

9a. Grading Option: Standard Grade

9b. Catalog Description:

Study of points, lines, angles, polygons, triangles, similarity, congruence, geometric proofs, area, volume, perimeter, the circle, right triangle trigonometry.

Course Outline Information

10. Student Performance Objectives: (Performance objectives for all credit courses must indicate that students will learn critical thinking and will be able to apply concepts at college level. Performance objectives must be related to items listed in Section 11.)

1. Name, identify, reproduce and differentiate between definitions, postulates/axioms and theorems;
2. create deductively valid proofs verifying mathematical statements concerning lines, angles, polygons and circles by using appropriate definitions, axioms or theorems, as necessary then identify, recall and demonstrate the method of indirect and direct proof;
3. cite, list and identify definitions and axioms/postulates about parallel lines; analyze properties of transversals of parallel lines and corresponding angles;
4. demonstrate the use of construction tools, particularly a compass and straight edge, to create various geometric figures (parallel lines, angle bisectors, congruent segments, equilateral triangles, perpendicular bisectors, etc);
5. verify congruency and similarity of two dimensional geometric figures by using congruence or similarity to solve for missing lengths;
6. calculate the perimeter and area of standard two dimensional figures; identify properties specific to two dimensional geometric figures;
7. apply properties of the chords, tangent lines and secants of a circle; find the area, circumference and arc length of a sector of a circle; determine relationships between angles found in a circle;
8. determine the lateral area, surface area and volume of standard three dimensional figures; and
9. apply the sine, cosine and tangent ratios of a right triangle; find the measure of an angle given the values of unknown sides using a calculator; solve right triangles and evaluate trigonometric values of special angles 30° , 45° , 60° .

11. Course Content Outline: (Provides a comprehensive, sequential outline of the course content, including all major subject matter and the specific body of knowledge covered.)

- I. Terminology Needed for Proofs
 - A. Definitions
 - B. Axioms/Postulates
 - C. Theorems
- II. Geometric Proofs and Logic
 - A. Direct Proof
 - B. Indirect Proof
- III. Parallel Lines
 - A. Definition
 - B. Postulates
 - C. Transversals and Corresponding Angle Properties
- IV. Construction
 - A. Parallel Lines
 - B. Angle Bisectors
 - C. Perpendicular Bisectors
 - D. Congruent Segments and Angles
 - E. Applications
- V. Triangles
 - A. Sum of angles
 - B. Area
 - C. Congruence, Corresponding Parts
 - D. Isosceles, Equilateral
 - E. Similar
 - F. Ratio, Proportion
 - G. Pythagorean Theorem
- VI. Polygons
 - A. Properties of Polygons
 - B. Properties of Quadrilaterals
 - C. Perimeter
 - D. Area
- VII. Circles
 - A. Angles
 - B. Circumference
 - C. Area
 - D. Arcs, Sectors, Chords, Secants and Tangents
- VIII. Three Dimensional Figures
 - A. Lateral Area
 - B. Surface Area
 - C. Volume
- IX. Right Triangle Trigonometry
 - A. Sine, Cosine, Tangent Ratios
 - B. Special Angles
 - C. Solving Right Triangles
 - D. Applications

12. Typical Out-of-Class Assignments: (Credit courses **require** two hours of independent work outside of class for each lecture hour, less lab/activity classes. List type of assignments including library assignments.)

a. Reading Assignments: (Submit at least 2 examples.)

1. Research the history of the Pythagorean Theorem and find different ways in which it has been proven.
2. Research Rene Descartes' life and his contributions to the field of geometry.

b. Writing, Problem Solving or Performance: (Submit at least 2 examples)

1. Prove the Pythagorean Theorem 2 different ways.
2. Two apartment buildings are 40 feet apart. From a window in her apartment, Sabrina can see the top of the other apartment building at an angle of elevation of 47 degrees. She can also see the base of the other building through an angle of depression of 33 degrees. How tall is the other building?

c. Other (Term projects, research papers, portfolios, etc.)

13. Required Materials:

a. All textbooks, resources and other materials used in this course are college level?

- Yes
 No

b. Representative college-level textbooks (for degree applicable courses) or other print materials:

Book 1:

Author: Alexander/Koeberlein
Title: Elementary Geometry for College Students
Publisher: Brooks Cole
Date of Publication: 2010
Edition: 5th

c. Other materials and/or supplies required of students:

14. Check all instructional methods used to present course content:

- | | |
|--|--|
| <input checked="" type="checkbox"/> Lecture | <input type="checkbox"/> Activity |
| <input checked="" type="checkbox"/> Discussion Seminar | <input type="checkbox"/> Distance Education (requires supplemental form) |
| <input type="checkbox"/> Lab | <input type="checkbox"/> Work Experience |
| <input type="checkbox"/> Directed Study | <input type="checkbox"/> Tutoring |

Other:

Give detailed examples of teaching methodology that relate to the course performance objectives:

Example 1: Interactive lecture format to develop the concept of proofs. Students will name, identify, reproduce and differentiate between definitions, postulates/axioms and theorems; and create valid proofs verifying mathematical statements concerning lines, angles, polygons, and circles.

Example 2: After reading about the Pythagorean theorem, students will integrate a geometric model with an algebraic model to prove that the square of the legs of a right triangle is equal to the square of the hypotenuse.

Example 3: In class small group collaborative learning activity focusing on solving right triangles using the sine, cosine, and tangent functions.

15. Methods of Assessing Student Learning

15a. Methods of Evaluation:

- | | |
|--|--|
| <input type="checkbox"/> Essay Exam | <input type="checkbox"/> Reports |
| <input checked="" type="checkbox"/> Objective Exam | <input checked="" type="checkbox"/> Problem Solving Exam |
| <input checked="" type="checkbox"/> Projects | <input type="checkbox"/> Skill Demonstration |
| <input checked="" type="checkbox"/> Class Discussion | <input checked="" type="checkbox"/> Other |

15b. (All courses must provide for measurement of student performance in terms of stated student performance objectives, Area 10, and culminate in a formal recorded grade based on uniform standards. Submit at least 2 examples.)

Example 1. Prove that if a ray is on the interior of an angle, the sum of the two smaller angles is equivalent to the largest angle.

Example 2. Using only a straight-edge and a compass, construct a rectangle of a given size.

Example 3. Complete a proof that two triangles are congruent using the method of Side-Angle-Side.

Example 4. Find the volume and lateral area of a cone with a radius of 3 and height of 17.

SECTION C

1. Program Information:

- In an approved program
- Part of a new program
- Not part of an approved program

2. TOP Code Information

Program Title: Mathematics, General 170100

3. Course SAM Code:

- A - Apprenticeship Course
- B - Advanced Occupational
- C - Clearly Occupational
- D - Possibly Occupational
- E - Non-Occupational

4. Faculty Minimum Qualifications/Degrees:

Mathematics

Comments:

SECTION D**General Education Information:****1. College Associate Degree GE Applicability:**

Math Competency

2. CSU/UC GE Applicability: Analytic Thinking**3. IGETC Applicability:****4. CAN :****5. LDTP:****SECTION E****1. Articulation Information:** (Required for Transferable Courses Only)

- CSU Transferable
- UC Transferable
- CSU/UC Major Requirement.

If CSU/UC major requirement, list campus and major. (Note: Must be lower division)

2. List at least one community college and its comparable course. If requesting CSU and/or UC transferability also list a CSU/UC campus and comparable lower division course

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SECTION F

Planning and Resources: Please address the areas below:

1. Evidence of Need or Potential: recommendations of advisory committee, connection to existing or planned degrees/certificates, or regional/national developments, transfer university requirements.

Meets the Mathematics requirement for achieving an Associate Degree. Required as a prerequisite for Math 17.

2. Appropriateness to Mission: connection to basic skills, transfer, career technical education, or lifelong learning; relationship

Meets the Mathematics requirement for achieving an Associate Degree. Additionally required as a prerequisite for Math 17.

3. Place in Program/Department: relationship to student learning outcomes identified by program, connection to general education, or articulation with other institutions.

Meets GE applicability for Mathematics Competency and Communication and Analytical Thinking. Course includes all four Math program SLO's (Equations and Expressions, Visual Models, Applied Problems, Communication).

4. Availability of Faculty and Facilities: minimum qualifications to teach course, special training for instructors, or long-term physical impact of course.

All math faculty members meet the minimum qualifications to teach this course. No special training is required.

5. Potential Impact on Resources: impact on library, computer support, transportation, equipment, or other needs

No additional resources are needed since we have the classroom space and technology already available.

SECTION G

1. Maximum Class Size (recommended): 35

2. If recommended class size is not standard, then provide rationale: