CTSE 5040/6040

Fall 2012

Curriculum & Teaching

College of Education

Monday, Wednesday, Friday

8:00-9:50 a.m.

Haley 3430

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Office Hours: Monday/Wednesday, 10:00-11:30

Conceptual Framework

Mission

The mission of the Auburn University College of Education is to build a better future for individuals, our state, our nation and our world. We fulfill our mission by preparing competent, committed and reflective professionals as we engage in outstanding teaching, cutting-edge research and meaningful outreach.

Vision

Our vision is one of transformation. We strive to be and prepare agents of change. We seek to establish and work collaboratively within socially responsive learning communities that value the mosaic of a diverse society. Our vision includes engaging in the continuous learning necessitated by a rapidly advancing world; identifying and addressing critical issues related to the education of all people; and using technology to broaden and support learning opportunities. Ours is a vision of change embracing the inclusive, collaborative and technological aspects of our mission, thereby establishing us as a college representing educational advocacy and innovation in the 21st century.

Philosophy, Purpose and Goals

Our philosophy of learning and teaching emphasizes that building a better future for all means creating learning environments for diverse learners that acknowledge the active, collaborative and ever-evolving nature of learning. This philosophy also values teaching that promotes the development of safe, stimulating learning communities enriched with diverse perspectives; is grounded in reasoned and purposeful decision making; and is enacted in proactive, flexible and self-regulating ways.

The keystone, the topmost stone of an arch, serves as a visual reminder of our mission and our goals. Just as the keystone supports and holds an arch together, education holds intact the promise of a better future for all. We believe that education is the keystone of opportunity and equity in a richly diverse, increasingly technological, and ever-changing world. It is the critical building block that enables individuals and societies to flourish in a global community.

1. Course Number: CTSE 5040/6040
Course Title: Technology and Applications in Secondary Mathematics Education
Credit Hours: 4 semester hours (LEC 3, LAB 2)
Prerequisites: CTSE 5040: MATH 2660; Admission to Teacher Education
CTSE 6040: Admission to a graduate program in secondary mathematics or departmental permission
Corequisites: None

2. Date Syllabus Prepared: June 2007; Revised August 2012

3. Texts or Major Resources:

- Dick, T., & Hollebrands, K. F. (Eds.) (2011). *Focus in high school mathematics: Technology to support reasoning and sense making*. Reston, VA: National Council of Teachers of Mathematics.
- Hollebrands, K. F., & Lee, H. S. (2012). *Preparing to teach mathematics with technology: An integrated approach to geometry*. Dubuque, IA: Kendall Hunt.
- Lee, H. S., Hollebrands, K. F., & Wilson, P. H. (2010). *Preparing to teach mathematics with technology: An integrated approach to data analysis and probability*. Dubuque, IA: Kendall Hunt.
- National Council of Teachers of Mathematics. (2000). *Principles and Standards for School Mathematics*. Reston, VA: Author.
- Other course readings as assigned

4. Course Description: Use of technological tools to enhance mathematics teaching and learning

5. Course Objectives. By the end of this course, students will develop:

- Basic knowledge of calculators and computers and the ability to use them to explore and solve mathematical problems within the high school mathematics curriculum. **AQTS (1)(a)1,2,4,9; (1)(b)1,7**[1]
  - Ability to assess the reasonableness of one's solution and to logically prove that it is correct. **AQTS (1)(b)2,6**
  - Use of dynamic geometry software to enhance spatial abilities. **AQTS (1)(a)6; (1)(b)4**
  - Use of appropriate mathematical vocabulary and symbols. **AQTS (1)(a)7; (1)(b)3**
  - Effectively select or create a range of models or representations using technology, in order to develop solutions to problems, including visual displays and data graphs. **AQTS (1)(b)8,9**
  - Integration of the curriculum within mathematics and across disciplines, and its application to everyday situations. **AQTS (1)(a)13, (2)(b)11**
- Knowledge of strategies, and the ability to use those strategies, to identify and evaluate technology resources and technical assistance (i.e., those available on-line and on-site within a school and district setting). **Tech K(i);A(i)**[2]
- Knowledge of methods, and the ability to use those methods, for assessing advantages and limitations of current and emerging technologies, and on-line and software content to facilitate teaching and student learning. **AQTS (1)(a)8,11; Tech K(ii), A(ii)**
- Knowledge of strategies for developing and implementing a classroom management plan to ensure equitable and effective student access to available technology resources. **Tech K(iii), A(iii)1**
- Knowledge of safe, responsible, legal and ethical uses of technologies including fair-use and copyright guidelines and Internet user protection policies. **AQTS (5)(c)5(ii); Tech K(iv)**
- Knowledge of characteristics of appropriate and effective learner-centered lessons and units that integrate technology, and the ability to design and implement learner-centered lessons that use appropriate and effective inquiry-based practices in teaching and learning with technology. **AQTS (1)(a)10; Tech K(v), A(v)**
  - Meeting the needs of a range of students using technology in a variety of ways. **AQTS (1)(a)12**
  - Using technology to make the transition from concrete to more abstract representations. **AQTS (1)(a)12**
- Knowledge of technology tools (including web page development, digital video, the Internet, email, spreadsheets, graphing calculators, dynamic geometry and statistics software, and other mathematics-specific software) for instruction, student assessment, management, reporting purposes, and communication with parents/guardians of students. **AQTS (1)(a)10, (2)(b)10; Tech K(vi), A(vi)1**

[1] AQTS refers to the Alabama Quality Teaching Standards: Mathematics Education Class B, section 230-3-3-.04
[2] Tech refers to the Alabama Technology Standards; "K" denotes "Knowledge" standards; "A" denotes "Ability" standards.

- Knowledge of how to facilitate students' individual and collaborative use of technologies (including web page development, digital video, the Internet, email, spreadsheets, graphing calculators, dynamic geometry and statistics software, and other mathematics-specific software) to locate, collect, create, produce, communicate, and present information. **AQTS (1)(a)12, (1)(b)5; Tech K(vii)**
- Knowledge of the variety and application of technologies that are responsive to diversity of learners, learning styles and special needs of all students, and the ability to design learning experiences incorporating those technologies. **AQTS (1)(a)12;(4)(c)4(iii); Tech K(viii)**
- Knowledge of processes and criteria for evaluating students' technology proficiency and students' technology-based products within mathematics. **Tech K(ix), A(ix)**
- Knowledge of available and emerging technologies that support the learning of all students, including distance and online learning. **AQTS (3)(c)4.(i),(ii)**
- Knowledge of, and the ability to use, resources for enhancing professional growth using technology. **Tech K(x), A(x)**

6. Course Content and Schedule:

WEEK OF	MAJOR TOPIC	MAJOR ASSIGNMENTS
17-Aug	Course intro *(starts Friday)*	
20-Aug	Graphing Calculators	
27-Aug	Dynamic Geometry	
3-Sep	Dynamic Geometry	Project 1
10-Sep	Dynamic Geometry	
17-Sep	Statistics Software	
24-Sep	Statistics Software	
1-Oct	On-line Resources	Midterm
8-Oct	Interactive Media	Project 2
15-Oct	(open)	
22-Oct	(open)	
29-Oct	(open)	
5-Nov	Spreadsheets	
12-Nov	Synthesis	Lab Experience Assignments
19-Nov	THANKSGIVING	
26-Nov	Synthesis	Project 3
Finals	7-Dec, 8:00-10:30	Final exam

NOTE: This Course Calendar is presented for informational purposes only and is subject to change.

7. Course Requirements/Evaluation:[3] In achieving the goals of this course, students will:

a. Complete readings, participate in class discussions, both in-class and on-line
   - Topics to include:
     - Instructional strategies that promote student learning using technology
     - Use of technology to address special needs
     - Legal issues in the use of technology
     - Effective use of technology for communications with parents and students
     - Use of electronic resources in professional development
     - Evaluation of students' use of technology
   - Complete weekly essays related to the above topics, and other related assignments as follow: (15% of the total grade)
     - Assessment of technology resources related to mathematics available at a secondary school
     - Development of a model management plan
     - Critiques of various technological resources
     - Identification of on-line professional development resources

     (**CTSE 6040:** Essays are two pages in length)

b. Complete assigned projects, both in and out of class
   - Prepare projects on selected mathematics problems or topics using a variety of technological tools presented in a variety of formats (three; 30% of the total grade)

[3] Students in CTSE 6040 will complete all assignments, with additional requirements as stated.

c. Keep an up-to-date personal blog/website for the course, including all essays and projects (5% of the total grade)
d. Participate in scheduled lab experience (15% of the total grade)
    - Develop and present or co-present a lesson to a secondary mathematics classroom using technology (**CTSE 6040:** Include a two-page rationale for the lesson based on research.)
    - Use the school's classroom management system to enter attendance or grades.
    - Prepare a reflection on the experience.
    - Keep a detailed log of activities.
e. Take exams to show progress of knowledge (midterm and final; 35% of the total grade)
   *** CTSE 6040:** An additional take-home final examination will be required.

NOTE: All papers and assignments prepared for CTSE 6040 should incorporate appropriate references to the research literature and should be prepared following APA style as outlined in their *Publication Manual*.

Grading. All assignments will be graded on a 4-point scale (4=A; 3=B; 2=C; 1=D; 0=F) and weighted averages will be computed following the percentages given in the previous sections. Final grades will be assigned by rounding to the nearest whole number; i.e., 3.5 and up is an A, 2.5 and up is a B, and so forth.

8. Class Policy Statements:

- Participation: Students are expected to participate in all class discussions and participate in all exercises. It is the student's responsibility to contact the instructor if assignment deadlines are not met. Students are responsible for initiating arrangements for missed work.
- Attendance. Each student is expected to attend all classes as scheduled, including lab sessions held off campus. If an exam is missed, a make-up exam will be given only for University-approved excuses as outlined in the Student Policy eHandbook (www.auburn.edu/studentpolicies). Arrangement to take the make-up exam must be made in advance. Students who miss an exam because of illness need a doctor's statement for verification of sickness and should clear the absence with the instructor the day they return to class. Other unavoidable absences from campus must be documented and cleared with the instructor in advance. The second non-University approved absence from class and each succeeding unapproved absence from class will result in a lowering of the student's final grade by one letter grade. Each failure to report for a scheduled lab session in the schools will result in a lowering of the student's final grade by two letter grades.
- Unannounced Quizzes: The instructor may give unannounced quizzes as he deems necessary, to be included as a part of the exam score.
- Accommodations: Students who need accommodations are asked to electronically submit their approved accommodations through AU Access and to arrange a meeting during office hours the first week of classes, or as soon as possible if accommodations are needed immediately. If you have a conflict with my office hours, an alternate time can be arranged. To set up this meeting, please contact me by e-mail. If you have not established accommodations through the Office of Accessibility, but need accommodations, make an appointment with the Office of Accessibility, 1228 Haley Center, 844-2096 (V/TT).
- Honesty Code: The Student Academic Honesty Code (see Student Policy eHandbook) will be strictly enforced.
- Professionalism: As faculty, staff, and students interact in professional settings, they are expected to demonstrate professional behaviors as defined in the College's conceptual framework. These professional commitments or dispositions are listed below:
    - Engage in responsible and ethical professional practices
    - Contribute to collaborative learning communities
    - Demonstrate a commitment to diversity
    - Model and nurture intellectual vitality

  Students will be asked to sign a contract affirming standards of professional conduct. Failure to comply with those standards may lead to dismissal from the lab experience, the course, and/or the Mathematics Education Program.

9. Students are encouraged to provide feedback on their experiences in the course using AU eValuate:

- Fall Semester evaluation dates:
    - Open: November 29, 2012 (8:00 am)
    - Close: December 2, 2012 (11:59pm)