

UWUCC/LBST →
via COE
4/9

LSC Use Only No:	LSC Action-Date:	UWUCC USE Only No.	UWUCC Action-Date:	Senate Action Date:
		09-24L	AP-12/8/09	App-4/20/10

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person John D. Baker	Email Address jdbaker@iup.edu
Proposing Department/Unit Mathematics	Phone 724-357-3795

Check all appropriate lines and complete information as requested. Use a separate cover sheet for each course proposal and for each program proposal.

1. Course Proposals (check all that apply)

New Course Course Prefix Change Course Deletion
 Course Revision Course Number and/or Title Change Catalog Description Change

MATH 152 Elements of Mathematics II	
<u>Current Course prefix, number and full title</u>	<u>Proposed course prefix, number and full title, if changing</u>

2. Additional Course Designations: check if appropriate

This course is also proposed as a Liberal Studies Course. Other: (e.g., Women's Studies, Pan-African)
 This course is also proposed as an Honors College Course.

3. Program Proposals

New Degree Program Program Title Change Other
 New Minor Program New Track
 Catalog Description Change Program Revision

<u>Current program name</u>	<u>Proposed program name, if changing</u>
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4. Approvals		Date
Department Curriculum Committee Chair(s)	<i>[Signature]</i>	3-26-9
Department Chair(s)	<i>[Signature]</i>	3-27-09
College Curriculum Committee Chair	<i>[Signature]</i>	6/7/03/09
College Dean	<i>[Signature]</i>	4/7/09
Director of Liberal Studies *	<i>[Signature]</i>	4/8/10
Director of Honors College *		
Provost *		
Additional signatures as appropriate: (include title)	Joseph Domanack TECC	4/28/09
	May Ann Rajath TECC	4/28/09
UWUCC Co-Chairs	<i>[Signature]</i>	1/22/10

* where applicable

Received
JAN 22 2010

Received
NOV 17 2009

Part II. Description of Curriculum Change

1. New Syllabus of Record

I. CATALOG DESCRIPTION

MATH 152 Elements of Mathematics II

3c-01-3cr

Prerequisite: MATH 151

Topics included are organizing and analyzing data, statistics, probability, geometric shapes, measurement, congruence and similarity, coordinate geometry, and transformational geometry.

II. COURSE OUTCOMES

RELATIONSHIP OF COURSE TO COLLEGE CONCEPTUAL FRAMEWORK: The College of Education has developed a teacher education program based upon a preservice teacher who is competent in content and pedagogy. MATH 152 is a content course which broadens and deepens the student's knowledge of the mathematics content of the elementary grades as a vehicle to develop a pedagogical framework for learning to teach mathematics. In the course, students use a variety of materials for learning, work with conceptual models, use conceptual models to do mathematics, perform activities that develop new perspectives, and demonstrate competence in elementary school mathematics. These activities help preservice teachers become reflective practitioners who are capable of inquiry into a variety of methods of communicating mathematics while learning to collaborate and interact with their peers and with experienced teachers.

The student will:

1. develop and demonstrate knowledge of elementary school geometry content, concepts, and skills.
2. develop and demonstrate knowledge of elementary school measurement content, concepts, and skills.
3. develop and demonstrate knowledge of elementary school data analysis and probability content, concepts, and skills.
4. use and explain mathematical representations, reasoning, problem solving, and communication in order to gain insight and perspective into the nature of mathematics as taught in the elementary school.
5. demonstrate that one is a learner and doer of mathematics by actively engaging in problem solving, applying multiple strategies to solve problems, and making sense of solutions found.

Course Objective	College Conceptual Framework / Danielson	INTASC Standard /Principle	NCATE / ACEI Elementary Education Program Standard	Course Assessment Measuring Objective
1	1a – Content & Pedagogy	1, 4	2.3 Mathematics	Outcomes Assessment: Geometry Exam
2	1a – Content & Pedagogy	1, 4	2.3 Mathematics	Tests, Projects, and Quizzes
3	1a – Content & Pedagogy	1, 4	2.3 Mathematics	Tests, Projects, and Quizzes
4	1a – Content & Pedagogy	1, 4	2.3 Mathematics	Tests, Projects, and Quizzes

5	1b – Knowledge of Students	9	2.3 Mathematics	Projects and Quizzes
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III. COURSE OUTLINE / TIME SCHEDULE

- A. Statistics (*Objectives #3, #4, #5*) 12 academic hours
1. Organizing and Picturing Information
 2. Analyzing Data
 3. Misleading Graphs and Statistics
- B. Probability (*Objectives #3, #4, #5*) 10 academic hours
1. Probability and Simple Experiments
 2. Probability and Complex Experiments
 3. Simulations, Expected Value, Odds, and Conditional Probability
 4. Additional Counting Techniques
- C. Geometric Shapes (*Objectives #1, #4, #5*) 4 academic hours
1. Recognizing Geometric Shapes and Definitions
 2. Analyzing Shapes
 3. Properties of Geometric Shapes: Lines and Angles
 4. Regular Polygons and Tessellations
 5. Describing Three-Dimensional Shapes
- D. Measurement (*Objectives #2, #4, #5*) 5 academic hours
1. Measurement with Nonstandard and Standard Units
 2. Length and Area
 3. Surface Area
 4. Volume
- E. Geometry Using Triangle Congruence and Similarity (*Objectives #1, #4*) 3 academic hours
1. Congruence of Triangles
 2. Similarity of Triangles
 3. Basic Euclidean Constructions
 4. Additional Euclidean Constructions
 5. Geometric Problem Solving Using Triangle Congruence and Similarity
- F. Geometry Using Coordinates (*Objectives #1, #4*) 2 academic hours
1. Distance and Slope in the Coordinate Plane
 2. Equations and Coordinates
 3. Geometric Problem Solving Using Coordinates
- G. Geometry Using Transformations (*Objectives #1, #4*) 2 academic hours
1. Transformations
 2. Congruence and Similarity Using Transformations
 3. Geometric Problem Solving Using Transformations

This syllabus covers 38 academic hours leaving 4 academic hours for testing and/or review. The final is an additional 2 academic hours.

IV. EVALUATION METHODS

Criteria used in assessing the competency of the student will vary depending upon the instructor, but generally include examinations, projects, presentations, lab activities, writing assignments, and class participation.

More specifically, the following guidelines are recommended:

- 60% Tests (tests and final). Tests provide a summative assessment of topics covered and fulfillment of course outcomes (*e.g., Geometry Exam to cover geometry*). Performance assessments consist of group and individual tasks and may be used as formative as well as summative evaluations.
- 20% Participation and Quizzes. Participation includes attendance, homework, and in-class activities. Quizzes provide a formative assessment of class members' understandings and fulfillment of course outcomes.
- 20% Projects. Projects include but are not limited to: in-class activities, in-class presentations, small-group project problems, course topic reflections, reviews of elementary school journals and textbooks, and a portfolio of student's work. Group and individual projects are assigned. Projects show students' understandings and application of course topics in order to fulfill course outcomes.

V. EXAMPLE GRADING SCALE

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

VI. UNDERGRADUATE-COURSE ATTENDANCE POLICY

The course attendance policy is consistent with the University policy.

VII. REQUIRED TEXT

Musser, Burger, & Peterson. (2006). *Mathematics for Elementary Teachers: A Contemporary Approach*, Seventh Edition. New York: John Wiley & Sons.

VIII. SPECIAL RESOURCE REQUIREMENTS

None.

IX. BIBLIOGRAPHY

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- National Council of Teachers of Mathematics. *Yearbooks*. Reston, Virginia
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- National Council of Teachers of Mathematics. *Curriculum and Evaluation Standards for School Mathematics, Addenda Series*. Reston, Virginia
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- Van De Walle, J. (2007). *Elementary and middle school mathematics: Teaching developmentally*. New York: Pearson.

2. Summary of the Revision

We propose to change the catalog description for the course, and establish a current syllabus of record.

Current – MATH 152 Elements of Mathematics II

3c-01-3cr

Prerequisites: MATH 151

Topics included are sentences in one variable, sentences in two variables, nonmetric geometry, metric geometry, coordinate geometry, introduction to statistics and probability, computers, and calculators.

Proposed – MATH 152 Elements of Mathematics II

3c-01-3cr

Prerequisite: MATH 151

Topics included are organizing and analyzing data, statistics, probability, geometric shapes, measurement, congruence and similarity, coordinate geometry, and transformational geometry.

3. Rationale for the Revision

1. Catalog Description Change.

The new wording in the catalog description indicates the course content as it is currently taught. References to algebra, computers, and calculators were replaced with working with data.

Rationale: The course content has evolved over the years. Algebra is now part of MATH 151. Working with computers and calculators is integral to the course content rather than a separate topic. Changes in wording about geometry make the description more clear; the topics in geometry remain the same.

2. Course Revision - Syllabus of Record

Rationale: The last syllabus in our files is from 1989 and this revision is consistent with the content prescribed in the new state guidelines.

4. Old Syllabus of Record

Next page

INDIANA UNIVERSITY OF PENNSYLVANIA
MATHEMATICS DEPARTMENT

COURSE NUMBER: MA 152
COURSE TITLE: Mathematics for Elementary Teachers II
CREDITS: 3 Semester Hours
PREREQUISITES: ~~None~~ MA 151
CATALOG DESCRIPTION: Topics included are sentences in one variable, sentences in two variables, nonmetric geometry, metric geometry, coordinate geometry, introduction to statistics and probability, computers, and calculators.
PRESENT TEXT: Mathematics for Elementary School Teachers by James E. Schultz

COURSE OUTLINE:

Chapter 7	Integers
7.1	Defining Integers
7.2	Operations with Integers
Chapter 8	Some Fields
8.1	Rational Numbers
8.2	Real Numbers
8.3	Clock Arithmetic
Chapter 9	Geometry
9.1	Problem Solving in Geometry
9.2	Geometry of Shapes
9.3	Congruence: Polygons and Circles
9.4	Geometric Relations
Chapter 10	Measurement
10.1	Length and Perimeter
10.2	Angle Measure
10.3	Area
10.4	Space Figures and Their Measure
Chapter 11	Further Topics in Geometry
11.1	Constructions
11.2	The Pythagorean Theorem
11.3	Symmetry and Transformations

Chapter 12

Probability and Statistics, Graphs and
Functions

12.1

Probability

12.4

Relations and Functions

Appendix

Logic and Proof

Part III. Letters of Support or Acknowledgement

1. ELED & ECED – George Bieger



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in Education
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570 South Eleventh Street
Indiana, Pennsylvania 15705-1050

P 724-357-2400
F 724-357-2961
www.iup.edu/pse

February 27, 2009

To Whom It May Concern:

I am writing in reference to the proposed changes in several courses (i.e., MATH 151, MATH 152, MATH 320, and MATH 313) in the Department of Mathematics that will affect undergraduate students in Elementary Education and Early Childhood Education in our department.

The Professional Studies in Education faculty has collaborated successfully for many years with faculty in the Department of Mathematics and we are very familiar with the courses and the proposed changes. The proposed revisions are being made to make these courses, and therefore our programs, consistent with the standards dictated by the Pennsylvania Department of Education (PDE). The proposed revisions are necessary for IUP's teacher education programs to remain fully accredited by the PDE as approved teacher certification programs.

The proposed changes have the full and unqualified support of the Department of Professional Studies in Education, and we encourage all relevant entities (i.e., UWUCC and the University Senate) to approve the proposed revisions.

Please contact me if you have a need for additional information, or if you have any questions.

Sincerely,

A handwritten signature in black ink that reads 'George R. Bieger'.

George R. Bieger, Ph.D.
Professor and Acting Chairperson

2. EDEX, SPLP, & EDHL - Joseph Domaracki

Joseph W. Domaracki ,Ph.D. wrote:

> Dr. Baker,

> I a writing in support of the proposed changes to MATH 151 and MATH
> 152. The changes made particularly in MATH 151 are welcomed changes that
> will facilitate a smoother registration process for education majors.

>

> Joseph Domaracki

> Chair

> Department of Special Education and Clinical Services.

>

> John Baker wrote:

>> To: George Bieger for ELED & ECED

>> Joe Domaracki for EDEX, SPLP, & EDHL

>> Sally McCombie for CNSV

>> Bob Sweeney for ARED

>> Fredalene Bowers for CDFR

>>

>> I am looking for letters or emails of support from your department for
>> the proposed changes to MATH 151 & MATH 152 (attached). I do not
>> believe that there are any significant changes that affects your
>> program. If you are not the contact person, please forward.

>>

>> For MATH 151, we propose adding as a prerequisite the majors that are
>> already in effect for the liberal studies limitation.

>>

>> For MATH 152, we propose a change in the catalog description of the
>> course to fit what is already taught.

>>

>> Thanks,

>> John

>>

>

--

Dr. John D. Baker
Mathematics Department
Indiana University of Pennsylvania
Indiana, PA 15705

(724)357-3795
jdbaker@iup.edu

3. FCSE - Sally McCombie:

On Fri, 27 Feb 2009 09:54:30 -0500

"Sally M McCombie" <smccomb@iup.edu> wrote:

> Hello John,

> I support the changes. You are correct in that my majors are

>required to take both MATH 151 and 152; however, my majors are not

>CNSV they are FCSE.

> Thank you.

> Sally

>

> Sally M. McCombie, Ph.D., Certified Family Life Educator

> President-Elect -Pennsylvania Association of FCS

> Indiana University of PA

> Human Development & Environmental Studies

> 207 Ackerman Hall

> Indiana, PA 15705

> (724)357-2336

>

> On Fri, 27 Feb 2009 09:46:40 -0500

> John Baker <jdbaker@iup.edu> wrote:

>>To: George Bieger for ELED & ECED

>> Joe Domaracki for EDEX, SPLP, & EDHL

>> Sally McCombie for CNSV

>> Bob Sweeney for ARED

>> Fredalene Bowers for CDFR

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>>I am looking for letters or emails of support from your department

>>for the proposed changes to MATH 151 & MATH 152 (attached). I do not

>>believe that there are any significant changes that affects your

>>program. If you are not the contact person, please forward.

>>

>>For MATH 151, we propose adding as a prerequisite the majors that are

>>already in effect for the liberal studies limitation.

>>

>>For MATH 152, we propose a change in the catalog description of the

>>course to fit what is already taught.

>>

>>Thanks,

>>John

>>

>>--

>>

>>Dr. John D. Baker

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>>

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>>jdbaker@iup.edu

4. ARED - Robert Sweeney

March 13, 2009

Dr. John D. Baker
Mathematics Department
Indiana University of Pennsylvania
Indiana, PA 15705

Dr. Baker,

I have reviewed your proposal for proposed changes to MATH 151 & MATH 152. As I see no significant changes that affect the Art Education program, I am in support of these changes. I appreciate the opportunity to review these revisions. Please feel free to contact me if you require further input, and good luck with your program changes.

Sincerely,

A handwritten signature in black ink, appearing to read 'BOB SWEENEY', with a stylized flourish at the end.

Bob Sweeney

Bob Sweeney, PhD
Assistant Professor, Art and Art Education
Coordinator of Art Education
College of Fine Arts
115 Sprowls Hall
Indiana University of Pennsylvania
Indiana, PA 15701
sweeney@iup.edu

5. CDFR - Fredalene Bowers

Fredalene B Bowers wrote:

> John,

>

> The proposed course charges seem appropriate. These courses will meet
> the needs of our majors. Good luck.

>

> Freddie

>

> Fredalene B. Bowers, Ph.D., Professor

> Program Coordinator, Child & Family Studies Program

>

>

>

>

>

> Fredalene B. Bowers, Ph.D., Professor

> Coordinator, Child & Family Studies Program

> Department of Human Development and Environmental Studies

> Ackerman Hall, Room 112B

> Indiana University of Pennsylvania

> Indiana, Pennsylvania 15705

> Office Phone: 724 357-4046

> Fax: 724 357-5941

LIBERAL STUDIES COURSE APPROVAL, PARTS I-III: 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

- | | |
|---|--|
| <input checked="" type="checkbox"/> _____ | A. Intellectual Skills and Modes of Thinking: |
| _____ <input checked="" type="checkbox"/> _____ | 1. Inquiry, abstract logical thinking, critical analysis, synthesis, decision making, and other aspects of the critical process. |
| <input checked="" type="checkbox"/> _____ | 2. Literacy--writing, reading, speaking, listening. |
| _____ <input checked="" type="checkbox"/> _____ | 3. Understanding numerical data. |
| _____ <input checked="" type="checkbox"/> _____ | 4. Historical consciousness. |
| _____ <input checked="" type="checkbox"/> _____ | 5. Scientific Inquiry. |
| _____ <input checked="" type="checkbox"/> _____ | 6. Values (Ethical mode of thinking or application of ethical perception). |
| _____ <input checked="" type="checkbox"/> _____ | 7. Aesthetic mode of thinking. |
| <input checked="" type="checkbox"/> _____ | B. Acquiring a Body of Knowledge or Understanding Essential to an Educated Person |
| _____ _____ <input checked="" type="checkbox"/> _____ | C. Understanding the Physical Nature of Human Beings |
| _____ _____ <input checked="" type="checkbox"/> _____ | D. Collateral Skills: |
| _____ <input checked="" type="checkbox"/> _____ | 1. Use of the library. |
| _____ <input checked="" type="checkbox"/> _____ | 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 that 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.

A. Intellectual Skills and Modes of Thinking:

1. Inquiry, abstract logical thinking, critical analysis, synthesis, decision making, and other aspects of the critical process.

The study of mathematics requires the student to use these categories to collect data (the given, known quantities), clearly state the problem under study, apply the methods known to arrive at a solution to the problem, and analyze and interpret the solution in the context of the problem. These concepts are especially important for those students who will someday be instructing young children in elementary and middle schools.

2. Literacy--writing, reading, speaking, listening.

All of these can be applied and improved in this course. Reading skills are necessary for a clear understanding of the material; the writing of and orally explaining solutions to a mathematical problem requires clarity of mind and organization of thought; the requirement of discussing mathematics in the classroom shows the student the importance of clear patterns of thinking and of the importance of the expression of those thought orally; listening skills are very important in the understanding of mathematics. These skills will be improved through the writing on homework and tests, through the oral response to classroom questions, and through the reading of assignments. In this course, students are often asked to explain solutions to problems in writing and orally.

3. Understanding numerical data.

No data is meaningful without interpretation and the study of mathematics attempts to train the student in the methods and skills needed to interpret data correctly.

4. Historical consciousness.

Student will become aware of the historical development of strategies, algorithms, and methods of recording mathematics in western and non-western civilizations and their relationship to the education of children in elementary and middle schools. Textbooks used for this course contain references to historical developments. Instructors include activities from historical sources to highlight concepts of study.

5. Scientific Inquiry.

Students will be made aware of the importance of informal mathematical logic and the role it plays in developing more formal, scientific inquiry and problem solving techniques used throughout science. Of interest is the manner in which people use the structure of mathematics to construct problem solving techniques, and improve methods of decision making and deductive reasoning.

7. Aesthetic mode of thinking.

Mathematics is a beautiful art form. An effort will be made to develop in the student a sense of this beauty and an appreciation for its power at utility.

B. Acquiring a Body of Knowledge or Understanding Essential to an Educated Person

Although mastery of a specific area of mathematics is not required of all students, it is important that all students develop a sense of the importance of mathematics to society. In addition, the course of study should develop in the student a feeling of confidence in their ability to use the mathematical skills learned in their particular mathematics course.

D. Collateral Skills:

2. Use of computing technology.

Students need to be aware of the importance of computers and calculators in the educational process. Students will make use of hand-held calculators, observe demonstrations of web technologies, and where appropriate, take part in lab or homework assignments that utilize commercially-available or web-based programs.

IV. LIBERAL STUDIES COURSE APPROVAL, PART IV:

- A. Within the department, there is a curriculum committee, the Elementary Mathematics Education Committee (EMEC), which oversees this course's scheduling, staffing, and the textbook selection. Most sections of this course are taught by members of EMEC who regularly meet and discuss issues related to the course. A Reflective Practice group was formed by the members of EMEC to discuss implementation of a recent textbook.
- B. There are many contributions to the mathematics in this course. Algorithms, games, and visual representations come from many cultures. As mathematics educators who teach this course, we are aware of the need to recognize cultural and individual contributions. This course is presented in ways that provide perspectives to future teachers for teaching to all children with problem solving, cooperative learning, visual, and hands on approaches. The approaches we use to teach content are those that are recognized in the field for teaching children with learning disabilities, English-Language Learners, minorities, and women. In so doing, this enables us to use this course as a foundation for experiencing the mathematics and pedagogy that is presented in subsequent courses delivered to education majors. In the textbooks we use for this course, authors explicitly give contributions to the mathematics by other cultures, women, and minorities. These textbook features are made mandatory reading assignments and used in classroom lessons by instructors of the course.
- C. This course is designed to develop higher level quantitative skills, and as such, the content does not include substantial literary works.
- D. This course is intended for selected majors who have chosen education as their major. The focus of this course is to develop perspectives appropriate for understanding mathematics in ways that make sense to children. As such, mathematics is presented in non-standard ways, such as using blocks, counters, or visual representations to show a mathematical concept or idea. Students practice the mathematics they have already learned, but also, students are involved in activities that show the math in ways they may not have seen or approaches they may have forgotten.

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