Delta State University
Division of Teacher Education
Course Syllabus
MAT 231

I.   **Course Designation: MAT 231**
       Course Title: GEOMETRY, MEASUREMENT, AND PROBABILITY
       Course Description: Informal geometry, measurement, and basic probability for teachers of elementary and junior high school mathematics. Prerequisites: MAT 131 with a C or better. 3

The study of geometry form a hands on approach with paper folding and various manipulatives for a conceptual development of geometry from naming simple two and three dimensional shapes, their properties, and various measurements. Area, surface area, and volume are developed for simple shapes and irregular shapes; along with how simple shapes can be amalgamated to make complex shapes. Basic probability is studied from an experimental approach where candidates are allowed to conceptually build understand using various manipulatives.

II. Conceptual Framework

DELTA P³ MODEL
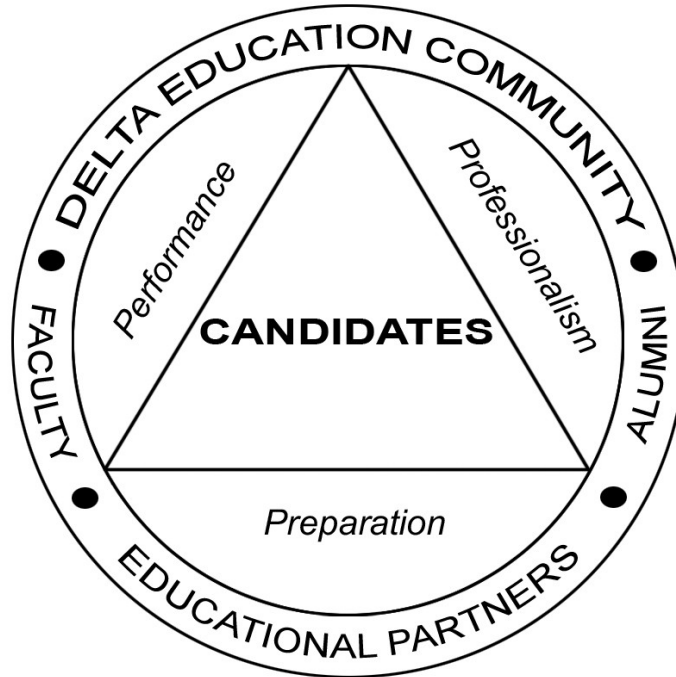
Vision: The Delta State University College of Education promotes a vibrant educational community committed to preparing capable and confident candidates who can positively affect learning outcomes of students in the P-12 school setting. Appropriately illustrated by the Delta triangle, the model reflects 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/Objectives

The candidate at the end of this course will be able to solve problems using geometric reasoning and measurements as related to Common Core State Standards. The candidate shall gain an understanding of shapes in two and three dimensions, relationships between shapes, lines and angles. Further, the candidate shall gain an understanding of measurements how they come about and how to use various units. Further, the candidate will gain an understanding of basic probability and measurements related to data sets.

Subject Matter/Content

A. Primary Texts and Resources

Text: Musser, Burger and Peterson: Mathematics for Elementary Teachers Tenth, Wiley, 2014. (Students may use any of the 7th, 8th or 9th editions).

Common Core State Standards (CCSS) http://www.corestandards.org/Math

B. Content Topics

This course will cover the following topics in geometry: shapes in both two and three dimensions, measurements, congruence and similarity, coordinates and transformations. With data sets measures of central tendency, and measures of dispersion.

C. 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 computer labs.

D. 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 (page numbers from the Tenth Edition)
Chapter 12
Section 1

Candidates will be able to state, explain, and provide examples of van Hiele's levels of understanding.
Candidates will be able to name two dimensional shapes from illustrations and descriptions.
Candidates will be able to place two dimensional shapes into a hierarchy.
Page 557 #'s: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 15, 16

Section 2

     Candidates will be able to use lines of symmetry to investigate shapes.
     Candidates will be able to identify lines of symmetry.
     Candidates will be able to recognize rotation symmetry.
     Candidates will be able to construct perpendicular lines.
     Candidates will be able to prove if lines are perpendicular.
     Candidates will be able to place two dimensional shapes into a hierarchy.

     Page 576 #'s: 1, 4,5,6, 7,8,9,10,11,12,13,14,15

Section 3

     Candidates will be able to place two dimensional shapes into a hierarchy.
     Page 585 #'s: 1-6, 7-10

Section 4

     Candidates will be able to define, draw and recognize: collinear points, parallel lines, concurrent lines, between, line segment, endpoints, length, midpoint, ray, angle, vertex, sides, angle interior, angle exterior, adjacent angles, acute angle, right angle, obtuse angle, straight angle, reflex angle, vertical angles, supplementary angles, complementary angles, transversal, corresponding angles, alternate interior angles, right triangle, acute triangle, obtuse triangle.
     Candidates will be able to prove that vertical angles are congruent.
     Candidates will be able to prove that the interior angle sum of a triangle is 180 degrees.
     Candidates will be able to define polygon and regular polygon.
     Candidates will be able to divide a polygon into triangles.
     Candidates will be able to determine a pattern for the number of sides and the number of triangles.
     Page 599 #'s: 1-9,10-12, 13-19

Section 5

     Candidates will be able to define and illustrate concave and convex simple closed curves.
     Candidates will be able to tessellate a plane.
     Candidates will be able to build tessellations.
     Page 612 #'s: 1-12, 14-17, 20, 21

Section6

     Candidates will be able to define and measure dihedral angles.
     Candidates will be able to name and describe polyhedra.
     Candidates will be able to define polyhedra and their component parts.
     Candidates will be able to use Euler's formula.
     Page 632 #'s: 1-5, 8, 9, 10, 11, 12, 17-22,

Chapter 13
Section 1

Candidates will be able to use both standard and nonstandard units.
Candidates will be able to use the English system of measurement.
Candidates will be able to use the Metric System.
Candidates will be able to convert units within a system.
Candidates will be able to convert units across systems.
Page 661 #'s: 3-22, 23-34

Section 2

Candidates will be able to define length.
Candidates will be able to define perimeter.
Candidates will be able to calculate perimeter.
Candidates will be able to define pi.
Candidates will be able to calculate pi.
Candidates will be able to define and calculate circumference.
Candidates will be able to define area.
Candidates will be able to compute areas for various shapes.
Candidates will be able to state the Pythagorean Theorem.
Candidates will be able to use the Triangle Inequality.
Page 676 #'s: 1-14, 18-24, page 685 # 38, 42, 44,

Section 3

Candidates will be able to define surface area.
Candidates will be able to calculate the surface area of various 3 dimensional figures.
Page 693 #'s: 1-12, 13-20

Section 4

Candidates will be able to define volume.
Candidates will be able to calculate the volume of various 3 dimensional figures.
Page 740 #'s: 1-11, 12-32

Chapter 14
Section 1

Candidates will be able to define the congruence of triangles.
Candidates will be able to determine if two triangles are congruent.
Page 727 #'s: 1-18

Section 2

Candidates will be able to define similarity of triangles.
Candidates will be able to determine if two triangles are similar.
Page 735 #'s: 1-6, 9-21

Section 3

Candidates will be able to use compass and straight edge to perform Euclidean constructions.

Page 750 #'s: 1-16

Section 4

Candidates will be able to use compass and straight edge to perform more Euclidean Constructions.

Candidates will be able to use software to perform constructions.

Pages 761 #'s: 1,2,4,5,6,10,14,17, (using sketchpad) 17, (pg 764 sketchpad)

Section 5

Candidates will be able to use the converse of the Pythagorean Theorem, as well as, the theorem.

Page 771 #'s: 2, 4, 5, 7, 11,13

Chapter 15

Section 1

Candidates are to review on their own.

Page 790 #s: 1-7,9, 15,

Chapter 16

Section 1

Candidates will be able to use and perform translations, rotations and reflections.

Candidates will be able to use and perform dilations.

Page 879 #'s: 2,3,4,6,7,11

VI.   Major Course Activities:

        Week 1: Chapter 12, Section 1
        Week 2: Chapter 12, Section 1 and 2
        Week 3: Chapter 12, Section 3 and 4
        Week 4: Chapter 12, Section 4

        Test 1

        Week 5: Chapter 12, Section 5
        Week 6: Chapter 12, Section 6
        Week 7: Chapter 13, Section 1

        Test 2
        Week 8: Chapter 13, Section 2
        Week 9: Chapter 13, Section 3
        Week 10: Chapter 13, Section 4

        Test 3

        Week 11: Chapter 14, Section 1 and 2
        Week 12: Chapter 14, Section 3
        Week 13: Chapter 14, Section 4

        Test 4

        Week 14: Chapter 14, Section 5
        Week 15: Chapter 16, Section 1

        Final Exam

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 - 60%, final examination - 25% 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:

$$\frac{51+78+44}{57+123+45} = \frac{173}{225} = 76.89\%$$

To compute the final grade use the above method for each category, and then use these scores for the final calculation. Suppose that our student has a 76% test grades, 53% on homework and quizzes and 68% on the final. To calculate the final average perform the following calculations:

$$\frac{(76)(60)}{100} + \frac{(53)(15)}{100} + \frac{(68)(25)}{100} = 45.60 + 7.95 + 17.0 = 70.55$$

This student would have earned a 70.55 percent in the class and thus a D grade.

No late assignments will be accepted, but one of every five 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%-94%
      B 93%-84%
      C 83%-74%
      D 73%-65%
      F Below 65%

Requirement

Passing a rational numbers examination. Every students must take and pass a rational numbers test with no less than a 70% by the drop date for the current semester. Each student may take the examination at most three times during the semester. If a student does not pass the examination on the third attempt or by the last day of March or October, depending on the semester within which the student is taking the course, will receive an "F" in the course. Your first examination will be in class; whereas, the second two examinations, if needed, will be taken out of class at a time agreed upon by both the student and instructor.

IX.   GENERAL COURSE INFORMATIOIN
Mathematics Department
Caylor White Walters Hall 209A, 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.
09.00-10.00 Monday, Wednesday, and Friday
09.00-10.30; 13.30-15.30 Tuesday and Thursday
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.

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:

Principles and Standards for School Mathematics(2000) published by the National Council of Teachers of Mathematics. ISBN: 978-87353-480-2

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

http://www.corestandards.org/the-standards/mathematics

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:

http://nlvm.usu.edu/en/nav/vlibrary.html

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