Institutional Syllabus

___ New Course

Date of Last Review __________

___ Substantive Change in Existing Course

Date of Most Recent Approval __________

I. Course Title
Organic Chemistry

II. Course Prefix/Number
CHEM 321

III. Credit Hours
4

IV. Prerequisites
CHEM 132, minimum grade C

V. Catalog Description
A study of the relationship between structure and reactivity of carbon-containing compounds. Four lectures per week.

VI. Curricular Relationships
Required for all BA and BS Chemistry degrees, BS Biology degrees (Cellular and Molecular emphasis and Organismal emphasis), and for students who are pursuing the pre-medicine, pre-veterinary medicine, pre-dentistry, pre-pharmacy, and pre-optometry curricula. The course may be used in the BA Biology degree.

VII. Student Learning Outcomes
- Students will demonstrate an ability to solve problems, think critically, and draw analogies.
- Students will demonstrate an ability to write effectively and to evaluate the writing of others, particularly with respect to technical subjects.
- Students will be able to distinguish between organic and inorganic compounds and recognize important organic functional groups.
- Students will be able to draw structures for organic compounds and name alkanes, alkenes, alkynes, and alkyl halides.
- Students will be able to predict physical properties of alkanes, alkenes, alkynes, and alkyl halides, as well as understand the importance of functional groups to polarity of organic molecules.
- Students will be able to list and describe the principles, importance, and applications of stereochemistry.
- Students will demonstrate an understanding of the characteristic reactions of alkanes, alkenes, alkynes, alkyl halides, and synthetic methods to prepare those same classes of compounds as well as other functional groups.
• Students will apply mechanistic reasoning to explain/predict the distribution of products in nucleophilic substitution, electrophilic addition, elimination, and free radical substitution reactions.
• Students will be able to solve problems involving multistep syntheses.
• Students will utilize mass, infrared, and nuclear magnetic resonance spectra for the identification of organic compounds.
• Students will be able to discuss how organic chemistry impacts their everyday lives.

VIII. Content Outline
1. Structure and Bonding
2. Polar Covalent Bonds; Acids and Bases
3. Alkanes and Cycloalkanes
4. Stereochemistry of Alkanes and Cycloalkanes
5. Overview of Organic Reactions
6. Alkenes: Structure and Reactivity
7. Alkenes: Reactions and Synthesis
8. Alkynes
9. Mass Spectrometry and Infrared Spectroscopy
10. Nuclear Magnetic Resonance Spectroscopy
11. Stereochemistry
12. Alkyl Halides
13. Reactions of Alkyl Halides: Nucleophilic Substitutions and Eliminations (if time permits, otherwise this topic is included in CHEM 322)

IX. Course Procedures/Policies/Grading Scale
Students are expected to attend all lecture sessions. Homework is assigned and graded, as are specific writing assignments, which involve significant use of the Internet and original literature. On average, bluebook quizzes are given at the start of class twice a week. Typically, four or five hour exams and a comprehensive final exam are given in this course.

Normal grading is used for this course.
Grading Scale: >90 = A; 80-89 = B; 70-79 = C; 60-69 = D; <60 = F

X. Required/Recommended Readings
The typical text used for the lecture portion of the course is Organic Chemistry, by McMurry.

XI. Issues Unique to this Course
Corequisite of CHEM 321L, unless the student has successfully completed (grade of C or better) the laboratory in a previous semester.

XII. Additional Departmental Issues
None