**MATH 140**

(GQ) **Calculus With Analytic Geometry I** (4) Functions, limits; analytic geometry; derivatives, differentials, applications; integrals, applications.

Students may only take one course for credit from MATH 110, 140, 140A, 140B, and 140H.

**Prerequisite:** MATH 022, MATH 026; or MATH 040 or MATH 041 or satisfactory performance on the mathematics proficiency examination

**Topics**

**Limits**

Tangent & Velocity Problems

Limit of a function

Calculating limits using properties of limits and/or limit laws

Continuity (including the Intermediate Value Theorem)

**Derivatives**

Limit definition of the derivative (including the definition and concept of differentiability and the derivative as a function)

Differentiation Formulas

Rates of Change in the Natural & Social Sciences

Derivatives of Trigonometric Functions

Chain Rule

Implicit Differentiation

Higher Order Derivatives

Related rate problems

Linear approximations and Differentials
Applications of Differentiation

Maximum and Minimum Values: Local (relative) and global (absolute) extrema and the Extreme Value Theorem

Mean Value Theorem

Local extrema and inflection points

Asymptotes and limits at infinity

Curve sketching

Optimization Problems

Integration

Antiderivatives

Limit definition of area under a graph

Definite Integral

Fundamental Theorem of Calculus

Substitution method of integration

Applications of Integration

Area Enclosed By Two Graphs

Volumes of rotation-Disk method

Volumes of rotation-shell method