

CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

NEW COURSE PROPOSAL

PROGRAM AREA _____

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.]*

MATH 448. SCIENTIFIC COMPUTING (3)

Three hours of lecture in the lab per week.

Prerequisites: MATH 350 or COMP 151 and Math 151.

Topics include: techniques of applied mathematics, solution of equations, finite differences, and wavelets.

GenEd: B3, B4 and Interdisciplinary

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]*

This course is required for Computer Science students according to accreditation guidelines and is an elective for Mathematics majors who are specializing in Computer Science. Can be used as a general education course.

Students will be able to:

- discuss analysis and development of numerical algorithms
- apply scientific computing methods to the solution of differential equations, nonlinear equations, as well as interpolation,
- apply numerical differentiation and methods for evaluating definite integrals
- discuss the errors involving numerical methods
- implement numerical methods on computers.

4. Is this a General Education Course **YES**

If Yes, indicate GE category:

A (English Language, Communication, Critical Thinking)	
B (Mathematics & Sciences)	B3 , B4
C (Fine Arts, Literature, Languages & Cultures)	
D (Social Perspectives)	
E (Human Psychological and Physiological Perspectives)	
INTERDISCIPLINARY	X

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

Finite Difference Methods and Algorithms
Finite Element Methods and Algorithms
Large Systems of Linear Equations and Algorithms
Non-linear equations and Algorithms
Ordinary Differential Equations and Algorithms
Trigonometric and Fourier transforms
Monte Carlo methods

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

Gerald / Wheatley, *Applied Numerical Analysis*, sixth edition, Addison Wesley 1998

7. List Faculty Qualified to Teach This Course.

All Mathematics faculty

8. Frequency.

a. Projected semesters to be offered: Fall Spring Summer

9. New Resources Required.

- a. Computer (data processing), audio visual, broadcasting needs, other equipment
Access to computer labs required
- 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.

Ivona Grzegorzcyk

1/8/03

Proposer of Course

Date