

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.

COLLEGE OF EDUCATION



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 2009

3. Texts or Major Resources:

- Dick, T., & Hollebrands, K. F. (Eds.) (2011). *Focus in high school mathematics: Technology*. Reston, VA: National Council of Teachers of Mathematics. (**COMING SOON**)
- Hollebrands, K. F., & Lee, H. S. (2011). *Preparing to teach mathematics with technology: An integrated approach to geometry* (Draft). Raleigh, NC: North Carolina State University.
- 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)1,7¹**
 - 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

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.

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**

- 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
15-Aug	Course intro; Dynamic Geometry	
22-Aug	Dynamic Geometry	
29-Aug	Dynamic Geometry	
5-Sep	Statistics Software	Project 1
12-Sep	Statistics Software	
19-Sep	Statistics Software	
26-Sep	Calculators	Project 2
3-Oct	Calculators	Midterm
10-Oct	On-line Resources	
17-Oct	(open)	
24-Oct	(open)	
31-Oct	(open)	
7-Nov	Spreadsheets	
14-Nov	Spreadsheets	Project 3
21-Nov	THANKSGIVING	
28-Nov	Synthesis	Implementation Plan
Finals	6-Dec, 8:00-10:30	Final exam

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

- 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 essays related to the above topics, and other related assignments as follow: (10% 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)
- Keep an up-to-date personal web site for the course (10% of the total grade)
 - Should incorporate use of digital images and video

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

- c. Complete computer laboratory activities, both in and out of class
 - Prepare projects on selected mathematics problems or topics using a variety of technological tools presented on personal web site (three; 30% of the total grade)
- d. Develop plans for integrating technology into instruction for a particular mathematical area to turn in, and present to the class using PowerPoint (10% of the total grade)
 - * **CTSE 6040:** Include a five-page literature review related to the selected topic.
- e. Participate in scheduled lab experience (10% 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.
 - Keep a detailed log of activities.
- f. Take exams to show progress of knowledge (midterm and final; 30% 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:

- Attendance. Each student is expected to attend all classes as scheduled, including lab sessions held off campus. Excused absences for lab sessions in the schools require preapproval by the instructor or university approval as specified in the *Tiger Cub*. The second unexcused absence from class and each succeeding unexcused 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.
- Accommodations: Students who need accommodations are asked 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 alternative time can be arranged. To set up this meeting, please contact me by e-mail. Bring a copy of your Accommodation Memo and an Instructor Verification Form to the meeting. If you do not have an Accommodation Memo but need accommodations, make an appointment with the Program for Students with Disabilities at 1244 Haley Center, 844-2096 (V/TT)
- Honesty Code: The University Academic Honesty Code and the *Tiger Cub* Rules and Regulations pertaining to *Cheating* will apply to this class.
- 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