

California State University Channel Islands
New Course Proposal
Program Areas: Math and Computer Science

1. Catalog Description of the Course.

COMP 572 NEURAL NETWORKS (3)

Three hours of lecture in the lab per week.

Prerequisite: Admission to the Computer Science or Mathematics Graduate Program

Covers the basic ideas of distributed computation with many simple processing units, similar to the neurons of the brain. Topics include: Hopfield style networks applied to optimization problems, and the backpropagation method applied to pattern classification problems. Additional topics include associate memory, binary vs analog networks, simulated annealing.

2. Mode of Instruction.

	<u>Units</u>	<u>Hours per Unit</u>	<u>Benchmark Enrollment</u>
Lecture 3	1	25	
Seminar 0	0	0	
Laboratory	0	0	0
Activity 0	0	0	

3. Justification and Learning Objectives.

Justification: An elective course in the MSCS program.

Learning Objectives:

1. Be able to define the main components of a neuron.
2. Be able to design, implement, and test basic programs that model the interaction of many neurons.
3. Be able to design, implement and test computer programs that simulate quadratic optimization problems.
4. Be able to implement Hopfield style networks.
5. Be able to implement the backpropagation method and apply it to a simple classification problem.
6. Be able able to distinguish content addressable memory models form other memory models.
7. Be able to explain the purpose of the Energy function in Hopfield networks.
8. Be able to write the equations of dynamics for a Hopfield network.

4. Is this a General Education Course?

No.

5. Course Content in Outline Form.

Topics:

1. Neurons
2. Excitation and Inhibition
3. Anatomy of the Human Brain
4. Mathematical Model of a Neuron
5. Neuron Dynamics
6. Distributed Processing
7. Hopfield Networks
8. Backpropagation Networks
9. Content Addressable Memory

6. References.

Neural Networks: A Comprehensive Foundation, Simon Haykin

Prentice Hall, 1998, 0132733501

7. Faculty Qualified to Teach This Course.

Qualified Faculty: Bieszczad, Wolfe

8. Frequency.

Projected semesters to be offered: Spring

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: W. Wolfe, AJ Bieszczad Date: 10/28/2003

Approvals

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
New Course Proposal Consultation Sheet

Course prefix, number, title, and units: _____COMP 572

2. Program Areas: _____CS and Mathematics

Recommend Approval

Program Area/Unit	Program/Unit Coordinator	YES	NO (attach objections)	Date
Art				
Business & Economics				
Education				
ESRM				
Humanities				
Liberal Studies				
Mathematics & CS				
Sciences				
Library*				
Information Technology*				

* If needed