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Glassboro State College Senate Curriculum Committee

Approval Form

Proposal Title: Foundations of Mathematics 1701.501

Sponsor(s) John Sooy Dept.: Math/Computer Science Ext. 6044
Janet Caldwell

Check one: Course Specialization Concentration Minor Achievement Certificate
 Certification Program Major Program Minor Change
(please name deletion or credit/title/catalog change)

Undergraduate Graduate Credit Hours

<p>Step 1 (Department)</p> <p><input checked="" type="checkbox"/> Approved <u>2-1-88</u> Date</p> <p><input type="checkbox"/> Not Approved</p> <p><u>John Sooy</u> Dept. CC Chairperson</p> <p>Reviewed <u>2-1-89</u> Date</p> <p><u>[Signature]</u> Dept. Chairperson</p>	<p>Step 2 (Receipt)</p> <p><input type="checkbox"/> SCC# <u>88-89-24</u></p> <p>Proposal Received <u>2/1/89</u> Date</p> <p><u>Brenda A. Bolay</u> SCC Chairperson</p>	<p>Step 3 (School CC)</p> <p>Reviewed <u>2/14/89</u></p> <p><input checked="" type="checkbox"/> Approved <input type="checkbox"/> Not Approved</p> <p>Comments:</p> <p><u>Ronald J. Gochos</u> School Curr. Comm. Chairperson</p>
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Step 4 (Academic Dean) **Comments:**

Recommend
 Not Recommend
 Conditionally Recommend (see comments)

Reviewed 2-27-89 Menna Lockow
Signature, Dean of School
Date

Step 5 (SCC)

Open Hearing 3/16/89 Approved by Senate Curriculum Committee 3/16/89
Date Date

Returned to sponsor(s) for the following reasons:
Pre-req to ent. desc. pass OK.
RAB

Step 6 (Senate)

Presented to Senate 3/17/89 Approved Not Approved
Date

Notification to Executive Vice-President/Provost 3/31/89 Brenda A. Bolay
Date Signature SCC Chairperson

Step 7 (Executive V.P./Provost)

Received 4/30/09
Date

Approved Yes No

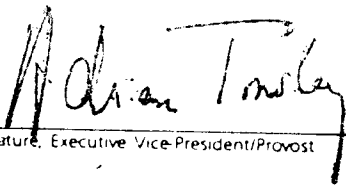
If no, reasons are as follows:

Student credit hours 3

Faculty load hours 3

Equalized credit hours 3

Official copy and approval sheet filed 4/29/09
Date


Signature, Executive Vice-President/Provost

Registrar

Approved course description received _____
Date

Hegis Taxonomy and Course Number assigned 1701-501 Rec KRC 4/10/09

Signature, Registrar Date

Notification forwarded:

- Senate Curriculum Committee Chairperson
- Department Chairperson(s)
- Academic Dean
- Registrar
- Sponsor(s)

GLASSBORO STATE COLLEGE

Department of Mathematics and Computer Science

Course Proposal

Foundations of Mathematics

1. Details

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|--------------------------------------|--|
| a. Course Title | Foundations of Mathematics |
| b. Sponsors | John Sooy and Janet Caldwell,
Department of Mathematics and
Computer Science |
| c. Credit Hours | 3 |
| d. Course Level | Graduate |
| e. Curricular Effect | Required course for all students in
the CCE and SMT programs. MST
mathematics students will also be
expected to complete this course. |
| f. Prerequisites | Bachelor's degree in mathematics or
a related field, or permission of
the instructor. |
| g. Suggested Time,
implementation | One section of the course offered
each fall. |
| h. Resources | Faculty, equipment, and library
resources are adequate. |

2. Rationale

The mathematics department's graduate courses in mathematics serve students in several degree programs, with different mathematical backgrounds, different interests, and different goals. The programs currently involved are four: the Master of Arts in Subject Matter Teaching (SMT), the Master of Arts in Community College Education (CCE), the master of Arts in Secondary School Teaching (SST), and the Master of Science in Teaching (MST). Each program requires a different number of credits in mathematics, from a minimum of three semester hours (MST and SST) to a maximum of 24 in the CCE. In addition to the definition of the four programs, graduate students enter these programs with widely varying backgrounds, some with mathematics majors from strong programs, others with weaker backgrounds.

All of the students pursuing degrees share one characteristic, however. All of these students are interested in teaching mathematics, either at the secondary or community college levels. In fact, they often are already teaching.

The course proposed here is intended to be a first graduate course in mathematics for students in all of these programs. As such, it will provide a common mathematical foundation for students in all of the programs, drawing upon the full range of undergraduate courses in mathematics. Mathematical connection will be emphasized in the course, allowing students to relate topics studied separately to one another. Also stressed will be mathematical reasoning and communication skills, as applied to mathematics. This course will permit students to build upon and share knowledge already acquired while pointing out areas in which additional study may be needed. In addition, it will develop the communication skills and understanding of the process of doing mathematics necessary for graduate-level study.

3. Essence of the course

a. Objectives in relation to student outcome:

Students will be able to:

Apply strategies and tools for problem solving, including computer use, to specific problems from number theory, geometry, analytic geometry, algebra, discrete mathematics, logic and calculus.

Included are:

Asking the right questions.

Stating the problem in a different way.

Special cases and pattern recognition.

Exposition and communication.

Generalization.

Specialization and analogy.

Working backwards.

Using plausibility arguments.

Counterexamples and proofs.

b. Topical outline of the seminar:

1. Introduction to Problem Solving

Asking the right questions.
Stating the problem in a different way.
Special cases and pattern recognition.
Exposition and communication.
Generalization.
Specialization and analog.
Working backwards.
Using plausibility arguments.
Counterexamples and proofs.

2. Solving Problems from Various Areas

Algebra
Analysis
Foundations, e.g., set theory and logic
Geometry
Emerging areas, e.g., discrete mathematics

3. The Literature of Mathematics

Journals, reviews, and abstracts.
Developing a mathematical topic or problem.
Writing mathematical prose.

c. Evaluation and Grading:

Students will be evaluated on the basis of homework, class participation, written assignments and papers and performance on examinations.

d. Course Evaluation:

This course will be evaluated through customary student evaluations as well as departmental review on a regular basis. In addition, the course will be evaluated through consultation with faculty in other departments involved with the SMT, CCE, and MST programs.

4. This proposal has been sent to the following faculty for consultation:

Drs. Jody Blohm, Dickinson Gardiner, Tom Gallia, Secondary Education
Dr. Dick Smith, Community College Teaching Members of the Mathematics Department

5. Additional Information

~~Possible texts:~~

Thomas Butts, Problem Solving in Mathematics, Scott Foresman, Glenview, IL, 1972.

The Foundations & Fundamental Concepts of Math., H. Eves & C.V. Newton, Holt/Rinehart 1958.

Matters Mathematical, I.N. Herstein & I. Kaplansky, Harper/Row, 1974.

A. Gardiner, Discovering Mathematics: The Art of Investigation, Oxford University Press, London, 1987.

Stephen Krulik and Jesse A. Rudnick, A Source Book for Teaching Problem Solving, Allyn and Bacon, Boston, 1984.

George Polya, Mathematics and Plausible Reasoning, Vols. 1 and 2, Princeton University Press, Princeton, NJ 1954.

Alan H. Schoenfield, Problem Solving in the Mathematics Curriculum, MAA Notes Number 1, MAA, Washington DC, 1983.

Wayne A. Wickelgren, How to Solve Problems, W.H. Freeman, San Francisco, 1974.

6. Catalog Description

1701.500 Foundations of Mathematics (3 sh)

Strategies and tools for problem solving, including computer use, will be applied to specific problems from number theory, geometry, analytic geometry, algebra, discrete mathematics, logic, and calculus.