COURSE SYLLABUS

Tunxis Community College

Education That Works For a Lifetime

Course Title:	Organic Chemistry I	**Date submitted:**	November 2017 (AAC:17-61)
Department:	Mathematics and Science		
Curriculum:	Chemistry		

Course Descriptors: Make certain that the course descriptors are consistent with college and Board of Trustees policies, and the current course numbering system.

Course Code: (eg. ACC 101)	CHE*211
Course Type:	X

A: Clinical B: Lab D: Distance Learning
I: Individual/Independent L: Lecture N: M: Seminar Internship
P: Practicum U: Studio
X: Combined Lecture/Lab Y: Combined Lecture/Clinical/Lab Z: Combined Lecture/Studio

Elective Type:	G/LAS/S

E: English FA: Fine Arts FL: Foreign Language G: General
HI: History HU: Humanities LAS: Liberal Arts & Sciences
M: Math S: Science SS: Social Science

Credit Hours:	4
Developmental: (yes/no)	NO
Contact Hours: Lecture:	3
Clinical:	0
Lab:	4
Studio	0
Other:	0
TOTAL:	7
Class Maximum:	20
Semesters Offered:	F

Prerequisites:

C- or better in General Chemistry II (CHE*122) or permission of department chair/director or 1 year general college Chemistry

Corequisites:

None

Other Requirements:

Safety glasses, scientific calculator, technology skills

Catalog Course Description:

A general introduction to organic chemistry, the study of carbon compounds. Topics include: molecular structure and properties, including molecular orbitals and bonding; conjugation and resonance; reaction; thermodynamics, including energy of activation and transition state; stereochemistry; stereoselective and stereospecific reactions; chemistry of aliphatic compounds: alkanes, alkenes, and alkynes and their derivatives; free-radical and electrophilic reactions; and cyclic aliphatic compounds. Laboratory sessions will illustrate fundamental techniques of organic chemistry using semi-micro and micro scale apparatus as well as instrumental methods of analysis, including gas chromatography and infra-red spectroscopy. This course is the first of a two-semester sequence.

Topical Outline: List course content in outline format.

Lecture:
1. Structure and properties of organic compounds
2. Reactions: energy of activation and transition state
3. Stereochemistry: stereoselective and stereospecific reactions
4. Alkanes
5. Alkenes
6. Alkynes
7. Free-radical addition and substitution reactions
8. Nucleophilic addition and substitution reactions
9. Alkyl halides

10. Solvent effects
11. Alcohols
12. Ethers
13. Conjugation and resonance
14. Cyclic aliphatic compounds

Laboratory:
1. Crystallization
2. Melting points, boiling points, refractive indices
3. Distillation
4. Steam distillation
5. Extraction: isolation of caffeine
6. Thin Layer Chromatography
7. Gas chromatography
8. Molecular modeling
9. Stereochemistry
10. Infrared spectroscopy
11. Nuclear magnetic resonance spectroscopy
12. Ultraviolet spectroscopy and mass spectrometry
13. Elimination reaction: synthesis of cyclohexane
14. Oxidation reaction: synthesis of cyclohexanone
15. Grignard synthesis

Outcomes:
Describe measurable skills or knowledge that students should be able to demonstrate as evidence that they have mastered the course content.

Upon successful completion of this course, the student will be able to do the following:

Lecture:
1. describe the structure and properties of organic compounds and their reactions
2. distinguish between energy of activation and transition state, stereochemistry: stereoselective and stereospecific reactions
3. define and give examples of alkanes, alkenes, and alkynes
4. explain and give examples of free-radical addition and substitution reactions nucleophilic addition and substitution reactions
5. explain and define the solvent effects of alcohols and ethers
6. distinguish between conjugation and resonance
7. identify the properties of cyclic aliphatic compounds
8. explain the relationships of organic molecules, their structures and effects on physical properties and chemical reactivities

Laboratory:
1. synthesize representative organic compounds in the laboratory
2. purify laboratory products by distillation and recrystallization
3. determine fundamental physical properties of synthetic products by Fourier Transform Infrared Spectroscopy, boiling points, melting points and refractive index
4. identify selected organic molecules from their infrared, NMR and mass spectra
5. determine theoretical and percent yields of laboratory products of synthesis reactions
6. configure and utilize molecular modeling and molecular orbital calculation programs
7. document lab procedures

PROGRAM: *(Numbering reflects Program Outcomes as they appear in the college catalog)*

N/A

COMPETENCY FULFILLED:

Scientific Knowledge & Understanding (SCKX) OR Scientific Reasoning (SCRX)

Evaluation: List how the above outcomes will be assessed.	**Assessment will be based on the following criteria:** quizzes examinations brief report library research reports laboratory reports bound laboratory notebooks
Instructional Resources: List library (e.g. books, journals, on-line resources), technological (e.g. Smartboard, software), and other resources (e.g. equipment, supplies, facilities) required and desired to teach this course.	**Required:** Chemical Laboratory **Desired:** Chemical software for modeling
Textbook(s)	Smith, *Organic Chemistry*, 2nd ed.; McGraw Hill Williamson, *Organic Experiments*, 9th ed.; Houghton Mifflin