

**IMPERIAL COMMUNITY COLLEGE DISTRICT  
IMPERIAL VALLEY COLLEGE**

**COURSE OUTLINE**

**DIVISION:** Science, Mathematics, and Engineering

**DATE:** October 12, 2005

**COURSE TITLE:** Organic Chemistry II    **COURSE NO.:** CHEM 206    **UNITS:** 5

**LEC HRS:** 3    **LAB HRS:** 6    **HRS. TBA:** 0

If cross-referenced, please complete the following:

**COURSE NO. (s):** \_\_\_\_\_    **COURSE TITLE:** \_\_\_\_\_

**I. COURSE/CATALOG DESCRIPTION:**

This course is a study of various reactions and properties aldehydes, ketones, carboxylic acids, aromatic compounds, amines, conjugated dienes, lipids, carbohydrates, and organic polymers. A survey of various biochemical topics such as metabolism, protein structure, and DNA is also included. This course is a continuation of CHEM 12A and is intended for students majoring in chemistry, biology, and pre-medical sciences.

**II. A. PREREQUISITES, IF ANY:**

CHEM 204 with a grade of C or better.

**B. CO-REQUISITES, IF ANY:**

None.

**C. RECOMMENDED PREPARATION, IF ANY:**

None.

**III. GRADING CRITERIA:**

- X  . Course must be taken on a "letter-grade" basis only.  
      . Course may be taken on a "credit" basis or for a letter grade.  
      . Course must be taken on a "credit" basis only.

**IV. MEASURABLE COURSE OBJECTIVES AND MINIMUM STANDARDS FOR GRADE OF “C”:**

1. Student will demonstrate knowledge of the structure and reactions aldehydes and ketones.
2. Student will demonstrate knowledge of the structure and reactions carboxylic acids and their derivatives.
3. Student will demonstrate knowledge of enolate anions and enamines.
4. Student will demonstrate knowledge of the structure and reactions of aromatic compounds.
5. Student will demonstrate knowledge of the structure and reactions of amines.
6. Student will demonstrate knowledge of the structure and reactions of conjugated dienes.
7. Student will demonstrate knowledge of organic polymers.
8. Student will demonstrate knowledge of the structure and reactions carbohydrates.
9. Student will demonstrate knowledge of lipids.
10. Student will demonstrate knowledge of the chemistry of metabolism.
11. Student will demonstrate knowledge of the structure and reactions of amino acids and proteins.
12. Student will demonstrate knowledge of nucleic acids and DNA.

V. CORE CONTENT TO BE COVERED IN ALL SECTIONS:

	<u>CORE CONTENT</u>	<u>APPROX % OF COURSE</u>
1.	Aldehydes and ketones. A. Structure, nomenclature, and physical properties of aldehydes and ketones. B. Spectroscopic properties of aldehydes and ketones C. Reactions of aldehydes and ketones: additions, the Wittig reaction, keto-enol tautomerism, oxidation and reduction	10%
2.	Carboxylic acids and their derivatives. A. Structure, nomenclature, and physical properties of carboxylic acids B. Acidity of carboxylic acids C. Spectroscopic properties of carboxylic acids D. Reactions of carboxylic acids: reduction, esterification, conversion to acyl halides, decarboxylation E. Derivatives of carboxylic acids: amides, imides, and sulfoamides F. Reactions of carboxylic acid derivatives: hydrolysis, reactions with alcohols, amines, & organometallic compounds G. Interconversion of functional derivatives	9%
3.	Enolate anions and enamines A. Aldol reactions B. Condensation reactions C. Synthesis of esters	8%
4.	Aromatic compounds A. The concept of aromaticity B. Spectroscopic properties of aromatic compounds C. Reactions of benzene and its derivatives: electrophilic substitution, nucleophilic substitution, disubstitution, & polysubstitution	9%
5.	Amines A. Structure, nomenclature, and physical properties of amines B. Spectroscopic properties of amines C. Chirality of amines and quaternary ammonium ions D. Basicity of amines E. Reactions of amines: preparation of amines, reactions with acids, & elimination reactions	8%
6.	Conjugated dienes A. Electrophilic addition B. The Diels-Alder reaction C. Pericyclic reactions and transition state aromaticity	8%
7.	Organic polymers A. Polymer morphology B. Polymer notation and nomenclature C. Polymerization reactions	8%

8.	Carbohydrates A. Structure, physical properties, and reactions of monosaccharides B. Disaccharides and oligosaccharides C. Polysaccharides	8%
9.	Lipids A. Triglycerides B. Soaps and detergents C. Prostaglandins D. Steroids E. Phospholipids	8%
10.	Metabolism A. Glycolysis and beta-oxidation B. Fatty acids C. Digestion and absorption of carbohydrates	8%
11.	Amino Acids and Proteins A. Amino acid structure B. Acid-base properties of amino acids C. Primary structure of polypeptides and proteins D. Synthesis of polypeptides E. Geometry of polypeptides F. Higher levels of protein structure	8%
12.	Nucleic acids and DNA A. Structure of nucleosides and nucleotides B. Structure of DNA C. Structure of RNA D. The Genetic Code E. Sequencing DNA	8%

**VI. METHOD OF EVALUATION TO DETERMINE IF OBJECTIVES HAVE BEEN MET BY STUDENTS:** (Check all that apply.)

Essay	<u>  X  </u>	Class Activity	<u>  X  </u>	Written Assignments	<u>  X  </u>
Problem Solving Exercise	<u>  X  </u>	Final Exam	<u>  X  </u>	Oral Assignments	<u>  X  </u>
Skill Demonstration	<u>  X  </u>	Objective	<u>  X  </u>	Quizzes	<u>  X  </u>
Other	_____.				

**INSTRUCTIONAL METHODOLOGY:** (Check all that apply.)

Lecture	<u>  X  </u>	Discussion	<u>  X  </u>	Demonstration	<u>  X  </u>
Audio Visual	<u>  X  </u>	Group Activity	<u>  X  </u>	Lab Activity	<u>  X  </u>
Computer Assisted Instruction	<u>  X  </u>	Individual Assistance	<u>  X  </u>	Simulation/ Case Study	_____.

Two (2) hours of independent work done out of class per each hour of lecture or class work, or 3 hours lab, practicum, or the equivalent per unit.

**VII. TEXTBOOK(S) AND SUPPLEMENT(S):**

Wade, Leroy G. *Organic Chemistry*. 5<sup>th</sup> edition. Prentice Hall, 2003.

Brown, William H. and Christopher S. Foote. Organic Chemistry. 2<sup>nd</sup> ed. Fort Worth, TX: Saunders College Publishing. 1998.

Schoffstall, Allen M. et al. Microscale and Miniscale Organic Chemistry Laboratory Experiments. Boston: McGraw Hill. 2000

Carey, Francis A. Organic Chemistry. 4<sup>th</sup> ed. Boston: McGraw Hill. 2000

Luceigh, B.A. ChemTV: Core Organic Chemistry. Sudbury, MA: Exeter Multimedia Publishing. 1997.

Stanitski, Conrad, ed. Chemistry in Context: Applying Chemistry to Society. 3<sup>rd</sup> ed. New York: McGraw Hill. 2000.