Fund. of Organic & Biological Chemistry CEM 132.I61 Winter 2021

Number of Credits: 4 credits

Meeting Times: Two synchronous sessions/week; day & times determined by JetNet student survey

Location/Venue: Online

Instructor: Patricia Visser, Ph.D.

Contact Phone: 517-796-8533 (office phone; rarely checked)

Contact Email: patricia_visser@jccmi.edu

Online Office Hours: on-demand via Zoom; send me a note or Remind text anytime 8AM – 11PM

Course Description

This course is an extension of material covered in CEM 131. It is required in many bachelor's degree programs, including nursing. Organic topics include the structure, physical properties and chemical behavior of the major classes of organic compounds. The structure, function, formation and reactions of carbohydrates, fats, proteins, and nucleic acids are covered, including enzymes, chemical messengers and biochemical energy production. Course includes a laboratory component.

Prerequisite(s)

CEM 131, 141 or other acceptable chemistry course

Course Considerations

Preparation for Class: You are expected to review the assigned chapter, using the distributed lecture outlines as a guide, before coming to class so that you can focus on learning, understanding and applying the chemistry. We will be covering a lot of information each class session, so attendance is important. If you must miss a class session, you will be responsible for all information discussed that day, including information about exams, labs, homework, etc. If you have questions about class material, practice or homework problems, etc., ASK QUESTIONS – during class sessions or via email/Remind text

Course Objectives

Provide By the end of the semester, students will demonstrate – through both factual lecture exams and laboratory exercises– their understanding of the following topics:

1. For the major classes of organic molecules (hydrocarbons, alcohols, ethers, thiols, aldehydes, ketones, carboxylic acids, esters, amines and amides) ….
   a. describe their physical and chemical properties,
   b. identify the correct name (common and IUPAC) for representative molecules, and
   c. draw structures of representative molecules based on name.
2. Identify the defining functional group for each major class of biochemical molecules.
3. Define, differentiate between and correctly identify structural, geometric and stereoisomers.
4. Identify the products formed by the following types of reactions (using various substrates): combustion, substitution, addition, esterification, hydrolysis, saponification, oxidation, reduction.
5. Identify structural differences and uses of the major disaccharides, polysaccharides and lipids.

6. Describe the synthesis of polysaccharides, complex lipids, proteins and nucleic acids.
7. Describe the structure and relevance of trans fats, saturated vs unsaturated fatty acids & lipoprotein.
8. Describe the structure of chromosomes and genes.
9. Identify the steps and correct products of S phase, transcription and translation.
10. Differentiate between the uses of the 4 types of RNA.
11. Identify causes of mutations and predict the effect of various types of mutations on protein function.
12. Describe the levels of protein structure and how each is formed and denatured.
13. Describe the structure-function relationship between enzymes and receptors.
14. Identify the various classes of enzymes.
15. Describe the major mechanisms used to control enzyme activity.
16. Describe the oxidative harvesting of potential energy from macronutrients, methods of ATP formation from them, and calculate the ATP yields from each.
17. Describe the interconversion of macronutrient biomolecules.
18. Identify how metabolism of biomolecules changes based on fed state, meal content & O_2 availability.
19. Describe the fates of nitrogen atoms from amino acids.
20. Describe the structure and components of biological membranes.
21. Describe the role of antioxidants.
22. Describe bio-conversion of molecules into toxic forms in the body.
23. Identify practical uses of each class of biological and organic molecules.
24. Describe the effects of digestive system activity on macronutrient molecules.
25. Explain reasons for administering pharmaceuticals in structures other than their active form.

GEO 4 (Scientific Reasoning). The course goals incorporate specific General Education Outcomes (GEOs) established by the JC Board of Trustees, administration, and faculty. These goals are in concert with four-year colleges and universities and reflect input from the professional communities we serve. GEOs guarantee students achieve goals necessary for graduation credit, transferability, and professional skills needed in many certification programs.

Textbook

- General, Organic, and Biochemistry, 10th Ed. Katherine Denniston, McGraw-Hill ISBN13: 9781260148954 **Text Book Zero.** This text is available in a digital format. Please see the link posted in the class JetNet site for access to the text and ancillary materials.
- **This course uses OER.** *Optional version* of the text is General, Organic, and Biochemistry; David Ball; Creative Commons

Follett Access

- Please review the cost of your required materials to determine the best option for you.
- For more information on the Follett ACCESS Program, you can view the view the frequently asked questions.

If after reviewing the costs, you choose to opt out, you may do so here: www.jccmi.edu/optout. Please note your opt out selection is for your entire semester schedule. You cannot opt out and opt in to individual courses, and you must opt out by the due date for your first class: **March 18, 2021.**

If you have questions about materials, please contact the Jackson College Follett bookstore at jackson@bkstr.com. For account billing questions, please contact the Jackson College Cashier at jccashier@jccmi.edu.

Exam Process- Respondus

To protect the fairness and integrity of the exams, students will be required to take exams using Respondus Lockdown Browser and Monitor. This is an online test proctoring software that requires a download to your computer or iPad. (Note: Chromebooks cannot be used with this system as they block browser downloads.) Training and practice of Respondus technology will be provided in advance of the first exam. A webcam and microphone are required to use Respondus. If you do not have this technology, please contact your instructor right away. Students are expected to complete the Respondus Practice quiz on time to give our IT department time to help troubleshoot issues **before** exam 1 begins.

Grading Procedure

The grade you earn is based upon the percentage of total points accumulated (approx. 810 total):

1. Tests (Best 5 of 6 @ 80 points each) = 400 [The 6th is comprehensive and must be taken.]
2. Lab Hand-ins (10 @ 20 points each) = 200
3. Homework sets (12 @ 15 points each) = 180
4. "Chemistry in Life" Papers (2 @ 15 points each) = 30

Grading Scale

GPA	GRADE RANGE
4.0	90-100%
3.5	85-89.5%
3.0	80-84.5%
2.5	75-79.5%
2.0	70-74.5%
1.5	65-69.5%
1.0	60-64.5%
0.0	< 60%

Failure

Students must complete all activities in the course. Failure to submit lab hand-ins or homework assignments will result in loss of enough points that it would not be possible to pass the course, so failure to submit these will result in the student being reported as "not participating" and dropped from the course.

Makeup Policy

"Life Happens" so it is understood that things might occasionally happen to warrant an extension or a chance to make up as assignment or test. To minimize this, all exams will be open for 3 days; however, if you need an "extenuating circumstances" extension, please send me a note, give me a brief idea of the circumstances and indicate when you will be able to complete the work.

Academic Honesty Policy

Academic Honesty is defined as ethical behavior that includes student production of their own work and not representing others' work as their own, by cheating or by helping others to do so.

Plagiarism

Plagiarism is defined as the failure to give credit for the use of material from outside sources. Plagiarism includes but is not limited to:

- Submitting other's work as your own
- Using data, illustrations, pictures, quotations, or paraphrases from other sources without adequate documentation
- Reusing significant, identical or nearly identical portions of one's own prior work without acknowledging that one is doing so or without citing this original work (self-plagiarism)

Cheating

Cheating is defined as obtaining answers/material from an outside source without authorization. Cheating includes, but is not limited to:

- Plagiarizing in any form
- Using notes/books/electronic material without authorization
- Copying
- Submitting others' work as your own or submitting your work for others
- Altering graded work
- Falsifying data
- Exhibiting other behaviors generally considered unethical
- Allowing your work to be submitted by others

Accessibility

Jackson College understands that cultivating a broadly diverse community is crucial to our educational mission and to our foundational commitment to leadership and service. Jackson College is fully committed to ensuring our courses are accessible to everyone including those with disabilities. We are currently working to increase accessibility and usability of our course materials in order to meet or exceed the requirements of Section 508 of the Rehabilitation Act of 1973, the Americans with Disabilities Act of 1991 and Web Content Accessibility Guidelines (WCAG) 2.0. For more information about Jackson College's efforts to ensure accessibility please visit the Jackson College accessibility web page.

If you have an accessibility need in any of our classes please e-mail the Center for Student Success at JCCSS@jccmi.edu or visit the Center for Student Success web page.

At the Center for Student Success (CSS), we are committed to providing all students the opportunity to achieve academic success by providing a variety of support services free of charge to Jackson College students. This includes, but is not limited to, peer and faculty tutoring, mental health referral, temporary assistance with transportation, various workshops/seminars, and the TRIO program.

In addition, the CSS staff is committed to adapting the College's general services to meet the individual needs of otherwise qualified students with disabilities, for the purpose of providing equal access to all programs and facilities.

Course Information

- **Practice problems:** Ungraded practice problems will be available for each chapter to help you check understanding of the material. You should work on them as soon as possible to have time to ask for help if needed. While not graded, doing them will help you do better on graded homework and tests.
- **"Chemistry in Life" papers**: When you do "ordinary" reading (magazines, newspapers, websites, etc. – **not** scientific research papers), look for articles related to chemistry. For 2 different articles, write 1-2 page papers that include 1) proper citation, 2) a summary of the content, 3) an analysis of how well the chemistry is presented and 4) how your reaction to reading the article compares to how it would have been before you took this class. Papers may be submitted via paper or email at any time but are due no later than the two dates listed in the class schedule.
- **Laboratory assignments**: There will be 13 online laboratory activities during the semester requiring submission of a hand-in addressing data analysis and application to class content. The lowest two lab scores will be dropped from your point total.
- **Preparation for Class**: You are expected to review the assigned chapter, using the lecture outlines as a guide, before the class session so that you can focus on learning, understanding and applying the chemistry. We will be covering a lot of information each session, so preparation is important.
- **There will be no extra credit projects for this course**, since it is felt that your time will be better spent studying the assigned materials.

Help

Available learning services or opportunities for students seeking help with their course work. May include information about tutors, learning centers, reserved library materials, counseling services. Ask me or contact the Center for Student Success (CSS). [Live chat services are available via the JC website.]

Accommodations

It is important to contact a Center for Student Success (CSS) professional prior to the start of the semester in order to receive accommodations in a timely manner. While we will make every effort to coordinate accommodations in a timely manner, failure to self-identify prior to the start of the semester may delay notification to instructors and timeliness of acquiring accommodations. Accommodations do not automatically carry over to the next semester. Please e-mail JCCSS@jccmi.edu or visit the Accommodations for Students with Disabilities web page

Attendance- Participation Policy

Just as in a traditional classroom course, regular class participation and keeping up on the reading and assignments is strongly correlated with survival in college. It is my recommendation that you plan to do your assignments and take your exams BEFORE the last day they are due. If problems occur, there is time to fix them before the deadline.

In compliance with Federal Title IV funding requirements, as well as college initiatives, I will be monitoring student participation on a regular basis and officially reporting student activity throughout the term to assure compliance with college policy and federal regulations. It is imperative that you log in to the course and actively participate *within the first couple of days of the term* to validate your enrollment in the course. After that, not actively participating in class may result in you being withdrawn from the course. Being withdrawn from a course can have an impact on financial aid, billing, athletic eligibility, and housing status.

As a college student you are responsible for how your participation impacts your academic progress; the accountability lies with you.

Calendar

Dates are expected; adjustments may be made in case of unexpected events.

WEEK	DATES	CLASS TOPIC	LAB ACTIVITY
1	Mar. 15-21	Ch. 10, 11 - Introduction to Organic Chem & Hydrocarbons	Ex. 1 Properties of Organics (3/18) Ex. 2 Organic Isomerism (3/22)
2	Mar. 22-28	Ch. 12 - Alcohols, Sulfides & Ethers Ch. 13, 16 - Carbonyls & Carbohydrates	Ex. 3 O_2-containing Molecules (3/25) Ex. 4 Oxidation-Reduction (3/29
3	Mar. 29 - Apr. 4	Ch. 14 - Carboxylic Acids & Esters Ch. 17, 15 - Lipids & Amines	Ex. 5 Synthesizing Esters (4/1) Ex. 6 Soaps & Detergents (4/5)
4	Apr. 5-11	Ch. 20 - Nucleic Acids **Chem in Life paper #1 due**	Ex. 7/8 Acids/Bases/Buffers (4/8) Ex. 9 Transcription/Translation (4/12)
5	Apr. 12-18	Ch. 18 - Proteins Ch. 19 - Enzymes & Receptors (part 1)	Ex. 10 Protein Folding (4/15)
6	Apr. 19-25	Ch. 19 - Enzymes & Receptors (part 2) Ch. 21 - Carbohydrate Metabolism	Ex. 11 Digestive Enzymes (4/22)
7	Apr. 26 - May 1	Ch. 22, 23 - Aerobic Respiration and Lipid & Amino Acid Metabolism **Chem in Life paper #2 due**	Ex. 13/14 Fermentation & Biochemical Energy (4/29)

Important Deadline Dates:

DATE	EVENT	DATE	EVENT
Mar. 19	*Last day to drop without a W*	Apr. 17	Test 4 – Saturday 4/17
Mar. 27	Test 1 – Saturday 3/27	Apr. 24	Test 5 – Saturday 4/24
Apr. 3	Test 2 – Saturday 4/3	*Apr. 26*	*Final date to drop with a W*
Apr. 10	Test 3 – Saturday 4/10	May 1	Test 6 – Saturday 5/1

Tests will be open for 3 days, closing at midnight the night of the posted deadline.