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Glassboro State College Senate Curriculum Committee

Approval Form

Proposal Title: DISCRETE MATHEMATICS FOR TEACHERS

Sponsor(s) J. CALDWELL & F. MASAT Dept.: MATH/COMPUTER SCIENCE Ext. 6044

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

[] Undergraduate [X] Graduate 3 Credit Hours

Step 1 (Department) [X] Approved 11/2/87 Date Dept. CC Chairperson Ronald J. Guder
Step 2 (Receipt) [] SCC# 87185-28 Proposal Received 11/18/87 Date SCC Chairperson Brenda A. Bolay
Step 3 (School CC) Reviewed 2/9/88 [X] Approved [] Not Approved Comments: School Curr. Comm. Chairperson Al H. C. Jones

Step 4 (Academic Dean) [X] Recommend [] Not Recommend [] Conditionally Recommend (see comments) Reviewed 2-10-88 Date Signature, Dean of School M. Jackson

Step 5 (SCC) Open Hearing 3/2/88 Date [X] Approved by Senate Curriculum Committee 2/18/88 Date [] Returned to sponsor(s) for the following reasons: Need catalog description on 3/24

Step 6 (Senate) Presented to Senate 1/25 Date [X] Approved [] Not Approved Notification to Vice-President for Academic Affairs 1/25/88 Date Signature, SCC Chairperson Brenda A. Bolay

Step 6 (Senate)

Received 4/7/09
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 5-12-09
Date



Signature, Vice-President for Academic Affairs

Registrar

Approved course description received _____
Date

Hegis Taxonomy and Course Number assigned _____

Signature, Registrar

Date

Notification forwarded:

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

Discrete Mathematics for Teachers
Course Proposal

I. Details

- A. Title: Discrete Mathematics for Teachers
- B. Department: Mathematics & Computer Science
Authors of proposal: Janet Caldwell & Fran Masat
- C. Semester hour credits: 3
- D. Level of course: Graduate
- E. Curricular effect: Free elective
- F. Prerequisites: Participants must hold New Jersey teaching certificates in the area of mathematics or be currently teaching mathematics or computer science in grades 7 - 12. Successful completion of Introduction to Computer Science, Computer Science I or equivalent.
- G. One section to be offered each summer, beginning in 1988.
- H. Present staff, resources, library facilities, and space are sufficient for implementation.
- I. A summary of the short-term evaluations is attached.

II. Rationale

Discrete mathematics is relatively recent as a specialization in mathematics, having gained in stature as computer science grew as a discipline. The Mathematics and Computer Science Department at GSC instituted an undergraduate course for computer science majors three years ago and only recently began requiring it of mathematics majors. Thus, most of the teachers currently employed in the secondary schools in the southern New Jersey region did not study discrete mathematics as part of their undergraduate curriculum.

Discrete mathematics is currently having considerable effects on the undergraduate mathematics curriculum and has the potential for radically changing the secondary mathematics curriculum as well. It is therefore necessary for teachers to become more familiar with the theory and basic concepts of the subject. Further, teachers of computer science in the high school also need the content of such a course in order to continue their study of computer science and its applications.

III. Essence of the Course

A. Objectives

This course provides a sophisticated approach to new topics in discrete mathematics for persons with substantial backgrounds in traditional mathematics. The approach used throughout is one of exploring selected topics in depth and relating them to concepts from other areas of mathematics. The student completing the course successfully will:

- i. Be able to analyze basic algorithms.
- ii. Be able to apply first order mathematical logic to problems involving rules of inference, axiomatic theories, predicates and quantifiers.
- iii. Understand how logic is implemented in gates and how to simplify logic circuits.
- iv. Be able to solve problems in combinatorics and permutations.
- v. Understand operations in the binary, octal, and hexadecimal number systems.
- vi. Understand and use computer data representation formats and computer arithmetic.
- vii. Relate the concepts of Boolean algebras, sets, and relations to other fields of mathematics.
- viii. Understand the data structures such as trees, graphs, and networks.
- ix. Review proof by induction.
- x. Be introduced to formal languages and automata theory.

B Topical Outline/Content

- a. Number systems
- b. Symbolic logic
- c. Boolean algebra
- d. Algorithms
- e. Set theory
- f. Relations and Functions
- g. Combinatorics
- h. Mathematical induction

- i. Recursion
- j. Trees
- k. Graph theory
- l. Introduction to automata and formal languages

C. Evaluation of students

Students will be graded on the basis of homework problems, examinations, and, at the instructor's discretion, projects or programs which are relevant to the course content.

D. Course Evaluation

The success of this course may be determined in several ways. The usual student surveys (either SIRS or the departmental forms) may be distributed by the instructor. Upon request, the instructor may provide written comments on the course syllabus after the semester is over. Moreover, after two years, the departmental curriculum committee intends to review past evaluations and recommend any needed revisions.

IV Consultations

The following professors have been consulted for opinions on this proposal:

Professor Gardiner, Secondary Education/Foundations of Education
Professor Gallia, Secondary Education/Foundations of Education
Professor Smith, Educational Administration

Catalog Description

1703.550 Discrete Mathematics for Teachers

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(Prerequisites: (1) Introduction to Programming Computer Science I, or equivalent and (2) teaching certification in mathematics or presently teaching mathematics or computer science in grades 7-12)

This course provides an advanced approach to topics in discrete mathematics for persons with substantial backgrounds in traditional mathematics. Selected topics are explored in depth and related to concepts from other areas of mathematics. Topics normally included are logic, combinatorics, number systems, data structures and representations, Boolean algebra, induction, graphs and trees.