Fundamentals of Mathematics III - Geometry & Measurement:
SMTE 3352.001 & 3352.002
Department of Mathematics and Statistics
Fall 2015

A. COURSE INFORMATION

Course number/section: SMTE 3352.001 & 3352.002
Class meeting time: Section 001 meets TR – 11:00 AM – 12:15 PM
Section 002 meets TR – 3:30 – 4:45 PM
Class location: CS107

B. INSTRUCTOR INFORMATION

Instructor: Dr. Sherry L. Bair
Office location: CI 358
Office hours: T: 9:30 – 10:30 AM
W: 10 AM – noon
R: 1:00 – 3:00 PM
Other hours by appointment
Telephone: 825-2819
E-mail: sherry.bair@tamucc.edu
Appointments: scheduled by email or in person

C. COURSE DESCRIPTION

Catalog Course Description
The conceptual framework for understanding and applying properties, models and operations related to various geometric systems in problem solving settings.

Extended Course Description
This course provides students with a research-based perspective on the teaching and learning of elementary mathematics.

This course is designed to have students experience and learn mathematics through a process of inquiry which differs in significant ways from traditional mathematics classes. Students will work together to do mathematics, which involves solving problems, making claims and conjectures, justifying and critiquing claims and conjectures, and modifying or rejecting claims and conjectures as needed.

D. PREREQUISITES AND COREQUISITES

Prerequisites
MATH 1314: College Algebra
SMTE 1350: Fundamentals of Math I
SMTE 1351: Fundamentals of Math II

Corequisites – none
E. REQUIRED TEXTBOOK(S), READINGS AND SUPPLIES

Required Textbook(s)

Optional Textbook(s) or Other References

The textbook used for SMTE 1350 & 1351 may be used as a reference to help students, but reading materials for this course will be provided by the instructor, or can be readily found on-line.

Texas Essential Knowledge & Skills (free online)
Principles and Standards for School Mathematics, NCTM, 2000 (free trial online)
Khan Academy (instructional videos)

Supplies

You will be expected to have a ruler with mm and 1/16 inch markings, a protractor, and a scientific calculator with trigonometric functions. A cell phone may not be used as your calculator during tests and quizzes!

F. STUDENT LEARNING OUTCOMES AND ASSESSMENT

Assessment is a process used by instructors to help improve learning. Assessment is essential for effective learning because it provides feedback to both students and instructors. A critical step in this process is making clear the course’s student learning outcomes that describe what students are expected to learn to be successful in the course. The student learning outcomes for this course are listed below. By collecting data and sharing it with students on how well they are accomplishing these learning outcomes students can more efficiently and effectively focus their learning efforts. This information can also help instructors identify challenging areas for students and adjust their teaching approach to facilitate learning.

If the student meets the expectation of the instructor for completing assigned tasks, reflecting on the daily activities, studying the key concepts discussed during class, and getting additional help when needed, then the student will be able to:

1) Use, model and explain measurable attributes and appropriate strategies for making direct and indirect measurements of various attributes; model and explain the appropriate use of measurement tools, and discuss the precision and accuracy of measurements made.

2) Identify, analyze, and classify shapes by their properties and relationships; use deductive reasoning to draw conclusions; and discuss the Van Hiele Level of Geometric Thinking of tasks.
3) Use inductive and deductive reasoning to develop, justify and use formulas to find length, angle measures, perimeter, area and volume of polygons, circles, and basic three dimensional shapes.

4) Analyze and use the relationships between 3D and 2D representations of objects, including the use of nets, orthographic drawings, and isometric drawings.

5) Use, model and explain translations, rotations, reflections, and dilations/contractions and their relationship to congruence, similarity, symmetry, and tessellations. Relate these concepts to the mathematics in nature, art, architecture and society, including the art of M.C. Escher, circle-based art, quilting, and the Golden Ratio.

6) Identify correct and incorrect mathematical reasoning, and analyze error patterns present in EC-6 student work, and suggest remediation for these errors.

7) Write, and solve mathematical problems that involve geometric reasoning, and basic principles of mathematical modeling in a variety of mathematical or non-mathematical settings.

G. INSTRUCTIONAL METHODS AND ACTIVITIES

Classes will generally involve students actively involved in investigating mathematical relationships, working together to solve problems, and then participating in whole class discussions to solidify the concepts being developed in the activities. On a rare occasion the instructor will present a lecture-based lesson to provide background information prior to assigning problem solving tasks.

H. MAJOR COURSE REQUIREMENTS AND GRADING

Final course grades will be determined based on your attendance and participation; your homework completion, content quizzes, projects, as well as a midterm exam and a comprehensive final exam.

<table>
<thead>
<tr>
<th>ACTIVITY</th>
<th>% of FINAL GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance, Homework &amp; Participation</td>
<td>10</td>
</tr>
<tr>
<td>Quizzes (3)</td>
<td>15</td>
</tr>
<tr>
<td>Projects (3-4)</td>
<td>30</td>
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<tr>
<td>Midterm Exam</td>
<td>20</td>
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<tr>
<td>Final Exam</td>
<td>25</td>
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</table>
Each assignment, paper, and test or quiz item will be graded in a holistic manner, based on a rubric. A general version of the rubric appears in the following paragraphs. This is a summarized version of the more analytic rubric which will be attached to all major assignments. Each item is scored on a basis of 0 to 4 points. At the end of the semester grades are calculated in a manner similar to grade point average, weighting the mean score in each category and using the following guidelines for determining semester grades: A (3.4 – 4.0), B (2.75 – 3.39), C (2.0 – 2.74), D (1.5 – 1.99), F (0 – 1.49). This scale makes a full distribution of grades from A to F plausible, with A's being reserved for truly outstanding performance and a grade of C representing the minimal acceptable performance.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>A (4)</td>
<td>Outstanding performance</td>
<td>Student demonstrates solid conceptual understanding and insight. All required components are clearly present. Material is well written, demonstrating coherent thoughts and reasoning as well as utilizes proper grammar, correct spelling, appropriate mathematical terminology, and notation.</td>
</tr>
<tr>
<td>B (3)</td>
<td>Good performance</td>
<td>Student demonstrates good understanding and insight. All required components are present. Material is well written, demonstrating coherent thoughts and reasoning. Student uses appropriate mathematical terminology and notation, minor spelling or grammatical errors are possible.</td>
</tr>
<tr>
<td>C (2)</td>
<td>Adequate performance</td>
<td>Student demonstrates adequate understanding and insight. Most required components are present. Material is written coherently, demonstrating adequate writing skills, but may contain numerous grammatical or spelling errors. Students may not use appropriate mathematical terminology, but does not misuse mathematical terminology or notation.</td>
</tr>
<tr>
<td>D (1)</td>
<td>Inadequate performance</td>
<td>Student demonstrates inadequate understanding and insight. Required components are not present. Writing indicates little thought and reflection, or is of poor quality, making it difficult to read and understand. Students may have misused mathematical terms or notation.</td>
</tr>
<tr>
<td>F (0)</td>
<td>Totally unacceptable performance</td>
<td>Student demonstrates little to no understanding of the content. Work is not turned in, or most of the required components are missing. Writing indicates virtually no effort.</td>
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</tbody>
</table>

**Attendance & participation.** – Attendance & participation includes individual, collaborative and cooperative explorations of mathematical ideas, reflections, and discussions of the development of elementary students' reasoning. This category is judged based on each student's active engagement, thoughtful communication, and attendance.

**Homework.** - Homework is assigned for you complete outside of class, to think further about the content and topics discussed during class, as well as to practice skills. These assignments will occasionally be collected, without notice, to make sure that students are completing the required work. Generally, this type of homework is graded on effort to complete the task assigned. While collaboration on homework is great, only submit your own original work.

**Quizzes** are usually announced in advance, but short, unannounced quizzes are possible. These typically allow the use of any resources that we normally use during class. Make-ups are not allowed unless you notify the instructor of your absence prior to the class period in which the quiz was administered.
Mathematical Projects – There will typically be two mathematical projects assigned during the semester. These projects require students to demonstrate their content knowledge related to use of Geometry and Measurement in the real world. Generally, these projects will require substantive work outside of class. The specific guidelines and grading criteria for each project will be distributed and discussed in class well before the date each is due. Late papers will not be accepted.

Professional Development Projects – Two professional development activities are generally required throughout the course of the semester. Students will be provided with a menu of opportunities designed to help them gain experience working with elementary students, parents, and teachers. Completion requires substantial time and effort outside of class. A complete listing of the opportunities available and the grading criteria for each will be provided to students and discussed during class well before the first assignment is due. Late papers will not be accepted.

Midterm Exam – The Midterm is an in-class individual exam with a focus on explanations of concepts underpinning students' understanding of figures and measurement systems. This exam may not be made-up if missed.

Final Exam – The final exam is comprehensive summative evaluation of an individual’s knowledge of course material. The exam is scheduled by the university and may not be retaken or made-up if missed. If you have a conflict with the scheduled time, please see me at least two weeks prior to the scheduled time to discuss the situation.

» The final exam for the 11 AM section is 11:00 AM – 1:30 PM on Thursday Dec. 3rd.
» The final exam for the 3:30 PM section is 1:45 – 4:15 PM on Tuesday Dec. 8th.

I. COURSE CONTENT/SCHEDULE

<table>
<thead>
<tr>
<th>DATE (BY DAY OR WEEK)</th>
<th>TOPIC</th>
<th>ASSIGNMENTS</th>
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</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>Introduction to course Types of Measurement and units of measurement</td>
<td>Syllabus review and pre-assessment What do we measure? How do we measure it?</td>
</tr>
<tr>
<td>Week 2</td>
<td>Measurement Error, Precision &amp; Accuracy in Linear Measurement</td>
<td>Sources of measurement error. What is the difference between precision &amp; accuracy?</td>
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<tr>
<td>Week 3</td>
<td>Indirect measures of length</td>
<td>Outdoor task #1</td>
</tr>
<tr>
<td>Week 4</td>
<td>Angle Measures, and Right triangle trigonometry</td>
<td>In class activity Quiz #1</td>
</tr>
<tr>
<td>Week #5</td>
<td>Finish Linear measurement &amp; begin other polygons Properties of Polygons &amp; exploring squares on a geoboard</td>
<td>Project #1 Determine the polygon. How many squares?</td>
</tr>
<tr>
<td>Week #6</td>
<td>Classification of Quadrilaterals &amp; Van Hiele Levels of Geometric Thinking</td>
<td>Read articles and reflect on activities. Prof. Development Project #1</td>
</tr>
<tr>
<td>Week #7</td>
<td>Developing rules for area of various polygons</td>
<td>Areas on a geoboard. Formulas, formulas, and more formulas. Quiz #2</td>
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<tr>
<td>Week #8</td>
<td>Paper Folding and Geometric Justification &amp; Proof</td>
<td>Van Hiele revisited MIDTERM</td>
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<tr>
<td>Week #9</td>
<td>Circles and their relationships</td>
<td>Determine where circles are taught in K-8 according to TEKS.</td>
</tr>
<tr>
<td>Week #10</td>
<td>More on circles and their parts</td>
<td>Find the angles, lengths and areas. Professional Development Project #2</td>
</tr>
<tr>
<td>Week #11</td>
<td>Polyhedra, footprint, orthographic &amp; isometric drawings</td>
<td>Practice drawing buildings. Quiz #3</td>
</tr>
<tr>
<td>Week #12</td>
<td>Geometry around us – Donald Symmetry, tiling &amp; tessellations</td>
<td>Make a list. Find a unique tile patterns.</td>
</tr>
<tr>
<td>Week #13</td>
<td>Properties of tessellating figures - a return to angle measures</td>
<td>Quilting patterns.</td>
</tr>
<tr>
<td>Week #14</td>
<td>Escher’s Art</td>
<td>Math Project #2</td>
</tr>
<tr>
<td>Week #15</td>
<td>Wrap up and review</td>
<td>Final Exam</td>
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</table>

Note: Changes in this course schedule may be necessary and will be announced to the class by the Instructor. The assignments and exams shown are directly related to the Student Learning Outcomes described in Section F.

J. COURSE POLICIES

Attendance/Tardiness
Students are expected to attend every class session, arrive on time, and complete all in-class activities. If you need to miss a class session, please talk with a classmate and see the instructor to get caught-up. Feel free to email the instructor to schedule an appointment or answer any questions.

Late Work and Make-up Exams
Homework will usually be due class period after it is assigned. Larger assignments, such as projects, have ample time allocated for completion, and deadlines will be specifically set in advance. Late assignments are not accepted unless arrangements have been made with the instructor prior to the time the assignment is due. Make-up exams are only given if notice of absence is given to the instructor before the time the exam starts.

Extra Credit
No extra credit is given in this course.
Cell Phones/Electronic Devices.

Please silence electronic devices during class. If you have an emergency situation where it may be necessary to answer a call, step out of the class to do so. You may not use any personal electronic device during a quiz or exam. You must have a calculator that is not an app on your phone to use during any quiz or exam, or do all calculations by hand.

Written Work. Good writing skills are important in this class. Please type and proof-read your written assignments. While it is a math class, as preservice teachers you must be able to write coherently. Thus spelling and grammar are a portion of the grading criteria for projects and papers. The Writing Center is available for help with written assignments.

Participation/In-Class Discussion. Everyone in the class is encouraged to express personal views with an emphasis on evidence-based claims. We have diverse backgrounds and perspectives, but by maintaining a spirit of mutual respect and acknowledgement, the hope is that classroom discussion will be inviting, lively, and informative.

Classroom/Professional Behavior Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

K. COLLEGE AND UNIVERSITY POLICIES

- **Academic Integrity (University)**
  University students are expected to conduct themselves in accordance with the highest standards of academic honesty. Academic misconduct for which a student is subject to penalty includes all forms of cheating, such as illicit possession of examinations or examination materials, falsification, forgery, complicity or plagiarism. (Plagiarism is the presentation of the work of another as one’s own work.) In this class, academic misconduct or complicity in an act of academic misconduct on an assignment or test will result in a failing grade.

- **Classroom/Professional Behavior**
  Texas A&M University-Corpus Christi, as an academic community, requires that each individual respect the needs of others to study and learn in a peaceful atmosphere. Under Article III of the Student Code of Conduct, classroom behavior that interferes with either (a) the instructor’s ability to conduct the class or (b) the ability of other students to profit from the instructional program may be considered a breach of the peace and is subject to disciplinary sanction outlined in article VII of the Student Code of Conduct. Students engaging in unacceptable behavior may be instructed to leave the classroom. This
prohibition applies to all instructional forums, including classrooms, electronic classrooms, labs, discussion groups, field trips, etc.

- **Statement of Civility**
  Texas A&M University-Corpus Christi has a diverse student population that represents the population of the state. Our goal is to provide you with a high quality educational experience that is free from repression. You are responsible for following the rules of the University, city, state and federal government. We expect that you will behave in a manner that is dignified, respectful and courteous to all people, regardless of sex, ethnic/racial origin, religious background, sexual orientation or disability. Behaviors that infringe on the rights of another individual will not be tolerated.

- **Deadline for Dropping a Course with a Grade of W (University)**
  The grade of W will be assigned to any student officially dropping a course. Please consult with the instructor before you decide to drop to be sure it is the best thing to do. Just stopping attendance and participation WILL NOT automatically result in your being dropped from the class. Should dropping the course be the best course of action, visit the Office of the University Registrar for the Course Drop Form that must submitted. No student is eligible to receive a W without completing the official drop process by this deadline. Please consult the Academic Calendar (http://www.tamucc.edu/academics/calendar/) for the last day to drop a course.

- **Grade Appeals (College of Science and Engineering)**
  As stated in University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures, a student who believes that he or she has not been held to appropriate academic standards as outlined in the class syllabus, equitable evaluation procedures, or appropriate grading, may appeal the final grade given in the course. The burden of proof is upon the student to demonstrate the appropriateness of the appeal. A student with a complaint about a grade is encouraged to first discuss the matter with the instructor. For complete details, including the responsibilities of the parties involved in the process and the number of days allowed for completing the steps in the process, see University Procedure 13.02.99.C2.01, Student Grade Appeal Procedures. These documents are accessible through the University Rules website at http://www.tamucc.edu/provost/university_rules/index.html, and the College of Science and Engineering Grade Appeals webpage at http://sci.tamucc.edu/students/GradeAppeal.html. For assistance and/or guidance in the grade appeal process, students may contact the chair or director of the appropriate department or school, the Office of the College of Science and Engineering Dean, or the Office of the Provost.

- **Disability Services**
  The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you
believe you have a disability requiring an accommodation, please call (361) 825-5816 or visit Disability Services in Corpus Christi Hall 116.

If you are a returning veteran and are experiencing cognitive and/or physical access issues in the classroom or on campus, please contact the Disability Services office for assistance at (361) 825-5816.

http://disabilityservices.tamucc.edu/

• **Statement of Academic Continuity**
  In the event of an unforeseen adverse event, such as a major hurricane and classes could not be held on the campus of Texas A&M University–Corpus Christi; this course would continue through the use of Blackboard and/or email. In addition, the syllabus and class activities may be modified to allow continuation of the course. Ideally, University facilities (i.e., emails, web sites, and Blackboard) will be operational within two days of the closing of the physical campus. However, students need to make certain that the course instructor has a primary and a secondary means of contacting each student.

L. **OTHER INFORMATION**

• **Academic Advising**
  The College of Science & Engineering requires that students meet with an Academic Advisor as soon as they are ready to declare a major. The Academic Advisor will set up a degree plan, which must be signed by the student, a faculty mentor, and the department chair. Meetings are by appointment only; advisors do not take walk-ins. Please call or stop by the Advising Center to check availability and schedule an appointment. The College’s Academic Advising Center is located in Center for Instruction 350 or can be reached at (361) 825-3928.

**GENERAL DISCLAIMER**

I reserve the right to modify the information, schedule, assignments, deadlines, and course policies in this syllabus if and when necessary. I will announce such changes in a timely manner during regularly scheduled class sessions.