CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

NEW COURSE PROPOSAL

PROGRAM AREAS _____BIOLOGICAL AND PHYSICAL SCIENCES, MATH AND COMPUTER SCIENCE

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.]*

COMP 581. MATHEMATICAL METHODS IN ARTIFICIAL INTELLIGENCE (3)
Three hours of lecture in the lab per week.
Prerequisite: Admission to the Computer Science or Mathematics Graduate Program

This course presents several branches of mathematics that provide computational basis for Artificial Intelligence. The course covers Trees and Search, The Concepts of Predicate Logic, The Theory of Resolution, Nonmonotonic Reasoning, Probability Theory, Bayesian Networks, Fuzziness and Belief Theory, Classifier Systems, Math for Neural Networks, Elements of Statistics, Decision Trees and Optimization.

MATH 581. Mathematical Methods in Artificial Intelligence (3)
Three hours of lecture in the lab per week.
Prerequisite: Admission to the Computer Science or Mathematics Graduate Program

This course presents several branches of mathematics that provide computational basis for Artificial Intelligence. The course covers Trees and Search, The Concepts of Predicate Logic, The Theory of Resolution, Nonmonotonic Reasoning, Probability Theory, Bayesian Networks, Fuzziness and Belief Theory, Classifier Systems, Math for Neural Networks, Elements of Statistics, Decision Trees and Optimization.

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 an elective for graduate students in MS in Mathematics and MS in Computer Science programs.
Artificial Intelligence is a conglomerate that combines many techniques and methodologies. Many of them have roots in various areas of mathematics. A software engineer needs to understand the underlying theories to properly analyze the techniques applied and the correctness of the solution.

Through this course, students will be able to

- Apply and Understand AI Mathematical methods.
- Design AI solutions.
- Employ mathematical means in evaluating solutions.
- Explore Mathematics for improvements to AI methods.

4. **Is this a General Education Course**   YES   **NO**
   If Yes, indicate GE category:

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

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

   1. Trees and Search.
   2. The Concepts of Predicate Logic.
   3. The Theory of Resolution.
   4. Nonmonotonic Reasoning.
   5. Probability Theory.
   6. Bayesian Networks.
   7. Fuzziness and Belief Theory.
   8. Neural Networks and Minimization.
   9. Probability, Statistics, and Information.
   10. Decision Trees, Neural Nets, and Search

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

   1. Bender, Mathematical Methods in Artificial Intelligence, Wiley-IEEE Computer Society, 1996, ISBN 0818672005

7. **List Faculty Qualified to Teach This Course.**

   All Computer Science faculty.

8. **Frequency.**
   a. Projected semesters to be offered: Fall ___X__   Spring _____   Summer ____

9. **New Resources Required.**

   a. Computer (data processing), audio visual, broadcasting needs, other equipment

      Use of existing computer lab.

   b. Library needs

   c. Facility/space needs

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.

__P.Smith, AJ Bieszczad_____10/31/2003_____
Proposer of Course   Date