Course Outline

COURSE:  CHEM 30B  DIVISION:   10  ALSO LISTED AS:

TERM EFFECTIVE:   Spring 2017   CURRICULUM APPROVAL DATE: 05/09/2016

SHORT TITLE: ELEM ORG/BIOCHEM

LONG TITLE: Elementary Organic and Biochemistry

<table>
<thead>
<tr>
<th>Units</th>
<th>Number of Weeks</th>
<th>Type</th>
<th>Contact Hours/Week</th>
<th>Total Contact Hours</th>
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<td>4</td>
<td>18</td>
<td>Lecture: 3</td>
<td>54</td>
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<td>Lab: 3</td>
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COURSE DESCRIPTION:

This is the second semester of a year-long elementary chemistry course designed as a continuation of Chemistry 30A. It is designed for science majors, nursing and allied health students. The course will cover the principles of organic and biochemistry including hydrocarbons, alcohols, aldehydes and ketones, carboxylic acids, amines and amides, carbohydrates, lipids, proteins and their functions in physiological systems, as well as organic chemical reactions. PREREQUISITE: Chemistry 30A with a grade of C or better.

PREREQUISITES:

Completion of CHEM 30A, as UG, with a grade of C or better.

CREDIT STATUS: D - Credit - Degree Applicable

GRADING MODES

L - Standard Letter Grade

REPEATABILITY: N - Course may not be repeated

SCHEDULE TYPES:

02 - Lecture and/or discussion
03 - Lecture/Laboratory
04 - Laboratory/Studio/Activity

STUDENT LEARNING OUTCOMES:

6/20/2016
1. Identify major classes of organic compounds including the various functional groups.

2. Demonstrate comprehension of alkanes and cycloalkanes including physical/chemical properties, isomers, structures and nomenclature.

Measure: Homework, Group activities, Quizzes, and Exams

PLO:
ILO: 2, 1, 7
GE-LO: B1, B3, B5, B6, A6

Year assessed or anticipated year of assessment: 2010

3. Demonstrate knowledge of alkenes, alkynes and benzene compounds including unsaturation, physical/chemical properties, isomers, structures and nomenclature.

4. Compare, contrast, and analyze the chemical reactions of alkenes, alkynes and benzene compounds.

Measure: Homework, Group activities, Quizzes, and Exams

PLO:
ILO: 2, 1, 7
GE-LO: B1, B3, B5, B6, A6

Year assessed or anticipated year of assessment: 2015

5. Demonstrate understanding of alcohols, phenols, ethers, and thiols including physical/chemical properties, structures, and nomenclature.

6. Compare, contrast, and analyze the chemical reactions of alcohols, phenols, ethers, and thiols.

Measure: Homework, Group activities, Quizzes, and Exams

PLO:
ILO: 2, 1, 7
GE-LO: B1, B3, B5, B6, A6

Year assessed or anticipated year of assessment: 2015

7. Demonstrate comprehension of aldehydes and ketones including physical/chemical properties, structures, and nomenclature.

8. Compare, contrast, and analyze the chemical reactions of aldehydes and ketones.

Measure: Homework, Group activities, Quizzes, and Exams

PLO:
ILO: 2, 1, 7
GE-LO: B1, B3, B5, B6, A6

Year assessed or anticipated year of assessment: 2015

9. Demonstrate knowledge of carboxylic acids and esters including physical/chemical properties, structures, and nomenclature.

10. Compare, contrast, and analyze the chemical reactions of carboxylic acids and esters.

Measure: Homework, Group activities, Quizzes, and Exams

PLO:
ILO: 2, 1, 7
GE-LO: B1, B3, B5, B6, A6

Year assessed or anticipated year of assessment: 2016

11. Demonstrate understanding of amines and amides including physical/chemical properties, isomers, structures and nomenclature.

12. Compare, contrast, and analyze the chemical reactions of amines and amides.

Measure: Homework, Group activities, Quizzes, and Exams

PLO:
ILO: 2, 1, 7
GE-LO: B1, B3, B5, B6, A6

6/20/2016
Year assessed or anticipated year of assessment: 2016
13. Demonstrate comprehension of stereochemistry including isomerism, chirality, optical activity, and analyze the assignment of configuration of organic molecules.
14. Demonstrate knowledge of carbohydrates and lipids including physical/chemical properties, isomers, structures, and nomenclature.
15. Compare, contrast, and analyze the chemical reactions of carbohydrates and lipids.
Measure: Homework, Group activities, Quizzes, and Exams
PLO:
ILO: 2, 1, 7
GE-LO: B1, B3, B5, B6, A6

Year assessed or anticipated year of assessment: 2010
16. Demonstrate understanding of amino acids and proteins including physical/chemical properties, structures and nomenclature.
17. Compare, contrast, and analyze the chemical reactions of amino acids and proteins.
Measure: Homework, Group activities, Quizzes, and Exams
PLO:
ILO: 2, 1, 7
GE-LO: B1, B3, B5, B6, A6

Year assessed or anticipated year of assessment: 2016
18. Demonstrate comprehension of nucleic acids, DNA and RNA including physical/chemical properties, structures, and nomenclature.
19. Compare, contrast, and analyze the chemical reactions of nucleic acids, DNA, and RNA.
Measure: Homework, Group activities, Quizzes, and Exams
PLO:
ILO: 2, 1, 7
GE-LO: B1, B3, B5, B6, A6

Year assessed or anticipated year of assessment: 2010
20. Collect and analyze laboratory experimental data and solve related chemical problems.
21. Examine chemical concepts through peer interaction and written laboratory reports.
22. Relate classroom and laboratory experiences to phenomena outside the classroom.
Measure: Homework, Group activities, Quizzes, and Exams
PLO:
ILO: 2, 1, 4, 6
GE-LO: B4, B7, B8, A5

Year assessed or anticipated year of assessment: 2016

PROGRAM LEARNING OUTCOMES:
Employing the scientific method as a basis for evaluation theoretical and laboratory derived information, students will gain an understanding of the biological and/or physical worlds. Students will also gain a working familiarity with mathematics and an understanding of mathematics as it applies to modeling in the sciences.

CONTENT, STUDENT PERFORMANCE OBJECTIVES, OUT-OF-CLASS ASSIGNMENTS
Curriculum Approval Date: 05/09/2016
Week/Topic 1-2
12 Hours
Chapter-11     Organic Chemistry.  Saturated Hydrocarbons
Structural features of organic compounds. Isomerism. Functional groups. Alkanes and cycloalkanes. Nomenclature of alkanes and
cycloalkanes. The physical and chemical properties of alkanes and cycloalkanes.
Homework problems from text and instructor.
Laboratory Experiment: Locker Check-In and Safety.
Laboratory Experiment: Isomerism.
Identify major classes of organic compounds including functional groups.
Demonstrate comprehension of alkanes and cycloalkanes including physical/chemical properties, isomers, structures, and nomenclature.
Week/Topic 3-4
12 Hours
Chapter-12 Unsaturated Hydrocarbons
Their occurrence in nature. Nomenclature of alkenes and alkynes.
Geometric isomers. Addition reactions of the double and triple bonds.
How addition reactions occur. Addition polymers. The benzene ring and aromatic properties. Nomenclature of benzene compounds.
Homework problems from text and instructor.
Laboratory Experiment: Hydrocarbons.
Laboratory Experiment: Structure and Solubility.
Demonstrate comprehension of alkenes, alkynes, and benzene compounds including unsaturation, physical/chemical properties, isomers, structures, and nomenclature.
Compare, contrast, and analyze the chemical reactions of alkenes, alkynes, and benzene compounds.
Week/Topic 5-6
12 Hours
Chapter-13 Alcohols, Phenols, Ethers, and Thioalcohols
Homework problems from text and instructor.
Laboratory Experiment: Oxidation of Alcohols.
Demonstrate comprehension of alcohols, phenols, ethers, and thioalcohols including physical/chemical properties, structures, and nomenclature.
Compare, contrast, and analyze the chemical reactions of alcohols, phenols, ethers, and thioalcohols.
Week/Topic 7-8
12 Hours
Chapter-14 Aldehydes and Ketones
Homework problems from text and instructor.
Laboratory Experiment: Oxidation of Carbonyl Compounds.
Demonstrate comprehension of aldehydes and ketones including physical/chemical properties, structures, and nomenclature.
Compare, contrast, and analyze the chemical reactions of aldehydes and ketones.
Week/Topic 9-10
12 Hours
Chapter-15 Carboxylic Acids and Esters
Homework problems from text and instructor.
Laboratory Experiment: Esterification.
Laboratory Experiment: Synthesis of Aspirin.
Demonstrate comprehension of carboxylic acids and esters including physical/chemical properties, structures, and nomenclature.
Compare, contrast, and analyze the chemical reactions of carboxylic acids and esters.
Week/Topic 11
6 Hours
Chapter-16 Amines and Amides
The occurrence, nomenclature, and physical properties of amines. Chemical properties and reactions of amines. The occurrence, nomenclature, and physical properties of amides. Chemical properties and reactions of amides.
Homework problems from text and instructor.
Laboratory Experiment: Basicity of Amines.
Demonstrate comprehension of amines and amides including physical/chemical properties, structures, and nomenclature.
Compare, contrast, and analyze the chemical reactions of amines and amides.
Week/Topic 12
6 Hours
Chapter-17 Stereoisomerism
Homework problems from text and instructor.
Laboratory Experiment: Optical Activity.
Demonstrate comprehension of stereochemistry including isomerism, chirality, optical activity, and specific rotation.
Compare, contrast, and analyze the assignment of configuration of organic molecules.
Week/Topic 13-14
12 Hours
Chapter-18 Carbohydrates
An overview of biochemistry. Introduction to monosaccharides.
The D- and L- families of carbohydrates. Cyclic forms of
Homework problems from text and instructor.
Laboratory Experiment: Test for Carbohydrates.
Laboratory Experiment: Determination of Ascorbic Acid.
Demonstrate comprehension of carbohydrates including physical/chemical properties, isomers, structures, and nomenclature.
Comparing, contrast, and analyze the chemical reactions of carbohydrates.
Week/Topic 15
6 Hours
Chapter 19 Lipids
The occurrence, nomenclature, and physical properties of lipids.
Chemical properties and reactions of triacylglycerols. Phospholipids.
Steroids. The lipid components of cell membranes.
Homework problems from text and instructor.
Laboratory Experiment: Test for Lipids.
Demonstrate comprehension of lipids including physical/chemical properties, structures, and nomenclature.
Comparing, contrast, and analyze the chemical reactions of lipids.
Week/Topic 16
6 Hours
Chapter 20 Proteins
Homework problems from text and instructor.
Laboratory Experiment: DNA Fingerprinting.
Demonstrate comprehension of amino acids and proteins including physical/chemical properties, structures, and nomenclature.
Comparing, contrast, and analyze the chemical reactions of amino acids and proteins.
Week/Topic 17
6 Hours
Chapter 24 Nucleic Acids
Homework problems from the text and instructor.
Laboratory Experiment: DNA Fingerprinting.
Demonstrate comprehension of nucleic acids, DNA, and RNA including physical/chemical properties, structures, and nomenclature.
Comparing, contrast, and analyze the chemical reactions of nucleic acids, DNA, and RNA.
Week/Topic 18
2 Hours
Final Examination (cumulative).
Comprehensive over the entire course with evaluation of each of the areas previously encountered.

ASSIGNMENTS:
Included in content section.

METHODS OF INSTRUCTION:
Instruction is by lecture, class discussion, lecture, demonstration, small group problem solving, laboratory work projects, homework and exams.

METHODS OF EVALUATION:
CATEGORY 1 - The types of writing assignments required:
Percent range of total grade: 20 % to 30 %
Written Homework
Lab Reports
Other: Extra Credit report on an organic chemistry topic.
CATEGORY 2 - The problem-solving assignments required:
Percent range of total grade: 70 % to 80 %
Homework Problems
Lab Reports
Quizzes
Exams
CATEGORY 3 - The types of skill demonstrations required:
Percent range of total grade: 0 % to  %
CATEGORY 4 - The types of objective examinations used in the course:

REPRESENTATIVE TEXTBOOKS:
Required:
1.) J. McMurry, D.S. Ballantine, C.A. Hoeger, V.E Peterson
1.) "Fundamentals of General, Organic, and Biological Chemistry." 8th ed.
1.) Pearson/Prentice Hall Publishing 1.) 2016
2.) D. Clark, G. Burce, E. Kilby
2.) "Gavilan College Chem 30B Laboratory Manual," 2nd ed.
2.) Premium Source Publishing 2.) 2015
Or other appropriate college level text.
Recommended:
1.) J. McMurry, D.S. Ballantine, C.A. Hoeger, V.E Peterson
1.) Pearson/Prentice Hall Publishing 1.) 2016
978-1-634-34143-1
978-0-321-77616-7
Reading level of text, Grade: 12 Verified by: D. Clark
Other textbooks or materials to be purchased by the student: None

ARTICULATION and CERTIFICATE INFORMATION
Associate Degree:
GAV B1, effective 201370
GAV B3, effective 201370

6/20/2016
CSU GE:
CSU B1, effective 201370
CSU B3, effective 201370

IGETC:
IGETC 5A, effective 201370
IGETC 5C, effective 201370

CSU TRANSFER:
Transferable CSU, effective 201370

UC TRANSFER:
Transferable UC, effective 201370

SUPPLEMENTAL DATA:
Basic Skills: N
Classification: Y
Noncredit Category: Y
Cooperative Education:
Program Status: 1 Program Applicable
Special Class Status: N
CAN: CHEM8
CAN Sequence: CHEM SEQ B
CSU Crosswalk Course Department: CHEM
CSU Crosswalk Course Number: 30B
Prior to College Level: Y
Non Credit Enhanced Funding: N
Funding Agency Code: Y
In-Service: N
Occupational Course: E
Maximum Hours:
Minimum Hours:
Course Control Number: CCC000280630
Sports/Physical Education Course: N
Taxonomy of Program: 190500