

California State University Channel Islands
New Course Proposal

Program Areas Math and Computer Science

1. Catalog Description of the Course.

Math 511 FUNCTIONAL ANALYSIS (3)

Three hours of lecture per week

Prerequisite: Admission to the Computer Science or Mathematics Graduate Program

Topics include: metric spaces, function spaces, normed vector spaces, linear operators. Banach spaces, Hilbert space,. Spectral theory, and fundamental theorems in functional analysis. Applications in various fields including computer science, bioinformatics, statistical analysis.

2. Mode of Instruction.

| | <u>Units</u> | <u>Hours per Unit</u> | <u>Benchmark Enrollment</u> |
|------------|--------------|-----------------------|-----------------------------|
| Lecture 3 | 1 | 30 | |
| Seminar * | * | * | |
| Laboratory | * | * | * |
| Activity * | * | * | |

3. Justification and Learning Objectives.

Justification: This course is an elective for students in MS in Applied Mathematics and MS in Computer Science.

Learning Objectives:

Through this course, students will be able to

- Understand the theoretical basis of the function spaces and normed spaces
- Work with metric and function spaces, linear operators, and spectral theory
- Analyze properties of various function spaces
- Apply functional analysis to various fields
- Express concepts and techniques of in oral and written form by constructing various proofs.

4. Is this a General Education Course?

No.

5. Course Content in Outline Form.

Topics:

- a) metric spaces,
- b) function spaces,
- c) normed vector spaces,
- d) linear operators,
- e) Banach spaces,
- f) Hilbert spaces.
- g) Spectral theory,
- h) Fundamental theorems
- i) Applications in computer science, bioinformatics, statistical analysis.

6. References.

Texts:

- a) Functional Analysis, W. Rudin, McGraw-Hill (1997)
- b) History of Functional Analysis, Jean Dieudonné, North-Holland (1981)

Proposer of Course

Date

Approvals

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|---------------------|------|
| Program Coordinator | Date |
|---------------------|------|

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| GE Committee Chair (If applicable) | Date |
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| Curriculum Committee Chair | Date |
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| Dean | Date |
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Effective Semester: _____

California State University Channel Islands

Course prefix, number, title, and units: _____ MATH 511

2. Program Areas: _____ MATH

Recommend Approval

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| Art | | | | |
| Business & Economics | | | | |
| Education | | | | |
| ESRM | | | | |
| Humanities | | | | |
| Liberal Studies | | | | |
| Mathematics & CS | | | | |
| Sciences | | | | |
| | | | | |
| Library* | | | | |
| Information Technology* | | | | |
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* If needed