I.   **Course Designation: CUR 487**
       Course Title: Teaching of Secondary Mathematics
       Course Description: Place of mathematics in curriculum, aims and objectives of mathematics teaching, organization and teaching of high school mathematics, planning of lessons, and other topics of interest to prospective teachers. Prerequisite: a major or minor in mathematics. 3

II.   **Conceptual Framework:**

DELTA P³ MODEL
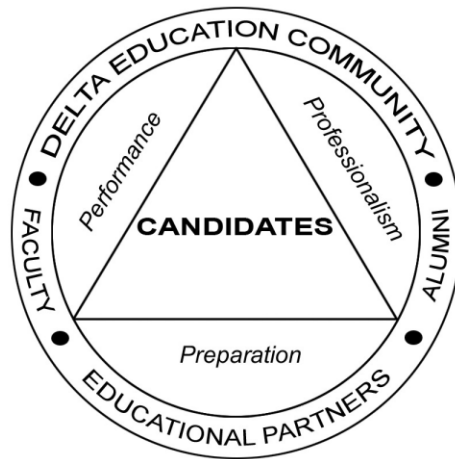
Vision: The Delta State University College of Education promotes a vibrant educational community committed to preparing capable and confident candidates who can positively affect learning outcomes of students in the P-12 school setting. Appropriately illustrated by the Delta triangle, the model reflects 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:**
       Mathematics is a dynamic set of tools and thinking processes that people of any age can experience and develop. In this course, we explore the amazing mathematical thinking that adolescents can exhibit, if/when they are given appropriate opportunities. We will explore how to recognize the mathematics adolescents know, design instruction that encourages adolescents to build on their knowledge, draw out the mathematical thinking in what they do, and construct educational experiences for adolescents that emphasize their understanding of important and meaningful mathematics. Mathematics education consists of components of curriculum, defined by standards and local mapping to objectives; instruction, encouraged by the pedagogy of your experience, philosophy, and classroom realities; and evaluation/assessment, the component which should then be used to modify instruction and curriculum to maximize the understandings within each student, or necessitate modification in the type of assessment. Our course activities are designed to give you practical experience and theoretical perspective for each of the areas.

As we explore the cooperative, creative endeavor that is mathematics education, you will have the opportunity to reflect on your own mathematical thinking and your beliefs about mathematics. In some instances, you will be a mathematics student, engaging in a variety of problem solving tasks. At other times, you will be a mathematics teacher, reflecting on the process of teaching and learning mathematics. You will read, solve problems, view and analyze learning episodes, and communicate about mathematics.

While some of the content we will cover may not be new to you, we will be working with it in new ways, with several goals in mind. The basic focus of the course is to deepen your understanding of important mathematical ideas for middle and high school-aged adolescents.

The overarching goal of this course is to help you develop new approaches to teaching meaningful mathematics so that adolescents can learn with understanding. There will be no prescriptions for "how to teach." Instead, we will explore current research about how adolescents think about mathematics. Armed with the skills to recognize, analyze, and understand a child's thinking, you will be better equipped to plan meaningful instruction. When mathematics is learned with meaning and understanding, it becomes a creative and powerful set of intellectual tools. I hope to lead you further into this exploration, helping you build your own appreciation for mathematics as an exciting and fascinating intellectual domain.

IV.   General Course Objectives:

1. To learn how to use the National Council of Teachers of Mathematics *Principles and Standards* and the Common Core State Standards as guides for your curricular, instructional, and assessment decisions.
2. To learn how to write lesson objectives and plan instructional activities that emphasize mathematical reasoning, communication, problem solving, and representations relevant to adolescents' lives, other areas of the mathematics curriculum, and other disciplines.
3. To learn how to assess and use adolescents' thinking as a guide to planning instruction.
4. To learn to communicate effectively about mathematics, including the sharing of problem-solving strategies and the questioning and analysis of others' strategies.
5. To demonstrate how tools and resources (i.e. textbooks, computer software & hardware, professional organization publications, online resources, concrete manipulatives, calculators) can be used to enhance mathematics instruction and assessment.
6. To analyze the ways that different groups of students (by age, experience, gender, ethnicity, and perhaps economic status) experience mathematics instruction.
7. To use the Delta State Conceptual Framework to critique and evaluate effective mathematics education.

V.   Subject Matter/Content:
Required Course Materials:

1. **Course Reader:** I have created a course reader for you containing readings and resources that you will need throughout the semester. The reader is required and can be purchased at the campus bookstore.
2. **Instructional Resources:** Ewing 222, IRC, Internet, and library.
3. **TaskStream subscription:** The Delta State University College of Education assessment system utilizes TaskStream to collect data on individual candidates and to summarize and analyze data for ongoing program improvement. Each candidate is expected to purchase and use TaskStream for all assignments so designated in this class. Effective Fall, 2010, candidates will receive a grade of incomplete if deadlines to upload assignments into TaskStream are not adhered to, even if a paper copy of the assignment has been submitted.
4. **Notebook and pencil**

Content Topics:

1. NCTM Standards
2. Common Core State Standards
3. Writing objectives
4. Planning a lesson
5. Preparing an electronic portfolio
6. Teaching mathematical concepts
7. Classroom questioning
8. Assigning homework
9. Constructing tests
10. Evaluating student and teacher performance
11. Teaching problem solving
12. Using technology
13. Remediation
14. Planning enrichment activities
15. Overcoming mathematics anxiety and developing positive attitudes
16. Classroom management
17. Integrated lessons across subject areas
18. Multiculturalism and classroom diversity including ELL
19. College of Education Conceptual Framework (included)

Technology Statement: Candidates will use a variety of technology resources in this course. These include, but are not limited to, PowerPoint, the Internet, Microsoft Word, and Excel. It is required that word processors be used in creating the Teacher Intern Assessment Instrument (TIAI) and the Teacher Work Sample (TWS).

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 P^3 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. Discuss the objectives from the Common Core State Standards and NCTM's recommendations for any secondary mathematics course.
2. Write objectives of mathematics instruction in behavioral terms.
3. Develop appropriate instructional activities and select appropriate materials (including manipulative materials) for teaching mathematical concepts and skills.
4. Write objectives covering all levels of Bloom's taxonomy.
5. Discuss the benefits of membership in the NCTM and MCTM.
6. Describe the features of the Mathematics Teacher and Mathematics Teaching in the Middle School
7. Describe the material included in the teacher's edition of secondary mathematics textbooks.
8. Compare the content of current secondary textbooks to the Common Core State Standards.
9. Discuss criteria needed to meet each indicator of TIAI and TWS.
10. Prepare an electronic portfolio using the instructions of the TIAI and TWS.
11. Evaluate classroom questions using the criteria discussed in class.
12. Write a set of questions to be used in a classroom to develop a selected mathematical topic.
13. Describe types of activities that might be used for motivation.
14. Select or develop activities to be used for motivation for selected mathematical topics.
15. Describe purposes of homework, types of assignments, methods of giving assignments, and evaluation of homework.
16. Plan a homework assignment for a selected mathematical topic.
17. Identify and discuss the content for each secondary mathematics course--advanced math, algebra II, geometry, algebra I, pre-algebra.
18. Demonstrate the use of the overhead projector or other technology in presenting a selected mathematical concept.
19. Construct a five to ten-minute test on a selected mathematical topic.
20. Prepare a full-period test on a mathematical topic.
21. Describe some instruments used to measure attitudes toward mathematics.
22. Describe methods of evaluating teaching performance.
23. Identify and describe methods of measuring student performance with conventional testing as only one of the methods.
24. Describe remediation strategies and plan a lesson for remediation on a selected mathematics topic.
25. Identify problem-solving strategies and describe techniques to be used in teaching problem solving.
26. Describe specific uses of technology in teaching mathematics in secondary school.
27. Explain NCTM's position in regard to the use of technology.
28. Plan calculator and/or computer activities to be used in teaching a selected mathematical topic.
29. Develop or select enrichment activities for a chosen mathematics class.
30. Plan a mathematics program for a club or a school assembly.
31. Define mathematics anxiety and describe techniques to be used to alleviate anxiety in the classroom.
32. Plan and teach a 50-minute lesson designed to present a mathematical concept.
33. Plan teaching strategies that provide for individual learning differences.
34. Select teaching materials appropriate for specific situations, for students of differing abilities, for diversity and multiculturalism in the classroom, for English language learners and other exceptionalities, and for integration of knowledge from several subject areas.
35. Describe some effective classroom management techniques.
36. Prepare instructional bulletin boards.
37. Discuss issues of access to higher levels of mathematics, especially for minority students.
38. Select materials to purchase for the classroom when a maximum amount is allocated for such expenditures.

39. Select, read, and summarize current articles on the topics listed in "subject matter topics" (see above).
40. Prepare a list of questions to be asked before accepting a teaching position.
41. Write your philosophy of teaching secondary school mathematics.
42. Discuss/explain the College of Education Conceptual Framework

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 their course readers. These will prepare students for classroom tasks and individual assignments (TIAI and TWS).
2. **Teaching Ability Assessments:** Through Taskstream candidates are required to submit a Teacher Work Sample (**TWS**) where they describe and reflect on a full unit of instruction plan that they create, the Teacher Intern Assessment Instrument (**TIAI**).
    a. **Middle and High School Field Experiences:** Candidates will also be required to teach two 50-minute lessons (one in a middle school and one in a high school). Candidates will need to go to the school before the lesson to prepare and after the lesson to debrief.
    b. **Tutoring Experiences:** Candidates will be required to tutor students in math lab during the first two weeks of the semester. The math lab will be from 12-1PM on Fridays. After fulfilling this requirement, candidates are encouraged to continue tutoring in the math lab as a student worker.
3. **Readiness Assurance Tests (RATs):** Each of the three instructional sequences will begin with a multiple-choice RAT (with 10 items and 5 possible responses per item) based on the assigned readings and video tutorials. 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 an evidence-based appeal after any question.
4. **Mini-Lecture:** After the RAP I will provide the class with direct instruction aimed at addressing overarching themes, summary reflections, and un-resolved questions.
5. **Team Application Tasks:** After my mini-lecture you will spend several classes working on application tasks with your team members. The team application tasks will prepare you for your other course assignments
6. **Presentations:** Candidates will be required to deliver individual presentations of problems that may come either from the readings, mini-lectures, or from team application tasks.

Important Course Dates:

Date	Topics Addressed	Assignments
Learning Sequence One: *Unpacking Standards to Develop Curriculum* **Weeks 1-3**		
Week 1	Look at secondary textbooks, examine teacher's editions of textbooks, compare content of secondary textbooks to the standards, and discuss criteria needed to meet each indicator of TIAI.	◊ **Read** Syllabus, DSU Teacher Education Handbook, TIAI, and TWS documents **Pages:** _____ ◊ Teaching Philosophy **DUE:** _____
Weeks 2 – 3	Discussion of content and practice standards from the Mississippi College and Career Readiness Standards and the NCTM Principles and Standards relevant for secondary mathematics courses. Discussion of the progression of standards across and within grade levels.	◊ **RAT 1**, **Date:**_____ ◊ **Read:** All NCTM, MS CCR, and Progressions documents **Pages:** _____
Learning Sequence Two: *Instructional and Assessment Strategies* **Weeks 4-9**		
Week 4	Discuss best practices for the writing of objectives, and development of assessments and instructional activities	◊ **RAT 2, Date**:_____ ◊ **Read**: *Writing Objectives Using Bloom's Taxonomy, Task Orientated Construction Wheel Based on Bloom's Taxonomy, Designing and Implementing Worthwhile Tasks, Working with Standards using UbD, Degree of Autonomy Rubric, Essential Questions Table*

		Pages: _____
Week 5	Discuss the use of enrichment and remediation activities, how to recognize mathematics anxiety and the use of techniques to alleviate anxiety in the classroom, planning for individual learning differences, and selecting materials appropriate for differing abilities, diversity, cross-disciplines, multiculturalism, and English Language Learners (ELLs).	◊ **Read**: *Reconcilable Differences? Standards-based Teaching and Differentiation*, *Using Bloom's Taxonomy with English Language Learners* **Pages**: _____
Week 6	Discuss the role of homework as a teaching method, look at types of assignments, and discuss evaluation of homework.	◊ **Read**: *Using Bloom's Taxonomy as a Framework for Classroom Assessment*, *Taking the Work out of Homework*, *Funny Face Contest: A Formative Assessment*, *Punch Up Algebra with POWs*, *A Model for Constructing Higher-Level Classroom Assessments* **Pages:** _____ ◊ **Submit** Lesson Plans Days 1 - 3 in Taskstream **Due:** _____
Week 7	Discuss the role of questioning as a teaching strategy, write questions to be used in a classroom setting in the development of a topic, construct a short quiz on a selected topic, and prepare a full-length test on a selected unit.	◊ **Read:** *Using Open-Ended Problems for Assessment*, *Assessing True Academic Success: The Next Frontier of Reform*, *Using Portfolios to Assess Students' Mathematical Thinking* **Pages:** _____ ◊ **Submit** Lesson Plans Days 4 - 6 in Taskstream **Due:** _____
Weeks 8-9	Discuss methods of evaluating student performance, methods of evaluating teaching performance	◊ **Read:** *Ensuring Fair and Reliable Measures Practitioner Brief*, *Executive Summary: Principles to Action* **Pages:** _____ ◊ **Submit** Lesson Plans Days 7 - 10 in Taskstream ◊ **Due:** _____
Learning Sequence Three: *Developing as a Professional* **Weeks 10-15**	
Week 10	Discuss problem-solving strategies, the use of technology at the secondary level, and demonstrate calculator and computer activities for certain mathematical topics	◊ **RAT 3, Date**:_____ ◊ **Midterm Formative Peer Evaluations** ◊ **Read:** *Web Watch – Reinforcing Math Skills*, *Podcasting Potential for High School Mathematics*, *Using Technology to Optimize and*

		Generalize: The Least Squares Line, Problem Solving Strategies **Pages: _____**
Week 11	Discuss effective classroom management techniques, math attitudes and motivation, plan an instructional bulletin board, and discuss the purchasing of classroom materials on a budget	◊ **Read:** *APL Classroom Management Training Notes, Mathematics Instruction and Behavior Problems: Making the Connection, A Review of Instruments Created to Assess Affect in Mathematics, Math Bulletin Board Ideas* **Pages: _____** ◊ **TWS: Sections 1 and 2** **Due: _____**
Week 12	Candidates will have a field experience where they teach a full 50-minute lesson.	◊ **TWS: Sections 3 and 4** **Due: _____**
Week 13	Discuss interviewing for a teaching position and the Mississippi Educator Code of Ethics. Candidates will also write or revise their philosophy of teaching secondary school mathematics statement.	◊ **Read:** *Interview Preparation for Teachers, Mississippi Educator Code of Ethics and Standards of Conduct* **Pages: _____** ◊ **TWS: Sections 5 and 6** **Due: _____**
Week 14	Discuss professional development and the benefits and resources available through NCTM.	◊ **Read** *Frequently Asked Questions* **Pages: _____** ◊ **TWS: Sections 7 and 8** **Due: _____**
Week 15	Thanksgiving Break	◊ **Revise TIAI and TWS**
Weeks 16-17	Discuss any course objectives that have not been fully addressed previously.	◊ **Submit TIAI and TWS final drafts**

VII. How Grades Will Be Earned:
 (A=90-100; B=80-89; C= 70-79; D=65-69; F=Below 65)
- 25% TIAI Portfolio **(minimum acceptable grade = C, Full letter grade reduction per day late)**
- 25% TWS **(minimum acceptable grade = C, Full letter grade reduction per day late)**
- 15% Readiness Assurance Process (average of individual and team scores)
- 5% Team Member Performance Evaluation (Peer graded @ End of semester)
- 15% Teaching of one 50-Minute Lessons in both a local middle and a local high school
- 15% Presentations

Managing your life and this course: With the exception of the TIAI and TWS, 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 few 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 3 RAP grades the lowest 1 will be dropped (individual and team component)
   Safety Valve Two: You will have the opportunity to revisit your individual presentations within one week if necessary

VIII. General Course Information:

Liza Cope, Ph.D.
lcope@deltastate.edu
Department of Mathematics
Broom Hall 282, Phone 662-846-4512

Office Hours: Tuesdays and Thursdays: 8-9AM and 1-4 PM; Fridays 1-3PM

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 Library.

Class Attendance: Regular and punctual attendance at all scheduled classes and activities is expected of all students and is regarded as integral to course credit. Each student is directly responsible to the individual professor for absences and for making up work missed. Particular policies and procedures on absences and make-up work are established for each class, and are announced in writing at the beginning of the term. When an undergraduate student accumulates absences greater than 25 percent of the scheduled meetings of a class, the student receives a grade of F in the class. A student absent from class and missing a scheduled test and/or major presentation is entitled to a make-up if evidence is presented to the instructor that absence was due to illness or death in the immediate family. Absences authorized by the Provost/Vice President for Academic Affairs for official purposes (athletics, performing groups, student government groups, etc.) also entitle a student to make up a test or class presentation. However, absences due to any reason are counted in the total number of absences during a semester.

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 and acceptable portfolio will result in failure of this course. The portfolio is due on December 1, 2015.

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*, the *Mississippi College and Career Readiness Standards*, and other books will be assigned throughout the semester. Appropriate articles form current periodicals such as *Mathematics Teacher* will be assigned. Resources: Ewing 222, IRC, internet, and Roberts 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.