**Course Title**: Introductory Organic and Biochemistry

**Course Description**: Introduction to the basic concepts of organic and biological chemistry. A study of the structure and behavior of organic and biochemical compounds, including metabolism, and regulation. Primarily for students in health oriented professions.

**Section Numbers:** Chemistry 3B L01 (52846)

**Instructor**: Brian Abela

**Voice mail/Office phone**: (559)925-3000 ext 3793

**Email**: brianabela@whccd.edu

**Office Location**: 208C located at the Lemoore Campus

**Office Hours**: Available by appointment.

**Course Website**: This is a web enhanced course. Login to blackboard from the Reedley College website at: [**http://blackboard.reedleycollege.edu**](http://blackboard2.fresnocitycollege.edu/).

**Prerequisites**: Chemistry 1A or 3A or equivalent.

**Units**: 3.00

**Start Date**: January 10, 2012

**End Date**: May 15, 2012

**Drop Date:** March 9, 2012

# **Textbook**: *Organic and Biological Chemistry,* 5th ed., Stoker, Brooks/Cole, 2010 (ISBN-10: 978-0-547-16804-3)

# **Lab Manual**: Custom publication laboratory manual through Pearson by Karen Timberlake, (ISBN: 978-0-558-18630-2).

**Required Materials**: Scientific calculator

**Class Time and Location**:

 Day(s) Time Room

Chemistry 3B Lecture Tuesday 4:00pm - 5:50pm Room PHY 76

Chemistry 3B Lab Thursday 4:00pm - 6:50pm Room PHY 77

**Grading**: Points are earned from lab assignments and exams. Points for each component and range of percentages are listed below.

Components Percentage

Lab Assignments 35%

Exams 45%

Final Exam 20%

Total 100%

**Grade Formula**: % = 0.35(average labs) + 0.45(average exams) + 0.20(final)

**Lab Attendance**: This course includes a lab component. Enrollment and completion

of a lab is required to complete this course. It is important to be in lab on time. There will be no

lab make ups without prior notification. A missed lab will result in a zero score for that lab.

**Lab Assignments**: All lab assignments will be given a due one week after the assigned day unless otherwise specified. Some assignments will require work outside of lab (homework).

**Exams**: Exams will be scheduled according to the syllabus, however, exact exam dates are be subject to change.

Grading Scale Letter Grade

90%-100% A

80% - 89% B

70% - 79% C

60% - 69% D

Below 60% F

**Academic Accommodation**: If you need academic accommodation or materials in alternate media (i.e.: Braille, large print, electronic text, etc.) per the Americans with Disabilities Act or Section 504 of the Rehabilitation Act, please advise your instructor.

**Cell Phone Policy**: cell phones should be set to silent mode during class. Any cell phone usage disrupting students during quizzes or exams will result in the early termination of that quiz or exam for that student. No make up will be given.

**Drop Policy**: Failure to attend the first day of class will result in the student being dropped from the class. A student not attending class for three consecutive scheduled class days will result in a drop from the course prior to the drop deadline.

**Academic Honesty**: This course abides by the the academic honesty policy set forth by the Reedley College. This policy includes the completion of all academic work without plagiarism, cheating, lying, tampering, stealing, or receiving unauthorized or illegitimate assistance from any other person.

**Disclaimer**: This syllabus is subject to change during the course of the semester.

**Lecture and Lab Schedule**

Week # Date Topic

 1 January 10 Lecture Review of chemical bonding and structure

 January 12 Lab Lab Safety and nomenclature

2 January 17 Lecture Chapter 1 Saturated Hydrocarbons

 January 19 Lab Properties of Organic Compounds

3 January 24 Lecture Chapter 2 Unsaturated Hydrocarbons

 January 26 Lab Reactions of Hydrocarbons

4 January 31 Lecture Chapter 3 Alcohols, Phenols and Ethers

February 2 Lab **Exam 1 Chapters 1, 2**

5 February 7 Lecture Chapter 4 Aldehydes and Ketones

 February 9 Lab Alcohols and Phenols

6 February 14 Lecture Chapter 5 Carboxylic Acids, Esters and Other Acid Derivatives

 February 16 Lab Aldehydes and Ketones

7 February 21 Lecture Chapter 6 Amines and Amides

 February 23 Lab **Exam 2 Chapters 3, 4, 5**

8 February 28 Lecture Chapter 7 Carbohydrates

March 1 Lab Plastics and Polymerization (Parts B, C, D)

9 March 6 Lecture Chapter 8 Lipids

 March 8 Lab Tests for Carbohydrates

10 March 13 Lecture Chapter 9 Proteins

 March 15 Lab Peptides and Proteins

11 March 20 Lecture **Exam 3 Chapters 6, 7, 8**

 March 22 Lab Aspirin and Other Analgesics

12 March 27 Lecture Chapter 10 Enzymes and Vitamins

 March 29 Lab Enzymes

13 April 3 Lecture **Spring Break: No Class**

 April 5 Lab **Spring Break: No Class**

14 April 10 Lecture Chapter 11 Nucleic Acids

April 12 Lab DNA Components and Extraction

**Lecture and Lab Schedule (continued)**

15 April 17 Lecture Chapter 12 Biological Energy Production

April 19 Lab To be announced

16 April 24 Lecture Chapter 13 Carbohydrate Metabolism

 April 26 Lab **Exam 4 Chapters 9, 10, 11**

17 May 1 Lecture Chapter 14 Lipid Metabolism

 May 3 Lab Lipids (Parts C, D only)

18 May 8 Lecture Chapter 15 Protein Metabolism

 May 10 Lab Final Exam Review

19 Tuesday May 15 **Comprehensive Final Exam 4:00pm -6:00pm room PHY 76**

**Course Outline**

A. Introduction to organic chemistry

1. Sources of organic compounds
2. Structure of organic compounds
3. Hybrid orbitals

B. Saturated hydrocarbons

1. IUPAC nomenclature
2. Cycloalkanes
3. Physical and chemical properties
4. Functional groups

C. Unsaturated hydrocarbons

1. Nomenclature
2. Hybridization and geometry
3. Physical and chemical properties
4. Addition polymers

D. Aromatic hydrocarbons

1. Nomenclature
2. Reactions of aromatic compounds

E. Halogenated hydrocarbons

1. Nomenclature
2. Alkyl and aryl halides

F. Alcohols, ethers, thiols

1. Nomenclature
2. Physical and chemical properties
3. Important alcohols

G. Aldehydes and ketones

1. Nomenclature
2. Physical and chemical properties
3. Preparation by oxidation
4. Important aldehydes and ketones

H. Carboxylic acids and esters

1. Nomenclature
2. Physical and chemical properties
3. Preparation and acidity of carboxylic acids
4. Hydrolysis of carboxylic esters

I. Amines and amides

1. Nomenclature
2. Physical and chemical properties
3. Preparation, hydrolysis and basicity of amines and quarternary salts

J. Stereoisomerism

K. Carbohydrates

1. Enantiomers and chirality
2. Saccharides

L. Lipids

1. Structure and properties of fats
2. Complex lipids and membranes
3. Cholesterol and hormones

M. Proteins

1. Amino acids
2. Zwitterions
3. Peptides and proteins
4. Primary, secondary and tertiary structure
5. Denaturation

N. Enzymes

1. Nomenclature, common terms and classification of enzymes
2. Factor affecting activity
3. Mechanisms
4. Enzyme regulation

O. Vitamins, hormones

P. Nucleic acids

1. Components of nucleic acids
2. Structure of DNA and RNA
3. DNA replication
4. RNA
5. Transcription of information
6. Genetic code

**Student Learning Outcomes (SLO’s)**

A. Demonstrate structural formula/name conversions for less complex organic and biochemical compounds.

B. Organize and illustrate the function and processes of enzymes and coenzymes in major metabolic pathways.

C. Successfully employ the course material to complete courses requiring a basic knowledge of organic and biochemistry.

D. Safely demonstrate laboratory experiments involving basic organic chemistry and biochemical themes.