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CURRICULUM PROPOSAL FORM 2000-2001

NON-GENERAL EDUCATION PROCESS A

*DEADLINES: Deadline dates for 2000/2001 submissions: Regular proposals: October 20, 2000 to be implemented in Fall 2001; Short-Term proposals: December 8, 2000 to be implemented in Fall, 2001; Regular proposals February 16, 2001 to be implemented in Spring, 2002; March 23, 2000 for short-term courses to be implemented in Spring 2002.

ROWAN UNIVERSITY SENATE

PROPOSAL TITLE: SELECTED TOPICS IN MATHEMATICS:

SPONSOR(S): DRS. ERIC MILOU & JANET CALDWELL

DEPARTMENT: MATHEMATICS

COLLEGE: LAS

IF LAS CHECK ONE: ___ History/Humanities ___X Math/Sciences ___ Social/Behavioral Sciences

Check one: ___ Undergraduate ___X Graduate

17d 523

THE ATTACHED NON-GEN-ED PROPOSAL IS BEST DESCRIBED BY THE ITEM(S) CHECKED.

___X New non-gen-ed course

___ Short-term non-gen-ed course

___ Minor curricular changes (fewer than three) to:

___ existing non-gen-ed course

___ non-gen-ed degree requirements

___ major

___ minor, specialization, concentration, track, certificate program

DEPARTMENT

(Signature indicates approval)

V. Strohman / 10/4/00

Dept. Curriculum Chair / Date

Ronald J. Gachon / 10/4/00

Dept. Chairperson / Date

ACADEMIC DEAN

Approved

Not Approved ___

Comments:

Dean's Signature/Date Guy Thompson 10/11/00

COLLEGE CURRICULUM COMMITTEE

Date of open hearing (if necessary) 2/20/01 Approved Not Approved

Comments:

Signature of College Chair/Date: [Signature] 2/20/01

UNIVERSITY CURRICULUM COMMITTEE

Date Received/Processed 5/29/01

Comments:

Curriculum Chair Signature [Signature] Date Announced At Senate 6/10/01

EXECUTIVE VICE PRESIDENT/PROVOST

Approved Not Approved If no, reasons are as follows:

Student Credit Hours _____ Faculty Load Hours _____ Equalized Credit Hours _____

Official Copy & Approval Sheet Filed (Date): _____ Executive VP/Provost Signature/Date [Signature] 6/15/01

REGISTRAR

Date Approved Course Description Received _____ Hegis Taxonomy & Course Number Assigned _____

Registrar Signature/Date [Signature] 6/15/01

NOTIFICATION FORWARD

Senate Curriculum Committee Chairperson

Academic Dean(s)

*memo sent
8/13/01*

Department Chairpersons

Registrar

____ Sponsor(s)



Mathematics Department

New Course Proposal

1. Details

- A. Title: 1701.5xx: Selected Topics In Mathematics: _____
- B. Sponsor: Drs. Eric Milou & Janet Caldwell, Department of Mathematics
- C. Credit Hours: Variable 1 to 6
- D. Course Level: Graduate
- E. Prerequisites: (Permission of instructor)
- F. Suggested Time, Implementation: Once per year or as requested.
- G. Curricular Effect: Elective for graduate students in the M.A. in mathematics, M.A. in subject matter teaching programs, and M.Ed. in elementary education. Approval of each selected topics course into the specific graduate program will be made by the graduate advisor of the program in consultation with the student. Students are limited to a total of 9 s.h. of this course. (All selected topics will be submitted to the mathematics department curriculum committee for approval.)
- H. Adequacy: Present staff is adequate.
- I. Resources: Faculty, computer equipment, and mathematics department calculator resources are adequate.

2. Rationale:

- A. With the completion and implementation of the NJ Mathematics Curriculum Frameworks (1996) across the state, the mathematical content knowledge of in-service teachers needs to be upgraded. There is content in the Standards (e.g: mathematical modeling) that many teachers did not learn as undergraduates. This course will provide the opportunity for teachers (K-12) to update their mathematical content knowledge, preparing their students to pass the mathematics sections of the new state tests (ESPA, GEPA, and HSPA).

B. Having a selected topics course provides flexibility in graduate programs so that students can explore new topics in mathematics such as fractals & chaos theory.

C. The mathematics department has never before offered such a course, although many other departments do so.

3. Essence of the Course & Outline (three examples):

Example 1) Selected Topics In Mathematics: Mathematical Modeling

This course introduces secondary teachers to the process of solving problems from discrete and continuous mathematics. Mathematical modeling is the process of creating mathematical descriptions of reality and involves relating formulae and equations to real objects and behaviors. Most secondary teachers did not have such a course in their undergraduate experiences. The NJ Mathematics Framework emphasizes developing mathematical descriptions of real-world situations and predicting outcomes based on that model. Technology plays a large part in examining such models and the appropriate technological tools will be demonstrated and used. Students will examine polynomials, rational, trigonometric, exponential, and logarithmic models as well as discrete topics such as fair division, representation, and voting methods.

Example 2) Selected Topics In Mathematics: Problem Solving & Reasoning

This course focuses on the logic and structure underlying school mathematics, including concepts, procedures, problem solving, and applications at concrete, pictorial, and abstract levels. This course is designed primarily for in-service elementary and/or middle school teachers. When the student completes the course, he/she

- will be able not only to perform calculations and solve problems but also to show why the procedures used are valid and appropriate.
- will be able to examine and judge the validity of alternate mathematical approaches to problem solving as well as alternate algorithmic methods.
- will understand the role of proof in mathematics, and be able to articulate the

essential difference between mathematical proof and evidence obtained from inductive reasoning.

Example 3) Selected Topics In Mathematics: Fractals & Chaos

This course will introduce students to fractals and chaos, covering iterated function systems, dimensions, real and complex dynamics, and the Mandelbrot set. Chaos theory is “the study of complex nonlinear dynamic systems.” Chaos has been thrust into the spotlight many times in the last few years, namely in the movie Jurassic Park. It studies what factors dictate all reactions in the behavior of a system. It also studies the universal order of all similar systems. For example, when initial numbers in the start of an equation differ only slightly, one would expect the outcome to differ only slightly. In many cases, however, the outcome varies greatly and in no predictable pattern. But, the overall behavior is the same. Chaos theory has many applications in real life, including the study of population, epidemiology, and heart palpitations. Fractals are being used now more than ever. Movie makers use fractals to help them produce more realistic clouds, rocks, and even shadows. Fractals and chaos promise to be very exciting fields of converging math and science.

Evaluation & Grading: Students will be evaluated by the traditional methods of written homework, projects and exams.

Course evaluation: This course will be evaluated through the customary student evaluations as well as a regular departmental review.

Screening Process: All selected topics will be submitted to the mathematics department curriculum committee for approval.

4. Consultation

Consultation with the College of Education was held (Dean B. Sisco, J. Gallagher, and C. Calliari). Letter of support was written by Dr. C. Calliari, chairperson Elementary Education.

(Prerequisite: Permission of Instructor)


Catalog Description: 1701.5xx: Selected Topics In Mathematics: _____ (1 to 6 s.h.)

This course provides students with the opportunity to explore current issues in mathematics. The course will have a changing focus that will permit faculty to offer specialized seminars focused on new developments in the field, issues of significance, areas of faculty research, or in response to students' requests. Students may take this course for credit more than once (limit: 9 s.h.), as long as the focus of the course is different each time the student enrolls.



Elementary / Early Childhood Education

To: Eric Milou, Mathematics Department ✓
Janet Caldwell, Mathematics Department

From: Carl L. Calliari, Ed.D. 
Department Chair

Date: September 25, 2000

Re: Mathematics Course Proposal

After appropriate departmental consultation, I am authorized to write this letter of support for both the undergraduate course 1701.2xx Technological Tools for Discovering Mathematics (2 sh) and the graduate level selected topics course (variable credit).

Given the focus on the NJ Core Content Curriculum Standards and the national movement towards competency testing, both of these course offerings will help K-12 students to improve their mathematical skills and reasoning abilities.

The Department supports both proposals and underscores the approval of each selected topics course into the specific graduate program being made by the graduate program advisor of the program.

CLC/jpc

c: B. Sisco, Dean, College of Education
M. Rilling, Dean, Graduate School
L. Molinari, Graduate Program Advisor