

**California State University Channel Islands
New Course Proposal**

Program Areas: Math and Computer Science

1. Catalog Description of the Course.

COMP 510 ALGORITHMS (3)

Three hours lecture per week

Prerequisite: Admission to the Computer Science or Mathematics Graduate Program

Design strategies for algorithms and data structures. Theoretical limits to space and time requirements.

Time/space trade-offs. Categories of problems and algorithms. Applications to business, bioinformatics, engineering, telecommunications and other disciplines. Open problems in the field.

2. Mode of Instruction.

	<u>Units</u>	<u>Hours per Unit</u>	<u>Benchmark</u>	<u>Enrollment</u>
Lecture	3	1	24	
Seminar	0	0	0	
Laboratory	0	0	0	
Activity	0	0	0	

3. Justification and Learning Objectives.

Justification: This course is a core course for graduate students in MS in Mathematics and MS in Computer Science programs. A course in algorithms is a required component of most graduate programs in Computer Science. Newer domains such as Bioinformatics require new algorithms.

Learning Objectives:

1. Be able to describe the philosophy guiding various design techniques (e.g. greedy, divide-and-conquer, dynamic programming)
2. Be able to select the appropriate algorithm design technique to apply to a given application problem
3. Apply properly the use of recursive backtracking and branch-and-bound algorithms to search problems
4. Be able to recognize a basic set of NP-complete problems
5. Be able to apply algorithmic methods in other fields.

4. Is this a General Education Course?

No.

5. Course Content in Outline Form.

Topics:

1. Amortized Analysis
2. Network Flows
3. Linear Programming
4. NP - Completeness
5. Approximation Algorithms
6. Genetic Algorithms and Bioinformatics
7. Applications

6. References.

Title	Author	Publisher	Year	ISBN
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1. Introduction to Algorithms Cormen, Leiserson, Rivest & Stein McGraw-Hill 2002
0070131511

7. Faculty Qualified to Teach This Course.

Qualified Faculty: Computer Science Faculty

8. Frequency.

Projected semesters to be offered: Fall, Spring, Summer

9. New Resources Required.

a. New Equipment needs:

Use of existing computer lab

b. New Library needs: none

c. New Space/Facilities needs: none

10. Consultation.

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

11. Program Modification.

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

12. Proposer of Course.

Proposer: P. Smith, AJ.Bieszczad Date: 10/28/2003

Proposer of Course

Date