College of Education Undergraduate Course Change Proposal
Signature Page

Course Title: Technology for Teaching Secondary Mathematics I

Course Prefix and Number: MAE 4652 Type of Change: SUBSTANTIVE

Name of Faculty Sponsor: Rick Austin Telephone: 
Email: austin@usf.edu

APPROVALS
List appropriate Department Chair, Committee Chair, Faculty Council Chair and Associate Dean

Approving:
Dr. Stephen Thornton
Department Chair
________________________
SIGNATURE DATE

Patty McHatton
Name of UPC Chair
________________________
SIGNATURE DATE

Erwin Johanningmeier
College Council Chair
________________________
SIGNATURE DATE

Michael Stewart, Ph.D.
Name of Associate Dean
________________________
SIGNATURE DATE

CONCURRENCE
List other units and department of the University that have been consulted, comments and supporting remarks:

UNIT

CHOOSE ONE: CONCURRENCE, NON-CONCURRENCE or DEFER RECOMMENDATION

__________________________________________
Name/Title Signature Date

UNIT

CHOOSE ONE: CONCURRENCE, NON-CONCURRENCE or DEFER RECOMMENDATION

__________________________________________
Name/Title Signature Date

UNIT

CHOOSE ONE: CONCURRENCE, NON-CONCURRENCE or DEFER RECOMMENDATION

__________________________________________
Name/Title Signature Date

UNIT

CHOOSE ONE: CONCURRENCE, NON-CONCURRENCE or DEFER RECOMMENDATION

__________________________________________
Name/Title Signature Date

COUNCIL/DEAN APPROVALS
Recommendation of Undergraduate Council: Approved: _____ Disapproved: _____
Signature of Undergraduate Council Chair: __________________________ Date ____________
Action by the Undergraduate School Dean: Approved: _____ Disapproved: _____
Signature of Undergraduate Dean: __________________________ Date ____________
Effective Date (Term): __________________________
College of Education
UNDERGRADUATE COURSE CHANGE PROPOSAL

PLEASE INDICATE THE TYPE OF CHANGE YOU ARE REQUESTING TO MAKE:

SUBSTANTIVE: Change in course syllabus

NON-SUBSTANTIVE: 

1. DEPARTMENT AND CONTACT INFORMATION

Department: Secondary Education
College: Education
Budget account number: 172400 Secondary Education
Faculty Contact Name: Rick Austin
Phone: 
E-mail: austin@usf.edu

2. CURRENT COURSE INFORMATION

Prefix: MAE  Number: 4652

Full Course Title:
Technology for Teaching Secondary School Mathematics I

Abbreviated Course Title: (not to exceed 30 characters)
Tech Teach Math I

The course title is variable? 
○ Yes  ○ No

Is a permit required for registration? 
○ Yes  ○ No

Are the credit hours variable? 
○ Yes  ○ No

Credit hours (list max if variable): 3  Total Clock Hours: 45

Section Type: Class Lecture (Primarily)  Grading option: Regular

Prerequisites
Admission to Mathematics Education Program or CI

Corequisites

Co-Prerequisites
Course Description (not to exceed 255 characters including spaces)

This course is required in the undergraduate program in Mathematics Education. It covers the programming concepts and skills needed by mathematics teachers to facilitate computer usage at the secondary level. NCTM's Agenda for Action (1980) and their C

Please indicate in the description if the course:
* is restricted to majors or non-majors
* is repeatable for credit and, if so, for how many total credits

3. **New Course Information** (leave unchanged fields blank):

   New Prefix:  
   New Number:  

   New Full Course Title:  

   New Abbreviated Course Title: (not to exceed 30 characters)

   The course title is variable?  
   Yes  No

   Is a permit required for registration?  
   Yes  No

   Are the credit hours variable?  
   Yes  No

   New Credit hours (list max if variable):  
   New Total Clock Hours:

   New Section Type:  
   New Grading option:

New Prerequisites

New Corequisites

New Co-Prerequisites
New Course Description (not to exceed 255 characters including spaces)

This course provides prospective teachers an opportunity to develop concepts, skills, and instructional procedures for integrating technology for teaching Geometry and Probability into secondary mathematics classrooms.

Please indicate in the description if the course:
* is restricted to majors or nonmajors
* is repeatable for credit and, if so, for how many total credits

4. JUSTIFICATION:

   a. Nature of change(s): Be specific. (Indicate the nature of all changes, i.e., change of objectives, course level, etc. State the reasons why the change is necessary and how it will improve the course or program.) A structural analysis of the course should be included. Indicate where this course is in relation to other courses in the program. How will the change impact the enrollment of the course? Does this change affect accreditation or certification?

This course was created to meet the state requirement of a computer programming course for all mathematics education majors. With the elimination of this requirement the sequence of teaching with technology courses have been restructured to more adequately meet the needs of new mathematics teachers. The objectives have been rearranged to allow a smoother sequence by focusing on the topics of geometry and probability in this course and to focus on algebra, statistics and working with data in the subsequent course.

This course will become a prerequisite for the second course. This course is to be one of the first courses that new mathematics education majors will take. It is offered once each fall semester. Expectations for all written work for mathematics education classes, use of equation editor, proper variables and symbols will be covered here.

There should be no change in enrollment. Neither should there be any change that would impact accreditation or certification.

(Items “4.b.” – “4.f.” are ONLY for Substantive Course Changes)

   b. Indicate how this course will strengthen the Undergraduate Program.

The course change will help to make the sequence of courses for mathematics education majors clear and help to avoid repetition of topics needlessly. The new emphasis will actually make the course much more applicable to new mathematics teachers in that they will not spend half of a semester learning to write programs that they will very likely never use in their teaching. The time will be spent in much more productive interactions with the technologies that they will likely encounter in the schools.
c. What specific area of knowledge is covered by this change that is not covered by
courses currently listed?

The technology focus is shared across two classes. What is different is the focus in this course is on teaching topics from
geometry and probability with technology. In general, the other main focus is on computer technologies for teaching.

d. What is the need or demand for this course? (Here you must indicate if this course is part of a
required sequence in the major.) What other programs would use this course?

This course is required in the beginning of the program of study for mathematics education majors. There are not likely
to be other programs that would use this course.

e. What qualifications and/or experience are necessary to teach this course?

At least a masters degree and 18 graduate hours in mathematics education. Teaching experience, and computer
experiences as well as a PhD would all be recommended qualifications.

f. What will be the effect of this change on the program and on the students? Do you plan
to drop a course of this change is made?

No course will be dropped. The main change is that this course will become a prerequisite for the subsequent teaching
with technology course, thus the students will have to have a more structured sequence of classes than was previously
required.
5. OTHER COURSE INFORMATION – Required for submission to the Statewide Course Numbering System (You must complete this section with the requested items. “n/a” or “unchanged,” etc. is not acceptable) If this section is not filled out, the course change will NOT be made!

a. Course Objectives/Student Learning Outcomes

Technology Standards Issues:


2. Knowledge of current research related to the use of particular technology (dynamic geometry software) for instruction in the mathematics classrooms.

3. Knowledge of issues related to technology use for mathematics learning and teaching when technology is used as an integral part of instruction (e.g. Advantages / disadvantages, affordances / hindrances of using particular technology tools.

Technology to Support Communicating about Mathematics Effectively

4. Use of technology to communicate mathematics appropriately (e.g. Equation Editor, symbolic representations, web-based images, incorporating images into documents).

b. Major Course Topics

Introductory information about the course
Historical Overview of technology use in mathematics classrooms
Overview of current recommendations in the field of technology use in mathematics classrooms
Introduction to Standards and expectations for technology use in secondary mathematics classes
Introduction to Equation Editor
Expectations for written assignments within the mathematics education set of courses.
Review of Power Point as a presentation tool and spreadsheets
Writing Logo programs applicable for teaching geometry; Topics include:

c. Course Textbooks

There is no text – Students will be required to complete readings and lab exercises posted on the Blackboard system or from a course readings booklet/packet. Extensive use will be made of web based tutorials and application information

6. Gordon Rule/General Education

This course is certified for:

This course is neither a Gordon Rule course n or a General Education course

7. Syllabus – If this is a substantive course change you MUST attach a copy of the syllabus.
1. **Course Prefix and Number:** MAE 4652

2. **Course Title:** Technology for Teaching Secondary School Mathematics I

3. **Regular Instructor(s):**
   - Dr. Rick Austin
   - Dr. Denisse Thompson
   - Dr. Helen Gerretson
   - Dr. Gladis Kersaint
   - Dr. Eugenia Vomvordi-Ivanovic

4. **Course Prerequisites (if any):** Admission to the Mathematics Education Program or CI

5. **Course Description:**
   This course provides prospective teachers an opportunity to develop concepts, skills, and instructional procedures for integrating technology for teaching Geometry and Probability into secondary mathematics classrooms.

6. **Course Goals and Objectives:**
   Upon completion of this course, the student will have demonstrated:

   **Technology Standards Issues:**

   1. Knowledge of national and local standards (e.g., International Society for Technology in Education (ISTE), National Council of Teachers of Mathematics (NCTM), New Generation Sunshine State Standards (NGSSS)) for technology integration in general, and in particular in mathematics education.

   2. Knowledge of current research related to the use of particular technology (dynamic geometry software) for instruction in the mathematics classrooms.

   3. Knowledge of issues related to technology use for mathematics learning and teaching when technology is used as an integral part of instruction (e.g. Advantages / disadvantages, affordances / hindrances of using particular technology tools).

   **Technology to Support Communicating about Mathematics Effectively**

   4. Use of technology to communicate mathematics appropriately (e.g. Equation Editor, symbolic representations, web-based images, incorporating images into documents).

   5. Use of technology “in the cloud” to collaborate with others on the teaching and learning of mathematics.

January 2010
6. Use of Power Point (or other presentation tools) to support the presentation of mathematics.

**Competence with Specific Mathematics Technology**

7. Competence with technology tools for teaching Geometry (e.g. dynamic geometry software, web-based applets)

8. Competence with technology tools for teaching probability concepts (e.g. dynamic probability software, web-based applets)

**Technology to support teaching and learning particular mathematics concepts**

9. The ability to modify and develop lessons that use technology tools for teaching Geometry (e.g. dynamic geometry software, web-based applets)

10. The ability to modify and develop lessons that use technology tools for teaching probability concepts (e.g. Dynamic probability software, web-based applets)

7. **Content Outline:**
   - Introductory information about the course
   - Historical Overview of technology use in mathematics classrooms
   - Overview of current recommendations in the field of technology use in mathematics classrooms
   - Introduction to Standards and expectations for technology use in secondary mathematics classes
   - Introduction to Equation Editor
   - Expectations for written assignments within the mathematics education set of courses.
   - Review of Power Point as a presentation tool and spreadsheets
   - Writing Logo programs applicable for teaching geometry; Topics include:
     - Fundamental Logo syntax and introduction of fundamental turtle graphics, Defining, Editing,
     - Saving and Loading Logo Procedures, Variable types in Logo, Built in mathematical functions,
     - Cartesian coordinates in Logo, Recursive procedures, Writing simulation programs
   - Working with geometric exploration and drawing utility program(s)
   - Working with probability exploration/utility program(s)
   - Working with web based applets and activities to support teaching topics from geometry and / or probability to secondary mathematics students.

8. **Evaluation of Student Outcomes:**

Students are evaluated on the basis of:

**Required:**
Students will develop a set of lessons, at least one from each of the technologies featured in the content outline above. The lessons may be developed as a part of a group exercise and will feature integration of technology into an appropriate secondary mathematics course curriculum.

(AP #10 and 12)

This is a core assignment and students must have a passing score entered into the Chalk and Wire system in order to earn a passing grade for the course.

Each student will complete an interview performance exam with the instructor in which
competence with various aspects of technologies may be demonstrated.

Optional assignments:

Reflective writing concerning on-line tutorials available for use with current technologies
Reflective writing concerning videos watched related to teaching with technology
Reflective writing concerning lab exercises related to technology
Programs resulting from lab exercise
Classroom presentations

9. **Grading Criteria:**

Core assignment, technology lesson development 50% – 60%
Oral Interview exam 10% – 20%
Total of optional assignments together 30% – 40%

The university approved plus and minus grading scale will be used in this class.

10. **Textbook(s) and Readings:**

There is no text – Students will be required to complete readings and lab exercises posted on the Blackboard system or from a course readings booklet/packet. Extensive use will be made of web based tutorials and application information

11(a) **ADA Statement:** Students with disabilities are responsible for registering with the Office of Student Disabilities Services in order to receive special accommodations and services. Please notify the instructor during the first week of classes if a reasonable accommodation for a disability is needed for this course. A letter from the USF Disability Services Office must accompany this request.

11(b). **USF Policy on Religious Observances:**
Students who anticipate the necessity of being absent from class due to the observation of a major religious observance must provide notice of the date(s) to the instructor, in writing, by the second class meeting.

11(c). **A Reminder:**
In the event of an emergency, it may be necessary for USF to suspend normal operations. During this time, USF may opt to continue delivery of instruction through methods that include but are not limited to: Blackboard, Elluminate, Skype, and email messaging and/or an alternate schedule. It's the responsibility of the student to monitor Blackboard site for each class for course specific communication, and the main USF, College, and department websites, emails, and MoBull messages for important general information.

11. **Please complete Attachment I (for College of Education files).**

Complete Attachment I, including the matrix by listing the (1) course objectives, (2) related topics, (3) evidence of achievement (including performance-based assessments, as appropriate) to be used to ensure that students have acquired the objectives, and identify the correlated Accomplished Practices (Attachment II), if applicable.

January 2010
Please respond to each of the following questions and complete the attached Matrix:

1.  *Rationale for Setting Goals and Objectives:* What sources of information (e.g., research, best practices) support the formulation and selection of course goals and objectives.

2.  List the specific competencies addressed from the *relevant national guidelines.*

   The National Council of Teachers of Mathematics (NCTM) published the Principals and Standards for School Mathematics in 2000. Technology was included as one of 6 basic principles along with; Equity, Curriculum, Teaching, Learning and Assessment. This provides a view of the importance attached to technology in teaching mathematics. The Technology Principle states: “Technology is essential in teaching and learning mathematics, it influences the mathematics taught and enhances students’ learning.” (p. 24) More specifically; “Electronic technologies - calculators and computers - are essential tools for teaching, learning, and doing mathematics.” (p. 24)

Specific list from last NCATE preparation from NCTM

   1.6.2  Use computer software to explore and solve mathematical problems
   2.4  Programs prepare prospective teachers who use a variety of resource materials such as software, print materials, technology, and activity files to enhance the learning of mathematics

3.  Are there field-based experiences in this course? If so, please briefly indicate nature and duration.

   NO

4.  Is technology used in this course? If so, please briefly indicate type of technology and how it is used to manage, evaluate and improve instruction. Are students provided opportunities to access and/or demonstrate use of technology in instruction in this course? If so, please briefly describe.

   THE WHOLE COURSE REQUIRES / FEATURES A VARIETY OF TECHNOLOGY USES.

5.  List the specific competencies addressed from the *Florida Adopted Subject Area Competencies,* if applicable.

   While many of the lab exercises have a basis in the high school mathematics competencies, they are not addressed in order to teach any of them, rather as a review.

6.  Are there any components of the course designed to prepare teacher candidates to help K-12 students achieve the *Sunshine State Standards?* Is so, please identify.

January 2010
The entire course is designed to prepare secondary mathematics teachers who can use technology helping their grade 6 - 12 students meet the mathematics goals listed in the New Generation Sunshine State Standards. The particular emphasis is in the areas of geometry, measurement and probability.

(Continued)
DEPARTMENTAL COURSE SYLLABUS

Attachment I (cont'd)

MATRIX

(For College of Education files only)

7. Complete the following matrix showing the association among (1) course objectives (item #6 of syllabus), (2) related topics, (3) evidence of achievement of objectives (including performance-based assessments, as appropriate), and (4) Accomplished Practices (Undergraduate and Plan II Master's Programs).

<table>
<thead>
<tr>
<th>Course Objectives</th>
<th>Topics</th>
<th>Evidence of Achievement</th>
<th>Predominant Accomplished Practices*</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Note: Objectives should be numbered 1.0, 2.0, 3.0, etc.)</td>
<td>What topics are used to fulfill each objective?</td>
<td>Classroom Discussions Reflective Writing Assignments</td>
<td>#12 technology</td>
</tr>
<tr>
<td>1.0 Knowledge of national and local standards (e.g. International Society for Technology in Education (ISTE), National Council of Teachers of Mathematics (NCTM), New Generation Sunshine State Standards (NGSSS)) for technology integration in general, and in particular in mathematics education.</td>
<td>1.1 Overview of current recommendations in the field of technology use in mathematics classrooms</td>
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<td>2.0 Knowledge of current research related to the use of particular technology (dynamic geometry software) for instruction in the mathematics classrooms.</td>
<td>2.1 Historical Overview of technology use in mathematics classrooms Overview of current recommendations in the field of technology use in mathematics classrooms</td>
<td>Classroom Discussions Reflective Writing Assignments</td>
<td>#12 technology</td>
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<td>3.0 Knowledge of issues related to technology use for mathematics learning and teaching when technology is used as an integral part of instruction (e.g. Advantages / disadvantages, affordances / hindrances of using particular technology tools).</td>
<td>3.1 Introduction to Standards and expectations for technology use in secondary mathematics classes</td>
<td>Classroom Discussions  Reflective Writing Assignments  Lesson Set Assignment</td>
<td>#12 technology</td>
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<td>4.0 Use of technology to communicate mathematics appropriately (e.g. Equation Editor, symbolic representations, web-based images, incorporating images into documents).</td>
<td>4.1 Introduction to Equation Editor  Expectations for written assignments within the mathematics education set of courses.  Review of Power Point as a presentation tool and spreadsheets</td>
<td>Classroom Discussions  Reflective Writing Assignments  Lesson Set Assignment</td>
<td>#12 technology  #2 Communication</td>
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<td>5.0 Use of technology “in the cloud” to collaborate with others on the teaching and learning of mathematics.</td>
<td>5.1 Expectations for written assignments within the mathematics education set of courses.</td>
<td>Lesson Set Assignment  Interview Performance Exam</td>
<td>#12 technology  #2 Communication</td>
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<td>6.0 Use of Power Point (or other presentation tools) to support the presentation of mathematics.</td>
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<td>Classroom Discussions  Reflective Writing Assignments  Lesson Set Assignment  Interview Performance Exam</td>
<td>#12 technology</td>
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<td>7.0 Competence with technology tools for teaching Geometry (e.g. dynamic geometry software, web-based applets)</td>
<td>7.1 Working with geometric exploration and drawing utility program(s)  Working with web based applets and activities to support teaching topics from geometry and/or probability to secondary mathematics students.</td>
<td>Classroom Discussions  Reflective Writing Assignments  Lesson Set Assignment  Interview Performance Exam</td>
<td>#12 technology  #10 planning</td>
</tr>
<tr>
<td>8.0  Competence with technology tools for teaching probability concepts (e.g. dynamic probability software, web-based applets)</td>
<td>Working with Logo Programs</td>
<td>Classroom Discussions Reflective Writing Assignments Lesson Set Assignment Interview Performance Exam</td>
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