APPLICATION FOR NEW COURSE

1. Submitted by College of Arts and Sciences Date August 19, 2002
   Department/Division offering course Mathematics

2. Proposed designation and Bulletin description of this course
   a. Prefix and Number MA 614
   b. Title* Enumerative Combinatorics
      *NOTE: If the title is longer than 24 characters (including spaces), write A sensible title (not exceeding 24 characters) for use on transcripts Enum Combinatorics
   c. Lecture/Discussion hours per week 3
   d. Laboratory hours per week 0
   e. Studio hours per week 0
   f. Credits 3
   g. Course description
      See attached.
   h. Prerequisites (if any)
      A graduate course in linear algebra or consent of instructor.

   i. May be repeated to a maximum of ____________________________ (if applicable)

4. To be cross-listed as
   Prefix and Number
   Signature, Chairman, cross-listing department

5. Effective Date Spring 2003 (semester and year)

6. Course to be offered
   ☑ Fall ☑ Spring ☑ Summer

7. Will the course be offered each year? (Explain if not annually)
   ☑ Yes ☐ No

8. Why is this course needed?
   A proposed change in emphasis of one of the mathematics doctoral prelim sequences from optimization to discrete mathematics.

9. a. By whom will the course be taught? Discrete mathematics group faculty members.
   b. Are facilities for teaching the course now available?
      If not, what plans have been made for providing them?
      ☑ Yes ☐ No
APPLICATION FOR NEW COURSE

10. What enrollment may be reasonably anticipated?  

7-10 each year

11. Will this course serve students in the Department primarily?  

☑ Yes □ No

Will it be of service to a significant number of students outside the Department?  

☑ Yes □ No

There is potential for service to graduate students in the Department of Computer Science.

Will the course serve as a University Studies Program course?  

☐ Yes ☑ No

If yes, under what Area?

12. Check the category most applicable to this course

☑ traditional; offered in corresponding departments elsewhere;

☐ relatively new, now being widely established

☐ not yet to be found in many (or any) other universities

13. Is this course part of a proposed new program:  

If yes, which?  

☐ Yes ☑ No

14. Will adding this course change the degree requirements in one or more programs?*  

If yes, explain the change(s) below  

☐ Yes ☑ No

15. Attach a list of the major teaching objectives of the proposed course and outline and/or reference list to be used.

16. If the course is a 100-200 level course, please submit evidence (e.g., correspondence) that the Community College System has been consulted.

17. Within the Department, who should be contacted for further information about the proposed course?  

Name Margaret Readdy

Phone Extension 257-4680

*NOTE: Approval of this course will constitute approval of the program change unless other program modifications are proposed.
Signatures of Approval:

Peter A. [Signature]
Department Chair

David [Signature]
Dean of the College

W/11/62
Date
DEC 13 2002
Date

NOV 27 2002
Date of Notice to the Faculty

*Undergraduate Council
Date

*University Studies
Date

*Graduate Council
Date

*Academic Council for the Medical Center
Date

*Senate Council (Chair)
Date of Notice to University Senate

*If applicable, as provided by the Rules of the University Senate

ACTION OTHER THAN APPROVAL
Catalog description for
MA 614: Enumerative combinatorics

Course description:
An introduction to the basic notions and techniques in enumerative combinatorics. The material has applications to polytopal theory, hyperplane arrangements, computational commutative algebra, representation theory and symmetric functions. Topics include generating functions, the principle of inclusion and exclusion, bijections, recurrence relations, partially ordered sets, the Möbius function and Möbius algebra, the Lagrange inversion formula, the exponential formula and tree enumeration. Prereq: A graduate course in linear algebra or consent of instructor.

Learning objectives for MA 614: Enumerative combinatorics

1. Students will become familiar with the definitions, proof techniques and theorems in enumerative combinatorics.
2. Students will gain experience in developing the main results of enumerative combinatorics.
3. Students will develop their problem solving skills by working in small groups and as individuals.
4. Students will develop their ability to explain and communicate mathematics verbally and orally.

Suggested grading criteria: Enumerative combinatorics

The course grade will be based upon weekly written homework assignments (15%), two exams (25% each) and a final exam (35%).
Enumerative Combinatorics
Math 614

Enumerative Combinatorics
Math 614

Outline of Topics

1. Generating Functions.
2. Stirling Numbers of the First and Second Kind.
4. q-analogues.
5. The Twelvefold Way.
7. Partially Ordered Sets and Lattices.
8. The Fundamental Theorem of Distributive Lattices.
10. The Möbius Inversion Formula.
12. The Möbius Algebra.
14. The Zeta Polynomial.
15. Rank-selection.
17. Eulerian Posets.
18. Exponential Generating Functions.
19. The Exponential Formula.
20. Tree Enumeration.
21. Lagrange Inversion Formula.

Textbook:

Enumerative Combinatorics
Math 614

References:


Course Description:

An introduction to the basic notions and techniques in enumerative combinatorics. The material has applications to polytopal theory, hyperplane arrangements, computational commutative algebra, representation theory and symmetric functions. Topics include generating functions, the principle of inclusion and exclusion, bijections, recurrence relations, partially ordered sets, the Mobius function and Mobius algebra, the Lagrange inversion formula, the exponential formula and tree enumeration. Prereq: A graduate course in linear algebra or consent of instructor.
INVESTIGATOR REPORT

INVESTIGATING BODY  Area A, Steven Yates
(Area, Area Chair)

COURSE, MAJOR or DEGREE  MA 614
(department or college)

DATE FOR COUNCIL REVIEW  12/13/02

CATEGORY  NEW, CHANGE, DROP

INSTRUCTIONS: This completed form will accompany the course application to the Graduate/Undergraduate Council(s) in order to avoid needless repetition of investigation. The following questions are included as an outline only. Be as specific and as brief as possible. If the investigation was routine, please indicate this. The term "course" is used to indicate one course, a series of courses or a program, whichever is in order. Return the form to the Associate Dean, 231 Patterson Office Tower for forwarding to the other Council(s). ATTACH SUPPLEMENT IF NEEDED.

1. List any modifications made in the course proposal as submitted originally and why.
   
   None

2. If no modifications were made, review considerations that arose during the investigation and the resolutions.
   
   None

3. List contacts with program units on the proposal and the considerations discussed therein.
   
   None

4. Additional information as needed.
   
   None

5. A&S Area A, Natural & Mathematical Sciences Curriculum Committee Recommendation:
   
   Approve, Approve with Reservation, or Disapprove

6. A&S Council Recommendation:
   
   Approve, Approve with Reservation, or Disapprove

7. 

   Steven Yates

   A&S Council Investigator, Dr. Steven Yates

   Date: 12/13/02

File: InvestigatorRpt