1. Catalog description
   a) Course Number: 2270
   b) Title: Technology in Mathematics
   c) Meeting times and credit: 2-1-3
   d) Term(s) to be offered: S
   e) Short title: Tech in Math
   f) Course Description: The focus of this course is how to use technology to investigate,
      model, simulate, and solve mathematical problems. Authentic and involved
      mathematical tasks and situations will be presented from a broad range of topics.
      Attention is given to the appropriate uses of technology and the potential drawbacks of
      technology in the secondary classroom. Laboratory experiences will include (but are
      not limited to) graphing calculators, Computer Algebra Systems, statistical tools, and
      dynamic geometry software.
   g) Prerequisite(s): MAT 2170
   h) Initial term offered: Spring 2004

2. Objectives and Evaluation of the Course
   a) Objectives:
      • Computational and operational fluency with using technology in mathematics
        addressing a wide range of content (i.e. calculus, geometry, algebra, discrete
        mathematics, combinatorics).
      • Creation of mathematical demonstrations using appropriate technology.
      • Engagement in mathematical investigations using appropriate technology.
      • Understanding appropriate uses of technology in the secondary classroom.
   b) Methods of assessment:
      • Regular completion of content specific mathematical activities and problems
      • Demonstration of mathematical understanding of content area via demonstrations
        and/or projects.
      • Summaries of current journal articles concerning the use of technology in
        teaching.
      • Extended mathematical investigations involving technology
      • Exams concerning mathematical content covered in course that integrate the use
        of technology.
      • Exams concerning appropriate technology use and theory.
   c) Course will be offered in a traditional format.
   d) Not numbered 4750-4999
   e) This course is designated as writing-intensive.

3. Outline of the Course
   a) Course will meet 3 days a week at 50 minutes each for 15 weeks.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Time</th>
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<tbody>
<tr>
<td>Spreadsheets and applications (problem solving, data collection,</td>
<td>8 days</td>
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<td>creation and manipulation of a data array, graphing)</td>
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<td>Graphing Calculators (awareness, applications, connections between</td>
<td>8 days</td>
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<tr>
<td>calculators and computers, visualization of mathematical ideas,</td>
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<td>proficiency of use)</td>
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<tr>
<td>Geometry tools (proofs assisted by technology, constructions, case</td>
<td>8 days</td>
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<tr>
<td>analysis, explorations, problem solving)</td>
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<tr>
<td>CAS (awareness of the power, advanced mathematical ideas)</td>
<td>8 days</td>
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Programming (basic ideas within a technological tool: calculators, CAS, Geometry Tools, etc.) | 4 days
---|---
Software Evaluation (awareness of different programs, judging effectiveness and usefulness) | 3 days
Use of technology issues (journal readings, when to/not to use technology) | 2 days
Assessment | 4 days
---|---
Total: 45 days

Examples of specific technological tools that may be used are: Maple, Microsoft Excel, and Geometer's SketchPad.

b) Course will be offered in a traditional format

4. Rationale
   a) The use of technology is essential in secondary mathematics. As technology advances, so do the types of problems and mathematics that students encounter; additionally, the types of mathematics a secondary teacher teaches continues to change. The Illinois Professional Teaching Standards and Mathematics Content Standards require that future secondary educators in mathematics have a proficient understanding of technology in their discipline. Currently, no one course consistently requires any mathematics major- teacher certification option to understand, use, judge, and become proficient with a range of mathematics technology.
   b) Prerequisites will be MAT 1441 with a grade of C or better and experience with a computer operating system.
   c) This course is not similar to any course in existence. The only impact is on the mathematics major- teacher certification option.
   d) Students who major in mathematics- teacher certification option will be required to take this course.

5. Implementation
   a) This course may be initially assigned to: Marshall Lassak, Allen Davis, Peter Andrews, Bill Slough, Nancy Van Cleave
   b) Purchase of a graphing calculator ($80-$100)
      Supplements: User manuals and guidebooks that come with hardware and software, appropriate journal articles.

6. Community College Transfer
   A community college course may be judged equivalent to this course.

7. Date approved by the department: April 14, 2003

8. Date approved by the college curriculum committee: May 2, 2003

9. Date approved by CAA: August 28, 2003