MED 341: Tools and Technology of Secondary Mathematics

Instructor: Bill Blubaugh, Ph.D.
Office: 2239D Ross Hall
Office hrs: 9:30 –10:00 (M W F),
11:00 – 12:00 (M W F)
2:30 – 3:30 (M W F)
Others by appointment

Credit: 2 Semester Hours
Office phone: 351 - 2028
Credit: 2 semester hours

Prerequisite: Completion of PTEP, Phase II

Materials
A graphics or symbolic calculator (TI-Nspire preferred), available at Target, Circuit City, Staples, Office Depot, and online.

You may wish to purchase such software as Fathom or Tinker Plots.

Course Description
Hands-on training in using new software tools and graphing calculators for mathematics instruction will be the focus of this course. You 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. You 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 mathematical 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.

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.
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 may be used along with graphics calculators and the Internet, so that you become familiar with appropriate technology. You 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. Your ability to identify specific mathematical topics of grades 6-12 with appropriate and specific technology.

5. Your ability to write and teach one or more lesson plans, 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 approximate amount of class time and approximate percent of your grade is 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 dynamic geometry technology (including Geometer’s Sketchpad, GeoGebra, 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, MathCad and the Internet) appropriately to enhance algebra and pre-calculus instruction,

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

20% One or more 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.

Your Final Course Grade is Calculated as a Percent of Total Points Obtained

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<thead>
<tr>
<th>Grade</th>
<th>Percentage Range</th>
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<tbody>
<tr>
<td>A</td>
<td>92.5% or greater</td>
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<tr>
<td>A-</td>
<td>90.0 to 92.4%</td>
</tr>
<tr>
<td>B+</td>
<td>87.5% to 89.9%</td>
</tr>
<tr>
<td>B</td>
<td>82.5% to 87.4%</td>
</tr>
<tr>
<td>B-</td>
<td>80.0% to 82.4%</td>
</tr>
<tr>
<td>C+</td>
<td>77.5% to 79.9%</td>
</tr>
<tr>
<td>C</td>
<td>72.5% to 77.4%</td>
</tr>
<tr>
<td>C-</td>
<td>70.0 to 72.4%</td>
</tr>
<tr>
<td>D+</td>
<td>67.5% to 69.9%</td>
</tr>
<tr>
<td>D</td>
<td>62.5% to 67.4%</td>
</tr>
<tr>
<td>D-</td>
<td>60% to 62.4%</td>
</tr>
<tr>
<td>F</td>
<td>59.9% or below</td>
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UNC Policies

- **Student Handbook**: UNC’s policies and recommendations for academic misconduct will be followed. Consult your student handbook for university policies on student conduct in the classroom, cheating, plagiarism, and other academic expectations (http://www.unco.edu/dos/handbook/index.html). You are expected to attend class and take responsibility for your own learning.

- **Disability Support Services**: Students who believe that they may need accommodations in this class are encouraged to contact the Disability Support Services at (970)-351-2289 as soon as possible to ensure that 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.

- **Portable Electronic Devices** - Please extend courtesy to your instructor and fellow students by turning off your portable electronic devices such as: cell phones, pagers, and
iPods. Although not an audio issue, text-messaging is a distraction to other students and prevents you from full participation in class. You should keep your portable electronic devices in your backpack or purse during class. Your personal electronic devices should not be on your desks. If you know that you may need to accept an emergency phone call during class or if you have children in childcare or school, please let the instructor know. If you need to take a phone call during class, please step out of the classroom while you complete your call. Thank you for your cooperation.

**Missed Materials**
Outside of my office (Ross 2239D), you will find a file for your class. This folder is for handouts, graded work, quizzes, projects, etc. that you may not have picked up during class. You can pick up these materials at any time – I do not need to be present. Please do not use this folder for materials that you want to turn into me.

**Blackboard**
As a great deal of course material is contained online in Blackboard we will refer to it often for both in-class and out-of-class work.

**Important Dates:**
- January 18: Martin Luther King Day, No Classes
- January 15: Last day to add a class
- January 25: Last day to drop a class
- March 6: Last day to withdraw from classes and receive a ‘W’
- March 13-21: Spring Break – No classes
- April 30: Last Day of Classes
- May 7: Final Exam Time, Friday, 10:45 AM – 1:15 PM