Norwalk Community College
Learning Outcomes for MAT 268 – Calculus III

After completing Calculus III, the student should be able to:

- Write vectors in component form and as linear combinations of standard unit vectors.
- Add and subtract vectors algebraically and graphically.
- Find the dot and cross products of two vectors and the triple product of three vectors.
- Find the angle between two vectors and the direction cosines of a vector in space.
- Find the projection of one vector onto another vector.
- Write the parametric and symmetric equations of a line in space.
- Find the distance between two objects in space (points, lines, and planes).
- Solve application problems involving velocity, force, and work.
- Find limits, derivatives, and integrals of vector-valued functions.
- Solve applications problems using vector-valued functions, including projectile motion.
- Find the unit tangent vector and principal unit normal vector to a curve at a point.
- Find the tangential and normal components of acceleration.
- Find the arc length and curvature of a plane curve or space curve.
- Convert among rectangular, cylindrical, and spherical coordinates.
- Write the equations of surfaces in rectangular, cylindrical, and spherical form.
- Determine if a function of several variables is continuous or differentiable.
- Find the partial derivatives of a function of several variables and use the chain rules.
- Apply approximation techniques to functions of several variables using differentials.
- Find the directional derivative and gradient of a function of several variables.
- Find the equation of the tangent plane and normal line to a surface at a point.
- Find the absolute extrema of a function of several variables.
- Solve optimization problems involving functions of several variables.
- Use the method of Lagrange Multipliers to solve optimization problems.
- Evaluate double and triple integrals as iterated integrals.
- Find the area or volume using double or triple integrals.
- Determine if a vector field is conservative and find a potential function.
- Find the divergence and curl of a vector field.
- Find a set of parametric equations of a surface in space.
- Evaluate line integrals, surface integrals, and flux integrals.
- Apply the Divergence Theorem and Stokes' Theorem to evaluate line integrals or flux integrals.