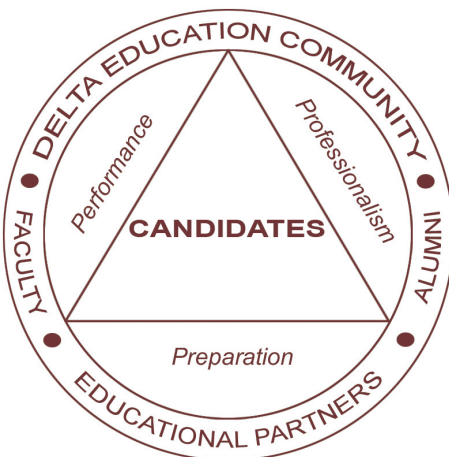


Delta State University
Division of Teacher Education
Course Syllabus
Spring 2014
MAT 215

- I. **Course Designation:** MAT 215
Course Title: Mathematics Technology
Course Description: MAT 215. MATHEMATICS TECHNOLOGY. Introduction to the use and application of technology in the mathematical sciences. Lecture 1 hour, laboratory 1 hour. **Prerequisite or Co-requisite:** MAT 205 or MAT 251. 1

II. **Conceptual Framework:**

DELTA P³ MODEL



Vision: The Delta State University College of Education promotes a vibrant educational community committed to preparing capable and confident candidates who can positively affect learning outcomes of students in the P-12 school setting. Appropriately illustrated by the Delta triangle, the model reflects candidate development through the triad of preparation, performance and professionalism, supported by the greater Delta educational community (faculty, educational partners, and alumni).

Guiding Principles:

1. **Education is a lifelong endeavor**, requiring an ever-expanding content knowledge base, a repertoire of skills, and a broad experience base. (GP1)
2. **Education is interactive and reflective**, a process that is accomplished through assessment and reflection of a collaborative nature. (GP2)
3. **Education is culturally contextualized**, requiring both an understanding and appreciation of the diversity of all individuals within the learning community. (GP3)
4. **Education is dynamic**, with change being driven by assessment data and the needs of all segments of the educational community. (GP4)
5. **Education is enhanced by technology**, infused throughout programs and services. (GP5)

III. **General Course Goals:** This course is designed to provide the prospective mathematics teacher with ways to appropriately use technology to support the learning of mathematics. Mathematics content suitable for the secondary mathematics classroom will be the vehicle used to illustrate and demonstrate the use of a wide variety of technology and relevant multimedia.

- IV. **General Course Objectives:** Upon completion of the course, the student will be able to:
1. Use technology tools to solve mathematics problems.
 2. Communicate mathematics ideas that arise from the use of various technology tools.
 3. Explore and compare the uses of available technology tools for specific classroom uses.
 4. Select the appropriate technology tools that support specific learning objectives of mathematics.
 5. Use technology tools in the teaching of content suitable for the secondary mathematics classroom.

V. **Subject Matter/Content:**

Required Course Materials:

1. **Textbook:** Dick, T., & Hollebrands, K. (2011). *Focus in High School Mathematics: Technology to Support Reasoning and Sense Making*. NCTM: Reston, VA. ISBN# 978-0-87353-674-5
2. **Instructional Resources:** Ewing 222, IRC, Internet, and library.
3. **Notebook and pencil**

Content Topics:

1. Learning Management Systems
2. Web-page Creation Tools
3. Word Processing Tools
4. Drawing Tools
5. Presentation Tools
6. Screen-casting Tools
7. Pod-casting Tools
8. Spreadsheet Tools
9. Graphing Calculators
10. Geometric Visualization Tools
11. Virtual Manipulative Tools
12. NCTM *Illuminations* Interactive Tools
13. Apps for Mathematics Education
14. Software for Mathematics Education
15. Games for Mathematics Education
16. Websites for Mathematics Education

Technology Statement: Candidates will use a variety of technology resources in this course. These include, but are not limited to the Internet, Microsoft Word, Power point, and Excel.

Diversity Proficiencies Expected of all Candidates: Candidates will:

1. Develop the capacity to teach in diverse settings with students and colleagues of varying backgrounds, ethnicities, capabilities, and beliefs (CF 1, 3; DRS 3)
2. Identify contextual factors that may influence student learning and act upon those factors in planning curriculum and instruction. (CF 2, 3, 4; DRS 2)
3. Establish classroom and school climate that reflects the belief that all students have the ability to learn. (CF 2, 3, 4; DRS 1, 2, 4)
4. Differentiate instruction and experiences based on contextual factors and the diverse needs of learners. (CF 2, 3, 4, 5; DRS 1, 2, 4)
5. Use appropriate assessment strategies to serve the diverse needs of learners. (CF 3, 4; DRS 1,2)

*CF = Delta P³ Model; DRS = Dispositions Rating Scale

Specific Course Objectives:

At the conclusion of this course, the prospective secondary teacher will be able to do the following:

1. Develop a course shell for a hypothetical 7-12 mathematics course using the CANVAS Learning Management Systems that includes a:
 - Home Web-page
 - Course Outline
 - Course Calendar
 - Grade Book
 - Multiple-Choice Assessment with Answer Key
 - Constructive Response Assessment with Rubric and Exemplar
 - Slide Presentation
 - Screencast
 - Podcast
 - Discussion
 - Interactive Investigation with Rubric and Exemplar
 - Reviews of Technology Tools
2. Create instructional resources (i.e. web-page, outline, assessment, slides) that include visual representations related to the mathematical content and that incorporate properly typed mathematical equations (i.e. fractions, powers).
3. Use a spreadsheet tool to analyze a hypothetical data set of student grades.
4. Write a summary of the results of analyses of student grades and discussion of instructional implications.
5. Write reviews critiquing one mathematics education-related example of each of the following technology tools: app, software, game, website.
6. Facilitate the class in one investigation.

VI. Major Course Activities: Research shows that people learn best from concrete experience, interacting with the content and with other learners, engaging in challenging tasks, being held accountable for their work, and receiving frequent feedback on their progress. The following course activities have been designed based on these principles:

1. **Readings** – Outside of class students will be responsible for individually completing reading assignments from the course textbook. These will prepare students for classroom tasks and individual assignments.
2. **Teaching Ability Assessment** – Through Canvas candidates are required to submit a hypothetical course shell that includes a home web-page, course outline, course calendar, grade book, multiple-choice assessment with answer key, constructive response assessment with rubric and exemplar, slide presentation, screencast, podcast, discussion, interactive investigation with rubric and exemplar, and reviews of technology tools. Candidates will also be required to facilitate the class in one investigation. Furthermore, candidates will be required to critique various technology tools. Finally, candidates will use technology to analyze a hypothetical data set of student grades and reflect on the instructional implications of their analyses.
3. **Readiness Assurance Tests (RATs):** Each of the 4 instructional sequences will begin with a multiple-choice RAT (with 10 items and 5 possible responses per item) based on the assigned readings. You will actually take each RAT twice, once on your own and once as a team. You will use instant feedback forms to take the team RAT which will provide your team with the opportunity to earn partial credit (1st response = 10 pts., 2nd response = 5 pts., 3rd response = 2 points, 4th or 5th response = 0 points). Your team will also be given the opportunity to write a evidence-based appeal after tests.
4. **Mini-Lecture** – After each RAT I will provide the class with direct instruction aimed at addressing overarching themes, summary reflections, and un-resolved questions. There will also be brief demonstrations of how to use tools led by Dr. Cope and other faculty members at Delta State University.
5. **Application Tasks:** After mini-lectures you will spend the majority of class working on application tasks. You will be expected to interact with your team members during application tasks. This interaction should include checking strategies, representations, and solutions with your team members. Students will receive credit for their participation in application tasks. The application tasks will also prepare you for creating your course shell. Students will also evaluate their team members' performance.

Important Course Dates:

| Date | Topics Addressed | Assignments |
|--|---|--|
| Instructional Sequence One: <i>Technology Tools to Support Mathematics Teaching</i> Weeks 1-4 | | |
| Weeks 1 – 4 (Monday, January 13 th – Sunday, February 9 th) | <ul style="list-style-type: none"> ◇ Learning Management Systems ◇ Web-page Creation Tools ◇ Word Processing Tools ◇ Drawing Tools ◇ Presentation Tools ◇ Screen-casting Tools ◇ Pod-casting Tools ◇ Virtual Manipulative Tools ◇ NCTM <i>Illuminations</i> Interactive Tools ◇ Apps for Mathematics Education ◇ Software for Mathematics Education ◇ Games for Mathematics Education ◇ Websites for Mathematics Education | <ul style="list-style-type: none"> ◇ Read Chapters 1, 2, & 7 ◇ Readiness Assurance Test (January , 2014) ◇ Begin creation of course shell |
| Instructional Sequence Two: <i>Reasoning about Probability & Statistics with Technology</i> Weeks 5-7 | | |
| Week 5-7 (Monday, February 10 th – Sunday, March 2 nd) | <ul style="list-style-type: none"> ◇ All tools utilized in Instructional Sequence 1 ◇ Spreadsheet Tools | <ul style="list-style-type: none"> ◇ Read Chapters 5 & 6 ◇ Readiness Assurance Test (February , 2014) ◇ Continue to work on course shell ◇ Begin work on analyses and discussion of the hypothetical student grades data set |
| Instructional Sequence Three: <i>Using Technology to Represent, Analyze, and Model Functions</i> Weeks 8-11 | | |
| Weeks 8-11 (Monday, March 3 rd – Sunday, April 6 th) | <ul style="list-style-type: none"> ◇ All tools utilized in Instructional Sequences 1-2 ◇ Graphing Calculators | <ul style="list-style-type: none"> ◇ Read Chapter 4 ◇ Readiness Assurance Test (March , 2014) ◇ Continue to work on course shell ◇ Continue to work on analyses and discussion of the hypothetical student grades data set ◇ Begin developing a investigation with a exemplar, and rubric |
| Instructional Sequence Four: <i>Technology as a Tool for Creating and Reasoning about Geometry Tasks</i> Weeks 12-14 | | |
| Weeks 12-14 (Monday, April 7 th – Sunday, April 27 th) | <ul style="list-style-type: none"> ◇ All tools utilized in Instructional Sequences 1-3 ◇ Geometric Visualization Tools | <ul style="list-style-type: none"> ◇ Read Chapter 3 ◇ Readiness Assurance Test (April , 2014) ◇ Complete course shell ◇ Complete analyses and discussion of the hypothetical student grades data set ◇ Complete investigation with a exemplar, and rubric |
| Week 15 Monday, April 27 th – Friday, May 2 nd Complete reviews critiquing one mathematics education-related example of each of the following: app, software, game, website. | | |
| Week 16 Monday, May 5 th – Friday, May 9 th Facilitate the class in one investigation; Submit Course Shell; Final Peer Evaluations | | |

VII. How Grades Will Be Earned: (A=94-100; B=84-93; C= 74-83; D=70-73; F=Below 70)

- 15% Readiness Assurance Tests (10% individual and 10% team; 3 RAPs)
- 5% Team Member Performance Evaluation (Peer graded @ End of semester)
- 55% Course Shell (**minimum acceptable grade = C, Full letter grade reduction per day late**)
- 10% Teaching of a 50-Minute Lesson
- 15% Team Tasks (14 weekly grades)

Managing your life and this course: With the exception of the Course Shell, which will receive a full letter grade reduction for each day late, all other missed assignments will receive no credit. As many of the assignments in the course are team-based and completed in class, it is impossible to schedule make-up opportunities for missed assignments. Since there will be occasions in your life when missing a class meeting or missing a deadline for an assignment is simply unavoidable (i.e. illness; personal crisis), this course has a couple built-in safety valves. These are your tools to use in managing your life, please manage these carefully and be careful not to waste your safety valves early in the semester, because you may need your droppable grades to offset any unforeseen low scores or difficulties later in the semester:

Safety Valve One: Out of your 4 RAT grades the lowest 1 will be dropped (individual and team component)

Safety Valve Two: Out of the 14 weekly team task grades the lowest 2 will be dropped

VIII. General Course Information:

Faculty Contact Info: Liza Cope, Ph.D., Broom Hall 282, 662-846-4512, lcope@deltastate.edu
Office Hours: Monday, Wednesday, and Friday 8:00-12:00

Library: Requirements for courses include activities, projects, and/or papers where use of the University library is essential. Library hours are posted on the university website. The Instructional Resource Center in the library houses important materials useful specifically for education majors. Library resources are also available online. DSU students may secure access information by visiting the DSU Roberts-LaForge Library.

Class Attendance: Prompt and regular attendance is necessary for success in this course. Any student that exceeds 2 absences without verifiable excuses will receive a lowered participation grade. A student is allowed a maximum of 4 absences. Any person exceeding this number will receive a semester grade of "F."

Lateness-Tardiness Policy: If you need to arrive late or leave early and thereby miss part or all of an in-class assignment, you will receive no credit for the assignment, neither for individual work nor for the work of your team in your absence.

Course Deadlines: Failure to meet deadlines will result in a grade penalty on all assignments in this course. All assignment deadlines are indicated on the syllabus and will be announced in class. Failure to submit an acceptable portfolio will result in failure of this course. The final course shell will be due on the day of the Final Examination.

Examinations: Students are expected to take tests and examinations at the scheduled times. Should a conflict arise, the student should contact the instructor prior to the date of the test to make arrangements for taking the test or exam. The student will have three class days to make up any missed test after returning to school.

Cheating and Plagiarism: Cheating and plagiarism will not be tolerated. University policy will be followed, according to current catalog issues, and procedures specific to the Division will be enforced consistently across programs. These procedures will be disseminated and explained at the beginning of the semester.

Accountability for Individual Work: Unless otherwise directed, all papers and assignments are to represent the individual student's efforts. Students submitting a personal assignment that represents the collaborative works of others or the work of another individual will not be given credit for the assignment. If the offense constitutes cheating or plagiarism, university policy will be followed.

Bibliography: Appropriate sections of secondary mathematics textbooks, portions of Principles and Standards for School Mathematics, Common Core State Standards, and other books used throughout the semester. Appropriate articles from current periodicals such as Mathematics Teacher will be used throughout the semester. Resources: Ewing 222, IRC, internet, and Roberts-LaForge Library.

IX. Disabilities Statement and Policy: It is the responsibility of students who have professionally diagnosed disabilities to notify the instructor so that necessary and/or appropriate modifications can be made to meet any special learning needs. Students are also directed to contact the Disability Director for the University who will coordinate the accommodations process.