

Course Outline

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

TERM EFFECTIVE: Fall 2021 **CURRICULUM APPROVAL DATE:** 12/14/2021

SHORT TITLE: ELEM ORG/BIOCHEM

LONG TITLE: Elementary Organic and Biochemistry

<u>Units</u>	<u>Number of Weeks</u>	<u>Type</u>	<u>Contact Hours/Week</u>	<u>Total Contact Hours</u>
4	18	Lecture:	3	54
		Lab:	3	54
		Other:	0	0
		Total:	6	108

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.

COREQUISITES:

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
- 04B - Laboratory - LEH 0.75
- 05 - Hybrid
- 71 - Dist. Ed Internet Simultaneous
- 72 - Dist. Ed Internet Delayed
- 73 - Dist. Ed Internet Delayed LAB
- 73B - Dist. Ed Internet LAB-LEH 0.75

STUDENT LEARNING OUTCOMES:

By the end of this course, a student should:

1. Draw and name structures containing common mono-functional organic molecules and differentiate functional groups when they appear in an organic structure, relate the physical and chemical properties of compounds containing these groups with the structure of each functional classification.
2. Distinguish roles of four major classes of bio-molecules in living cells.
3. Compare and contrast the processes of DNA replication and transcription, RNA translation, and common types of mutations.
4. Describe the major biochemical components in metabolism.

COURSE OBJECTIVES:

By the end of this course, a student should:

1. Identify major classes of organic compounds including the various functional groups.
2. Identify alkanes and cycloalkanes including physical/chemical properties, isomers, structures and nomenclature.
3. Identify 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.
5. Identify 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.
7. Identify aldehydes and ketones including physical/chemical properties, structures, and nomenclature.
8. Compare, contrast, and analyze the chemical reactions of aldehydes and ketones.
9. Identify carboxylic acids and esters including physical/chemical properties, structures, and nomenclature.
10. Compare, contrast, and analyze the chemical reactions of carboxylic acids and esters.
11. Identify amines and amides including physical/chemical properties, isomers, structures and nomenclature.
12. Compare, contrast, and analyze the chemical reactions of amines and amides.
13. Describe stereochemistry including isomerism, chirality, optical activity, and analyze the assignment of configuration of organic molecules.
14. Identify carbohydrates and lipids including physical/chemical properties, isomers, structures, and nomenclature.
15. Compare, contrast, and analyze the chemical reactions of carbohydrates and lipids.
16. Identify amino acids and proteins including physical/chemical properties, structures and nomenclature.
17. Compare, contrast, and analyze the chemical reactions of amino acids and proteins.
18. Identify 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.
20. Collect and analyze laboratory experimental data and solve related chemical problems.

CONTENT, STUDENT PERFORMANCE OBJECTIVES, OUT-OF-CLASS ASSIGNMENTS

Curriculum Approval Date: 12/14/2021

LECTURE CONTENT:

4 Hours

Organic Chemistry: Saturated Hydrocarbons (alkanes and cycloalkanes)

6 Hours

Unsaturated Hydrocarbons (alkenes and alkynes)

6 Hours

Alcohols, Phenols, Ethers, and Thioalcohols

6 Hours

Aldehydes and Ketones

6 Hours

Carboxylic Acids and Esters

6 Hours

Amines and Amides

6 Hours

Stereoisomerism and Chirality

3 Hours

Carbohydrates

3 Hours

Lipids

3 Hours

Proteins

3 Hours

Nucleic Acids

2 Hours

Final Exam

LAB CONTENT:

3 Hours

Locker Check-In and Safety

3 Hours

Isomerism: alkanes and cycloalkanes

6 Hours

Hydrocarbons, Structure and Solubility: alkenes, alkynes, and benzene compounds

6 Hours

Oxidation of Alcohols: alcohols, phenols, ethers, and thioalcohols

6 Hours

Oxidation of Carbonyl Compounds: aldehydes and ketones

6 Hours

Esterification, Synthesis of Aspirin: carboxylic acids and esters

3 Hours

Basicity of Amines: amines and amides

6 Hours

Optical Activity: stereochemistry, isomerism, chirality, optical activity, and specific rotation

3 Hours

Test for Carbohydrates, Determination of Ascorbic Acid

3 Hours

Test for Lipids

6 Hours

DNA Fingerprinting

3 Hours

Lab Exam and Locker Check-Out

METHODS OF INSTRUCTION:

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

OUT OF CLASS ASSIGNMENTS:

Required Outside Hours 78

Assignment Description

Assigned reading, homework, other written assignments

Required Outside Hours 30

Assignment Description

Lab-based projects

METHODS OF EVALUATION:

Writing assignments

Evaluation Percent 25

Evaluation Description

Written Homework

Lab Reports

Other: Extra Credit report on an organic chemistry topic.

Problem-solving assignments

Evaluation Percent 75

Evaluation Description

Homework Problems

Lab Reports

Quizzes

Exams

REPRESENTATIVE TEXTBOOKS:

Fundamentals of General, Organic, and Biological Chemistry, 8th ed, McMurry, J., Ballantine, D.S., Hoeger, C.A., Peterson, V.E., Pearson/Prentice Hall Publishing, 2017.

ISBN: 9780321750839

12 Grade Verified by: D. Clark

D. Clark, G. Burce, E. Kilby. Gavilan College Chem 30B Laboratory Manual. Premium Source Publishing. Updated periodically.

RECOMMENDED MATERIALS:

Study Guide & Solution Manual, 8th ed., J. McMurry, D.S. Ballantine, C.A. Hoeger, V.E. Peterson, Pearson/Prentice Hall Publishing, 2016.

ISBN: 9780321776167

12 Grade Verified by: D. Clark

ARTICULATION and CERTIFICATE INFORMATION

Associate Degree:

GAV B1, effective 201370

GAV B3, effective 201370

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:

CSU Crosswalk Course Number:

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