

# CHEM 104: COLLEGE CHEMISTRY II

## Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2021
Credits:	5
Total Contact Hours:	144
Lecture Hours :	72
Lab Hours:	72
Hours Arranged:	0
Outside of Class Hours:	144
Prerequisite:	CHEM 103 or CHEM 110.
District General Education:	B2. Natural Sciences - Physical Sciences, B3. Natural Sciences - Laboratory
Transferable to CSU:	Yes
Transferable to UC:	Yes - Approved
Grading Method:	Standard Letter

## Catalog Course Description

The second semester of a year program includes chemistry of organic compounds; covers topics in biochemistry including carbohydrates, fats, proteins, metabolism, nucleic acids, and nutrition. Required for students transferring to four-year college nursing programs and students majoring in physical therapy, occupational therapy and home economics. 72 lecture hours, 72 lab hours.

## Course Objectives

- Write the name and structure of organic compounds (up to ten carbons) including alkanes, alkenes, alkynes, alcohols, ethers, aldehydes, ketones, esters, acids.
- Carry out a number of identification tests in the laboratory.
- Recognize functional groups and their reactions.
- Given structure of Amoxicillin- all functional groups and their class in the compound must be labeled. If Amoxiciline is picked as the drug of choice then the manufacturer, side effects, the use of the drug, the method of synthesis, how it works in the body must be given as an oral presentation by using Powerpoint.
- Write common reactions for several functional groups.
- Distinguish between geometric isomers.
- Select optical isomers from a group of compounds.
- Write the name and structure of all amino acids.
- Distinguish between primary, secondary, tertiary, and quaternary structure of proteins.
- Write the structure of a fat.
- List the components of the nucleic acids.
- Identify in the laboratory a number of reactions involving different functional groups.

## Major Course Content

1. Properties, nomenclature, and reaction of alkanes
2. Properties, nomenclature and reactions of alkenes, and alkynes

3. Properties of alcohols, phenols, ethers, and organic acids
4. Properties of aldehydes, ketones, and their identification reactions
5. Properties of acids and esters, their reactions and nomenclature
6. Properties of amines and amides, their reactions, and nomenclature
7. Stereoisomers, optical isomers, importance of biochemistry
8. Carbohydrates, monosaccharides, disaccharides, and polysaccharides
9. Chemistry of fats, oils, detergents, triglycerides, waxes, and phospholipids
10. Chemistry of proteins, the amino acids, essential amino acids, nucleic acids, and the genetic code
11. Enzymes and vitamins.

## Lab Content

1. Combustion of alkanes.
2. Reactions and solubility of primary, secondary and tertiary alcohols.
3. Reactions of aldehyde and ketones and their differences.
4. Acidity of carboxylic acids, preparation of esters (apple, banana, pear flavors).
5. Synthesis of aspirin and ibuprofen.
6. Identification of an unknown amino acid by chromatography, reaction of enzymes at different pH, temperature, and quantity of substrate.
7. Vitamins.

## Suggested Reading Other Than Required Textbook

None

## Examples of Required Writing Assignments

A 1-2 page open book - in class assignment such as describing the differences between physical and chemical properties of carboxylic acids and esters.

## Examples of Outside Assignments

Read the text book. Pre-Lab write-up.

## Instruction Type(s)

Lecture, Lab, Online Education Lecture, Online Education Lab

## IGETC Area 2: Mathematical Concepts and Quantitative Reasoning

No

## IGETC Area 5: Physical and Biological Sciences

5A. Physical Science, 5C. Science Laboratory

## IGETC Area 6: Languages other than English

No