APPLICATION FOR NEW COURSE

1. Submitted by College of Arts and Sciences Date August 20, 2002

   Department/Division offering course Mathematics

2. Proposed designation and Bulletin description of this course

   a. Prefix and Number MA 111 b. Title* Introduction to Contemporary Mathematics

   *NOTE: If the title is longer than 24 characters (including spaces), write A sensible title (not exceeding 24 characters) for use on transcripts Contemporary Mathematics

   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)

   See attached.

   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 Fall 2003 (semester and year)

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

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

8. Why is this course needed?

   This course is proposed to be an alternative course to satisfy the USP Basic Skills requirement for students not planning to major in disciplines requiring calculus.

9. a. By whom will the course be taught? Mathematics faculty, instructors, and TA's.

   b. Are facilities for teaching the course now available? ☑ Yes ☐ No
   If not, what plans have been made for providing them?

10. What enrollment may be reasonably anticipated? Fall: 400. Spring: 200.

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
If so, explain.

The course would satisfy the USP Basic Skills requirement and would therefore be of service to all students.

Will the course serve as a University Studies Program course? ☑ Yes ☐ No

If yes, under what Area? Basic Skills (but would not be a pre-calculus course).

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: ☐ Yes ☑ No
If yes, which?

14. Will adding this course change the degree requirements in one or more programs?* ☐ Yes ☑ No
If yes, explain the change(s) below

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 Carl Lee Phone Extension 257-1405

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

CLEAR FORM

Signatures of Approval:

Department Chair	Date
Dean of the College	Date
	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

Application for New Course
MA 111[1] — Introduction to Contemporary Mathematics[2]

Course description: An introduction to concepts and applications of mathematics, with examples drawn from such areas as voting methods, apportionment, consumer finance, graph theory, tilings, polyhedra, number theory, and game theory. This course is not available for credit to persons who have received credit in any mathematics course of a higher number with the exceptions of MA 112, 123, 162, 199, 201 and 202. This course does not serve as a prerequisite for any calculus course. Credit not available on the basis of special examination. Prereq: Two years of high school algebra and a Math ACTE score of 19 or above, or MA 108R, or math placement test.

Prerequisites: Two years of high school algebra and a Math ACTE score of 19 or above, or MA 108R, or math placement test.

Note on USP Requirements: This course is intended to fulfill the University Studies Basic Skills requirement, and can be followed by PHI 120 and STA 200 to fulfill the Inference requirement. Note, however, that this course WILL NOT COVER THE PREREQUISITE MATERIAL FOR CALCULUS COURSES.

Evidence of Consultation with Community College System: Lillie Crowley, faculty member of the Department of Mathematics of Lexington Community College, was a member of the USP Inference Subcommittee, which proposed the development of this course. The full final report is available at the website

www.ms.uky.edu/~rayens/USP00/usp00.html.

Peggy Saunier, faculty member of the Department of Mathematics of Lexington Community College, is teaching two pilot sections of this course in Fall 2002. Here is one example of correspondence from her:

> Date: Tue, 05 Mar 2002 12:33:30 -0500
> To: lee@ms.uky.edu

[1] I propose 111 because it is the smallest unused MA course number greater than the prerequisite 108. Other possibilities are 105 or 107 (matching the numbers at University of Louisville and Paducah Community College, respectively, but these are lower numbers than 108) or 115 (matching the number at NKU, but this is a higher number than 113).

[2] This title is similar to the titles at NC State, Texas A&M, University of Louisville, and Paducah Community College. Another possibility might be Mathematics for the Liberal Arts.

From: Peggy Saunier ¡psaunie@uky.edu¿
Subject: Contemporary Math

Carl - I'm looking forward to piloting the new Contemporary Math course next fall. We've scheduled two sections of A&S 100 for MWF 10 and 11. I'd like to try to follow what you're doing, so when you have meetings with the TA's who will be working with you on this project, if you think it would be appropriate I'd like to come and listen. Also, I'd like to use the same textbook you do, so after you choose a text, if you'd let me know the name and author I will ask our math coordinator to order copies for our sections. Thanks for including us in this project. Peggy Saunier

Peggy Saunier, Ph.D.
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Rationale for Course Development

Excerpt from outside review of the Mathematics Department, several years ago

"MA 108R and 109 are remedial mathematics courses designed to cover material usually taught in junior high and high school. Students who achieve an ACT score of at least 18 may bypass MA 108R and qualify for MA 109. The Dean cited the high failure rate in MA 109, with nearly half the students failing, withdrawing, or making a D, as a concern of the College. To some extent this is more a societal rather than departmental problem, but the university community still has a duty to serve its constituents. During extensive discussions with all levels of the department, from undergraduates to the senior faculty, the committee came away with an impression that significant improvements could be made without a great investment of new resources. Our observations of the current situation follow. Two types of students are now taking MA 109. These have very different expectations and needs. The first are (poorly motivated) students who are taking the course only as a university studies requirement. This is the last mathematics course these students will ever take[3]. These are the majority. Another group of students need business calculus for their major, but did not have a strong enough mathematics background to bypass MA 109. These students, a minority, are motivated to do well in this course since it affects their careers. MA 109 is currently designed for this second group of students. . . .

"MA 109 really serves two groups, students who take it as a terminal mathematics course due to university requirements (the majority), and students who want to go on to take the business calculus course. A large part of the problem is due to the possibly unrealistic university expectation that all students should achieve the same minimum level of competence, a level that would be needed to go on to business calculus. These two groups have very different expectations and needs, and it may be unrealistic to serve them both with the same course. The department should critically assess the needs of each group, perhaps in consultation with advisors from other programs. MA 109 is the right course for the business calculus student, but what material is appropriate for the last mathematics course a Theater Arts major will ever take? That would probably be a course that stresses the mathematical skills needed to handle personal finances. We suggest that MA 109 be split into two courses. The current 109 can (and

[3]Note: they can fulfill the Inference Requirement by taking a logic course and a statistics course, rather than by taking a calculus course. CWL

does) serve students going on to business calculus. However, the majority of students would take a terminal survey course that satisfies university requirements. This course could possibly include some discrete mathematics. The scope of the new survey course should be determined from consultations with advisors from across the university[4]. The new survey course could be taught in larger sections, perhaps using the computer-assisted learning methods now being developed in the Chemistry Department for CH 105. This would free up considerable PTI/TA resources for other use or permit a lower TA teaching load.

MA 108R covers material usually presented in high school and should not be offered by UK. Teaching of remedial mathematics has been eliminated in many of UK's benchmark universities. LCC should be used for this remedial purpose. Students with a weak mathematics background, who only need to satisfy university course requirements, could still take the proposed new survey course. The few remaining students who fail the ACT entrance requirement of 109 and yet need 109 as a prerequisite for business calculus should get that pre-high school remediation at a community college. The ACT score is used to decide which students must take 108R before 109. Currently the ACT threshold for placement in 109 is 18. The department has data correlating success in the 109 course with ACT score. Raising the ACT threshold by one point would improve the success rate. There are problems with this proposal, however. The department indicated that they have been unable to get advisors across the university to respect the current placement policies. This may be beyond what a single department can do[5]."

[4]Note: This occurred within the context of a University-appointed USP subcommittee, which also recommended the creation of an alternative course to MA 109. CWL

[5]Note: The ACT entrance requirement for MA109 has since been raised to 19. CWL

Possible Topics (From COMAP book)

1. Management Science
    (a) Street Networks
    (b) Planning and Scheduling
    (c) Linear Programming
2. Coding Information
    (a) Identification Numbers
    (b) Transmitting Information
3. Social Choice and Decision Making
    (a) Election Systems
    (b) Weighted Voting Systems
    (c) Fair Division
    (d) Apportionment
    (e) Game Theory
4. On Size and Shape
    (a) Growth and Form
    (b) Symmetry and Patterns
    (c) Tilings
5. Modeling in Mathematics
    (a) Logic and Modeling
    (b) Consumer Finance Models

Possible Texts

1. COMAP, *For All Practical Purposes*.
2. Tannenbaum, *Excursions in Modern Mathematics*.
3. Hathaway, *Mathematics for the Modern World*.
4. Pirnot, *Mathematics All Around*.
5. Gilbert and Hatcher, *Mathematics Beyond the Numbers*. (Currently used at NKU.)

Other Institutions with Similar Courses

1. University of Louisville, Math 105, Introduction To Contemporary Mathematics.
2. NKU, MAT115, Math for the Liberal Arts. Text: Gilbert and Hatcher, *Mathematics Beyond the Numbers*, Wiley.
3. NC State, MA 103, Topics in Contemporary Mathematics. Text: COMAP, *For All Practical Purposes*, Freeman.
4. Ohio State, Math 116, Excursions in Mathematics. Text: *For All Practical Purposes*.
5. Penn State, Math 035, General View of Mathematics.
6. Texas A&M, Math 166, Topics in Contemporary Mathematics. Text: Tan, *Finite Mathematics for the Managerial, Life, and Social Sciences*, Brooks/Cole.
7. University of Arizona, Math 105, Mathematics in Modern Society. Text: Tannenbaum and Arnold, *Excursions in Modern Mathematics*, Prentice Hall, and Parks, *Consumer Math*.
8. University of Georgia, Math 1060, Mathematics of Decision Making.
9. University of Maryland, Math 110, Elementary Mathematical Models.
10. University of Minnesota, Math 1001, Excursions in Mathematics. Text: *Excursions in Modern Mathematics*.
11. UNC, Math 18, Selected Topics in Mathematics. Text: *For All Practical Purposes*.
12. University of Texas, M302, Introduction to Mathematics. Text: *For All Practical Purposes* or *The Heart of Mathematics*.

13. University of Washington, Math 107, Mathematics: A Practical Art.
14. University of Wisconsin, Math 141, Quantitative Reasoning and Problem Solving.
15. Paducah Community College, MT107, Contemporary College Mathematics.