LSC Use Only
Number: 234
Submission Date:
Action-Date:

FEB 27 2002

UWUCC USE Only
Number: 01-62a
Submission Date:
Action-Date: UWUCC App 4/9/02
Senate App 5/7/02

CURRICULUM PROPOSAL COVER SHEET
University-Wide Undergraduate Curriculum Committee

I. CONTACT

Contact Person Gerald Buriok Phone 7 2608

Department Mathematics

II. PROPOSAL TYPE (Check All Appropriate Lines)

X COURSE MATH 105 College Algebra
Suggested 20 character title

___ New Course* _____
Course Number and Full Title

X Course Revision MATH 105 College Algebra
Course Number and Full Title

___ Liberal Studies Approval+ for new or existing course _____
Course Number and Full Title

___ Course Deletion _____
Course Number and Full Title

___ Number and/or Title Change _____
Old Number and/or Full Old Title

_____
New Number and/or Full New Title

X Course or Catalog Description Change MATH 105 College Algebra
Course Number and Full Title

APR - 4 2002

___ PROGRAM: ___ Major ___ Minor ___ Track

___ New Program* _____
Program Name

___ Program Revision* _____
Program Name

___ Program Deletion* _____
Program Name

___ Title Change _____
Old Program Name

_____
New Program Name

III. Approvals (signatures and date)

Jany Stovall 10/1/01
Department Curriculum Committee

Gerald Buriok 10/1/01
Department Chair

02/26/02
College Curriculum Committee

2/27/02
College Dean

4-18-02
+Director of Liberal Studies (where applicable)

*Provost (where applicable)

I. Catalog Description

MATH 105 College Algebra

3 credits
3 lecture hours
0 lab hours
(3c-0l-3sh)

Prerequisite: MATH 100 or appropriate Placement Test score or permission of the Mathematics Department Chairperson.

Note: Students may not take MATH 105 after successfully completing either a calculus course or MATH 110 without the written approval of the Mathematics Department Chairperson.

Prepares students for the study of calculus for business, natural and social sciences. Topics include detailed study of polynomial, exponential, and logarithmic functions.

II. Course Objectives

1. Students will understand and take advantage of pattern recognition in the study of mathematics.
2. Students will make a careful study of functions and their application to science, business, and economics.
3. Students will understand how to interpret functions expressed analytically and graphically.
4. Students will be able to calculate the rate of change of a function and interpret its meaning
5. Students will leave the course with a solid set of skills and a conceptual framework to equip the students for the future study of calculus, science, and business.

III. Course Outline

A. Review of Basic Algebra (3 hours)
   1. Exponents, Radicals, Rational Exponents
   2. Polynomials and Factoring
   3. Rational Expressions

Treat this as a review of MATH 100; do not spend a great deal of time on this!

B. Equations and Inequalities (6 hours)
   1. Equations
   2. Setting Up Equations: Applications
   3. Quadratic Equations
   4. Other Types of Equations
   5. Solving Inequalities
   6. Equations and Inequalities Involving Absolute Value

C. Graphs (5 hours)
   1. Rectangular Coordinates; Graphs of Equations
   2. Lines
   3. Parallel and Perpendicular Lines
   4. Scatter Diagrams; Linear Curve Fitting (graphing calculator users only)
   5. Variation

D. Functions and Their Graphs (8 hours)
   1. Functions
   2. Properties of Functions
   3. Library of Functions
   4. Graphing Techniques: Transformations
   5. Operations on Functions; Composite Functions
   6. Mathematical Models: Constructing Functions

E. Polynomial and Rational Functions (5 hours)
   1. Quadratic Functions and Models (non calculator users omit curve fitting)
   2. Polynomial Functions
   3. Rational Functions I (can omit oblique asymptotes if desired)
   4. Rational Functions II: Analyzing Graphs
   5. Polynomial and Rational Inequalities

F. Exponential and Logarithmic Functions (10 hours)
   1. One-to-One Functions; Inverse Functions
   2. Exponential Functions
   3. Logarithmic Functions
   4. Properties of Logarithms; Exponential and Logarithmic Models (non calculator users omit curve fitting)
   5. Logarithmic and Exponential Equations
   6. Compound Interest
   7. Growth and Decay; Newton's Law; Logistic Models

This syllabus covers 37 hours, leaving 5 hours for testing and/or review.

IV. Evaluation Methods

The final grade for the course will be determined as follows:

50% Tests. Tests will include problems on basic competency and critical thinking.
20% Final Examination. The final examination will be comprehensive and cover both basic competency and critical thinking.
30% Homework, Quizzes, and Projects. These will cover textbook assignments and applications to business and economics.
Grades will be assigned as follows:

A: 90%-100%
B: 80%-89%
C: 70%-79%
D: 60-69%
F: 0%-59%

V. Required Textbook

Sullivan, Michael. College Algebra, 6th ed. Upper Saddle River, NJ: Prentice-Hall, Inc., 2002.

VI. Special Resource Requirements

Some instructors may require students to purchase a graphing calculator.

VII. Bibliography

Committee on the Mathematical Sciences in the Year 2000. Everybody Counts: A Report to the Nation on the Future of Mathematics Education. Washington, DC : National Academy Press, 1989.

Connally, Eric, et al. Functions Modeling Change. New York: John Wiley & Sons, Inc., 2000.

Hughes-Hallet, Deborah, et al. Applied Calculus. New York: John Wiley & Sons, Inc., 1999.

Part II. Description of Curriculum Change

1. New syllabus or record. (Attached.)

2. Summary of proposed revisions.

The proposed change is in the prerequisite, replacing "or equivalent high school preparation" with "or appropriate Placement Test Score or permission of the Mathematics Department Chairperson." The word "Students" is added to the note to improve grammar.

a. Proposed new catalog description:

MATH 105 College Algebra **3c-0l-3sh**

Prerequisite: MATH 100 or appropriate Placement Test Score or permission of the Mathematics Department Chairperson.
Note: Students may not take MATH 105 after successfully completing a calculus course or MATH 110 without the written approval of the Mathematics Department Chairperson.

Prepares students for the study of calculus for business, natural and social sciences. Topics include detailed study of polynomial, exponential, and logarithmic functions.

b. Old catalog description:

MATH 105 College Algebra **3c-0l-3sh**

Prerequisite: MATH 100 or equivalent high school preparation
Note: May not take MATH 105 after successfully completing a calculus course or MATH 110 without the written approval of the mathematics department chairperson.

Prepares students for the study of calculus for business, natural and social sciences. Topics include detailed study of polynomial, exponential, and logarithmic functions.

3. Justification/rationale for the change.

The prerequisite "equivalent high school preparation" is difficult to check and enforce. High school mathematics classes vary in depth and quality and a list of courses doesn't provide reliable information. With the implementation of Banner, it is possible for the computer to check to see if a student's Placement Test Score in mathematics is appropriate for enrollment in MATH 105. The Placement Test Score provides a way of measuring high school preparation, and Banner will enforce this prerequisite. Students lacking adequate preparation are directed to MATH 100 for remediation.

4. Old syllabus of record. (Attached.)

5. Liberal Studies course approval form and checklist. (Attached.)

Part III. Letters of Support (Attached.)

Mathematics Department
Indiana University of Pennsylvania
Indiana, PA 15705

Course Number: MA 105

Course Title: College Algebra

Credits: 3 semester hours

Prerequisites: MA 100 or equivalent high school preparation

Textbook: *College Algebra*, 5th ed.
by Michael Sullivan
Prentice Hall

There is a companion website for students to do practice problems and review. It is at http://cw.prenhall.com/bookbind/pubbooks/sullivan/ Encourage your students who need extra practice to try it out.

Revised: 4/00

Catalog Description:
To prepare students for the study of calculus for business, natural and social sciences. Topics include a detailed study of polynomial, exponential, and logarithmic functions. This course is designed primarily for students planning to take MA 121: Calculus for Business, Natural, and Social Sciences.

Course Outline:

1. Preliminaries: Review of Basic Algebra (3 hours)

1.3, 1.7, 1.8	Exponents and Radicals
1.4, 1.5	Polynomials and Factoring
1.6	Rational Expressions

Treat this as a review; do not spend a great deal of time on this!

2. Equations and Inequalities (7 hours)

2.1	Equations
2.2	Setting Up Equations: Applications
2.3	Quadratic Equations
2.4	Other Types of Equations
2.5, 2.6	Inequalities; Linear Inequalities

2.7 Polynomial and Rational Inequalities
2.8 Equations and Inequalities Involving Absolute Value

3. Graphs (4 hours)

3.1 Rectangular Coordinates; Graphs of Equations (omit midpoint formula)
3.3 Lines
3.4 Parallel and Perpendicular Lines (omit circles)
3.5 Linear Curve Fitting (graphing calculator users only)
3.6 Variation

4. Functions and Their Graphs (6 hours)

4.1 Functions
4.2 More About Functions
4.3 Graphing Techniques: Transformations
4.4 Operations on Functions; Composite Functions
4.5 Mathematical Models: Constructing Functions

5. Polynomial and Rational Functions (4 hours)

5.1 Quadratic Functions; Curve Fitting (graphing calculator users only)
5.2 Polynomial Functions
5.3 Rational Functions (can omit oblique asymptotes if desired)

6. Exponential and Logarithmic Functions (10 hours)

6.1 One-to-One Functions; Inverse Functions
6.2 Exponential Functions
6.3 Logarithmic Functions
6.4 Properties of Logarithms; Curve Fitting (graphing calculator users only)
6.5 Logarithmic and Exponential Equations
6.6 Compound Interest
6.7 Growth and Decay

This syllabus covers 34 hours, leaving 8 hours for testing and/or review.

LIBERAL STUDIES COURSE APPROVAL, PARTS 1-3: GENERAL INFORMATION CHECK-LIST

I. Please indicate the LS category(ies) for which you are applying:

LEARNING SKILLS:

____ First Composition Course	____ Second Composition Course
✓ Mathematics	

KNOWLEDGE AREAS:

____ Humanities: History	____ Fine Arts
____ Humanities: Philos/Rel Studies	____ Social Sciences
____ Humanities: Literature	____ Non-Western Cultures
____ Natural Sci: Laboratory	____ Health & Wellness
____ Natural Sci: Non-laboratory	____ Liberal Studies Elective

II. Please use check marks to indicate which LS goals are primary, secondary, incidental, or not applicable. When you meet with the LSC to discuss the course, you may be asked to explain how these will be achieved.

Prim	Sec	Incid	N/A	
				A. Intellectual Skills and Modes of Thinking:
✓				1. Inquiry, abstract logical thinking, critical analysis, synthesis, decision making, and other aspects of the critical process.
	✓			2. Literacy--writing, reading, speaking, listening.
✓				3. Understanding numerical data.
	✓			4. Historical consciousness.
	✓			5. Scientific Inquiry.
			✓	6. Values (Ethical mode of thinking or application of ethical perception).
	✓			7. Aesthetic mode of thinking.
✓				**B. Acquiring a Body of Knowledge or Understanding Essential to an Educated Person**
			✓	**C. Understanding the Physical Nature of Human Beings**
				D. Collateral Skills:
			✓	1. Use of the library.
		✓		2. Use of computing technology.

III. The LS criteria indicate six ways that courses should contribute to students' abilities. Please check all that apply. When you meet with the LSC, you may be asked to explain your check marks.

___ 1. Confront the major ethical issues which pertain to the subject matter; realize that although "suspended judgment" is a necessity of intellectual inquiry, one cannot live forever in suspension; and make ethical choices and take responsibility for them.

✓ 2. Define and analyze problems, frame questions, evaluate available solutions and make choices.

✓ 3. Communicate knowledge and exchange ideas by various forms of expression, in most cases writing and speaking.

✓ 4. Recognize creativity and engage in creative thinking.

✓ 5. Continue learning even after the completion of their formal education.

✓ 6. Recognize relationships between what is being studied and current issues, thoughts, institutions, and/or events.

LIBERAL STUDIES COURSE APPROVAL, PART IV:

A. There will be a common syllabus of topics that should be covered by each of the individual instructors teaching this course. The common syllabus will include, but not be limited to, topics which introduce the student to deductive reasoning, develop problem solving skills, enable the student to understand the underlying principles of formulae and extend the student's ability to use and interpret numerical data.

The Mathematics Department has in place a Service Courses Committee, which oversees courses offered by the department as a service for other departments. MATH 105 College Algebra will be under the jurisdiction of this committee, which will assure that basic equivalency exists among sections.

B. Whenever appropriate, information will be introduced into the classroom discussion which will reflect the contributions made to mathematics by women and minorities. Particular attention will be given to the following areas as they relate to this topic:

1. The classroom discussion will be sensitive to gender balancing with respect to language;
2. Quizzes, tests, examinations, and any other written information distributed to the students will be sensitive to gender balancing, especially in problem construction, and to minorities whenever possible;
3. Specific names and contributions made by women and other members of minority groups will be discussed in the classroom when the discussion of such is germaine to the material being studied.

C. The Mathematics Department requests an exception to the required reading criteria for Liberal Studies courses since the primary purpose of the course is the development of higher level quantitative skills. MATH 105 College Algebra is designed to prepare students for MATH 115 Applied Mathematics for Business and MATH 121 Calculus I for Business, Natural, and Social Sciences, where it will replace MA 110 Elementary Functions for most students. The prerequisite for MA 121 will be changed from "MATH 110 or high school equivalent" to "MATH 105 or MATH 110 or appropriate Placement Test Score or permission of the Mathematics Department Chairperson." The Mathematics Department currently offers two calculus sequences, MATH 121/122 and MATH 123/124 Calculus for Physics and Chemistry, and a one semester calculus course for students in the College of Business, MATH 115 Applied Mathematics for Business. Although these calculus courses are quite different in their level of expectations, MATH 121 and MATH 123 now have the same prerequisite, namely MATH 110. MATH 105 was introduced as an alternative to MATH 110 for students who are required to complete MATH 115 or MATH 121 rather than the more demanding course MATH 123. This will enable us to concentrate on the specific topics that will better prepare students for their required course.

D. The thrust of MATH 105 is not to be remedial in nature but rather to develop in the student an awareness of, and an appreciation for, the power and usefulness of mathematics and its important role in a technological society. In particular, the course is meant to improve the

mathematical maturity of students to the point where they are prepared to enroll in an introductory applied calculus course. Additionally, this course should enable students to develop confidence in handling numerical problems, present the student with an opportunity to develop an appreciation for mathematic, and allow the introduction to students of graphics calculators and/or mathematical computer software.

CHECK LIST -- MATHEMATICS
(Learning Skills Area)

Mathematics Criteria which the Course must meet:

✓ Introduce students to deductive reasoning

✓ Develop in the student problem solving techniques appropriate for the course

✓ Enable the student to understand the underlying principle of formulas

✓ Enable the student to use and interpret numerical information

Courses appropriate to the Mathematics Learning Skills Area must be either:

✓ **A.** Mathematics courses that develop significant mathematical skills required by a major discipline

____ **B.** Mathematics courses designed for Liberal Studies

Additional criteria which courses in Category B must meet:

____ Develop the student's confidence in handling numerical problems and data.

____ Be sensitive to the diverse background characteristics of the student

____ Include elements on the history or appreciation of mathematics

____ Introduce the hand-held calculator or the computer as a tool

Mathematics Department Curriculum Changes 01-62a

Response Form

✓ The Mathematics Department has informed me of the proposed changes listed below, and I support these changes.

___ The Mathematics Department has informed me of the proposed changes listed below, and I do not support these changes.

Comments:

MANAGEMENT
Department

Prabhakar B.N 5/31/2001
Chairperson / Date

1. MATH 105 College Algebra: Change in prerequisite.

2. MATH 121 Calculus I for Business, Natural and Social Sciences: Change in prerequisite, catalog description, and title.

3. MATH 122 Calculus II for Business Natural and Social Sciences: Change in prerequisite and title.

Mathematics Department Curriculum Changes

Response Form

✓ The Mathematics Department has informed me of the proposed changes listed below, and I support these changes.

___ The Mathematics Department has informed me of the proposed changes listed below, and I do not support these changes.

Comments:

Accounting
Department

Chairperson / Date 6/1/01

1. MATH 105 College Algebra: Change in prerequisite.

2. MATH 121 Calculus I for Business, Natural and Social Sciences: Change in prerequisite, catalog description, and title.

3. MATH 122 Calculus II for Business Natural and Social Sciences: Change in prerequisite and title.

Mathematics Department Curriculum Changes

Response Form

✓ The Mathematics Department has informed me of the proposed changes listed below, and I support these changes.

___ The Mathematics Department has informed me of the proposed changes listed below, and I do not support these changes.

Comments:

Finance & Legal Studies
Department

Ibrahim Affaneh 6/1/01
Chairperson / Date

1. MATH 105 College Algebra: Change in prerequisite.

2. MATH 121 Calculus I for Business, Natural and Social Sciences: Change in prerequisite, catalog description, and title.

3. MATH 122 Calculus II for Business Natural and Social Sciences: Change in prerequisite and title.

Mathematics Department Curriculum Changes

Response Form

✓ The Mathematics Department has informed me of the proposed changes listed below, and I support these changes.

___ The Mathematics Department has informed me of the proposed changes listed below, and I do not support these changes.

Comments:

Masons

Masons Department

June 13, 2001

Chairperson / Date

1. MATH 105 College Algebra: Change in prerequisite.

2. MATH 121 Calculus I for Business, Natural and Social Sciences: Change in prerequisite, catalog description, and title.

3. MATH 122 Calculus II for Business Natural and Social Sciences: Change in prerequisite and title.

Mathematics Department Curriculum Changes

Response Form

X The Mathematics Department has informed me of the proposed changes listed below, and I support these changes.

___ The Mathematics Department has informed me of the proposed changes listed below, and I do not support these changes.

Comments:

Safety Sciences
Department

Lon H. Ferguson 5/31/01
Chairperson / Date

1. MATH 105 College Algebra: Change in prerequisite.

2. MATH 121 Calculus I for Business, Natural and Social Sciences: Change in prerequisite, catalog description, and title.

3. MATH 122 Calculus II for Business Natural and Social Sciences: Change in prerequisite and title.

Mathematics Department Curriculum Changes

Response Form

✓ The Mathematics Department has informed me of the proposed changes listed below, and I support these changes.

___ The Mathematics Department has informed me of the proposed changes listed below, and I do not support these changes.

Comments:

Spanish & Classical Lang
Department

R. Roger Smith 6-4-01
Chairperson / Date

1. MATH 105 College Algebra: Change in prerequisite.

2. MATH 121 Calculus I for Business, Natural and Social Sciences: Change in prerequisite, catalog description, and title.

3. MATH 122 Calculus II for Business Natural and Social Sciences: Change in prerequisite and title.

Mathematics Department Curriculum Changes

Response Form

✓ The Mathematics Department has informed me of the proposed changes listed below, and I support these changes.

___ The Mathematics Department has informed me of the proposed changes listed below, and I do not support these changes.

Comments:

GEOGRAPHY
Department

Chairperson / Date 8/1/01

1. MATH 105 College Algebra: Change in prerequisite.

2. MATH 121 Calculus I for Business, Natural and Social Sciences: Change in prerequisite, catalog description, and title.

3. MATH 122 Calculus II for Business Natural and Social Sciences: Change in prerequisite and title.

Mathematics Department Curriculum Changes

Response Form

✓ The Mathematics Department has informed me of the proposed changes listed below, and I support these changes.

___ The Mathematics Department has informed me of the proposed changes listed below, and I do not support these changes.

Comments:

Nursing and Allied Health Professions
Department

Chairperson / Date 6-4-01

1. MATH 105 College Algebra: Change in prerequisite.

2. MATH 121 Calculus I for Business, Natural and Social Sciences: Change in prerequisite, catalog description, and title.

3. MATH 122 Calculus II for Business Natural and Social Sciences: Change in prerequisite and title.

Mathematics Department Curriculum Changes

Response Form

✓ The Mathematics Department has informed me of the proposed changes listed below, and I support these changes.

___ The Mathematics Department has informed me of the proposed changes listed below, and I do not support these changes.

Comments:

Biology — W. Bo Bo 8/7/01

Department — Chairperson / Date

1. MATH 105 College Algebra: Change in prerequisite.

2. MATH 121 Calculus I for Business, Natural and Social Sciences: Change in prerequisite, catalog description, and title.

3. MATH 122 Calculus II for Business Natural and Social Sciences: Change in prerequisite and title.

Mathematics Department Curriculum Changes

Response Form

__ The Mathematics Department has informed me of the proposed changes listed below, and I support these changes.

__ The Mathematics Department has informed me of the proposed changes listed below, and I do not support these changes.

Comments:

Computer Science
Department

Gary L Bertenthal Jan 18, 2001
Chairperson Date

1. MATH 105 College Algebra: Change in prerequisite.

2. MATH 121 Calculus I for Business, Natural and Social Sciences: Change in prerequisite, catalog description, and title.

3. MATH 122 Calculus II for Business Natural and Social Sciences: Change in prerequisite and title.

Mathematics Department Curriculum Changes

Response Form

✓ The Mathematics Department has informed me of the proposed changes listed below, and I support these changes.

___ The Mathematics Department has informed me of the proposed changes listed below, and I do not support these changes.

Comments:

Geoscience
Department

Darlene Richardson 6/13/01
Chairperson / Date

1. MATH 105 College Algebra: Change in prerequisite.

2. MATH 121 Calculus I for Business, Natural and Social Sciences: Change in prerequisite, catalog description, and title.

3. MATH 122 Calculus II for Business Natural and Social Sciences: Change in prerequisite and title.

Mathematics Department Curriculum Changes

Response Form

✓ The Mathematics Department has informed me of the proposed changes listed below, and I support these changes.

___ The Mathematics Department has informed me of the proposed changes listed below, and I do not support these changes.

Comments:

Physics
Department

Richard O. Roberts 6/8/01
Chairperson / Date

1. MATH 105 College Algebra: Change in prerequisite.

2. MATH 121 Calculus I for Business, Natural and Social Sciences: Change in prerequisite, catalog description, and title.

3. MATH 122 Calculus II for Business Natural and Social Sciences: Change in prerequisite and title.

Mathematics Department Curriculum Changes

Response Form

✓ The Mathematics Department has informed me of the proposed changes listed below, and I support these changes.

___ The Mathematics Department has informed me of the proposed changes listed below, and I do not support these changes.

Comments:

Chemistry
Department

Russell VanJoosen Ramsey
Chairperson / Date
August 24, 2001

1. MATH 105 College Algebra: Change in prerequisite.

2. MATH 121 Calculus I for Business, Natural and Social Sciences: Change in prerequisite, catalog description, and title.

3. MATH 122 Calculus II for Business Natural and Social Sciences: Change in prerequisite and title.

Mathematics Department Curriculum Changes

Response Form

✓ The Mathematics Department has informed me of the proposed changes listed below, and I support these changes.

___ The Mathematics Department has informed me of the proposed changes listed below, and I do not support these changes.

Comments:

MIS/DS
Department

Louise B Bush 9/25/01
Chairperson Date

1. MATH 105 College Algebra: Change in prerequisite.

2. MATH 121 Calculus I for Business, Natural and Social Sciences: Change in prerequisite, catalog description, and title.

3. MATH 122 Calculus II for Business Natural and Social Sciences: Change in prerequisite and title.

To: Dr. Charles McCreary, Chairperson
French/German Department

From: Gerald Buriok, Chairperson
Mathematics Department

Date: September 13, 2001

Subject: Proposed Mathematics Curricula Revisions

Attached to this memo is a copy of proposed mathematics curricula revisions that may affect your department. This is the same material that was originally sent to your department on June 1, 2001. Professor Op De Beeck returned the original with a note saying I should send them to Dr. Liscinsky later in the summer. Considering the unfortunate events that occurred, I have held off until now.

Please consider these proposed revisions and return the response form to me at your earliest convenience.

Jerry Buriok

From: Jerry Buriok <jburiok@grove.iup.edu>
To: <karatjas@iup.edu>
Cc: Jerry Buriok <jburiok@grove.iup.edu>
Sent: Friday, July 06, 2001 8:37 AM
Subject: Math Curriculum Proposals

Hi Nick,

I haven't heard back from you about the curriculum proposals for MATH 105, 110, 121, 122, 123, 124 that I sent out around the first of June. Any chance you could dig those out and fill out the response form I provided? If you can't find them, let me know and I will send another copy.

Jerry Buriok