

COLLABORATION

FOR LEARNING & LEADING

CUIN 6340: Teaching Geometry Concepts Grades 6 – 12

Standard III: Geometry and Measurement: The Master Mathematics Teacher understands geometry, spatial reasoning, measurement concepts and principles, and the vertical alignment of geometry and measurement to teach the statewide curriculum (Texas Essential Knowledge and Skills [TEKS]).

Standard VI: Instruction: The Master Mathematics Teacher applies knowledge of mathematical content, uses appropriate theories for learning mathematics, implements effective instructional approaches for teaching mathematics, including teaching students who are at-risk, and demonstrates effective classroom management techniques.

Standard VII: Creating and Promoting a Positive Learning Environment: The Master Mathematics Teacher demonstrates behavior that reflects high expectations for every student, promotes positive student attitudes towards mathematics, and provides equitable opportunities for all students to achieve at a high level.

Standard VIII: Assessment: The Master Mathematics Teacher selects, constructs, and administers appropriate assessments to guide, monitor, evaluate, and report student progress to students, administrators, and parents, and develops these skills in other teachers.

Standard IX: Mentoring and Leadership: The Master Mathematics Teacher facilitates appropriate standards-based mathematics instruction by communicating and collaborating with educational stake-holders; mentoring, coaching, exhibiting leadership, and consulting with colleagues; providing professional development opportunities for faculty; and making instructional decisions based on data and supported by evidence from research.

T.E.K.S. addressed: (4.8) & (4.9); (5.7); (6.6); (7.6); (8.6); (G.1 – G.3); (G.6); (G.8) & (G.9); (G.11)

Description of Course and Assessment Methodology for Course Objectives

CUIN 6340, Teaching Geometry Concepts Grades 6-12, is designed for Curriculum and Instruction M.Ed and Ed.D students seeking an emphasis in mathematics education. It prepares students for attaining expertise and demonstrating leadership regarding how children develop geometry and measurement concepts and the corresponding instructional and assessment practices that facilitate this development. Students will learn postulates, theorems, proofs, and axiomatic ways of understanding geometry and measurement. Small-group geometry-related activities involving appropriate uses of technology, electronic discussions, student presentations, and analysis of practice-related artifacts are important instructional strategies that will be utilized in this course.

The Student of CUIN 6340 will	Key Course Assignments
Understand measurement as a process of communicating information and evaluating solutions to problems.	Graded HW 3-5 Mathematics Assessments Midterm Exam Final Exam
Understand the geometric relationships and axiomatic structure of Euclidean geometry to justify and prove theorems.	
Analyze the properties of two- and three dimensional figures, investigate geometric concepts/properties using technology, and use these representations to solve problems.	
Understand transformational and vector geometry, and relates algebra to geometry and trigonometry using the Cartesian coordinate system.	
Plan and design effective instruction and assessment based on knowledge of how all students, including students who are at risk, learn	
	TEKS Alignment Lesson Plan Analysis

and develop probability and statistics concepts, skills, and procedures.	Unit Exam Analysis Task-based Interview Video Analysis (Fall & Spring semesters only) Midterm Exam/Final Exam
Implement a variety of instruction and assessment techniques to guide, evaluate, and improve students' learning of probability and statistics concepts, skills, and procedures.	
Apply mentoring skills with 4-8 pre-service mathematics teachers	Mentoring Case Study

Mathematics Assessments (Competencies 13-16, 24 & 25): 3-5 mathematics assessments

Mathematics Education Assignments (Competencies 17 & 18)

TEKS Alignment: In collaborative teams, teachers examine and critique the K-12 TEKS regarding geometry and measurement concepts in light of 1) recommendations by the National Council of Teachers of Mathematics *Principles and Standards*, 2) current research about how children develop geometry and measurement concepts and 3) as it relates to the development of proportional reasoning concepts. In addition, where applicable, they participate in activities of examining TAKS items designed to measure said TEKS (e.g., Chauvot & Benson, 2008).

Criteria to assess the TEKS Alignment Assignment: This assignment is evaluated on the extent to which the MMT candidates accurately identify strengths and weaknesses of the TEKS, provide rationales supported by relevant research, and to correctly identify proportional reasoning concepts.

Lesson Plan Analysis: MMT candidates will submit and exchange their own lesson plans from practice. They then collaboratively analyze submissions in light of course readings about how children develop geometry and measurement concepts.

Criteria to assess the Lesson Plan Analysis Assignment: This assignment is evaluated on the extent to which the MMT candidates accurately identify strengths and weaknesses of the lesson plans and to which they provide rationales supported by relevant research.

Unit Exam Analysis: MMT candidates submit and exchange unit exams from practice. They examine and apply frameworks (e.g., Kastberg (2003)) for analyzing classroom assessments. They submit the analysis, the test and suggested revisions.

Criteria to assess the Unit Exam Analysis Assignment: This assignment is evaluated on the extent to which the MMT candidates accurately classify the items and to which they provide appropriate revisions.

Task-Based Interview: Drawing from the TEKS Alignment Assignment (above), MMT candidates conduct and analyze an audio-taped task-based interview with a grade 4-8 child that relates to both development of proportional reasoning concepts and geometry and measurement concepts. Equipment for this assignment is available in the College of Education CITE lab.

Criteria to assess the Task-Based Interview Assignment: This assignment is evaluated on the extent to which the MMT candidates support claims about the child's thinking with evidence

from the interview and the extent to which the MMT connects the child's thinking to relevant literature.

Video Analysis: The MMT candidate captures 20-40 minutes of his or her instructional practices and analyzes his or her teaching in terms of criteria brought forward in the respective course. Equipment for this assignment is available in the College of Education CITE lab.

Criteria to assess the Video Analysis Assignment: This assignment is evaluated on the extent to which the MMT candidates address relevant criteria and support claims about the instruction with evidence from the video.

Mentoring Case Study: Through the UH Director of Teacher Educator or Director of Student Teaching, the MMT candidate is assigned an undergraduate interdisciplinary student who is preparing for 4-8 mathematics certification, and enrolled in one of three UH mathematics methods courses or student teaching. The MMT candidate maintains a log and submits bi-monthly reports as he or she participates in mentoring activities that focus on lesson planning and classroom management.