MATH 119 – Geometry for Architects

Course Description from Bulletin: Basic Euclidean and analytic geometry in two and three dimensions; trigonometry. Equations of lines, circles and conic sections; resolution of triangles; polar coordinates. Equations of planes, lines, quadratic surfaces. Applications. (3-1-3) (C)

Enrollment: This course does not count for graduation in any engineering, mathematics, natural science or computer science degree program

Textbook(s): Calter & Calter, *Technical Mathematics with Calculus*, 5th ed., Wiley & Sons, 2007.
E.A. Abbott, *Flatland*, Dover (in some sections)

Other required material: None

Prerequisites: None

Objectives:
1. Students will be able to solve applied problems involving the areas and perimeters of polygons and circles and the surface areas and volumes of spheres, cylinders, cones and other solids.
2. Students will become proficient in applying the basic trigonometric identities and in solving right and oblique triangles.
3. Students will learn to plot in Cartesian and polar coordinates and to convert equations from Cartesian to polar coordinates and vice versa.
4. Students will learn to measure distances in 3-space with Cartesian and spherical ccordinates, to locate the shadow of a body based on the solar azimuth and solar elevation angles, and to find the angular velocity of a rotating body and the linear speed of a point on such a body.
5. Students will learn to graph the conic sections, to find their tangent lines, and to find the equations of the rotations and translations of these curves.
6. Students will learn to find the distance from a point to a line, to find the angles between pairs of lines and to determine the slopes of angle bisectors.

Lecture schedule: Two 75 minute lectures and one 75 minute workshop period per week.

Course Outline: Hours
1. Euclid's axiomatic geometry, compass & straightedge constructions.   11
2. The six trigonometric functions, solving right and oblique triangles.   7
3. Solar geometry: the location of shadows on the ground due to the angle of the sun.   4
4. The longitudinal/latitudinal geographic coordinate system and the 3-dimensional Cartesian coordinate system. Calculating surface distances on the earth.   4
5. Trigonometric functions of a general angle, the fundamental trig identities, plotting trig functions in Cartesian and polar coordinates   8
6. Analytic geometry: the slopes and inclinations of straight lines, the angles between intersecting lines, the conic sections.   8

Assessment:	Homework/Quizzes	10%
	Worksheets/Projects	25%
	Tests	40-50%
	Final Exam	20-30%

Syllabus prepared by: Art Lubin and David Maslanka
Date: 12/15/05   **Revised**: 08/04/08, 12/08/10, 07/14/15