

PELLISSIPPI STATE COMMUNITY COLLEGE
MASTER SYLLABUS

BASIC ORGANIC & BIOCHEMISTRY
CHEM 1020

Class Hours: 3.0

Credit Hours: 4.0

Laboratory Hours: 3.0

Revised: Spring 2011

Catalog Course Description:

Organic chemistry: alkanes and unsaturated and aromatic hydrocarbons, with emphasis on structure, nomenclature and functional groups. Biochemistry: amino acids and proteins, carbohydrates, lipids, nucleic acids. Course includes three hours of lecture and three hours of laboratory application each week.

Entry Level Standards:

The student should have a good understanding of general chemistry. Reading and writing on a college level is also expected. Basic mathematical skills (algebra, logarithms and ratios) are also needed.

Prerequisites:

CHEM 1010

Textbook(s) and Other Course Materials:

Textbook: : Smith. *General, Organic & Biological Chemistry*, 1st ed.
McGraw-Hill, 2010. ISBN: 978-0-07-302657-2. Approximate price: \$180

Lab Manual: Bettelheim & L. *Experiments for Introduction to General, Organic, & Biochemistry*. Thomson Learning, 2006. ISBN_978-0-03-075351-0. Approximate price: \$55

I. Week/Unit/Topic Basis:

| Week | Topic (TENTATIVE) |
|-------------|--------------------------------------------------------------|
| 1 | Syllabus, D2L, and Ch 11 Introduction to Organic Chemistry. |
| 2 | Chapter 12 & 13: Alkanes and Alkenes |
| 3 | Chapter 13 : Alkenes and Aromatics |
| 4 | Chapter 14 : Alcohols, Ethers, Thiols, Sulfides and Halogens |
| 5 | Chapter 14: Continued |
| 6 | Chapter 16: Aldehydes and Ketone |
| 7 | Chapter 17: Carboxylic Acids, Esters, and Amides |

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|----|--------------------------------------------------|
| 8 | Chapter 18: Amines and Neurotransmitters |
| 9 | Chapter 19: Lipids |
| 10 | Chapter 15: Stereochemistry |
| 11 | Chapter 20: Carbohydrates |
| 12 | Chapter 20: Carbohydrates |
| 13 | Chapter 21: Amino Acids, Proteins, and Enzymes |
| 14 | Chapter 22: Nucleic Acids and Proteins Synthesis |
| 15 | Chapter 22: Nucleic Acids and Proteins Synthesis |

II. Course Goals*:

The course will:

- A. Understand molecular structure and chemical bonding in carbon containing molecules. V.4
- B. Develop a working knowledge of IUPAC as well as common nomenclature for organic compounds. V.2,4
- C. Develop a deeper understanding of the Lewis and Bronsted-Lowry definitions for acids and bases and their essential role in organic and biological chemistry. V.
- D. Understand the difference between constitutional and stereo isomerism and the importance of chirality in biological systems. V.5
- E. Acquire a knowledge of the reactivity of various functional groups including alkyl halides, alcohol, ethers, alkenes, alkynes, aromatics, aldehydes, ketones, esters, carboxylic acids, amines and amides as well as methods for preparation of these functional groups. V.4
- F. Acquire a knowledge of the structures of biological molecules including carbohydrates, lipid, proteins, and nucleic acids and their roles in metabolic and regulatory biochemical processes. V.5
- G. Understand the factors affecting enzyme activity and the mechanism of enzyme actions. V.2
- H. Understand the roles of RNA and DNA in protein synthesis. V.5
- I. Acquire a knowledge of the types of molecules used for communication between cells including: neurotransmitters and hormones. V.4

*Roman numerals after course objectives reference General Education Goals of the university parallel program.

III. Expected Student Learning Outcomes*:

Students will be able to:

1. Name organic structures using IUPAC rules including stereochemistry as well as draw structures for given names including appropriate stereochemistry. A, B, D

2. Identify functional groups. A
3. Determine the products for a variety of reactions involving alkanes, alkenes, alkynes, aromatic hydrocarbons, alcohols, ethers, aldehydes, ketones, carboxylic acids, esters, amines and amides based on examples and reaction mechanisms discussed in class. E
4. Determine the reagents necessary to accomplish chemical transformations of the functional groups studied. E
5. Draw and identify structures for important biological molecules including proteins, carbohydrates, lipids and nuclei acids. F
6. Determine the affects of changes in pH on the ionization of amino acids and proteins. F
7. Discuss the factors affecting enzyme activity. G
8. Know the structural characteristics of classes of neurotransmitters and hormones involved in chemical communication and the mode of action. I
9. Know the steps involved in DNA replication, transcription and translation. H

* Capital letters after Expected Student Learning Outcomes reference the course goals listed above.

IV. Evaluation:

A. Testing Procedures: 75% of grade

Chapter tests & quizzes:

Five exams will be given worth 150 points each. Exams will be given in a recurring format with multiple choice, calculations, and discussion questions. **You may replace your lowest score with the score of your Final Exam.** Students arriving late for an exam will not be given extra time. **NO EXTRA CREDIT ASSIGNMENT WILL BE GIVEN DURING THE SEMESTER.**

Pop Quizzes:

Pop quizzes may be given during any class period, except when a test is scheduled. Points from quizzes will be included in the lecture grade at the discretion of the instructor.

Comprehensive final exam: 150 points.

All students are required to take the comprehensive final exam in order to receive credit for the course.

Tests may be made up only if the student can show, by contacting the instructor BEFORE the scheduled exam, that the absence is excused (doctor/hospital visit, funeral), including appropriate documentation. Make up tests are permitted only if the instructor agrees. Any other missed exams will count as a zero.

B. Laboratory Expectations: 25% of grade— **Including Lab Reports and the Comprehensive Final**

Students must read the assigned lab experiment prior to class and complete any pre-lab assignments. Failure to do so may result in points being taken off of the lab report grade.

Attendance is required for all scheduled lab meetings.

There are **NO MAKE-UP LABS**. If you should have to miss a lab due to a serious problem, you must contact the instructor within 24 hours and provide a valid, documentable excuse. However, students may be excused from, at most, one and only one lab meeting if the above conditions are met. In all other cases of missed labs will be recorded as a zero.

Laboratory reports are due on the due date provided by the instructor. Points will be deducted for laboratory reports turned in late. No laboratory reports will be accepted after the laboratory final examination.

Quizzes maybe given at the beginning of each lab period. Students who arrive late will not be allowed to make up the quiz. Students arriving exceptionally late or with multiple incidences of tardiness may lose additional points at the instructor's discretion.

Students should dress appropriately for the laboratory. Dress requirements as well as other safety rules will be discussed during the first lab meeting. Students who are not appropriately attired for subsequent lab meetings will not be allowed to complete the lab assignment and will receive a zero.

C. Field Work:

N/A

D. Other Evaluation Methods:

N/A

V. Policies:

A. Attendance Policy:

Pellissippi State expects students to attend all scheduled instructional activities. As a minimum, students in all courses (excluding distance learning courses) must be present for at least 75 percent of their scheduled class and laboratory meetings in order to receive credit for the course. Individual departments/programs/disciplines, with the approval of the vice president of Academic Affairs, may have requirements that are more stringent. In very specific circumstances, an appeal of the policy may be addressed to the head of the department in which the course was taken. If further action is warranted, the appeal may be addressed to the vice president of Academic Affairs.

B. Academic Dishonesty:

Academic misconduct committed either directly or indirectly by an individual or group is subject to disciplinary action. Prohibited activities include but are not limited to the following practices:

- Cheating, including but not limited to unauthorized assistance from material, people, or devices when taking a test, quiz, or examination; writing papers or reports; solving problems; or completing academic assignments.
- Plagiarism, including but not limited to paraphrasing, summarizing, or directly quoting published or unpublished work of another person, including online or computerized services, without proper documentation of the original source.
- Purchasing or otherwise obtaining prewritten essays, research papers, or materials prepared by another person or agency that sells term papers or other academic materials to be presented as one's own work.
- Taking an exam for another student.
- Providing others with information and/or answers regarding exams, quizzes, homework or

other classroom assignments unless explicitly authorized by the instructor.

- Any of the above occurring within the Web or distance learning environment.

C. Accommodations for disabilities:

Students who need accommodations because of a disability, have emergency medical information to share, or need special arrangements in case the building must be evacuated should inform the instructor immediately, privately after class or in her or his office. Students must present a current accommodation plan from a staff member in Services for Students with Disabilities (SSWD) in order to receive accommodations in this course. Services for Students with Disabilities may be contacted by going to Goins 127, 132, 134, 135, 131 or by phone: 539-7153 or TTY 694-6429. More information is available at <http://www.pstcc.edu/sswd/>.

D. Other Policies:

Visitors are **not** allowed in the classroom or the laboratory.

Cell phones are **not** to be used in the classroom at any time. Please turn off (or onvibrate) all cell phones and pagers or other electronic devices that make audible sounds that may disturb the classroom environment as deemed by the instructor.