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Math 5
Trigonometry
Section 3338 – Fall, 2016
MTWR, 8-9:10, SOC13

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This syllabus is a beta model and subject to modification.

Course Description: This course is the first of a two semester sequence in preparation for Calculus. We study functions with an emphasis on the circular functions. Topics include a review of plane and coordinate geometry, function representation, transformations and inverses. The definitions, properties and graphs of the trigonometric functions are central to this course, together with how they are used to model periodic behavior, and solve triangle problems, using the Laws of Sinces and Cosines. We study the conic sections, including an introduction to parametric and polar equations, and how conic sections can be modeled with circular/trigonometric functions.

Prerequisite(s): Math 40 and Math 30 with a grade of "C" or better. The Math 30 requirement will be waived if you've had geometry in high school.
Note(s): A minimum grade of C is required in this course to progress to Math 12, Precalculus and Computer Science 7A.
Credit Hours: 5
Text(s): *Schaum's Outline of Geometry*, 4th Edition **Author(s):** Rich, Thomas; **ISBN-13:** 978-0071544122
Text(s): *Precalculus: Mathematics for Calculus*, 7th Edition **Author(s):** Steward, Redlin and Watson; **ISBN-13:** 978-1305071759

Course Objectives:
At the completion of this course, students will be able to:

1. Apply facts about angles, parallel lines and triangles to deduce further results about a geometric figure.
2. Prove two given triangles are congruent or similar.
3. Determine the proportion of sides in an isosceles right triangle and in a 306090 triangle.
4. Deduce the lengths of sides in quadrilaterals such as trapezoids or rectangles using basic definitions, the Pythagorean Theorem, or the perimeter and/or area.
5. Calculate the measure of a central angle in a circle using the measure of the intercepted arc and calculate the areas of geometric figures involving circles.
6. Apply facts about plane geometric figures to deduce the surface area and volume of three dimensional geometric figures.

7. Demonstrate an understanding of the concept of a function by identifying and describing a function graphically, numerically and algebraically.
8. Calculate the domain and range for a function expressed as a graph or an equation. From a graph, estimate the intervals where a function is increasing, decreasing and/or has a maximum or minimum value.
9. Use and interpret function notation to find "inputs" and "outputs" from the graph, table and/or an equation describing a function.
10. From an equation, graph or table, calculate average rates of change by using a difference quotient or by using slopes of secant lines. Analyze average rates of change to determine the concavity of a graph.
11. Demonstrate an understanding of the basic transformations of functions by graphing transformed functions including quadratic functions.
12. Deduce a function from a word problem, in particular, a geometric problem.
13. Determine when a function has an inverse (one to one functions) and find the inverse function graphically or algebraically.
14. Form new functions through addition, subtraction, multiplication, division and composition.
15. Recognize classical and analytic definitions of the trigonometric functions.
16. Solve triangles using right triangle trigonometry, the law of sines and the law of cosines.
17. Convert from radian to degree measure and vice-versa.
18. Graph the 6 trigonometric functions and demonstrate the ability to change parameters and predict corresponding graphic behavior.
19. Use the basic Pythagorean identities to deduce further identities.
20. Analyze geometrically and manipulate algebraically the equations and graphs of the standard and shifted conic sections (as derived from their geometric definitions) including the major/minor axes, foci, directrix, and asymptotes in rectangular, polar and parametric form.
21. Communicate effectively with the instructor and mathematical community using proper terminology verbally as well as proper written notation.

Course Student Learning Outcomes:

1. Demonstrate that previously learned fundamental skills and knowledge from arithmetic, algebra, and geometry prior learning have been maintained or restored.
2. Demonstrate problem solving skills in application problems, with emphasis on the concepts of distance and angles
3. Demonstrate problem solving skills in application problems, with an emphasis on periodic phenomena.
4. Create, analyze, and interpret graphs of trigonometric functions.
5. Develop an appreciation for the use of proof in mathematics, with an emphasis on its use in geometry, including the ability to create mathematical proofs of geometric properties.
6. Develop deductive reasoning skills in mathematics with emphasis in geometry

Grade Distribution:

WebAssign HW	10%
Quizzes	10%
Warm-up Problems	20%
Midterm Exams	40%
Final Exam	20%

Letter Grade Distribution:

>= 90.00	A	70.00 - 79.99	C
80.00 - 89.99	B	60.00 - 69.99	D

Course Policies:

- **General**
  - Turn off cell phones during class time and keep them out of sight.
  - Exams are closed book, closed notes and, generally, no calculators are allowed.
- **Homework Assignments**
  - Students are expected to work independently and in groups. Each individual is expected to come to their own independent understanding of the course material, but working with fellow students and visiting the professor during office hours are essential tools to reach that understanding. Discussion amongst students is encouraged, but to be sure, direct your questions to the professor, tutor, or lab assistant (the Math/Science tutoring center is a good place to study where the lab assistant is available to answer questions when you are stuck.)
  - We will use Webassign, which is keyed to our text, to complete homework assignments. Go to webassign.com and log in with your given username/password, which will be explained in class.
  - After each class, I post a list of **warm-up problems** for students to solve for presentation at the beginning of the next class.

    I select two to four of these problems and randomly choose names from my roster. If a student enters the classroom and sees her name on the board, she copies her work underneath. As class begins, I call these students up to explain their work to their peers. After each warm-up presentation, I assign a grade from zero to five. I am inclined to give students high marksmost students earn 5/5. I grade based on the quality of both the solution and the explanation. All students present four warm-up problems during the semester, and these scores account for 10 percent of the final grade.
  - Polya's Problem Solving Method is Recommended:
    1. Understand the problem
    2. Make a plan
    3. Carry out the plan
    4. Look back
- **Attendance and Absences**
  - Attendance is expected and will be noted for each class. You are allowed **1** unexcused absence during the semester without penalty. Any further absence will result in point and/or grade deductions. Basically, if you're not there, you missed it.
- **Useful Resources**
  - David Joyce's Euclid's Elements Online http://aleph0.clarku.edu/ djoyce/java/elements/elements.html
  - Euclid21 http://www.maa.org/book/export/html/590371
  - Geogebra https://www.geogebra.org/download

Academic Honesty Policy:

See Student Conduct Code
http://catalog.collegeofthedesert.edu/rights-responsibilities-of-students/#studentconductstandards.

Tentative Course Outline:
The weekly coverage might change as it depends on the progress of the class. However, you must keep up with the reading assignments.

Week	Content
Week 1	• Geometry of points lines and basic triangles and circles. • Reading assignment: Lecture Notes
Week 2	• Geometry of polygons and circles. • Reading assignment: Lecture Notes
Week 3	• Circles and review/exam. • Reading assignment: Lecture notes.
Week 4	• Functions • Reading assignment: Steward 2.1-2.5
Week 5	• Functions • Reading assignment: Stewart 2.6-2.8
Week 6	• Chapter Exam, Start Unit Circle • Reading assignment: Chapter 2, 5.1-2
Week 7	• Trig functions and their graphs. • Reading assignment: 5.3-5.5
Week 8	• Trig functions, inverses and graphs
Week 9	• Angle measurement and functions of angles. • Reading assignment: Chapter 6.1-6.3
Week 10	• Law of Sines and Law of Cosines • Reading assignment: Something interesting
Week 11	• Conic Sections: Parabolas, Ellipses • Reading assignment: 11.1–11,2
Week 12	• Conic Sections: Hyperbolas and shifted conics • Reading assignment: Something interesting
Week 13	• Parametric and Polar Forms. • Reading assignment: 8.4 and
Week 14	• Parametric and Polar Forms (more). • Reading assignment: Review for Final Exam
Week 15	• Review • Reading assignment: Review for Final Exam
Week 16	• Exam Week