

CALIFORNIA STATE UNIVERSITY CHANNEL ISLANDS

COURSE MODIFICATION PROPOSAL

Courses must be submitted by November 5, 2007, to make the next catalog production

DATE (CHANGE DATE IF REVISED): 11.12.07 REV 12.21.07

PROGRAM AREA(S): MATH

Directions: All of sections of this form must be completed for course modifications.

1. Catalog Description of the Course.

[Follow accepted catalog format.] (If Cross-listed please submit prefixes for each discipline being modified)

OLD

Prefix MATH Course# 428 Title Philosophy of Mathematics
Units (3)
3 hours lecture per week
hours blank per week

- Prerequisites:
 Corequisites:

Description (Do not use any symbols): 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 types of entities mathematical objects.

- Gen Ed
Categories A3, B3, UDIGE
 Lab Fee Required
- Graded
 CR/NC Repeatable for up to _____ units
 A - F Multiple
Optional Enrollment in (Student's same semester choice)

- American Institutions, Title V Section 40404: Government US Constitution US History (Refer to EO 405, for more information at: <http://senate.csuci.edu/comm/curriculum/resources.htm>)
 Service Learning Course

NEW

Prefix MATH Course# 438 Title Philosophy of Mathematics
Units (3)
3 hours lecture per week
hours blank per week

- Prerequisites:
 Corequisites:

Description: Topics include infinity, paradoxes, Goedel's incompleteness theorems, whether mathematics is discovered or invented, why mathematical knowledge requires proof, whether mathematics is objective truth or social convention, and the identification of types of mathematical objects.

- Gen Ed
Categories A3, B3, UD
 Lab Fee Required
- Graded
 CR/NC Repeatable for up to _____ units
 A - F Multiple
Optional Enrollment in same (Student's semester choice)

2. Mode of instruction (Hours per Unit are defaulted for you)

Hegis Code(s) _____
(Provided by the Dean)

Existing

Proposed

	Units	Hours Per Unit	Benchmark Enrollment	Graded		Units	Hours Per Unit	Benchmark Enrollment	Graded	CS# Units (filled out by Dean)
Lecture	_____	<u>1</u>	<u>25</u>	<input checked="" type="checkbox"/>	Lecture	<u>3</u>	<u>1</u>	<u>25</u>	<input checked="" type="checkbox"/>	_____
Seminar	_____	<u>1</u>	_____	<input type="checkbox"/>	Seminar	_____	<u>1</u>	_____	<input type="checkbox"/>	_____
Lab	_____	<u>3</u>	_____	<input type="checkbox"/>	Lab	_____	<u>3</u>	_____	<input type="checkbox"/>	_____
Activity	_____	<u>2</u>	_____	<input type="checkbox"/>	Activity	_____	<u>2</u>	_____	<input type="checkbox"/>	_____
Field Studies	_____	_____	_____	<input type="checkbox"/>	Field Studies	_____	_____	_____	<input type="checkbox"/>	_____
Indep Study	_____	_____	_____	<input type="checkbox"/>	Indep Study	_____	_____	_____	<input type="checkbox"/>	_____
Other blank	_____	_____	_____	<input type="checkbox"/>	Other blank	_____	_____	_____	<input type="checkbox"/>	_____

3. Course Content in Outline Form if Being Changed. [Be as brief as possible, but use as much space as necessary]

OLD

NEW

4. 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]*

OLD

NEW

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

OLD

NEW

6. **Indicate Changes and Justification for Each.** [Check all that apply and follow with justification. Be as brief as possible but, use as much space as necessary.]

- Course title
- Prefix/suffix
- Course number
- Units
- Staffing formula and enrollment limits
- Prerequisites/corequisites
- Catalog description
- Course content
- References
- GE
- Other

Justification: The course was submitted last year, and was intended as a GE course at that time. However, due to time constraints, the GE Committee did not have time to decide on the course before it was submitted to Curriculum. Of the three GE Categories proposed, B3 and UD are the most critical for this course. I also propose to change the wording of the course description. Last year the description was changed slightly by CC and the rewording was a little awkward.

7. **General Education Categories:** All courses with GE categories notations (including deletions) must be processed at 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)

UD Interdisciplinary

8. **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

9. Will this course modification alter any degree, credential, certificate, or minor in your program? YES NO

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

10. Effective Date (Semester and Year – all modifications submitted prior to November 5th will be effective in the Fall 2008 catalog): Spring 2008

Jesse Elliott

11/7/07

Proposer of Course Modification

Date

Request for MATH 428: Philosophy of Mathematics to be added to GE Category A3: Critical Thinking.

Committee Response:

Approved by committee on 11-07-2007

Criteria and Justifications Submitted:

- *Prepare the student to use reasoning of both inductive and deductive types*
Students will learn about inductive and deductive reasoning and will be asked to construct philosophical arguments for their viewpoints and/or theses. Philosophical arguments will be studied that include inductive and deductive reasoning. Mathematical and logical reasoning will also be discussed.
- *Focus on the analysis of written, oral, visual and/or symbolic communication*
Students will write papers and discuss articles and each others views in a group setting. They will have weekly reading and writing assignments and will have to analyze and assess the written works of various philosophers and mathematicians. Students will also discuss symbolic logic and formal systems, which are forms of symbolic communication.
- *Prepare the student to assess common fallacies in reasoning*
Students will examine logical principles such as modus ponens and reductio ad absurdum from both mathematical and philosophical perspectives. Students will also examine and attempt to resolve several famous paradoxes in the philosophy of mathematics, such as the paradoxes of infinity (such as Zeno's and Cantor's paradoxes) and Russell's paradox. Various uses and misuses of Godel's incompleteness theorems will be considered.
- *Address modes of argument, rhetorical perspectives, and the relationship of language to logic*
Students will analyze the limitations of logic and attempt to understand the philosophical ramifications of the Incompleteness of Formal Systems (Godel's Incompleteness Theorem). Students will use deductive reasoning and mathematical logic, coupled with inductive reasoning, to construct philosophical arguments. They will learn how to analyze and construct philosophical arguments about the nature of mathematical knowledge, thereby learning about modes of argument, rhetorical perspectives (both philosophical and mathematical), and the relationship of language to logic, mathematics, and philosophy.

Request for MATH 428: Philosophy of Mathematics to be added to GE Category B3: Mathematics -- Mathematics and Applications.

Committee Response:

Approved by committee on 11-07-2007

Criteria and Justifications Submitted:

- *Promote the understanding and appreciation of the methodologies of math or science as investigative tools and the limitations of mathematical or scientific endeavors*
The course studies different conceptions of number and infinity, and what it means to say that mathematical objects like numbers and infinity "exist". The course also studies Godel's incompleteness theorems, which many interpret as saying that there are inherent limitations to mathematics, specifically, that it is impossible to form a complete and rigorous foundation for all of mathematics. The course also asks whether mathematics is indispensable to science.
- *Present mathematical or scientific knowledge in a historical perspective and the influences of math and science on the development of world civilizations, both past and present*
Students will examine at the mathematical and/or philosophical ideas of Pythagoras, Plato and Socrates, Kant, Frege, Russell, Cantor, Godel, and various contemporaries, such as Penelope Maddy, from both philosophical and historical perspectives. Mathematics itself will be considered from historical and socio-cultural perspectives. For example, we examine Mathematical Humanism, which is the philosophy that mathematics makes sense only from a historical and socio-cultural perspective.
- *Apply inductive and deductive reasoning processes and explore fallacies and misconceptions in the mathematical or scientific areas*
Students will examine and attempt to resolve different paradoxes, such as Russell's paradox and Cantor's paradoxes on infinity. Various uses and misuses of logic, and of Godel's incompleteness theorems, will be considered. Students will apply inductive and deductive reasoning when constructing theses and arguing for them in their writing assignments. They will also learn the process of dialectical reasoning.
- *Promote an understanding of mathematical ideas and problem solving skills*
The mathematical concepts of number, logic and formal systems, set theory, and infinity will be studied. Godel's incompleteness theorems will also be studied. Students will also be given basic mathematical problems on these topics.

Request for MATH 428: Philosophy of Mathematics to be added to GE Category UDIGE: Upper Division Interdisciplinary GE.

Committee Response:

Approved by committee on 11-07-2007

Criteria and Justifications Submitted:

- *Emphasize interdisciplinarity by integrating content, ideas, and approaches from two or more disciplines*

The content, ideas, and approaches of both mathematics and philosophy will be fully integrated. The course is not merely multi-disciplinary because the ideas of mathematics and philosophy will not be presented in a serial fashion. Rather, the ideas and methods of both mathematics and philosophy will be fully integrated throughout the course. Neither is the course merely cross-disciplinary, as neither the ideas of philosophy nor of mathematics will dominate the course. Nor is the course adisciplinary, since the disciplines of both mathematics and philosophy will be presented in a substantive way. The course works toward the conscious integration of insights from both mathematics and philosophy and is therefore interdisciplinary in the true sense of the word. For example, the courses uses logic, formal systems, and Godel's incompleteness theorems, which are pieces of mathematics, to understand what numbers are and what the limitations of logic are when creating a rigorous foundation for mathematics, which are philosophical questions. Without including a significant amount of both mathematics and philosophy, the course objectives could not be met. Finally, the perspectives of other disciplines, such as the sciences (e.g. physics and biology), history and cultural studies, and the arts, will also be an integral part of the course.

- *Include substantive written work consisting of in-class writing as well as outside class writing of revised prose. Examples of appropriate written work include: short papers, long papers, term papers, lab reports, documentation, disciplinary-based letters and memos, and essays.*

Students will have the following: weekly short writing assignments (both in class and out of class), many of which will be responses to assigned reading; a written dialogue in dialectic or Socratic style; two short papers and a long paper; a weekly journal based on class discussions, kept both in class and outside of class. The course will have substantial writing assignments.

Approval Sheet

Program/Course: Math 428

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 Learning and Engagement Director		
-----------------------------------------------------------	--	--

Signature

Date

Center for Civic Engagement and Service Learning Director		
-----------------------------------------------------------	--	--

Signature

Date

Curriculum Chair		
------------------	--	--

Signature

Date

Dean of Faculty		
-----------------	--	--

Signature

Date