

# CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

## COURSE MODIFICATION PROPOSAL

**Courses must be submitted by October 15, 2010, and finalized by the end of the fall semester to make the next catalog (2011-12) production**

DATE (CHANGE DATE EACH TIME REVISED): APRIL 26, 2011; REV 9.8.11; REV 9.12.11; REV 10.3.11

PROGRAM AREA(S): COMP, MATH, PHYS

**Directions:** All of sections of this form must be completed for course modifications. Use **YELLOWED** areas to enter data. All documents are stand alone sources of course information.

### 1. Indicate Changes and Rationale for the Change. [Mark all change areas that apply and follow with justification. Be as brief as possible but, use as much space as necessary.]

- |                                                                 |                                                         |
|-----------------------------------------------------------------|---------------------------------------------------------|
| <input type="checkbox"/> Course title                           | <input type="checkbox"/> Course Content                 |
| <input checked="" type="checkbox"/> Prefix/suffix               | <input type="checkbox"/> Course Learning Outcomes       |
| <input type="checkbox"/> Course number                          | <input type="checkbox"/> References                     |
| <input type="checkbox"/> Units                                  | <input type="checkbox"/> GE                             |
| <input type="checkbox"/> Staffing formula and enrollment limits | <input type="checkbox"/> Other <input type="checkbox"/> |
| <input type="checkbox"/> Prerequisites/Corequisites             | <input type="checkbox"/> Reactivate Course              |
| <input checked="" type="checkbox"/> Catalog description         |                                                         |
| <input type="checkbox"/> Mode of Instruction                    |                                                         |

**Rationale:** PHYS 546 has been an elective course for the MS in Mathematics and the MS in Computer Science courses since its inception. It uses and teaches significant mathematical and computer science tools to explore topics in pattern recognition. Cross-listing this course better reflects the nature of the course.

### 2. Course Information.

[Follow accepted catalog format.] (Add additional prefixes if cross-listed)

#### OLD

Prefix PHYS Course# 546

Title Pattern Recognition; Units (3)

3 hours lecture per week

☐ hours blank per week

☐ Prerequisites: Admission to the Computer Science or Mathematics Graduate Program

☐ Consent of Instructor Required for Enrollment

Corequisites: ☐

**Catalog Description** (Do not use any symbols):

New and emerging applications of pattern recognition - such as data mining, web searching, multimedia data retrieval, face recognition, and cursive handwriting recognition - require robust and efficient pattern recognition techniques. Statistical decision making and estimation are regarded as fundamental to the study of pattern recognition. The course addresses the issue of analyzing pattern content by feature extraction and classification. The principles and concepts underpinning pattern recognition, and the evolution, utility and limitations of various techniques (including neural networks) will be studied. Programming exercises will be used to implement examples and applications of pattern recognition processes, and their performance on a variety of diverse examples will be studied.

General Education Categories: ☐

Grading Scheme (Select one below):

☒ A - F

☐ Credit/No Credit

☐ Optional (Student's Choice)

Repeatable for up to ☐ units

#### NEW

Prefix COMP/MATH/PHYS Course# 546

Title Pattern Recognition; Units (3)

3 hours lecture per week

☐ hours blank per week

☐ Prerequisites: Admission to the Computer Science or Mathematics Graduate Program

☐ Consent of Instructor Required for Enrollment

Corequisites: ☐

**Catalog Description** (Do not use any symbols):

New and emerging applications of pattern recognition (PR) – such as data mining, web searching, multimedia data retrieval, face recognition, and cursive handwriting recognition - require robust and efficient techniques. Statistical decision making and estimation are fundamental to the study of PR. Pattern content is analyzed using feature extraction and classification. The principles and concepts underpinning PR, and the evolution, utility and limitations of various techniques (including neural networks) will be studied. Programming exercises will be used to implement examples and applications of PR processes, and their performance on a variety of diverse examples will be studied.

General Education Categories: ☐

Grading Scheme (Select one below):

☒ A - F

☐ Credit/No Credit

☐ Optional (Student's Choice)

Repeatable for up to ☐ units

Total Completions 1  
 Multiple Enrollment in Same Semester Y/N N  
 Course Level:  
☐ Undergraduate  
☐ Post-Baccalaureate  
☒ Graduate

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 Multiple Enrollment in Same Semester Y/N N  
 Course Level:  
☐ Undergraduate  
☐ Post-Baccalaureate  
☒ Graduate

3. Mode of Instruction (Hours per Unit are defaulted)

Hegis Code(s) \_\_\_\_\_  
 (Provided by the Dean)

Existing

Proposed

|               | Units    | Hours Per Unit | Benchmark Enrollment | Graded |               | Units    | Hours Per Unit | Benchmark Enrollment | Graded   | CS No. (filled out by Dean) |
|---------------|----------|----------------|----------------------|--------|---------------|----------|----------------|----------------------|----------|-----------------------------|
| Lecture       | <u>3</u> | <u>1</u>       | <u>24</u>            | x      | Lecture       | <u>3</u> | <u>1</u>       | <u>24</u>            | <u>x</u> |                             |
| Seminar       |          | <u>1</u>       |                      |        | Seminar       |          | <u>1</u>       |                      |          |                             |
| Lab           |          | <u>3</u>       |                      |        | Lab           |          | <u>3</u>       |                      |          |                             |
| Activity      |          | <u>2</u>       |                      |        | Activity      |          | <u>2</u>       |                      |          |                             |
| Field Studies |          |                |                      |        | Field Studies |          |                |                      |          |                             |
| Indep Study   |          |                |                      |        | Indep Study   |          |                |                      |          |                             |
| Other blank   |          |                |                      |        | Other blank   |          |                |                      |          |                             |

4. Course Attributes:

☐ General Education Categories: All courses with GE category notations (including deletions) must be submitted to the GE website: <http://summit.csuci.edu/geapproval>. Upon completion, the GE Committee will forward your documents to the Curriculum Committee for further processing.

**A (English Language, Communication, Critical Thinking)**

- ☐ A-1 Oral Communication
- ☐ A-2 English Writing
- ☐ A-3 Critical Thinking

**B (Mathematics, Sciences & Technology)**

- ☐ B-1 Physical Sciences
- ☐ B-2 Life Sciences – Biology
- ☐ B-3 Mathematics – Mathematics and Applications
- ☐ B-4 Computers and Information Technology

**C (Fine Arts, Literature, Languages & Cultures)**

- ☐ C-1 Art
- ☐ C-2 Literature Courses
- ☐ C-3a Language
- ☐ C-3b Multicultural

**D (Social Perspectives)**

**E (Human Psychological and Physiological Perspectives)**

**UDIGE/INTD Interdisciplinary**

**Meets University Writing Requirement**

**Meets University Language Requirement**

☐ American Institutions, Title V Section 40404: ☐ Government ☐ US Constitution ☐ US History

Refer to website, Exec Order 405, for more information: <http://senate.csuci.edu/comm/curriculum/resources.htm>

☐ Service Learning Course (Approval from the Center for Community Engagement must be received before you can request this course attribute).

5. Justification and Requirements for the Course. [Make a brief statement to justify the need for the course]

**OLD**

The course is a core course for MS in Mathematics and the MS in Computer Science. Pattern

**NEW**

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recognition is crucial to a number of new and emerging applications - such as data mining, web searching, multimedia data retrieval, face recognition, and cursive handwriting recognition. The course includes statistical decision making and estimation.

☐ Requirement for the Major/Minor  
☒ Elective for the Major/Minor  
☐ Free Elective

recognition is crucial to a number of new and emerging applications - such as data mining, web searching, multimedia data retrieval, face recognition, and cursive handwriting recognition. The course includes statistical decision making and estimation.

☐ Requirement for the Major/Minor  
☒ Elective for the Major/Minor  
☐ Free Elective

**Submit Program Modification if this course changes your program.**

**6. Student Learning Outcomes.** (List in numerical order. You may wish to visit resource information at the following website: <http://senate.csuci.edu/comm/curriculum/resources.htm>)

Upon completion of the course, the student will be able to:

**OLD**

1. Discuss pattern recognition problems and techniques
2. analyze analyzing pattern content by feature extraction and classification
3. Demonstrate knowledge of principles and concepts underpinning pattern recognition
4. write original computer code to implement pattern recognition algorithms
5. use statistical analysis in pattern recognition
6. analyze scientific visualization processes

Upon completion of the course, the student will be able to:

**NEW**

1. Discuss pattern recognition problems and techniques
2. Analyze analyzing pattern content by feature extraction and classification
3. Demonstrate knowledge of principles and concepts underpinning pattern recognition
4. Write original computer code to implement pattern recognition algorithms
5. Use statistical analysis in pattern recognition
6. Analyze scientific visualization processes

**7. Course Content in Outline Form.** (Be as brief as possible, but use as much space as necessary)

**OLD**

- a) analyzing pattern content by feature extraction and classification
- b) principles and concepts underpinning pattern recognition, and the evolution, utility
- c) limitations of various techniques (including neural networks)
- d) programming to implement examples and applications of pattern recognition processes
- e) performance analysis

**NEW**

- a) analyzing pattern content by feature extraction and classification
- b) principles and concepts underpinning pattern recognition, and the evolution, utility
- c) limitations of various techniques (including neural networks)
- d) programming to implement examples and applications of pattern recognition processes
- e) performance analysis

Does this course content overlap with a course offered in your academic program? Yes ☐ No ☐  
 If YES, what course(s) and provide a justification of the overlap.

Does this course content overlap a course offered in another academic area? Yes ☐ No ☐  
 If YES, what course(s) and provide a justification of the overlap.

Overlapping courses require Chairs' signatures.

**8. Cross-listed Courses (Please note each prefix in item No. 1)**

- A. List cross-listed courses (Signature of Academic Chair(s) of the other academic area(s) is required).
- B. List each cross-listed prefix for the course: COMP, MATH, PHYS
- C. Program responsible for staffing: MATH/PHYS

**9. References.** [Provide 3-5 references]

**OLD**

- Pattern Classification, Richard O. Duda and Peter E. Hart and David G. Stork., Wiley Interscience, 2000, 0471056693

**NEW**

- Pattern Classification, Richard O. Duda and Peter E. Hart and David G. Stork., Wiley Interscience, 2000, 0471056693
- Digital Image Processing for Medical Applications, G. Dougherty, Cambridge University Press, 2010, ISBN: 9780521860857

**10. Tenure Track Faculty qualified to teach this course.**

Physics and Mathematics Faculty, particularly Dr. Geoff Dougherty and Dr. Kathryn Leonard

**11. Requested Effective Date or First Semester offered: S'12**

**12. New Resource Requested: Yes ☐ No ☒**

If YES, list the resources needed.

**A. Computer Needs (data processing, audio visual, broadcasting, other equipment, etc.)**

☐

**B. Library Needs (streaming media, video hosting, databases, exhibit space, etc.)**

☐

**C. Facility/Space/Transportation Needs:**

☐

**D. Lab Fee Requested: Yes ☐ No ☐ ( Refer to the Dean's Office for additional processing)**

**E. Other. ☐**

**13. Will this course modification alter any degree, credential, certificate, or minor in your program? Yes ☐ No ☒**

If, YES attach a program update or program modification form for all programs affected.

Priority deadline for New Minors and Programs: **October 4, 2010** of preceding year.

Priority deadline for Course Proposals and Modifications: **October 15, 2010.**

Last day to submit forms to be considered during the current academic year: **April 15<sup>th</sup>.**

Cindy Wyels (Director, MS in Mathematics)

**4/21/11**

Proposer(s) of Course Modification

Date

Type in name. Signatures will be collected after Curriculum approval.

## Approval Sheet

**Course:** PHYS 510 (cross-list as COMP/ MATH/ PHYS 510)

If your course has a General Education Component or involves Center affiliation, the Center will also sign off during the approval process.

Multiple Chair fields are available for cross-listed courses.

|                                                           |  |      |
|-----------------------------------------------------------|--|------|
| Program Chair                                             |  |      |
| Signature                                                 |  | Date |
| Program Chair                                             |  |      |
| Signature                                                 |  | Date |
| Program Chair                                             |  |      |
| Signature                                                 |  | Date |
| General Education Chair                                   |  |      |
| Signature                                                 |  | Date |
| Center for Intl Affairs Director                          |  |      |
| Signature                                                 |  | Date |
| Center for Integrative Studies Director                   |  |      |
| Signature                                                 |  | Date |
| Center for Multicultural Engagement Director              |  |      |
| Signature                                                 |  | Date |
| Center for Civic Engagement and Service Learning Director |  |      |
| Signature                                                 |  | Date |
| Curriculum Chair                                          |  |      |
| Signature                                                 |  | Date |
| Dean of Faculty                                           |  |      |
| Signature                                                 |  | Date |