CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

NEW COURSE PROPOSAL

PROGRAM: BIOLOGICAL AND PHYSICAL SCIENCES

1. Catalog Description of the Course. [Include the course prefix, number, full title, and units. Provide a course narrative including prerequisites and corequisites. If any of the following apply, include in the description: Repeatability (May be repeated to a maximum of ___ units); time distribution (Lecture ___ hours, laboratory ___ hours); non-traditional grading system (Graded CR/NC, ABC/NC). Follow accepted catalog format.]

CHEM 313. ORGANIC CHEMISTRY I LEARNING COMMUNITY (1)
One hour of recitation per week.
Corequisite: CHEM 311
Interactive problem-solving session for students in CHEM 311 where students work in small groups on problems related to the content in CHEM 311.

2. Mode of Instruction.

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<th>Units</th>
<th>Hours per Unit</th>
<th>Benchmark Enrollment</th>
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<tr>
<td>Lecture</td>
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<td>Activity</td>
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3. Justification and Learning Objectives for the Course. (Indicate whether required or elective, and whether it meets University Writing, and/or Language requirements) [Use as much space as necessary]

This course accompanies the first semester organic chemistry course (CHEM 311) and provides students with an interactive, problem-solving session where students work in small teams to solve problems in organic chemistry.

Students who successfully complete this course will be able to:
- Recognize the development of the field of organic chemistry from a historical perspective and how organic chemistry has impacted society
- Describe the scientific method and how it is used to approach the study of organic molecules
- Recognize functional groups and how they serve as building blocks of more complex organic molecules
- Evaluate the relationship between the geometric structures of various molecules
- Explain the behavior of organic reactions using their knowledge of thermodynamics and kinetics and the geometric and electronic structures of organic molecules
- Explain the basic scientific principles that form the basis for organic chemistry analysis including chromatography, infrared and ultraviolet spectrophotometry, mass spectrometry, and nuclear magnetic resonance spectrometry, and the limitations of these techniques
- Identify the reactions and synthesis of alkyl halides, alkenes, alkynes, and dienes

4. Is this a General Education Course YES NO
   If Yes, indicate GE category:

5. Course Content in Outline Form. [Be as brief as possible, but use as much space as necessary]

   Structure and Bonding
   Historical context of the development of organic chemistry
   A review of atomic and molecular structure
   Valence bond description of bonds

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Resonance and electron-pushing
Molecular orbital description of bonds
Properties of bonds

Acid-Base Chemistry
- Brønsted and Lewis Definitions of Acids and Bases
- Acid-base equilibria
- Electron-pushing in acid-base reactions

Structures and Naming of Organic Molecules
- Functional groups
- Constitutional isomerism
- Representations of organic molecules
- IUPAC naming of alkanes and alkyl halides
- Configurational isomerism
- Chirality, optical activity, and representations of chiral molecules
- Conformational analysis

Spectroscopic Determination of Molecular Structure
- Degree of unsaturation
- Mass Spectrometry (MS and GC/MS)
- Infrared spectroscopy (IR)
- Nuclear Magnetic Resonance spectroscopy (NMR)
- Ultraviolet-visible spectroscopy (UV-vis)

Overview of Organic Reactions
- Classifications of organic reactions and reaction mechanisms
- Overview of organic reaction mechanisms
- Electron pushing in polar and radical mechanisms
- Kinetics and thermodynamics of organic reactions
- Reaction energy diagrams

Alkyl Halides and their Synthesis
- Radical halogenation of alkane
- Radical structure and stability
- Conversion of alcohols to alkyl halides

Nucleophilic Substitution and Elimination
- Substitution vs. elimination and nucleophile structure
- Substitution mechanisms
- Carbocation structure and stability
- Elimination mechanisms

Alkenes and their Synthesis
- Naming of alkenes and E/Z notation
- Addition reactions of alkenes
- Oxidation/ reduction of alkenes

Synthesis Reactions
- Organometallics and coupling reactions

Dienes and their reactions
- Diels-Alder Reaction

6. References. [Provide 3 - 5 references on which this course is based and/or support it.]


7. List Faculty Qualified to Teach This Course.

Dr. Philip Hampton

8. Frequency.
a. Projected semesters to be offered: Fall X Spring _____ Summer _____

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9. **New Resources Required.**
   No New Lab.

10. **Consultation.**
    Attach consultation sheet from all program areas, Library, and others (if necessary)

11. If this new course will alter any degree, credential, certificate, or minor in your program, attach a program modification.

   ____________________________  1/8/03
   Proposer of Course                  Date

   Philip Hampton