COLLIN COUNTY COMMUNITY COLLEGE
COURSE SYLLABUS

COURSE NUMBER: MATH 1351

COURSE TITLE: Mathematics for Teachers II

CREDIT HOURS: 3 LECTURE HOURS: 3 LAB HOURS: 0

ASSESSMENTS: Prior to enrolling in this course, the student must demonstrate eligibility to enroll in the following: MATH 1314, MATH 1350, MATH 1414, or higher.

PREREQUISITE: MATH 1350, MATH 1314, or MATH 1414; or equivalent. 3 credit hours.

COREQUISITE: None

COURSE DESCRIPTION: This course is intended to build or reinforce a foundation in fundamental mathematics concepts and skills. It includes the concepts of geometry, measurement, probability, and statistics with an emphasis on problem solving and critical thinking.

Note: This course is designed specifically for students who seek middle grade (4 through 8) teacher certification.

COLLEGE REPEAT POLICY: Beginning Fall 2016, Texas residents attempting a course more than twice at Collin College are subject to regular tuition plus an additional $50 per semester credit hour. Undergraduate courses attempted at Collin College with a graded status of A, B, C, D, F, I, W (withdrawals after census), and AU (Audit) will be evaluated for repeat limits. See the current Collin College Catalog for additional information.


SUPPLIES: Scientific or graphing calculator (optional — the use of a calculator is up to the discretion of the instructor)

STUDENT LEARNING OUTCOMES:

State-mandated Outcomes: Upon completion of this course, the student should be able to do the following:

1. Apply fundamental terms of geometry such as points, lines, and planes to describe two and three dimensional figures. (Communication Skills)
2. Make and test conjectures about figures and geometric relationships. (Critical Thinking)
3. Use a variety of methods to identify and justify congruency and similarity of geometric objects. (Critical Thinking, Communication Skills)
4. Perform geometric transformations. (Empirical/Quantitative Skills)
5. Demonstrate fundamental probability techniques and apply those techniques to solve problems. (Critical Thinking)
6. Explain the use of data collection and statistics as tools to reach reasonable conclusions. (Communication Skills)

7. Recognize, examine, and utilize the basic principles of describing and presenting data. (Empirical/Quantitative Skills)

8. Perform measurement processes and explain the concept of a unit of measurement. (Empirical/Quantitative Skills, Communication Skills)

9. Develop and use formulas for the perimeter, area, and volume for a variety of figures. (Critical Thinking, Empirical/Quantitative Skills)

COURSE REQUIREMENTS: Attending lectures, completing assignments, and exams.

COURSE FORMAT: Lecture, and guided practice.

METHOD OF EVALUATION: There is a minimum of four written exams and a comprehensive final exam. Homework and/or quizzes may be used in place of one exam or in addition to exams. The weight of each of these components of evaluation will be specified in the individual instructor’s addendum to this syllabus. All out-of-class course credit, including take-home exams, home assignments, service-learning, etc. may not exceed 25% of the total course grade; thus, at least 75% of a student’s grade must consist of exams given in the class or testing center, and no student may retake any of these exams.

ATTENDANCE POLICY: Attendance is expected of all students. If a student is unable to attend, it is his/her responsibility to contact the instructor to obtain assignments. Please see the schedule of classes for the last day to withdraw from the course with a grade of W.

RELIGIOUS HOLY DAYS: In accordance with section 51.911 of the Texas Education Code, the college will allow a student who is absent from class for the observance of a religious holy day to take an examination or complete an assignment scheduled for that day within a reasonable time. A copy of the state rules and procedures regarding holy days and the form for notification of absence from each class under this provision are available from the Admissions and Records Office. Please refer to the current Collin Student Handbook.

ADA STATEMENT: Collin College will adhere to all applicable federal, state and local laws, regulations and guidelines with respect to providing reasonable accommodations as required to afford equal educational opportunity. It is the student’s responsibility to contact the ACCESS office, SCC-D140 or 972.881.5898 (V/TTD: 972.881.5950) to arrange for appropriate accommodations. See the current Collin Student Handbook for additional information.

ACADEMIC ETHICS: Every member of the Collin College community is expected to maintain the highest standards of academic integrity. Collin College may initiate disciplinary proceedings against a student accused of scholastic dishonesty. Scholastic dishonesty includes, but is not limited to, statements, acts, or omissions related to applications for enrollment or the award of a degree, and/or the submission of one’s own work material that is not one’s own. Scholastic dishonesty may involve, but is not limited to, one or more of the following acts: cheating, plagiarism, collusion, use of annotated texts or teacher’s editions, use of information about exams posted on the Internet or electronic medium, and/or falsifying academic records. While specific examples are listed below, this is not an exhaustive list and scholastic dishonesty may encompass other conduct, including any...
conduct through electronic or computerized means:

**Plagiarism** is the use of an author’s words or ideas as if they were one’s own without giving credit to the source, including, but not limited to, failure to acknowledge a direct quotation.

**Cheating** is the willful giving or receiving of information in an unauthorized manner during an examination; collaborating with another student during an examination without authority; using, buying, selling, soliciting, stealing, or otherwise obtaining course assignments and/or examination questions in advance, copying computer or Internet files, using someone else’s work for assignments as if it were one’s own; or any other dishonest means of attempting to fulfill the requirements of a course.

**Collusion** is intentionally or unintentionally aiding or attempting to aid another in an act of scholastic dishonesty, including but not limited to, failing to secure academic work; providing a paper or project to another student; providing an inappropriate level of assistance; communicating answers to a classmate about an examination or any other course assignment; removing tests or answer sheets from a test site, and allowing a classmate to copy answers. See the current Collin Student Handbook for additional information.

Contact the Dean of Students at 972.881.5771 for the student disciplinary process and procedures or consult the Collin Student Handbook.

**COURSE CONTENT:** Proofs and derivations will be assigned at the discretion of the instructor. The student will be responsible for knowing all definition and statements of theorems for each section outlined in the following modules.

**Module 1: Probability, Data Analysis, and Statistics**

The student will be able to:

1. Compute experimental and theoretical probabilities.
2. Determine the probability of mutually exclusive events, non-mutually exclusive events, and complementary events.
3. Use a tree diagram to determine outcomes and probabilities of multistage experiments.
4. Define independent events and find the probability of two independent events occurring.
5. Model games that involve probability.
6. Use area models to determine probabilities geometrically.
7. Use simulations to compute probability.
8. Compute odds in favor and odds against (optional)
9. Compute conditional probabilities.
10. Compute expected value and determine if a game is fair.
11. Compute the number of permutations or combinations of objects.
12. Use permutations and combinations in probability.
14. Compute and interpret measures of central tendency: mean, median, mode.
15. Compute and interpret measures of the spread of data: range, interquartile range, variance, standard deviation, (mean absolute deviation is optional).
16. Calculate quartiles and the interquartile range (IQR).
17. Determine if any outliers exist for given data.
18. Construct box plots.
19. Interpret and apply the graphs of normal distributions and the percentages that represent approximations of the total percent of area under the curve.
20. Interpret percentiles.

Module 2: Introductory Geometry

The student will be able to:

1. Define and recognize: collinear points, line segment, ray, coplanar points, coplanar lines, skew lines, intersecting lines, concurrent lines, parallel lines, perpendicular lines, half-planes, line perpendicular to a plane, transversal.
2. Classify angles as acute, right, obtuse, or straight.
3. Use a protractor to measure an angle.
4. Define and illustrate a circle, its center, radius, diameter, an arc of a circle, and a semicircle.
5. Define and recognize a curve as: simple, nonsimple, closed, nonclosed, convex, concave.
6. Define and recognize polygons, interior angle of a polygon, exterior angle of a convex polygon, diagonal of a polygon, regular polygon.
7. Define and write the notation for congruent segments and congruent angles.
8. Classify triangles a right, acute, obtuse, scalene, isosceles, equilateral.
9. Classify quadrilaterals as trapezoid, kite, isosceles trapezoid, parallelogram, rectangle, rhombus, square.
10. Illustrate the hierarchy among polygons.
11. Define and recognize angles such as adjacent, complementary, supplementary, vertical, interior, exterior, alternate interior, alternate exterior, and corresponding.
12. Determine the sum of the measures of the exterior angles of a convex polygon.
13. Determine the sum of the measures of the interior angles of a convex polygon.
15. Define simple closed surfaces in three-dimensions.
16. Recognize and illustrate prisms and pyramids.
17. Recognize and name the five regular polyhedra.
18. Recognize and illustrate cylinders and cones.
19. Define the relationship between the number of faces, the number of edges, and the number of vertices of any polyhedron.
20. Determine polyhedra formed from a net.
21. Define and illustrate a sphere.
22. Define and illustrate terms relating to the Cartesian coordinate system: origin, x-axis, y-axis, x-coordinate, y-coordinate, graph.
23. Graph linear equations. Graph vertical and horizontal lines.
24. Find the equation of a line in slope-intercept form.
25. Find the x-intercept, y-intercept, and slope of a line.
26. Solve a system of linear equations using the substitution method and the elimination method.
Module 3: Congruence, Similarity, and Constructions

The student will be able to:

1. Define and recognize similar and congruent objects.
2. Determine if two triangles are congruent by SSS, SAS, ASA, AAS, HL.
3. Define and illustrate the altitude of a triangle.
4. Define and illustrate an isosceles triangle and its properties.
5. Know the properties of different types of quadrilaterals.
6. Calculate the scale factor for similar figures.
7. Determine if two triangles are similar by AA.
8. Define and construct a midsegment.
9. Find indirect measurements using similar triangles.
10. Use triangles to determine the slope of a line.
11. Construct congruent segments and congruent angles.
12. Construct a circle circumscribed about a triangle. (optional)
13. Construct a circle inscribed in a triangle. (optional)
14. Construct parallel lines, angle bisectors, perpendicular bisectors, and perpendicular lines.

Module 4: Measurement

The student will be able to:

1. Use dimensional analysis to convert from one unit of measure to another in the English system.
2. Convert units of length in the English and metric systems.
3. Calculate the perimeter of a polygon.
4. Calculate the circumference of a circle.
5. Given the radius of a circle, calculate the length of an arc whose central angle is known.
6. Determine the greatest possible error of a measurement.
7. Define and use the distance properties and the Triangle Inequality.
8. Calculate areas of polygons on a geoboard or dot paper.
9. Convert units of area in the English and in the metric systems.
10. Derive and use formulas for the area of a rectangle, parallelogram, triangle, kite, trapezoid, regular polygon, circle, and sector of a circle.
11. Use the Pythagorean Theorem to determine the sides of a right triangle.
12. Determine if a triangle is a right triangle by using the converse of the Pythagorean Theorem.
13. Use the Distance Formula to find the distance between two points.
14. Derive and use formulas for the surface area of a right prism, a right circular cylinder, a right regular pyramid, a right circular cone.
15. Use the formula for the surface area of a sphere.
17. Derive and use formulas for the volume of a right prism, right circular cylinder, right pyramid, right circular cone.
18. Use the formula for the volume of a sphere.
19. Discover the relationships among metric units of volume, capacity, and mass.
20. Convert units of temperature between the Celsius and Fahrenheit scales.
21. Basic Trigonometry (optional)

**Module 5: Motion Geometry and Tessellations**

The student will be able to:

1. Determine whether a geometric figure has line symmetry, rotational symmetry, or point symmetry.
2. Describe figures according to their symmetries.
3. Construct the image of a geometric figure under a translation.
4. Construct the image of a geometric figure under a rotation.
5. Construct the image of a geometric figure under a reflection.
6. Construct the image of a geometric figure under a glide reflection.
7. Construct an image similar to a geometric figure under a size transformation (dilation).
8. Define and identify tessellations of the plane.
9. Determine which regular polygons tessellate the plane.