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Spring 2-1-2019

CHMY 123.00: Introduction to Organic and Biochemistry

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Course Description

CHMY 123 Introduces the student to “**Organic Chemistry**” through the study of the nomenclature (naming compounds), chemical properties and physical properties of simple organic compounds. From this background we will focus on those organic compounds that are found in biological structure, their polymerization into large molecules like proteins and nucleic acids and the metabolic function and information transfer that characterizes life as we know it “**Biochemistry**”.

Learning Outcomes

1. Mastery of systematic nomenclature for basic organic compounds.
2. Mastery of intermolecular interactions in terms of define the structure of organic and biomolecules and how that dictates the function of organic and biomolecules.
3. Familiarity with Acid/Base ionization of functional groups with specific emphasis on amino acids, proteins, and nucleic acids to show structure/function impacts.
4. Familiarity with thermodynamics and kinetics as it pertains to enzyme catalyzed reactions.
5. Familiarity with oxidation-reduction reactions and their role in metabolism including energy requiring and energy yielding steps in metabolism.
6. Oxidation of organic substrates as coupled to the production of chemical energy in biological systems will be covered.
7. Biochemical mechanisms of information transfer will be explored (replication, transcription, and translation).

Pre-requisites and Co-requisites for CHMY 123: a grade of “C-” or better in CHMY 121 or permission of the instructor. CHMY 124 is the Introduction to Organic & Biochemistry Lab course that accompanies CHMY123. Most majors that require CHMY 123 also require CHMY 124, which is listed as a co-requisite for that reason.

Course Materials

- Text: Introduction to Organic and Biochemistry custom edition for CHMY 123 by Hein, Pattison and Arena, available in UM bookstore.
- Solutions Manual: Answers to even numbered back-of-the-chapter problems are found at the end of the textbook. If you wish the answers to all the problems there is a student solutions manual available (this is optional).
- Molecular Model Kit: CHMY 123 model kit, available in UM bookstore.

Assigned readings and problems are posted on Moodle.

Lecture Notes: The lecture notes/powerpoints for each week will be posted on Moodle
Study Guides: Study Guides will be posted on Moodle before each exam. Exams are based on the new material covered from the previous test but the very nature of the chemical sciences is that this knowledge is cumulative.

Weekly Schedule

Recitations: M afternoons see information for individual sections (starts January 14)
Lectures: MWF (3 days) 9:00-9:50pm ULH 101

Recitation Exercises

Recitation exercises are model based tutorials followed by a short 10 pt closed-book quiz. Please bring your textbook, class notes and model kit to recitation for the tutorial. Please go to the recitation section in which you are officially enrolled as seating is limited. There are twelve 10 point quizzes. The best ten quizzes will contribute to a total of 100 possible points from the recitations. Completion of more than ten recitations can contribute up to 20 points of extra credit for your grade. Recitations are guided tutorial based exercises and not homework. Therefore, recitations may only be made up with your TA during their office hours during the same week that the recitation is held.

Homework

Homework problems will be suggested for each chapter that is covered in lecture. The problems will not be handed in or graded. The problems in the book will be used as a basis for the recitation quizzes and exam questions. You are highly recommended to do them. A solutions manual is available that gives answers to all the problems. Your textbook only has answers to the odd numbered problems.

Exams

Exams are multiple choice, generally 25 questions worth 4 pts each (see calendar in back for exam dates). Help sheets, periodic tables, calculators and any other electronic devices are not permitted unless pre-approved. There are 4 x 100 point midterm exams. The lowest of these exams will be dropped, for a total of 300 possible pts. Missing an exam for any reason, legitimate or otherwise constitutes your lowest exam score. No make-up exams will be given.

Final Exam: The final exam is comprehensive and worth 200 pts (and cannot be dropped). The final exam is scheduled for Tuesday, Apr 30, 10:10 AM- Noon

Schedule your plane reservations, internships, employment for *after this time*. *No early finals will be given!*

Letter Grades

The points from best 3 exams (300) + final exam (200) + best 10 quizzes from recitations (100) for a total of 600 points. Letter grades will be assigned using the

traditional 90-80-70-60; A-B-C-D format. The use of + and – grading is at the discretion of the Professor.

Getting Help with CHMY 123

- TA (teaching assistant) for your recitation section has office hours, to be announced.
- Study Jams (regular study groups led by a student tutor)
http://www.umt.edu/oss/for_students/tutoring.php
- check the TRIO website to find out if you qualify for TRIO assistance
<http://www.umt.edu/trioss/apply.php#Eligibility>
- names of private tutors can be found through the Office of Student Success
<http://www.umt.edu/oss/> .

Student Conduct

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by the University. All students need to be familiar with the Student Conduct Code. The Code is available at <http://www.umt.edu/student-affairs/dean-of-students/default.php>

Students are particularly advised that plagiarism – representing someone else’s work as the student’s own without evidence of independent contribution - and misconduct during examination fall under items 1 and 2 of the student conduct code. The majority of CHMY 123 students are honest and responsible. As academic misconduct may affect those students, please be advised that I do enforce the Student Conduct Code in order to protect the honest students from academic misconduct.

Disability Modifications

DSS students: please contact me to arrange accommodations. If you think you may have a disability adversely affecting your academic performance, please contact Disability Services for Students (Lommasson Center room 154, 406-243-2243).

UM Policies on drop/add and grade changes

According to UM academic policy, the deadline for dropping courses is the 45th instructional day. After that day, documentation of special circumstances is required to drop a course.

UM policy allows you to change your grade option (typically occurs when students are not doing well and they change from traditional letter grade to credit/no credit option) up to the last regular day of classes, Apr 26, 2019.

Semester Schedule

The approximate lecture order is given in the calendar on the next page. We start at Chapter 19 and go sequentially through to the end of the book (Chapter 35). The exceptions are that Chapter 32 is omitted and the second half of Chapter 31 (Chapter 31.4-31.10) is reintroduced at the end. Portions of some chapters may be omitted at the instructors discretion.

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The dates given in the calendar are subject to change based on the pace of lecture. At times we may be slightly ahead or slightly behind the stated chapter. The goal however is to cover 3-4 chapters prior to testing. Additional homework suggestions may be provided in class or on Moodle. Those here are an initial guideline.

CHMY 123 Introduction of General Organic and Biochemistry SPRING 2019 Calendar

| Date | Lecture | Homework |
|-------------------|--|---|
| January 11 | Lecture 1: Introduction to Organic and Biochemistry | Read the Syllabus. |
| January 14 | Recitation 1 | |
| January 14,16,18 | Chapter 19: Saturated Hydrocarbons | Chapter 19: even # 2-34 Read 19.1-19.5 "Key Terms" Review Questions p 475 |
| January 21 | Martin Luther King Jr. Holiday No Classes – No Recitation | |
| January 23,25 | Chapter 20: Unsaturated and Aromatic Hydrocarbons | Chapter 20: 2-40 |
| January 28 | Recitation 2 | |
| January 28,30 | Chapter 21: Polymers and Macromolecules | Chapter 21: 4,6,8,12,14,26 |
| February 1 | Chapter 22: Functional Groups: Alcohols, Ethers EXAM REVIEW | Chapter 22: 2-28,36,40,42 Review Chapters 19-21 for exam, |
| February 4 | Recitation 3 | |
| February 4 | EXAM 1: Chapter 19-21 | |
| February 6 | Chapter 22: Functional Groups: Phenols and Thiols | Chapter 22: 2-28,36,40,42 |
| February 8 | Chapter 23: Aldehydes and Ketones | Chapter 23: 2-8, 14-30 |
| February 11 | Recitation 4 | |
| February 11 | Chapter 23: Aldehydes and Ketones | |
| February 13,15 | Chapter 24: Carboxylic Acid and Esters | Chapter 24: 2-8, 14-34 |
| February 18 | President's Day Holiday No Classes – No Recitation | |
| February 22,22 | Chapter 25: Organic Nitrogen Compounds, amides and amines | Chapter 25: 2,4, 10-16, 20-30 |
| February 25 | Recitation 5 | |

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| Date | Lecture | Homework |
|--------------------|---|-----------------------------------|
| February 25 | Chapter 26: Stereoisomerism EXAM REVIEW | Chapter 26: 6-20, 34,36 |
| February 27 | EXAM 2: Functional Groups Chapters 22-25 | |
| March 1 | Chapter 26: Stereoisomerism | |
| March 4 | Recitation 6 | |
| March 4,6 | Chapter 27: Carbohydrates | Chapter 27:2-22, 26-40. |
| March 8 | Chapter 28: Lipids | Chapter 28: 2-6, 14-18, 26,30,32. |
| March 11 | Recitation 7 | |
| March 11 | Chapter 28: Lipids | |
| March 13 | Chapter 29.1-29.2: Amino Acids | |
| March 15 | EXAM3: Stereoisomerism, Carbohydrates, Lipids, Amino Acids | |
| March 18 | Recitation 8 | |
| March 18 | Chapter 29: Polypeptides and Proteins | Chapter 29: 2-22, 24-26, 32 |
| March 20,22 | Chapter 30: Enzymes | Chapter 30: 2-26 |
| March 25-29 | SPRING BREAK | |
| April 1 | Recitation 9 | |
| April 1,3 | Chapter 31.1-3.3: Nucleic Acids, High Energy Nucleotides | Chapter 31: 2-10 |
| April 5 | Chapter 33: Bioenergetics | |
| April 8 | Recitation 10 | |
| April 8 | Chapter 33: Bioenergetics | |
| April 10,12 | Chapter 34: Carbohydrate Metabolism | |
| April 15 | Recitation 11 | |
| April 15,17 | Chapter 35: Metabolism of lipids and proteins | |
| April 19 | EXAM 4: Polypeptides, Enzymes, Bioenergetics, and Metabolism | |
| April 22 | Recitation 12 | |
| April 22,24 | Chapter 31.4-31.10: Nucleic Acids, DNA Replication, the Genetic Code, Biosynthesis of Proteins | Chapter 31: 12-28 |
| April 26 | REVIEW FOR FINAL EXAM | |
| Tuesday April 30 | 10:10-12:10 | FINAL EXAM |

