MED 341: Tools and Technology of Secondary Mathematics

Spring Semester, 2008

Instructor: Bill Blubaugh, Ph.D.

Office: 2239D Ross Hall

Office hrs: MWF, 10:30-11:30 & T, 1:30-2:30

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Credit: 2 Semester Hours

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Prerequisite: Completion of PTEP, Phase II

Required Materials
1. Software packet of Sketchpad and Fathom (or TinkerPlots) at Barns & Noble Bookstore.
2. A graphics or symbolic calculator (TI-84 Plus or TI-Nspire preferred).

Course Description
Hands-on training in using new software tools and graphing calculators for mathematics instruction will be the focus of this course. Students will learn how and when the use of appropriate technology will enhance mathematics instruction in courses that are typically taught at the middle school and high school grade levels. Inappropriate uses, challenges and errors of technology will also be identified and discussed. Students will be required to develop and teach mathematics lessons that incorporate their recently acquired knowledge in skills at selecting and using technology appropriately, to their peer who will emulate a public school mathematics classroom.

Course Objectives
1. To study and discuss topics and curriculum projects of a mathematics content area, or an academic project that uses such technology as graphing calculators, computers, multimedia presentations, etc.
2. To use commercial software in the exploration and solution of mathematical problems.
3. To explore changes in the content pedagogy which technology makes possible and desirable.
4. To develop some experience and expertise in the selection and use of appropriate software for solving problems in teaching and learning secondary school mathematics.

Outline of Course Content
This course will focus on major curriculum areas for secondary school mathematics. The focus will include topics and projects of pre-algebra, algebra, geometry, pre-calculus, and calculus. Software, such as Excel, Geometer's Sketchpad, Fathom, MathCAD, and Derive will be used along with graphing calculators and the Internet, so that students become familiar with appropriate technology. Students will be required to write instructional lessons involving different types of software, the Internet, and a graphics calculator for commonly taught mathematics topics of grades 7-12.
**Course Requirements**
In addition to showing an ability to solve mathematical problems and showing instructional capabilities with graphics calculators, computer software and Internet mathematics, one or more curriculum projects will be required. Each project or problem will focus on a specific mathematics area and will use one or more technological tools in the delivery of instruction or in solving the problem. The project will include references of how master teachers of mathematics have used and are using such technology at specific grade and course levels.

**Methods of Evaluation**
A letter grade will be assigned based on the following requirements:

1. Capability to use calculators and mathematical computer software to solve mathematical problems appropriate for pre-algebra, algebra, geometry, pre-calculus, and calculus students.

2. Capability to use calculators and mathematical computer software as demonstration tools for teaching pre-algebra, algebra, geometry, pre-calculus, and calculus students.

3. Familiarity with research and other publications regarding the use of technology for enhancing mathematical learning of students in grades 7-12.

4. Student’s ability to identify specific mathematical topics of grades 6-12 with appropriate and specific technology.

5. Ability to write and teach a lesson plan, that has a strong technology component for the different mathematics courses that are presently taught at the level in which the student is seeking licensure in Colorado.

The letter grade will be assigned as follows:

20% Demonstrated proficiency in using technology in solving mathematical problems,

10% Demonstrated proficiency in using a SMART Board for in-class presentation of an appropriate lesson of secondary school mathematics,

10% Demonstrated proficiency in appropriate use of Graphics Calculators (including writing programs, accessing programs from the Internet, and copying calculator screens onto a Word document) for enhancing instruction of secondary school mathematics,

10% Demonstrated proficiency in selecting and using technology (including Geometer’s Sketchpad and Internet) appropriately for teaching secondary school geometry,

10% Demonstrated proficiency in selecting and using technology (including Fathom or TinkerPlots and the Internet) appropriately to enhance instruction in data analysis,
10% Demonstrated proficiency in selecting and using a CAS (such as a symbolic calculator, Derive, MathCad and the Internet) appropriately to enhance algebra and pre-calculus instruction,

10% Demonstrated proficiency in selecting and using spreadsheet technology along with it’s associated tools (such as graphs and charts) appropriate in teaching a school mathematics,

20% One or curriculum projects, including lesson plans and all class materials, of consecutive lessons focusing on standards-based instruction that integrates technology in the teaching of a secondary school mathematics topic,

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

Helping
We will help each other learn when and how to use technology to facilitate the learning of mathematics, and all criticism will be kind and constructive.

Disability Support Services
Students who believe they may need accommodations in this class are encouraged to contact the Disability Support Services (970) 351-2289 as soon as possible to better ensure that such accommodations are implemented in a timely fashion.

Honor Code
All members of the University of Northern Colorado community are entrusted with the responsibility to uphold and promote five fundamental values: Honesty, Trust, Respect, Fairness, and Responsibility. These core elements foster an atmosphere, inside and outside of the classroom, which serves as a foundation and guides the UNC community's academic, professional, and personal growth. Endorsement of these core elements by students, faculty, staff, administration, and trustees strengthens the integrity and value of our academic climate.

UNC's Policies
UNC's policies and recommendations for academic misconduct will be followed.

Cell Phone
Please extend courtesy to your instructor and fellow students by turning off your cell phones and pagers. Thank you for your cooperation.

Bibliography of Related Materials


