CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

NEW COURSE PROPOSAL

PROGRAM: MULTIPLE PROGRAMS/ CHEMISTRY

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 410 ADVANCED ORGANIC SYNTHESIS (4)
   Three hours lecture and three hours laboratory per week
   Prerequisite: CHEM 305 (or concurrent enrollment), CHEM 314, and CHEM 315 or consent of instructor
   This course will examine modern synthetic reactions and approaches in the design of complex organic molecules. The laboratory introduces students to advanced synthetic reactions and techniques, including inert-atmosphere techniques. Lab fee required.

2. **Mode of Instruction.**

	Units	Hours per Unit	Benchmark Enrollment
Lecture	3	1	36
Seminar			
Laboratory	1	3	18
Activity			

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 is typically taken by Chemistry majors, as well as other science majors, who are interested in understanding more advanced synthetic reactions and techniques. Students interested in graduate study in Organic and Medicinal Chemistry should consider taking this course which is an upper-division elective for chemistry majors.

   Students who successfully complete this course will be able to:
   - Outline the development of the field of organic synthesis
   - Describe how molecular shape, electronic structure, thermodynamics, kinetics, and intermolecular interactions affect the reactivity of organic molecules and their types of reactions.
   - Discuss the reactivity of various functional groups found in organic molecules and how they can be converted into other functional groups.
   - Demonstrate a breadth and depth of understanding of the reactions of organic molecules.
   - Evaluate which reagent or reaction sequence would be the best approach to a synthetic target.
   - Interpret, discuss, and evaluate a primary literature article
   - Demonstrate the ability to understand journal articles on organic synthesis.
   - Compare strengths and limitations of various reagents and reaction conditions.
   - Perform modern synthetic reactions and characterize the products of the reactions.
   - Demonstrate proficiency at modern synthetic reactions and laboratory techniques.

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]*

Stereochemistry and Conformations
Synthetic Strategies and Retrosynthesis
Reading the Synthetic Literature
Acids, Bases, and Functional Group Exchange Reactions
Oxidation
Reduction
Hydroboration
Stereocontrol and Ring Formation
Protecting Groups
Nucleophiles and their Use in Carbon-Carbon Bond Formation
Electrophiles and their Use in Carbon-Carbon Bond Formation
Pericyclic Reactions and their Use in Carbon-Carbon Bond Formation
Radical Reactions and their Use in Carbon-Carbon Bond Formation
Organometallic Chemistry in Synthesis
Total Synthesis and Biomimetic Syntheses
Green Approaches to Synthesis

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

Sundberg, R. J.; Carey, F. A. *Advanced Organic Chemistry, Fourth Edition - Part A: Structure and Mechanisms*, Plenum, 4th Ed., 2001.

Sundberg, R. J.; Carey, F. A. *Advanced Organic Chemistry, Fourth Edition - Part B: Reaction and Synthesis*, Plenum, 4th Ed., 2001.

Smith, M. B. *Organic Synthesis*, Wiley, 2nd Ed., 2001.

Smith, M. B.; March, J. *March's Advanced Organic Chemistry: Reactions, Mechanisms, and Structure, 5th Edition*, Wiley, 5th Ed., 2001.

7. List Faculty Qualified to Teach This Course.

Dr. Phil Hampton

8. Frequency.

a. Projected semesters to be offered: Fall ____ Spring ___X__ Summer _____
Alternating with other upper-level chemistry electives on a two-year cycle.

9. New Resources Required.

None.

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.

__Phil Hampton_____12-16-03_____
Proposer of Course Date