I. Course Designation: MAT 411  
Course Title: Geometry  
Course Description: Intuitive, synthetic, and analytic approaches to Euclidean and other geometries. Prerequisite: MAT 205 or MAT 251. 3

II. Conceptual Framework

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/Objectives

The student at the end of this course will be able to solve problems in geometry related to measurement, logic and various geometries. The student will understand the differences between neutral, Euclidean, elliptic and hyperbolic geometries. Further, students will learn to perform geometric constructions using both manual tools and computer software.

Subject Matter/Content

A. Primary Texts and Resources

**Text:** Geometry: MAT 411, McGraw Hill, 2014. (This book specifically designed for this course at this university.)

B. Content Topics

The content to be covered includes and may not be limited to the following topics: logic, problem solving, axiomatic method, Euclidean geometry, constructions, transformational geometry, non Euclidean geometry, and Hilbert’s Axioms.

Technology Statement

Candidates will use a variety of technology resources in this course. These include, but are not limited to, the Internet, calculators, and various programs found on the internet and some loaded on the computers in the mathematics labs.
C. Diversity

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

IV. Specific Course Objectives

Chapter 1
The candidate/student will be able to describe the origins of geometry.
The candidate/student will be able to name and describe contributions to geometry by various individuals.
The candidate/student will be able to describe the Axiomatic Method and its uses in modern mathematics.
The candidate/student will be able to use axioms, definitions, and theorems to prove statements.
The candidate/student will be able to define the terms incomplete and independent in terms of mathematics.

Chapter 2
The candidate/student will be able to state from memory the undefined terms, axioms, definitions, and theorems from Euclidean geometry in this chapter.
The candidate/student will be able to use measurements such as length and area in various models.
The candidate/student will be able to work with an inversion model of geometry.

Chapter 4
The candidate/student will be able to perform various Euclidean constructions using: compass and straight edge, and computer software.
The candidate/student will be able to justify why constructions produce the objects or claim in question.

Chapter 5
The candidate/student will be able to define what a transformation is in plane geometry. The candidate/student will be able to use transformations to “move” plane objects around in the plane. The candidate/student will be able to use matrices to describe transformations.

Chapter 7

The candidate/student will be able to explain the reason for multiple geometries. The candidate/student will be able to prove theorems in non-Euclidean geometries. The candidate/student will be able to use models to represent non-Euclidean geometries.

VI. Major Course Activities:

The course will have three major examinations approximately 4, 8 and 12 weeks into the course. The course will have a comprehensive final examination during finals week at the listed time by university schedule. The course will require the candidate to write a paper on an article or chapter of a text. Specific instructions will be handed out at the appropriate time.

VII. Methods of Instruction:

Lectures, small group work, and discussions are used to convey the information in this class.

VIII. Evaluation Methods:

There are three categories of scores for this class: tests, homework/quizzes, and final examination. Each category will account for a various amount of your final average according to the following weights: tests - 50%, final examination - 25%, writing assignment 10%, and homework/quizzes - 15%.

Within each category the average will be computed on a part out of total procedure. For example, suppose that you receive the following scores of three test: 51 out of 57, 78 out of 123, and 44 out of 45. The test average will be computed as follows:

\[
\frac{51 + 78 + 44}{57 + 123 + 45} = \frac{173}{225} = 76.89\%
\]
No late assignments will be accepted, but the two lowest homework - quizzes will be dropped.

Cheating and plagiarism are not tolerated. If it is established that a violation has occurred the score on the assignment will be a zero, and in addition the instructor will report the offense as outlined by university policy.

Grading Scale:

Grades will be assigned according to the following scale:

- A 100%-90%
- B 89%-80%
- C 79%-70%
- D 69%-60%
- F Below 60%

IX. GENERAL COURSE INFORMATION

Mathematics Department
Broom 215, Phone 662-846-4508
Dr. David Jay Hebert
dhebert@deltastate.edu

Office Hours are posted on my office door. Additional time may be arranged by appointment.
10.00-11.00 Monday, Wednesday and Friday
08.30 – 09.00 on Tuesday and Thursday
13.30-16.00 Monday
14.00 – 16.30 Wednesday Computer Lab Nursing Building
Other times by appointment.

Class Attendance
1. The maximum number of absences allowable is the equivalent to two weeks of classes. This means for a Monday-Wednesday-Friday class is six or four for a Tuesday-Thursday class. If you exceed the allowable number of absences, a grade of “F” will be assigned as the final grade in the course. The only absences that do not count in this list is official university business such as but not limited to sporting activities for student athletes, or conflicts caused by other university activities.
2. When a student is tardy for class, it is the student's responsibility to request that the faculty member change the recorded absence to a tardy. This must be done on the day the tardy occurred. A maximum of 3 tardies will be allowed. Any additional tardies will be recorded as unexcused absences.

Classroom Policies and Make-Up Tests:
Students are expected to conduct themselves in a professional academic fashion at all times. Cell phones are not to be used in this class for any reason. If you have a cell phone out, you may and will be asked to leave the class for the remainder of the period.

**Examinations.** Students are expected to take examinations at the scheduled times. Should an authorized absence occur on a test date, then prior to the next scheduled class meeting, the student is to contact the instructor and make arrangements for the make-up examination. If a student fails to contact the instructor within one week (7 calendar days), concerning the absence and a desire to makeup the exam, a grade of zero will be recorded by the instructor.

**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.

**Pay for Print.** The University campus provides Pay-for-Print copying services at key locations campus-wide. Students are responsible for the costs of printing a copy of papers and other assignments.

**Bibliography:**


The Common Core Standards for Mathematics may be found at the following website for free.


The National Library of Virtual Manipulatives will be used to aid the students in understanding some of the topics being covered. This library may be found at the URL:


**X. 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.

**Important Dates:**

**Exam Schedule**