GAVILAN COLLEGE
5055 Santa Teresa Blvd
Gilroy, CA 95023

# 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

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

| | |
|---|---|
| Out of Class Hrs: | 108.00 |
| Total Learning Hrs: | 216.00 |

**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
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.

**COURSE CONTENT:**

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

**COURSE CONTENT(CONTINUED):**

**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
- GAV B3
- GAV Area 5 = Natural Sci

CSU GE:
- CSU B1
- CSU B3

IGETC:
- IGETC 5A
- IGETC 5C

CSU TRANSFER:
- Transferable CSU

UC TRANSFER:
- Transferable UC

**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
Prior to College Level: Y
Non Credit Enhanced Funding: N
Funding Agency Code: Y
In-Service: N
Occupational Course: E
Course Control Number: CCC000280630
Sports/Physical Education Course: N
Taxonomy of Program: 190500