Sinclair Community College
444 E. Third St.
Dayton, OH 45402

Master Syllabus

MAT 2290 - Calculus & Analytic Geometry III

Division: Science, Mathematics and Engineering

Department: Mathematics

Credit Hour Total: 5.0 **Lecture Hrs:** 5.0

Prerequisite(s): MAT 2280

Other Prerequisite(s): AND Other with a grade of C or better or satisfactory score on math placement test

Date Revised: March 2015

Course Description:

Lines, planes and surfaces in space, vector-valued functions, arc length and curvature. Functions of several variables, partial derivatives with applications, multiple integrals with applications, line integrals, surface integrals, vector fields, Green’s Theorem, the Divergence Theorem and Stokes’s Theorem.

General Education Outcomes:

- Critical Thinking/Problem Solving Competency

Course Outcomes:

Differential Calculus of Several Variables
alculate limits, partial derivatives, directional derivatives, gradients, and differentials of functions of several variables. Determine when a function of several variables is continuous or differentiable and determine extrema using the second partials test and Lagrange multipliers. Apply partial derivatives, gradients, differentials, chain rules, and Lagrange multipliers to solve applied problems.

Assessment Method: Locally developed exams
Performance Criteria: Passing grade with a score of 70% or better

Integral Calculus of Several Variables
Evaluate multiple integrals using rectangular, polar, cylindrical, and spherical coordinates. Calculate surface area using double integrals. Determine mass, center of mass, and moments of inertia of planar and solid regions with continuous density functions. Apply multiple integrals to solve applied problems.

Assessment Method: Locally developed exams
Performance Criteria: Passing grade with a score of 70% or better

Vector Calculus
Calculate the divergence and curl of a vector field and the flux of a field through a surface. Evaluate line and surface integrals of functions and of vector fields. Determine the graphs and the equations of tangent planes and normal lines to surfaces in space. Determine if a vector field is conservative, and if so, find the potential function. Determine if a line integral is independent of path. Apply line integrals and surface integrals to solve applied problems. Use the Fundamental Theorem of Line Integrals, Green's Theorem, the Divergence Theorem, and Stokes's Theorem to evaluate various integrals.

Assessment Method: Locally developed exams
Performance Criteria: Passing grade with a score of 70% or better

Vector-Valued Functions, Lines, and Surfaces in Space
Evaluate the derivative and integral of a vector-valued function. Demonstrate the ability to graph lines, planes, and surfaces in space and the ability to determine their equations when given sufficient information. Determine the length of a curve in space, and the curvature of a curve at a point using the unit tangent vector and the principal unit normal vector.

Assessment Method: Locally developed exams
Performance Criteria: Passing grade with a score of 70% or better

Outline:

Vector-Valued Functions, Lines, and Surfaces in SpaceDifferential Calculus of Several VariablesIntegral Calculus of Several VariablesVector Calculus