CENTRAL TEXAS COLLEGE
SYLLABUS FOR MATH 1351
MATHEMATICS FOR TEACHERS II
(FUNDAMENTALS OF MATHEMATICS II)
Semester Hours Credit: 3

I. INTRODUCTION

A. MATH 1351, Fundamentals of Mathematics II (Mathematics for Middle Grade Teacher Certification II), is a three-semester-hour course. The course is designed to meet the educational needs of prospective elementary and middle school teachers, with an emphasis on problem solving and critical thinking. Topics covered in this course include concepts of geometry, probability and statistics, as well as applications of the algebraic properties of real numbers to concepts of measurement.

B. Math 1351 is the second semester of a two-semester sequence (1350/1351) designed for prospective elementary and middle school teachers. This course extends the foundational ideas of mathematics so that prospective elementary/middle school teachers have an explicit understanding of these concepts.

C. Prerequisite: A grade of C or better in MATH 1414.

II. OVERALL OR GENERAL OBJECTIVES OF THE COURSE

Upon successful completion of this course, Mathematics for Elementary Teacher Certification II, the student will

A. Apply fundamental terms of geometry such as points, lines, and planes to describe two and three dimensional figures.
B. Make and test conjectures about figures and geometric relationships.
C. Use a variety of methods to identify and justify congruency and similarity of geometric objects.
D. Perform geometric transformations.
E. Demonstrate fundamental probability techniques and apply those techniques to solve problems.
F. Explain the use of data collection and statistics as tools to reach reasonable conclusions.
G. Recognize, examine, and utilize the basic principles of describing and presenting data.
H. Perform measurement processes and explain the concept of a unit of measurement.
I. Develop and use formulas for the perimeter, area, and volume for a variety of figures.
J. Express a positive attitude toward mathematics to pass on to future students.

III. INSTRUCTIONAL MATERIALS
A. The instructional materials identified for this course are viewable through www.ctcd.edu/books
B. Other Materials: A TI-83, TI-83+, TI-84 or TI-84+ Graphing Calculator is required; however, if the student plans on continuing onto Calculus, he or she should purchase the TI-89 or TI-89 Titanium.

IV. COURSE REQUIREMENTS
A. Assignments will be made daily. All assignments are to be completed by the following class meeting. Assignments may be collected and scored at any time.
B. Students are expected to attend every class and to arrive at each class on time and remain in class for the entire period.
C. The instructor will post office hours during which he/she will be available if you need additional help with your studies.

V. EXAMINATIONS
A. Examinations will be given at the end of each unit. If a unit is short and simple, it might be included with another short and simple unit for one exam. A final exam will be given and students must take the final exam in order to pass the course. The final exam date will be announced in advance.
B. Students who miss an exam should discuss with the instructor the circumstances surrounding the absence. The instructor will determine whether a make-up exam is to be given. Make-up exams are given by appointment only.

VI. SEMESTER GRADE COMPUTATION
A. Your point total is determined by adding the points earned on each unit examination. Your letter grade for the course is then determined by the following formula:
Your point total
Total points possible  X  100

B. Final grades will follow the grade designation below:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Class Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>“A”</td>
<td>90 to 100</td>
</tr>
<tr>
<td>“B”</td>
<td>80 to 89</td>
</tr>
<tr>
<td>“C”</td>
<td>70 to 79</td>
</tr>
<tr>
<td>“D”</td>
<td>60 to 69</td>
</tr>
<tr>
<td>“F”</td>
<td>0 to 59</td>
</tr>
</tbody>
</table>

**NOTE: Grade computation is determined by instructor. Please see instructor for grade computation.

VII. ADDITIONAL NOTES FROM COURSE INSTRUCTOR

A. Withdrawal from Course: It is the student's responsibility to officially drop a class if circumstances prevent attendance. Any student who desires to, or must, officially withdraw from a course after the first scheduled class meeting must file an Application for Withdrawal or an Application for Refund. The withdrawal form must be signed by the student.

Application for Withdrawal will be accepted at any time prior to Friday of the 12th week of classes during the 16 week fall and spring semesters. The deadline for sessions of other lengths is as follows.

- Friday of 3rd week for 5-week courses
- Friday of 4th week for 6-week courses
- Friday of 6th week for 8-week courses
- Friday of 7th week for 10-week courses
- Friday of 9th week for 12-week courses
- Friday of 12th week for 16-week courses

The equivalent date (75% of the semester) will be used for sessions of other lengths. The specific last day to withdraw is published each semester in the Schedule Bulletin.

Students who officially withdraw will be awarded the grade of "W," provided the student's attendance and academic performance are satisfactory at the time of official withdrawal. Students must file a withdrawal application with the college before they may be considered for withdrawal.
A student may not withdraw from a class for which the instructor has previously issued the student a grade of "F".

B. **An Incomplete Grade:** The College catalog states, "An incomplete grade may be given in those cases where the student has completed the majority of the course work but, because of personal illness, death in the immediate family, or military orders, the student is unable to complete the requirements for a course..." Prior approval from the instructor is required before the grade of "I" is recorded. A student who merely fails to show for the final examination will receive a zero for the final and an "F" for the course.

C. **Cellular Phones and Beepers:** Cellular phones and beepers will be turned off while the student is in the classroom or laboratory.

D. **Americans With Disabilities Act (ADA):** Disability Support Services provide services to students who have appropriate documentation of a disability. Students requiring accommodations for class are responsible for contacting the Office of Disability Support Services (DSS) located on the central campus. This service is available to all students, regardless of location. Explore the website at [www.ctcd.edu/disability-support](http://www.ctcd.edu/disability-support) for further information. Reasonable accommodations will be given in accordance with the federal and state laws through the DSS office.

E. **Civility:** Individuals are expected to be cognizant of what a constructive educational experience is and respectful of those participating in a learning environment. Failure to do so can result in disciplinary action up to and including expulsion.

F. **Advanced Math Lab:** The Math Department operates an Advanced Mathematics Lab in Building 152, Room 145. All courses offered by the Math Department are supported in the lab with appropriate tutorial software. Calculators are available for student use in the lab. Students are encouraged to take advantage of these opportunities. See posted hours for the Advanced Math Lab.

G. **Office Hours:** Full-time instructors post office hours outside the door of the Mathematics Department (Building 152, Room 223). Part-time instructors may be available by appointment. If you have difficulty with the course work, please consult your instructor.

**VIII COURSE OUTLINE**

A. **Lesson One:** Probability

1. **Learning Outcomes:** Upon the successful completion of this lesson, the
student will be able to:

a. Determine probabilities, and understand complementary and mutually exclusive events.
b. Compute probabilities of compound events using techniques such as organized lists, tree diagrams and area models.
c. Use simulations in probability.
d. Understand odds, conditional probability, and expected value
e. Use permutations and combinations in probability.

2. **Learning Activities:**
   a. Read pages of assigned chapter.
   b. Listen to classroom lecture and discuss exercises
   c. Work section, chapter, and computer problems assigned by instructor.

3. **Lesson Outline:**
   a. Section 9.1 (Determining Probabilities)
   b. Section 9.2 (Multistage Experiments and Modeling Games)
   c. Section 9.3 (Simulations & Applications in Probability)
   d. Section 9.4 (Permutations & Combinations in Probability)

B. **Lesson Two:** Data Analysis/Statistics: An Introduction

1. **Learning Outcomes:** Upon successful completion of this lesson, the student will be able to:
   a. Formulate questions, design studies, and collect data about a characteristic shared by two populations, or different characteristics within the same population.
   b. Use measures of center, focusing on the median, and understand what each does and does not indicate about the data sets
   c. Select, create, and use appropriate graphical representations of data, including histograms, box plots and scatter plots.
   d. Discuss and understand the correspondence between data sets and their graphical representations.
   e. Understand the abuses of statistics.

2. **Learning Activities:**
   a. Read pages of assigned chapter.
   b. Listen to classroom lecture and discuss exercises
   c. Work section, chapter, and computer problems assigned by instructor.

3. **Lesson Outline:**

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a. Section 10.1 (Designing Experiments/Collecting Data)
b. Section 10.2 (Displaying Data: Part I)
c. Section 10.3 (Displaying Data: Part II)
d. Section 10.4 (Measures of Central Tendency & Variation)
e. Section 10.5 (Abuses of Statistics)

C. **Lesson Three**: Introductory Geometry

1. **Learning Outcomes**: Upon successful completion of this lesson, the student will be able to:
   
a. Make and test conjectures about geometric properties and relationships and develop logical arguments to justify conclusions.
b. Precisely describe, classify and understand relationships among types of two and three dimensional objects using their defining properties.
c. Use visual tools such as networks to represent and solve problems.

2. **Learning Activities**:
   
a. Read pages of assigned chapter.
b. Listen to classroom lecture and discuss exercises
c. Work section, chapter, and computer problems assigned by instructor.

3. **Lesson Outline**:
   
a. Section 11.1 (Basic Notations)
b. Section 11.2 (Curves, Polygons & Symmetry)
c. Section 11.3 (More About Angles)
d. Section 11.4 (Geometry in Three Dimensions)

D. **Lesson Four**: Congruence & Similarity with Constructions & Transformations

1. **Learning Outcomes**: Upon successful completion of this lesson, the student will be able to:
   
a. Use coordinate geometry to represent and examine the properties of geometric shapes.
b. Use coordinate geometry to examine special geometric shapes, such as regular polygons or those with pairs of parallel or perpendicular sides.
c. Draw geometric objects with specified properties, such as side lengths or angle measures.
d. Perform geometric transformations.

2. **Learning Activities:**
   a. Read pages of assigned chapter.
   b. Listen to classroom lecture and discuss exercises
   c. Work section, chapter, and computer problems assigned by instructor.

3. **Lesson Outline:**
   a. Section 12.1 (Congruence through Construction)
   b. Section 12.2 (Additional Congruence Theorems)
   c. Section 12.3 (Additional Constructions)
   d. Section 12.4 (Similar Triangles and Similar Figures)
   e. Section 13.1 (Translations and Rotations)
   f. Section 13.2 (Reflections & Glide Reflections)
   g. Section 13.3 (Dilations)
   h. Section 13.4 (Tessellations of the Plane)

E. **Lesson Five**  Concepts of Measurement

1. **Lesson Outcomes:** Upon successful completion of this unit, the student will be able to:
   a. Have an understanding of the customary and metric systems and have an idea of the equivalences between the customary and metric systems.
   b. Explain the concepts of area, volume and surface area.
   c. Develop proficiency in the conversion of units for linear measure, area and volume using both the customary and metric systems.
   d. Develop an understanding of the relationship among metric units of volume, capacity, and mass.

2. **Learning Activities:**
   a. Read pages of assigned chapter.
   b. Listen to classroom lecture and discuss exercises
   c. Work section, chapter, and computer problems assigned by instructor.

3. **Lesson Outline:**
   a. Section 14.1 (Linear Measure)
   b. Section 14.2 (Areas of Polygons and Circles)
c. Section 14.3 (The Pythagorean Theorem, Distance Formula, and Equation of a Circle)
d. Section 14.4 (Surface Area)
e. Section 14.5 (Volume, Mass, and Temperature)