

HAROLD WASHINGTON COLLEGE
MASTER SYLLABUS – COLLEGE CREDIT COURSE

1. TITLE, NUMBER, AND CLASSIFICATION:

Name of Course Survey of Organic and Biochemistry
Department Name Physical Science
Number Code 073
Course Number: 212

2. COURSE TERM: 16 Week Semester

3. CREDIT AND CONTACT HOURS:

(i) credit hours : 4 (ii) contact hours per week : 6 (iii) types of activities
x Lecture/Discussion
x Lab
Clinical/Work Experience
Other

4. PREREQUISITES - if none check here ; otherwise describe below:

Grade of C or better in Chemistry 201 or consent of the department chairperson.

5. CATALOG DESCRIPTION - write below, as in current college catalog;

Survey of organic chemistry including nomenclature and reactions of major functional groups essential to biochemistry and an introduction to the structure and function of biomolecules, and the metabolism of proteins, lipids, and carbohydrates. Writing assignments are part of the course. *Prerequisite:* Grade of C or better in Chemistry 201 or consent of the department chairperson. 3 lecture and 3 lab hours per week.

6. STUDENTS FOR WHOM THE COURSE IS INTENDED:

This course is required for allied health majors and students interested in pursuing a nursing or nutrition degree as a certificate as a physician's assistant.

7. COURSE OBJECTIVES:

Upon completion of Chemistry 212, students would be able to:

- Identify major functional groups in molecules and apply the appropriate nomenclature in their description.
- Correlate the three-dimensional structure of a molecule to its chemical and physical properties, as well as deconstruct a complex biomolecule into its component functional groups.
- Communicate, in oral and written form, an understanding of organic chemical concepts as applied to complex molecules and biomolecules.
- Integrate chemical reasoning into an understanding about the world around them and the challenges of society.

8. STUDENT LEARNING OUTCOMES

Upon completion of the course, the student will demonstrate the ability to:

- Write the names and structural formulas for the following functional groups: alkanes, alkenes, alkynes, alcohols, thiols, amines, aldehydes, ketones, acids, amines, amino acids, and carbohydrates.
- Predict physical properties for the previously mentioned classes of compounds based on their structure and three dimensional arrangement.
- Predict the major organic products of reactions under the following categories:
 - Addition reactions for alkenes
 - Acid-Base reactions for amine and carboxylic compounds.
 - Nucleophilic aromatic substitution
 - Formation of acetals and ketals.
 - Oxidation and reduction of carbonyl compounds.
 - Dipeptide formation.
- Use chemical principles to explain the physical and biological properties of lipids, carbohydrates, amino acids, proteins, and enzymes.
- Explain the catalytic activity with respect to chemical and physical conditions.

In the laboratory, the student will:

- Demonstrate increased proficiency using standard laboratory techniques.
- Perform chemical reactions involving the functional groups listed above.
- Identify biologically relevant organic compounds using wet chemical techniques.
- Analyze and identify simple biological molecules through chemical and spectroscopic techniques.

9. TOPICAL COURSE OUTLINE

- Review of Lewis structures VESPR
- Structure and properties of alkanes
- Structure, properties, and reactions of alkenes
- Structure, properties, and reactions of alcohols and thiols
- Structure, properties, and reactions of amines
- Structure, properties, and reactions of carboxylic acids
- Structure, properties, and reactions of carbohydrates
- Structure, properties, and reactions of amino acids and proteins
- Structure, properties, and reactions of lipids
- Structure, function relationships with respect to enzymes
- Structure, function relationships with respect to biological macromolecules.
- Reactions of amines

10. TEXTS AND MATERIALS USED: List of books and/or materials suggested for this course. McMurry and Castellion; Fundamentals of General, Organic, and Biological Chemistry 4th Edition. Prentice Hall 2003

11. AMOUNT OF WRITING REQUIRED:

Writing required in laboratory reports, in examinations, and on homework assignments to describe chemical systems and reactions.

12. METHODS OF EVALUATION: (Direct and indirect)

Written and practical tests and laboratory reports will be used to assess skills. This may include standardized tests provided by the American Chemical Society.

13. AUTHORIZED SIGNATURE AND FILE DATE:

DEPARTMENT AND CAMPUS

**Physical Science Department
Harold Washington College**

5/06