CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

NEW COURSE PROPOSAL

DATE: JANUARY 31, 2007
PROGRAM AREA MATH

1. Catalog Description of the Course. *[Follow accepted catalog format.]*

Prefix MATH Course# 428 Title PHILOSOPHY OF MATHEMATICS Units (3)
Three hours lecture per week
☐ Prerequisites
☐ Corequisites
Description Discuss infinity, paradoxes, Goedel's incompleteness theorem, whether mathematics is discovered or invented, why mathematical knowledge requires proof, whether mathematics is objective truth or social convention, and what kinds of entities mathematical objects are and how we can know about them.

Graded
☐ Gen Ed ☐ CR/NC ☐ Repeatable for up to units
Categories
☐ Lab Fee Required ☒ A - Z Total Completions Allowed

2. Mode of Instruction.

	Units	Hours per Unit	Benchmark Enrollment	Graded Component	CS # (filled in by Dean)
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 Mathematics majors.

Upon completion, the student will be able to:
- Demonstrate an understanding of various concepts of basic mathematical objects, such as numbers and infinity
- Demonstrate familiarity with various paradoxes and their possible resolutions
- Demonstrate familiarity with axiomatizations of arithmetic set theory, and, formal languages and systems
- Explain the philosophical views of Russell, Cantor, and Goedel
- Critically assess how some philosophers have attempted to address important problems in mathematics
- Discuss the main philosophies of mathematics, such as Platonism, Formalism, Structuralism, and Humanism
- Develop and articulate their own views of the important problems in the philosophy of mathematics
- Understand and explore connections between mathematics and philosophy
- Express ideas in the philosophy of mathematics in oral and written form

This course does not satisfy the University Writing or Language Requirements.

4. Is this a General Education Course YES ☐ NO ☒
If Yes, indicate GE category and attach GE Criteria Form:

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) ☐
UD Interdisciplinary ☐

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

- Ontological and epistemological questions in the philosophy of mathematics
- Attempts at forming a foundation for mathematics (Frege, Russel, Peano, Zermelo-Fraenkel)
- The paradoxes of Russel and Cantor that created difficulties in forming a foundation for mathematics
- Goedel's Incompleteness Theorem and its philosophical ramifications
- Attempts of mathematicians and philosophers, both ancient and modern, to address some of the important problems in the philosophy of mathematics
- Differing philosophies of mathematics, such as Platonism, Fictionalism, Formalism, Structuralism, Humanism, Intuitionism, and Constructivism
- Further connections between mathematics and philosophy (such as the conflict between mathematical realism and British Empiricism)

Does this course overlap a course offered in your academic program? YES ☐ NO ☒
If YES, what course(s) and provide a justification of the overlap?

Does this course overlap a course offered in another academic area? YES ☐ NO ☒
If YES, what course(s) and provide a justification of the overlap?
Signature of Academic Chair of the other academic area is required on the consultation sheet below.

6. Cross-listed Courses (Please fill out separate form for each PREFIX)
List Cross-listed Courses

Signature of Academic Chair(s) of the other academic area(s) is required on the consultation sheet below

Department responsible for staffing: Mathematics

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

Thinking about Mathematics, by Stewart Shapiro, Oxford University Press, 2000.
The Philosophy of Mathematics, W.D. Hart (Editor), Oxford University Press, 1996.
Goedel's Theorem: An Incomplete Guide to its Use and Abuse, by Torkel Franzen, A.K.Peters Ltd., 2005.
Goedel, Escher, Bach: An Eternal Golden Braid, by Douglas Hofstadter, Basic Books, 1999.
What is Mathematics, Really? by Reuben Hersch, Oxford University Press, 1997.

8. List Faculty Qualified to Teach This Course.

Jesse Elliott, other Mathematics or Philosophy Faculty

9. Frequency.
a. Projected semesters to be offered: Fall ☒ Spring ☒ Summer ☐

10. New Resources Required. YES ☐ NO ☒
If YES, list the resources needed and obtain signatures from the appropriate programs/units on the consultation sheet below.

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

b. Library needs

c. Facility/space needs

11. Will this new course alter any degree, credential, certificate, or minor in your program? YES ☒ NO ☐
If, YES attach a program modification form for all programs affected.

Jesse Elliott	10/11/2006
Proposer of Course	Date

Approvals

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Program Chair Date

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Curriculum Committee Chair Date

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Dean Date