LSC Use Only No:	LSC Action-Date:	UWUCC USE Only No.	UWUCC Action-Date:	Senate Action Date:
		09-24a	AP-10/20/09	App-12/1/09

Curriculum Proposal Cover Sheet - University-Wide Undergraduate Curriculum Committee

Contact Person	Email Address
John D. Baker	jdbaker@iup.edu
Proposing Department/Unit	**Phone**
Mathematics	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

__X__Course Revision __X__Course Number and/or Title Change __X__Catalog Description Change

MATH 459 Technology in Elementary & Middle School Mathematics Instruction	MATH 459: Technology in Elementary/Middle Level Mathematics Instruction
***Current* Course prefix, number and full title**	***Proposed* course prefix, number and full title, if changing**

2. Additional Course Designations: check if appropriate

_____ This course is also proposed as a Liberal Studies Course.

_____ This course is also proposed as an Honors College Course.

_____ Other: (e.g., Women's Studies, Pan-African)

3. Program Proposals

_____Catalog Description Change _____Program Revision

_____New Degree Program _____Program Title Change _____Other

_____New Minor Program _____New Track

***Current* program name**	***Proposed* program name, if changing**

4. Approvals		**Date**
Department Curriculum Committee Chair(s)		3-9-09
Department Chair(s)		3-9-09
College Curriculum Committee Chair		03/16/09
College Dean		3-16-09
Director of Liberal Studies *		
Director of Honors College *		
Provost *		
Additional signatures as appropriate: (include title)	Joseph Demarandi TECL	07-06-09
	Mary Ann Rafoth	7-23-09
UWUCC Co-Chairs		
	Gail Sechrist	10/23/09

* where applicable

Received
SEP 01 2009
Liberal Studies

Received
OCT 23 2009
Liberal Studies

1. New Syllabus of Record, etc.

I. Catalog Description

MATH 459 Technology in Elementary/Middle Level Mathematics Instruction (3c-0l-3cr)
Prerequisite: MATH 152

Develops the knowledge, skills, and perspectives required for using educational technology in teaching mathematics at the Elementary/Middle Level. Hands-on experiences with technology are an important focus.

II. Course Outcomes

Students will:

1. employ various forms of educational technology for teaching mathematics. PDE Guidelines: I.F.1, I.F.6, I.F.9, II.B.1.c, II.B.6.f
2. analyze and create mathematics lessons using technology. PDE Guidelines: I.F.1, I.F.6, I.F.9, II.B.1.c, II.B.6.f
3. discuss educational technology resources for mathematics teachers. PDE Guidelines: I.F.1, I.F.6, I.F.9, II.B.1.c, II.B.6.f
4. apply findings from research on technology to mathematics education. PDE Guidelines: I.F.1, I.F.6, I.F.9, II.B.1.c, II.B.6.f
5. recognize the types and purposes of educational software for mathematics. PDE Guidelines: I.F.1, I.F.6, I.F.9, II.B.1.c, II.B.6.f
6. develop and apply criteria for evaluating educational software. PDE Guidelines: I.F.1, I.F.6, I.F.9, II.B.1.c, II.B.6.f

Course Outcomes	College Conceptual Framework / Danielson	INTASC Standard/ Principle	NCATE / NCTM Middle Level Mathematics Standards	Course Assessment Measuring Outcome
#1	1	1, 4	1, 3, 4, 5, 6, 8	Projects, Quizzes, Midterm, Final
#2	1	1, 4	1, 3, 4, 5, 6, 8	**Key Assessment: Technology-based Lesson Plan**
#3	1	1, 4	1, 3, 4, 5, 6, 8	Projects, Quizzes, Midterm, Final
#4	1	1, 4	1, 3, 4, 5, 6, 8	Projects, Quizzes, Midterm, Final
#5	1	1, 4	1, 3, 4, 5, 6, 8	Projects, Quizzes, Midterm, Final
#6	1	1, 4	1, 3, 4, 5, 6, 8	Projects, Quizzes, Midterm, Final

III. Course Outline

A. Mathematics Education Research Resources/Instructional uses of Spreadsheets
(*Outcomes #1, #3, #4, #6*) 12 academic hours

1. Research on using technology in the mathematics classroom
2. Spreadsheet Features
3. Using spreadsheets to create mathematical lessons such as Fraction Pies, Random Event Simulations, Magic Squares, Function machines, etc.

B. Internet Resources and Applets/ Theories of Learning
(*Outcomes #1, #3, #4, #5, #6*) 9 academic hours

1. NCTM Resources
2. Virtual Manipulatives
3. Other web resources
4. Theories of learning and how it relates to the use of technology in the mathematics classroom

C. Dynamic Geometry Software/Digital Imagery (*Outcomes #1, #3, #5, #6*) 9 academic hours

1. Overview of dynamic geometry software
2. Uses of Digital Imagery for mathematics instruction

D. Calculators and Probes (*Outcomes #1, #3, #4, #5, #6*) 6 academic hours

1. Orientation and fundamentals
2. Teaching basic skills, number concepts, and algebra
3. Problem –solving approaches to teaching
4. Current research and classroom usage
5. Data-collection devices and the teaching of algebra, probability, and statistics

E. Technology-based Lesson Plan Presentations (*Outcome #2*) 3 academic hours

This syllabus covers 39 academic hours, leaving 3 academic hours for testing and/or review. The final is an additional 2 academic hours.

IV. Evaluation Methods

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

10% Technology-based Lesson Plan. The Technology-based Lesson Plan is the **key assessments** and shall be required of all instructors.
10% Quizzes
10% Participation
30% Projects
20% Midterm
20% Final

The Technology-based Lesson Plan is the Key Assessment, comprising 10% of the course grade, and shall be required of all instructors.

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

VI. Undergraduate-Course Attendance Policy

Attendance policy will conform to university guidelines.

VII. Required Textbook

None.

VIII. Special Resource Requirements

This course requires the availability and use of the computer lab, a portable computer and display unit, video technology, a classroom set of graphing calculators with calculator- based laboratory units, and a classroom set of four-function and fraction calculators. The computer lab must have commercially-available, up-to-date software: word processor, spreadsheet, geometry exploration software, Internet browser, presentation and multimedia authoring program. Additionally, a cadre of up-to-date educational software for the teaching and learning of mathematics must be maintained and available. At present, the Mathematics Department has a lab that meets these requirements.

IX. Bibliography

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Flores, A. (2006). Using technology in your classroom, *ON-Math 2006*, Volume 4, Number 1

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McGehee, J. & Griffith, L.K. (2004). Technology enhances student learning across the curriculum, *Mathematics Teaching In The Middle School*, Volume 9, Issue 6.

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Timmerman, M. A., (2004).Using the internet: Are prospective elementary teachers prepared to teach with technology?, *Teaching Children Mathematics*, Volume 10, Issue 8.

Wiebe, J., (1993). Computer tools and problem solving in mathematics, Wilsonville, OR. Franklin, Beedle & Associates, Inc.

2. Summary of the Revision

We propose to change the name and prerequisite for the course, and establish a current syllabus of record. We have no syllabus of record on file.

Current – MATH 459 Technology in Elementary & Middle School Mathematics Instruction
3c-0l-3cr

Prerequisites: MATH 152, Elementary Education concentrate.

Intended to develop the knowledge, skills and perspectives required for using education technology in teaching mathematics at the elementary and middle school levels. Participants will have hands-on experiences with technology.

Proposed – MATH 459: Technology in Elementary/Middle Level Mathematics Instruction
3c-0l-3cr

Prerequisites: MATH 152

Develops the knowledge, skills, and perspectives required for using educational technology in teaching mathematics at the elementary and middle school levels. Participants will have hands-on experiences with technology.

3. Rationale for the Revision

Overview

The state of Pennsylvania has mandated changes to teacher training programs to support its new teacher licensing scheme. The current program for elementary grades K-6 is being replaced by new requirements for two training programs in: (1) Grades pre-K to 4 and (2) Grades 4-8.

These mandates from the state require revisions to existing courses and the addition of new courses. For Grades pre-K to 4, the new IUP teacher training program includes two courses in methods of teaching. The two new methods courses are revisions of existing methods courses for early childhood and elementary education.

For Grades 4 to 8, the new IUP teacher training program must provide coursework for prospective teachers to teach all subjects, but with a specialty in one subject area. The new program has four subject area tracks with mathematics being one track. The Mathematics Department, which supports the current K-6 program through a math concentrate for elementary education majors, will have a greater role in the math-track program.

The new math-track program will consist of nine mathematics content and one methods of teaching courses. The existing math concentrate courses (of which MATH 459 is one) need approval for revisions to fit the requirements of the new math-track program. Three new courses also need approval. The three other tracks will include three math content courses and one methods of teaching course drawn from the Mathematics Department's math-track courses.

1. Catalog Name Change

   Rationale: This change makes the name of the course consistent with the course name designations in new state guidelines.

2. Prerequisite Change

   Rationale: The reference to a concentrate was eliminated. Under the new state mandates for teacher preparation programs, the concentrate for elementary education majors will not apply to students in this program.

3. Catalog Description Change

   Rationale: The minor wording change is intended to make the description more direct.

4. Course Revision - Syllabus of Record

   Rationale: A syllabus of record could not be located and this revision is consistent with the content prescribed in the new state guidelines. As requested by TECC, the syllabus below is from a prior teaching of the course.

4. Old Syllabus

Next page

Course Number: MA 459

Course Title: Technology in Elementary and Middle School Mathematics Instruction

Credits: 3 credits
3 lecture hours
0 lab hours

Prerequisites: Ma 152 & Elementary Education Concentrate

Catalog Description:

This course is intended to develop the knowledge, skills, and perspectives required for using educational technology in teaching mathematics at the elementary and middle school levels. Participants will have hands-on experiences with technology.

COURSE OBJECTIVES:

To learn how to use various forms of educational technology for teaching mathematics.
To analyze and create mathematics lessons using technology.
To explore educational technology resources for mathematics teacher and to utilize technology in finding mathematics curriculum at the elementary and middle school levels.
To apply findings from research on technology to mathematics education.
To learn the types and purposes of educational software for mathematics.
To develop and apply criteria for evaluating educational software.
To learn how to use calculators in teaching basic skills, algebra, and problem solving.
To use calculators to collect, represent, and interpret data.
To explore and apply technology for teaching programming, algebra, and geometry.
To learn and apply presentation software to mathematics lessons.

COURSE OUTLINE:

Course Topic

A. Mathematics Education Research and Resources (1week)
1. Sources Utilizing technology
2. Educational resources via technology (such as the Internet)
3. Current research and issues in teaching mathematics with technology

B. Using Data Organization Technology to Teach Mathematics (4 weeks)
1. Learning how to use the technology
2. Problem-solving approaches to teaching topics such as:
a. basic skills
b. algebra
c. number concepts
d. pattern
e. logic
f. probability
g. statistics

3. Creating mathematics lessons
4. Current research

C. Educational Mathematics Software (4 weeks)
1. Foundations and purposes
2. Developing and using criteria for evaluation
3. Integrating educational software in mathematics textbook lessons to teach topics such as:
    a. Basic skills
    b. algebra
    c. number concepts
    d. pattern
    e. logic
    f. probability
    g. statistics

D. Calculators (2 weeks)
1. Orientation and fundamentals
2. Teaching basic skills, number concepts, and algebra
3. Problem –solving approaches to teaching
4. Current research and classroom usage
5. Data-collection devices and the teaching of algebra, probability, and statistics

E. Teaching Algebra & Geometry with Technology
1. Introductory explorations
2. Teaching Algebraic and geometric concepts
3. Programming fundamentals and the teaching of geometry
4. Integrating explorations into classroom mathematics lessons

F. Teaching Mathematics via Presentation Software
1. Learning how to use the technology
2. Preparing a mathematics presentation

EVALUATION METHODS:

Final grades in this course will be determined by the following:

Participation	10%
Class projects	40%
Tests/quizzes	30%
Final	20%

The grading scale follows:

90%-100%	A
80%-89%	B
70%-79%	C
60%-69%	D
Below 60%	F

REQUIRED TEXTBOOK(S), SUPPLEMENTAL BOOKS AND READINGS:

No required textbook.

SPECIAL RESOURCE REQUIREMENTS

This course requires the availability and use of the computer lab, a portable computer and display unit, video technology, laser-disk technology, a classroom set of graphing calculators with calculator- based laboratory units, and a classroom set of four-function and fraction calculators. The computer lab must have commercially- available, up-to date software: word processor, spreadsheet, geometry exploration software, Internet browser, Presentation program, and multimedia, authoring program. Additionally, a cadre of up-to date educational software for the teaching and learning of mathematics must be maintained and available.

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