CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

NEW COURSE PROPOSAL

PROGRAM AREAS _____BIOLOGICAL AND PHYSICAL SCIENCES, MATH AND COMPUTER SCIENCE

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.]*

COMP 422. DESIGN OF COMPILERS (3)
Three hours of lecture in the lab per week.
Prerequisite: COMP 444
Organization of compilers including lexical and syntax analysis, symbol tables, object code generation, code optimization techniques, and overall design. Compilation techniques and run-time structures.

2. **Mode of Instruction.**

	Units	**Hours per Unit**	**Benchmark Enrollment**
Lecture	___3_____	___1_____	__24______
Seminar	________	________	________
Laboratory	________	________	________
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]*

The course is an elective course for Computer Science majors.

Through this course, students will be able to

- Use modern compiler-construction tools
- Demonstrate common parsing strategies
- Discuss optimization techniques
- Design a compiler for a simple language
- Organize and express ideas clearly and convincingly in oral and written forms.

This course is not designed to satisfy the University Writing or Language requirements.

4. **Is this a General Education Course** **YES** **<u>NO</u>**
If Yes, indicate GE category:

A (English Language, Communication, Critical Thinking)	
B (Mathematics & Sciences)	
C (Fine Arts, Literature, Languages & Cultures)	
D (Social Perspectives)	
E (Human Psychological and Physiological Perspectives)	

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

1. Introduction to Translators
    1. Assemblers, Interpreters, Compilers
    2. Basic Techniques

        3. Symbol Tables
        4. One Pass vs. Two Pass
    2. Lexical Analysis
        1. Role of lexical analyzer, Regular expressions, DFA and NFA, Lexical analyzer generators
    3. Syntax Analysis
        1. Context free grammar
        2. Top-down parsers
        3. Bottom-up parsers, including LR(1), SLR(1), and LALR(1)
        4. Error recovery
    4. Semantic Analysis
        1. Syntax-directed definitions
        2. Attributed grammar
        3. Type checking
    5. Run-time Environment
        1. Storage organization
    6. Code Generation
        1. Intermediate code generation
        2. B. Code-generation algorithms
    7. Code Optimization
        1. Machine-independent code optimization
        2. Machine-specific code optimization

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

Pittman and Peters, *The art of compiler design: theory and practice*, Prentice-Hall (1991), ISBN 0130481904
Aho, Sethi, Ullman, *Compilers: Principles, Techniques, and Tools,*, Addison-Wesley, (1988) ISBN 0201100886.
Dowd, Severance and Loukides (ed*) High Performance Computing*, O'Reilly & Assoc., (1998), ISBN 156592312X

7. List Faculty Qualified to Teach This Course.

All Computer Science faculty.

8. Frequency.
a. Projected semesters to be offered: Fall ___X__ Spring _X____ Summer ___X__

9. New Resources Required.

a. Computer (data processing), audio visual, broadcasting needs, other equipment

Use of existing computer lab.

b. Library needs

none

c. Facility/space needs

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.

Proposer of Course Date