbon atoms including isomers. | CLO1, CLO2 | |
| * 1. Write the common names for the alkenes and alkynes with up to five carbon atoms including isomers. | CLO1, CLO2 | |
| * 1. Draw the condensed structure of an alkene given its name. | CLO1, CLO2 | |
| * 1. Name cis-trans isomers of alkenes from their structural formulas. | CLO1, CLO2 | |
| * 1. Draw the condensed structural formulas or skeletal formulas, if cyclic, and name the organic products of addition reactions of alkenes and alkynes. | CLO1, CLO2 | |
| * 1. Draw condensed structural formulas for monomers that form a polymer or a section of a polymer. | CLO1, CLO2 | |
| * 1. Describe the bonding in benzene. | CLO1, CLO2 | |
| * 1. Provide an IUPAC or common name from the structure of an aromatic compound. | CLO1, CLO2 | |
| * 1. Draw the structure of an aromatic compound from the IUPAC or common name. | CLO1, CLO2 | |
| * 1. Identify the health risks of polycyclic aromatic hydrocarbons (PAHs). | CLO1, CLO2, CLO3 | |
| * 1. Write the IUPAC and common names for simple alcohols, phenols, and thiols. | CLO1, CLO2 | |
| * 1. Draw condensed structural formulas or skeletal formulas for simple alcohols, phenols, and thiols. | CLO1, CLO2 | |
| * 1. Write the IUPAC and common names for simple ethers. | CLO1, CLO2 | |
| * 1. Draw condensed structural formulas or skeletal formulas for simple ethers. | CLO1, CLO2 | |
| * 1. Describe the classification, boiling points, and solubility of alcohols, phenols, and ethers. | CLO1, CLO2 | |
| * 1. Write balanced equations for the combustion, dehydration, and oxidation of alcohols and phenols. | CLO1, CLO2 | |
| * 1. Identify the intermediate products and the final product of the oxidation of ethanol in the body and state the physiological effects of these substances. | CLO1, CLO2, CLO3 | |
| ***Resources, Activities, and Preparation***  *Utilize these resources and complete these activities in preparation for your graded assignments.* | ***Alignment*** | ***AIE*** |
| **Weekly Reading**  **Read** Ch. 12 sections 5 through 8 of *General, Organic, and Biological Chemistry.*  **Read** Ch. 13 of *General, Organic, and Biological Chemistry.* | 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10, 2.11, 2.12, 2.13, 2.14, 2.15, 2.16, 2.17 |  |
| **Videos: Naming Hydrocarbons, Alcohols, Aromatics, and Cyclic Compounds**  **Watch** the following videos on naming hydrocarbons available on YouTube:     * [“Naming Simple Alkanes”](https://www.youtube.com/watch?v=NRFPvLp3r3g) (9:27) * [“Naming Alkanes with Alkyl Groups”](https://www.youtube.com/watch?v=KKAD-OOOHxg) (11:03) * [“More Organic Chemistry Naming Examples 1”](https://www.youtube.com/watch?v=96D7RHUQvMA) (8:58)   **Watch** the following video explaining the naming of alcohols available on YouTube:   * [“Alcohols – Naming + Properties”](https://www.youtube.com/watch?v=oyy1-9qHvj0) (9:26)   **Watch** the following video explaining aromatics and cyclic compounds available on YouTube:   * [“Aromatics and Cyclic Compounds”](http://youtu.be/kXFEex-dABU) (9:49) | 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.8, 2.9, 2.10, 2.11, 2.12, 2.13, 2.14, 2.15, 2.16 |  |
| ***Graded Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | ***Alignment*** | ***AIE*** |
| **Discussion Question: Polymers**  **Review** the following structure:    **Complete** the polymer tutorial available on [ChemistryLand](http://www.chemistryland.com/PolymerPlanet/Polymers/PolymerTutorial.htm).  The structure above represents a portion of a polymer chain.  **Post** a clear and logical response in 150 to 200 words to the following, providing specific examples to support your answers.   * Explain, based on its structure and functional groups, what properties this polymer has. Would it be elastic or rigid? * Would it be dissolved easily by hydrocarbon solvents, such as gasoline? * Would it have a low or high melting point? * Consider the same polymer without the pendant isopropyl groups (replace them with hydrogens). What changes would occur to the polymer properties?   *Note*: Initial answers to the questions are due by 11:59 p.m. (Eastern time) on Thursday.  **Respond** to at least three students in a manner that is thought provoking and appropriately challenges or elevates the discussion. All responses must be posted by 11:59 p.m. (Eastern time) on Sunday. | 2.6, 2.12, 2.15 | Discussion: one post and replies to three other posts = **2 hour** |
| **Discussion Question: Polycyclic Aromatic Hydrocarbons**  **Review** the effects of polycyclic aromatic hydrocarbons (PAHs) by reading the summaries in the [Agency for Toxic Substances & Disease Registry](http://www.atsdr.cdc.gov/ToxProfiles/TP.asp?id=122&tid=25) website.  **Post** a clear and logical response in 150 to 200 words to the following, providing specific examples to support your answers.   * What are the health risks for polycyclic aromatic hydrocarbons? * Where have these compounds been found? * Have you been exposed to these compounds? * What are the health risks associated with e-cigarettes? What compounds in e-cigarettes have been linked with health risks? * e-Cigarettes have been touted as being responsible for assisting the cessation of smoking of regular cigarettes. Do the benefits of e-cigarettes outweigh the health risks?   *Note*: Initial answers to the questions are due by 11:59 p.m. (Eastern time) on Thursday.  **Respond** to at least three students in a manner that is thought provoking and appropriately challenges or elevates the discussion. All responses must be posted by 11:59 p.m. (Eastern time) on Sunday. | 2.8, 2.9, 2.10 | Discussion: one post and replies to three other posts = **2 hours** |
| **Homework: Week 2 MasteringChemistry: Ch. 12 & 13**  **Complete** the Week 2 MasteringChemistry Ch. 12 & 13 homework assignments in MasteringChemistry.  **Review** your answers and the feedback from MasteringChemistry.  **Post** any questions and comments in the Week Two General discussion forum. | 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10 | Problem solving = **1 hour** |
| **Week 2 Test**  **Complete** the Week 2 Test over the topics covered in Ch. 12 & 13 of *General, Organic, and Biological Chemistry.*  *Note*: All weekly exams are open-book and questions are randomly pulled from a large pool of questions for each chapter. You have a time limit of 120 minutes to complete the exam. You can only take the exam once. | 2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 2.9, 2.10, 2.11, 2.12, 2.13, 2.14, 2.15, 2.16, 2.17 | Assessment=**1 hour** |

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| Week Three: Aldehydes, Ketones, Chiral Molecules, and Carbohydrates |  |  |
| ***Learning Objectives*** | ***Alignment*** | |
| * 1. Identify the carbonyl group. | CLO1, CLO2 | |
| * 1. Differentiate aldehyde and ketone functional groups. | CLO1, CLO2 | |
| * 1. Write the IUPAC and common names for simple aldehydes and ketones. | CLO1, CLO2 | |
| * 1. Draw condensed structural formulas or skeletal formulas for simple aldehydes and ketones, if cyclic. | CLO1, CLO2 | |
| * 1. Describe the boiling points of simple aldehydes and ketones. | CLO1, CLO2 | |
| * 1. Describe the solubility of simple aldehydes and ketones in water. | CLO1, CLO2 | |
| * 1. Draw the condensed structural or skeletal formulas for the reactants and products in the oxidation or reduction of simple aldehydes and ketones. | CLO1, CLO2 | |
| * 1. Draw the condensed structural formulas for the products of addition of alcohols to simple aldehydes and ketones. | CLO1, CLO2 | |
| * 1. Identify chiral and achiral carbon atoms in an organic molecule. | CLO1, CLO2 | |
| * 1. Classify a monosaccharide as an aldose or ketose and indicate the number of carbon atoms. | CLO1, CLO2 | |
| * 1. Draw Fischer projections of the D or L stereoisomers of glucose, galactose, and fructose. | CLO1, CLO2 | |
| * 1. Draw and identify the Haworth structures of monosaccharides. | CLO1, CLO2 | |
| * 1. Identify the products of the oxidation or reduction of monosaccharides. | CLO1, CLO2 | |
| * 1. Determine if a carbohydrate is a reducing sugar. | CLO1, CLO2 | |
| * 1. Describe the monosaccharide units and glycosidic bonds in disaccharides. | CLO1, CLO2 | |
| * 1. Describe the structural features of amylose, amylopectin, glycogen, and cellulose. | CLO1, CLO2 | |
| ***Resources, Activities, and Preparation***  *Utilize these resources and complete these activities in preparation for your graded assignments.* | ***Alignment*** | ***AIE*** |
| **Weekly Reading**  **Read** Ch. 14 of *General, Organic, and Biological Chemistry.*  **Read** Ch. 15 of *General, Organic, and Biological Chemistry.* | 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.12, 3.13, 3.14, 3.15, 3.16 |  |
| **Study Area: How to Identify Chiral Molecules**  **Watch** [“Identifying Chirality Centers"](https://www.khanacademy.org/science/organic-chemistry/stereochemistry-topic/chirality-r-s-system/v/chirality-center-jay) (8:08).  **Watch** the following video explaining how to work with chiral molecules:   * [“Chiral Examples 1”](https://www.youtube.com/watch?v=0XSSPow5oAc) (11:01) | 3.9 |  |
| **Videos: Formation of Acetals and Hemiacetals**  **Watch** the following videos explaining the formation of acetals and hemiacetals:   * [“Addition of Alcohols to Aldehydes and Ketones to Make Acetals and Hemiacetals”](https://www.youtube.com/watch?v=1wZtCzb-98Y) (6:55) * [“Aldehydes and Ketones: Naming + Properties”](https://www.youtube.com/watch?v=CT1zd65tC0o) (8:30) * [“Acetals and Ketals: Hemiacetals and Hemiketals”](https://www.youtube.com/watch?v=qTSYIOlvNac) (8:02) | 3.1, 3.2, 3.3, 3.4, 3.5, 3.6 |  |
| **Videos: Fischer Projections**  **Watch** the following videos explaining Fischer projections available on YouTube:   * ["Fischer Projections Explained"](https://www.youtube.com/watch?v=R2TZfWY_7OY) (2:30) * ["Organic Chemistry: How to draw a Fischer projection of a molecule with two chirality centers"](https://www.youtube.com/watch?v=aab_wVz1t54) (6:33) | 3.11 |  |
| **Video: Haworth Projections**  **Watch** the following video explaining Haworth projections available on YouTube:   * ["3B 7.11 Haworth Projection Formulas"](https://www.youtube.com/watch?v=UzMKSmu6yCE) (13:31) | 3.12 |  |
| ***Graded Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | ***Alignment*** | ***AIE*** |
| **Homework: Week 3 MasteringChemistry: Ch. 14 & 15**  **Complete** the MasteringChemistry Ch. 14 & 15 Homework in MasteringChemistry.  **Review** your answers and the feedback from MasteringChemistry.  **Post** all questions and comments in the discussion forum. | 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9 | Problem solving = **2 hour** |
| **Week 3 Test**  **Complete** the Week 3 Test over the topics covered in Ch. 14 & 15 of *General, Organic, and Biological Chemistry.*  *Note*: All weekly exams are open-book and questions are randomly pulled from a large pool of questions for each chapter. You have a time limit of 120 minutes to complete the exam. You can only take the exam once. | 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.12, 3.13, 3.14, 3.15, 3.16, 3.17, 3.18, 3.19 | Assessment = **2 hour** |

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| Week Four: Carboxylic Acids, Esters, and Lipids |  |  |
| ***Learning Objectives*** | ***Alignment*** | |
| * 1. Write the IUPAC names for simple carboxylic acids. | CLO1, CLO2 | |
| * 1. Write the common names for simple carboxylic acids. | CLO1, CLO2 | |
| * 1. Draw the condensed structural formula of a simple carboxylic acid given its name. | CLO1, CLO2 | |
| * 1. Describe the boiling points of carboxylic acids. | CLO1, CLO2 | |
| * 1. Describe the solubility and ionization of carboxylic acids in water. | CLO1, CLO2 | |
| * 1. Write a balanced chemical equation for the formation of an ester. | CLO1, CLO2 | |
| * 1. Write the IUPAC names for simple esters. | CLO1, CLO2 | |
| * 1. Write the common names for simple esters. | CLO1, CLO2 | |
| * 1. Draw condensed structural formulas for simple esters. | CLO1, CLO2 | |
| * 1. Describe the boiling points of simple esters. | CLO1, CLO2 | |
| * 1. Describe the solubility of simple esters in water. | CLO1, CLO2 | |
| * 1. Draw the condensed structural formulas for the hydrolysis products of simple esters. | CLO1, CLO2 | |
| * 1. Describe the classes of lipids. | CLO1, CLO2 | |
| * 1. Draw the condensed structural formula for a fatty acid and identify it as saturated or unsaturated. | CLO1, CLO2 | |
| * 1. Draw the condensed structural formula for a wax or a triacylglycerol produced by the reaction of a fatty acid and an alcohol or glycerol. | CLO1, CLO2 | |
| * 1. Draw the condensed structural formula for the product of a triacylglycerol that undergoes hydrogenation, hydrolysis, or saponification. | CLO1, CLO2 | |
| * 1. Describe the structure of a phospholipid containing glycerol or sphingosine. | CLO1, CLO2 | |
| * 1. Identify a compound as a steroid from a structural formula. | CLO1, CLO2. CLO3 | |
| * 1. Describe the composition and function of the lipid bilayer in cell membranes. | CLO1, CLO2, CLO3 | |
| ***Resources, Activities, and Preparation***  *Utilize these resources and complete these activities in preparation for your graded assignments.* | ***Alignment*** | ***AIE*** |
| **Weekly Reading**  **Read** Ch. 16 of *General, Organic, and Biological Chemistry.*  **Read** Ch. 17 of *General, Organic, and Biological Chemistry.* | 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16, 4.17, 4.18, 4.19 |  |
| **Video: Carboxylic Acids**  **Watch** the following videos explaining carboxylic acids available on YouTube:   * [“Carboxylic Acid Introduction”](https://www.youtube.com/watch?v=xheOq0XZ-so) (8:50) * [“Carboxylic Acids, Typical Acids and Esters”](https://www.youtube.com/watch?v=3YeXGpDdgZw) (4:30) * [“Carboxylic Acids: Naming + Properties”](https://www.youtube.com/watch?v=-Z1RM9OShiw) (5:40) | 4.1, 4.2, 4.3, 4.4 |  |
| ***Graded Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | ***Alignment*** | ***AIE*** |
| **Discussion Question: Fats and Oils in Foods**  **Choose** a food product containing fats or oils with a label that lists its ingredients.  **Post** a clear and logical response in 150 to 200 words to the following, providing specific examples to support your answers.   * List the fats and oils in the product listed on the ingredient label. * List the grams of fat in the product and the grams of fat in one serving of the product. * Is the fat saturated or unsaturated? How do you know?   *Note*: Initial answers to the questions are due by 11:59 p.m. (Eastern time) on Thursday.  **Respond** to at least three students in a manner that is thought provoking and appropriately challenges or elevates the discussion. All responses must be posted by 11:59 p.m. (Eastern time) on Sunday. | 4.8, 4.13, 4.14 | Compose initial response and respond to 3 students =  **2 hours** |
| **Homework: Week 4 MasteringChemistry: Ch. 16 & 17**  **Complete** the MasteringChemistry Ch. 16 & 17 Homework assignments in MasteringChemistry  **Review** your answers and the feedback from MasteringChemistry.  **Post** all questions and comments in the discussion forum. | 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12 | Problem solving =  **2 hours** |
| **Week 4 Test**  **Complete** the Week 4 Test over the topics covered in Ch. 16 & 17 of *General, Organic, and Biological Chemistry.*  *Note*: All weekly exams are open-book and questions are randomly pulled from a large pool of questions for each chapter. You have a time limit of 120 minutes to complete the exam. You can only take the exam once. | 4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.8, 4.9, 4.10, 4.11, 4.12, 4.13, 4.14, 4.15, 4.16, 4.17, 4.18, 4.19 | Assessment=**2 hours** |

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| Week Five: Amines, Amides, Amino Acids, and Proteins |  |  |
| ***Learning Objectives*** | ***Alignment*** | |
| * 1. Write the IUPAC names for simple amines. | CLO1, CLO2 | |
| * 1. Write the common names for simple amines. | CLO1, CLO2 | |
| * 1. Draw the condensed structural formula of a simple amine given its name. | CLO1, CLO2 | |
| * 1. Classify amines as primary (1º), secondary (2º), or tertiary (3º). | CLO1, CLO2 | |
| * 1. Describe the boiling points of amines. | CLO1, CLO2 | |
| * 1. Describe the solubility of amines in water. | CLO1, CLO2 | |
| * 1. Write balanced chemical equations for the ionization and neutralization of amines. | CLO1, CLO2 | |
| * 1. Identify simple heterocyclic amines and distinguish between their types. | CLO1, CLO2 | |
| * 1. Write the structural formula for the amide products for amidation. | CLO1, CLO2 | |
| * 1. Give the IUPAC and common names for the amide products for amidation. | CLO1, CLO2 | |
| * 1. Write balanced chemical equations for the hydrolysis of amides. | CLO1, CLO2 | |
| * 1. Describe the role of amines as neurotransmitters. | CLO1, CLO2, CLO3 | |
| * 1. Classify proteins by their functions. | CLO1, CLO2, CLO3 | |
| * 1. Write the common names for the essential amino acids. | CLO1, CLO2, CLO3 | |
| * 1. Draw the zwitterion for an essential amino acid at its isoelectric point. | CLO1, CLO2 | |
| * 1. Draw the ionized structure of an essential amino acid at pH values above or below the isoelectric point given its name. | CLO1, CLO2 | |
| * 1. Draw the condensed structural formula of a dipeptide. | CLO1, CLO2 | |
| * 1. Describe the primary and secondary structures of a protein. | CLO1, CLO2 | |
| * 1. Describe the tertiary and quaternary structures of a protein. | CLO1, CLO2 | |
| * 1. Describe the hydrolysis and denaturation of proteins. | CLO1, CLO2 | |
| ***Resources, Activities, and Preparation***  *Utilize these resources and complete these activities in preparation for your graded assignments.* | ***Alignment*** | ***AIE*** |
| **Weekly Reading**  **Read** Ch. 18 of *General, Organic, and Biological Chemistry.*  **Read** Ch. 19 of *General, Organic, and Biological Chemistry.* | 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13, 5.14, 5.15, 5.16, 5.17, 5.18, 5.19, 5.20 |  |
| **Video: Protein Structure Differences**  **Watch** the following video explaining protein structure difference available on YouTube:   * ["Four Levels of Protein Structure"](https://www.youtube.com/watch?v=iDVR1TB1X9w) (8:48) | 5.13, 5.17, 5.18, 5.19 |  |
| **Video: The Isoelectric Point and Zwitterions**:  **Watch** the following video explaining the isoelectric point and zwitterions available on YouTube:   * ["Isoelectric Point and Zwitterions"](https://www.youtube.com/watch?v=42llTiRn-b8) (5:24) | 5.14, 5.15, 5.16 |  |
| ***Graded Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | ***Alignment*** | ***AIE*** |
| **Discussion Question: Glycosylated Hemoglobin**  **Review** [“Hemoglobin moves O2 and CO2”](https://www.youtube.com/watch?v=QP8ImP6NCk8) available on YouTube (14:57).  **Review** the entry on glycated hemoglobin available at [Nursing Central](http://nursing.unboundmedicine.com/nursingcentral/view/Davis-Lab-and-Diagnostic-Tests/425287/all/Glycated_Hemoglobin).  **Post** a clear and logical response in 150 to 200 words to the following, providing specific examples to support your answers.   * Why is hemoglobin capable of carrying oxygen? * Why is glycosylated hemoglobin less capable of carrying oxygen? * What are the health effects, at a micro and a macro level, of an overabundance of glycosylated hemoglobin?   *Note*: Initial answers to the questions are due by 11:59 p.m. (Eastern time) on Thursday.  **Respond** to at least three students in a manner that is thought provoking and appropriately challenges or elevates the discussion. All responses must be posted by 11:59 p.m. (Eastern time) on Sunday. | 5.13, 5.18, 5.19 | Compose initial response and respond to 3 students =  **2 hours** |
| **Homework: Week 5 MasteringChemistry: Ch. 18 & 19**  **Complete** the MasteringChemistry Ch. 18 & 19 Homework assignments.  **Review** your answers and the feedback from MasteringChemistry.  **Post** all questions and comments in the discussion forum. | 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13, 5.14, 5.15, 5.16, 5.17, 5.18, 5.19, 5.20 | Review interactive problem set and post response =  **2 hours** |
| **Week 5 Test**  **Complete** the Week 5 Test over the topics covered in Ch. 18 & 19 of *General, Organic, and Biological Chemistry.*  *Note*: All weekly exams are open-book and questions are randomly pulled from a large pool of questions for each chapter. You have a time limit of 120 minutes to complete the exam. You can only take the exam once. | 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 5.8, 5.9, 5.10, 5.11, 5.12, 5.13, 5.14, 5.15, 5.16, 5.17, 5.18, 5.19, 5.20 | Assessment=**2 hours** |

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| Week Six: Enzymes, Vitamins, Nucleic Acids, and Protein Synthesis |  |  |
| ***Learning Objectives*** | ***Alignment*** | |
| * 1. Describe enzymes and their role in enzyme-catalyzed reactions. | CLO1, CLO2 | |
| * 1. Classify enzymes using enzyme class names. | CLO1, CLO2 | |
| * 1. Describe the effect of temperature, pH, concentration of enzyme, and concentration of substrate on enzyme activity. | CLO1, CLO2 | |
| * 1. Describe competitive and noncompetitive inhibition, as well as reversible and irreversible inhibition with respect to enzymes. | CLO1, CLO2 | |
| * 1. Describe the role of zymogens, feedback control, and allosteric enzymes in regulating enzyme activity. | CLO1, CLO2 | |
| * 1. Describe the types of cofactors found in enzymes. | CLO1, CLO2 | |
| * 1. Describe the bases and ribose sugars that make up the nucleic acids, RNA and DNA. | CLO1, CLO2, CLO3 | |
| * 1. Describe the primary structures of RNA and DNA. | CLO1, CLO2, CLO3 | |
| * 1. Describe the double helix of DNA. | CLO1, CLO2, CLO3 | |
| * 1. Describe the process of DNA replication. | CLO1, CLO2, CLO3 | |
| * 1. Identify the different types of RNA. | CLO1, CLO2, CLO3 | |
| * 1. Describe the synthesis of RNA. | CLO1, CLO2, CLO3 | |
| * 1. Describe the process of protein synthesis from mRNA. | CLO1, CLO2, CLO3 | |
| * 1. Describe some ways in which DNA is altered to cause mutations. | CLO1, CLO2, CLO3 | |
| * 1. Describe the preparation and uses of recombinant DNA. | CLO1, CLO2, CLO3 | |
| * 1. Describe the methods by which a virus infects a cell. | CLO1, CLO2, CLO3 | |
| ***Resources, Activities, and Preparation***  *Utilize these resources and complete these activities in preparation for your graded assignments.* | ***Alignment*** | ***AIE*** |
| **Weekly Reading**  **Read** Ch. 20 of *General, Organic, and Biological Chemistry.*  **Read** Ch. 21 of *General, Organic, and Biological Chemistry.*  **Post** any questions and comments about the reading in the Week Six General discussion forum. | 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16 |  |
| **Video: DNA and RNA**  **Watch** the following video explaining DNA and RNA available on YouTube:   * ["DNA, Hot Pockets, and the Longest Word Ever"](https://www.youtube.com/watch?v=itsb2SqR-R0) (14:07) | 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15 |  |
| ***Graded Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | ***Alignment*** | ***AIE*** |
| **Discussion Question: Vitamins**  **Navigate** to Choose My Plate available at the [United States Department of Agriculture](http://www.choosemyplate.gov/) website.  **Design** a balanced meal for an average adult.  **List** the vitamins that would be contained in the meal, being as specific as possible.  *Note*: You can also use resources from Table 20.9 on p. 729 and Table 20.11 on p. 731 in Ch. 20 of *General, Organic, and Biological Chemistry.*  **Describe** the deficiency symptoms that might occur as a result of the absence of those vitamins in your meal.  **Review** the nutritional information for vitaminwater® available on the vitaminwater® webpage.  **Post** a clear and logical response in 150 to 200 words to the following, providing specific examples to support your answers.   * Does it appear as if the supplementation of water with vitamins is worthwhile? Why or why not? * What risks are involved in having a product like water infused with vitamins on the market?   *Note*: Initial answers to the questions are due by 11:59 p.m. (Eastern time) on Thursday.  **Respond** to at least three students in a manner that is thought provoking and appropriately challenges or elevates the discussion. All responses must be posted by 11:59 p.m. (Eastern time) on Sunday. | 6.6 | Compose initial response and respond to 3 students =  **2 hours** |
| **Homework: Week 6 MasteringChemistry: Ch. 20 & 21**  **Complete** the MasteringChemistry Ch. 20 & 21 Homework assignments in Mastering Chemistry.  **Review** your answers and the feedback from MasteringChemistry.  **Post** all questions and comments in the discussion forum. | 6.1, 6.2, 6.3, 6.4, 6.5, 6.6 | Problem solving =  **2 hours** |
| **Week 6 Test**  **Complete** the Week 6 Test over the topics covered in Ch. 20 & 21 of *General, Organic, and Biological Chemistry.*  *Note*: All weekly exams are open-book and questions are randomly pulled from a large pool of questions for each chapter. You have a time limit of 120 minutes to complete the exam. You can only take the exam once. | 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, 6.8, 6.9, 6.10, 6.11, 6.12, 6.13, 6.14, 6.15, 6.16 | Assessment=**2 hours** |

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| Week Seven: Metabolic Pathways for Carbohydrates |  |  |
| ***Learning Objectives*** | ***Alignment*** | |
| * 1. Describe the three stages of metabolism. | CLO1, CLO2, CLO3 | |
| * 1. Describe the structure of ATP and its role in catabolic and anabolic reactions. | CLO1, CLO2, CLO3 | |
| * 1. Describe the components and functions of the coenzymes FAD, NAD+, and coenzyme A. | CLO1, CLO2, CLO3 | |
| * 1. Give the sites and the products of the digestion of carbohydrates. | CLO1, CLO2, CLO3 | |
| * 1. Describe the conversion of glucose to pyruvate in glycolysis. | CLO1, CLO2, CLO3 | |
| * 1. Give the conditions for the conversion of pyruvate to lactate, ethanol, and acetyl-coenzyme A. | CLO1, CLO2, CLO3 | |
| * 1. Describe the synthesis and breakdown of glycogen. | CLO1, CLO2, CLO3 | |
| * 1. Describe how glucose is synthesized from noncarbohydrate molecules. | CLO1, CLO2, CLO3 | |
| ***Resources, Activities, and Preparation***  *Utilize these resources and complete these activities in preparation for your graded assignments.* | ***Alignment*** | ***AIE*** |
| **Weekly Reading**  **Read** Ch. 22 of *General, Organic, and Biological Chemistry.* | 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8 |  |
| **Video: ATP**  **Watch** the following video explaining ATP and the process of respiration available on YouTube:   * [“ATP & Respiration”](https://www.youtube.com/watch?v=00jbG_cfGuQ) (13:25) | 7.1, 7.2 |  |
| ***Graded Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | ***Alignment*** | ***AIE*** |
| **Discussion Question: Manipulation of DNA and the Ethics of Immortality**  **Complete** the DNA Manipulation summary of the history of DNA manipulation available at the [Cold Spring Harbor Laboratory](http://www.dnai.org/b/index.html) website. *Note.* If the site does not load, cut and paste the address and try Google Chrome, enable Flash, and adjust your security settings for this site.  **Review** the “Playing God? The Ethics of Genetic Manipulation” presentation.  **Read** the following premise:  It is thought that we age and die because of genetic errors in the repair mechanisms for our DNA, which lead to more transcription errors and eventual cell death. The ability to manipulate DNA would seem to eventually give us the ability to locate and fix such errors, leading to much longer lives—theoretically enabling us to live forever. This would be the ultimate circumvention of evolution.  **Post** a clear and logical response in 150 to 200 words to the following, providing specific examples to support your answers.   * If given the chance to live forever, as described in the genetic manipulation materials, would you take it? * What would the consequences for our species be if this technology were widely available? Include your thoughts on the risks and rewards of using this technology widely.   *Note*: Initial answers to the questions are due by 11:59 p.m. (Eastern time) on Thursday.  **Respond** to at least three students in a manner that is thought provoking and appropriately challenges or elevates the discussion. All responses must be posted by 11:59 p.m. (Eastern time) on Sunday. | 6.8, 6.9, 6.10, 6.14, 6.15 | Compose initial response and respond to 3 students = **2 hours** |
| **Homework: Week 7 MasteringChemistry: Ch. 22**  **Complete** the MasteringChemistry Ch. 22 homework.  **Review** your answers and the feedback from MasteringChemistry.  **Post** all questions and comments in the discussion forum. | 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8 | Problem solving =  **2 hours** |
| **Week 7 Test**  **Complete** the Week 7 Test over the topics covered in Ch. 22 of *General, Organic, and Biological Chemistry.*  *Note*: All weekly exams are open-book and questions are randomly pulled from a large pool of questions for each chapter. You have a time limit of 120 minutes to complete the exam. You can only take the exam once. | 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8 | Assessment=**2 hours** |

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| Week Eight: Metabolism and Energy Production and Metabolic Pathways for Lipids and Amino Acids |  |  |
| ***Learning Objectives*** | ***Alignment*** | |
| * 1. Describe the oxidation of acetyl-CoA in the citric acid cycle. | CLO1, CLO2 | |
| * 1. Describe how hydrogen ions and electrons are transferred during electron transport. | CLO1, CLO2, CLO3 | |
| * 1. Describe the process of oxidative phosphorylation in ATP synthesis. | CLO1, CLO2, CLO3 | |
| * 1. Account for the ATP produced by the complete oxidation of glucose. | CLO1, CLO2, CLO3 | |
| * 1. Describe the sites and products obtained from the digestion of triacylglycerols. | CLO1, CLO2, CLO3 | |
| * 1. Describe the metabolic pathway of ß-oxidation. | CLO1, CLO2 | |
| * 1. Calculate the total ATP produced by the complete oxidation of a fatty acid. | CLO1, CLO2, CLO3 | |
| * 1. Describe the biosynthesis of fatty acids from acetyl-CoA. | CLO1, CLO2 | |
| * 1. Describe the hydrolysis of dietary protein and absorption of amino acids. | CLO1, CLO2 | |
| * 1. Describe the reactions of transamination and oxidative deamination in the degradation of amino acids. | CLO1, CLO2 | |
| * 1. Describe the formation of urea from an ammonium ion. | CLO1, CLO2, CLO3 | |
| * 1. Illustrate how some nonessential amino acids are synthesized from intermediates in the citric acid cycle and other metabolic pathways. | CLO1, CLO2, CLO3 | |
| ***Resources, Activities, and Preparation***  *Utilize these resources and complete these activities in preparation for your graded assignments.* | ***Alignment*** | ***AIE*** |
| **Weekly Reading**  **Read** Ch. 23 of *General, Organic, and Biological Chemistry.*  **Read** Ch. 24 of *General, Organic, and Biological Chemistry.*  **Post** any questions and comments about the reading in the Week Eight General discussion forum. | 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.11, 8.12 | Lecture activity = **1 hour** |
| **Mastering Chemistry Supplemental Problems**  Mastering organic and biochemistry requires plenty of practice. Developing the skills involved in working with chemical structures and recognizing the rules associated with them will take a certain amount of repetition. These supplemental problems are provided to help you practice your skills before taking the exam. | N/A | N/A |
| ***Graded Assignments***  *Complete these graded assessments by the end of the week unless specified otherwise.* | ***Alignment*** | ***AIE*** |
| **Homework: Week 8 MasteringChemistry: Ch. 23 & 24**  **Complete** the MasteringChemistry Ch. 23 & 24 homework.  **Review** your answers and the feedback from MasteringChemistry.  **Post** all questions and comments in the discussion forum. | 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.11, 8.12 | Problem solving =  **2 hours** |
| **Week 8 Test**  **Complete** the Week 8 Test over the topics covered in Ch. 23 & 24 of *General, Organic, and Biological Chemistry.*  *Note*: All weekly exams are open-book and questions are randomly pulled from a large pool of questions for each chapter. You have a time limit of 120 minutes to complete the exam. You can only take the exam once. | 8.1, 8.2, 8.3, 8.4, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.11, 8.12 | Assessment=**2 hours** |

# Breakdown of Academic Instructional Equivalencies

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|  | **AIE Hours** |
| **Week 1** |  |
| Required | 4 |
| Supplemental | 1 |
| **Week 2** |  |
| Required | 6 |
| Supplemental |  |
| **Week 3** |  |
| Required | 4 |
| Supplemental |  |
| **Week 4** |  |
| Required | 6 |
| Supplemental |  |
| **Week5** |  |
| Required | 6 |
| Supplemental |  |
| **Week 6** |  |
| Required | 4 |
| Supplemental |  |
| **Week 7** |  |
| Required | 6 |
| Supplemental |  |
| **Week 8** |  |
| Required | 5 |
| Supplemental |  |
|  |  |
| **Total Required Hours** | 41 |
| **Total Supplemental Hours** | 1 |
| **Total Hours** | 42 |